



MICROPLANNING MANUAL FOR MALARIA ELIMINATION IN THE REGION OF THE AMERICAS

Version for field personnel

PAHO



Pan American
Health
Organization



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Americas

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Washington, D.C.

2023

Microplanning Manual for Malaria Elimination in the Region of the Americas. Version for field personnel

ISBN: 978-92-75-12802-2 (PDF)

ISBN: 978-92-75-12803-9 (Print version)

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Suggested citation: Pan American Health Organization. *Microplanning Manual for Malaria Elimination in the Region of the Americas. Version for field personnel*. Washington, D.C.: PAHO; 2024. Available from: <https://doi.org/10.37774/9789275128022>.

Cataloguing-in-Publication (CIP) data: Available at <http://iris.paho.org>.

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TABLE OF CONTENTS

| | |
|---|----|
| Abbreviations | 6 |
| 1. Introduction | 7 |
| 2. Conceptual framework | 8 |
| 3. Stratification | 12 |
| 4. Microplanning | 15 |
| 5. Malaria management in operational units | 21 |
| Annex. Microplan example | 26 |
| | |
| Tables | |
| Table 1. Components for eliminating transmission foci | 11 |
| Table 2. Malaria interventions: Generic activities by stratum | 12 |
| Table 3. Delimitation and characterization of operational units | 17 |
| Table 4. Microplanming | 20 |
| Table 5. Focus management actions | 22 |
| | |
| Figures | |
| Figure 1 Diagram of the DTI-R Strategy | 9 |
| Figure 2. Classification of malaria foci | 15 |
| Figure 3. Example of the division of a municipality into operational units (foci or microareas) for malaria elimination | 19 |

ABBREVIATIONS

| | |
|-------|---|
| DTI-R | Diagnosis, treatment, investigation, and response |
| IRS | Indoor residual spraying |
| LLIN | Long-lasting insecticidal nets |
| PAHO | Pan American Health Organization |
| RDT | Rapid diagnostic tests |
| WHO | World Health Organization |

1. INTRODUCTION

The purpose of this manual is to provide guidance on how to implement Pan American Health Organization (PAHO) recommendations for malaria elimination at the local level. It is a streamlined, more operational version of the *Manual for Stratifying Malaria Risk and Elimination of Foci*, aimed primarily at operational teams working in the field. The content has been prioritized and the steps of the process organized to facilitate greater understanding by local teams. Adjustments have also been made to underscore its versatility for all malaria transmission scenarios in the Region of the Americas.

The adopted approach (which can be adapted to any transmission scenario) is based on microplanning to achieve malaria elimination. In countries with very few cases, microplanning addresses active foci, which are usually small, while ensuring adequate surveillance across the rest of the territory. In countries where transmission is still widespread (endemic areas of South America, certain countries in Central America, and Haiti) the approach is to divide territories into operational units: in these 'microterritories', foci, or 'microareas', interventions can then be tailored to interrupt transmission.

Malaria elimination is a field operation in which the geographical scope must be clearly defined. This handbook calls for recognition of the importance of establishing operational units for interventions aimed at malaria elimination.

2. CONCEPTUAL FRAMEWORK

Shifting from a malaria control to a malaria elimination strategy requires a rigorous exercise in microepidemiology and in the organization of malaria operations at the local level. It is necessary to establish an operational unit or microterritory with a team responsible for it, as well as an operational design based on local malaria transmission dynamics. Such an elimination strategy is adapted to the local context in order to turn active malaria foci into eliminated foci and thus consolidate all transmission-free territories.

HOW IS MALARIA ELIMINATED?

Consolidating an ever-increasing number of malaria-free territories by turning all active foci into eliminated foci.

In order to transition from a malaria control to a malaria elimination strategy, the definition, characterization, and approach of operational units must be established. Foci or microareas are the epidemiological and operational units in which program interventions are implemented. Although standardized at the national level, interventions must first and foremost be based on the transmission dynamics at the local level.

In this regard, PAHO promotes a strategy based on timely diagnosis, treatment, investigation, and response (DTI-R).

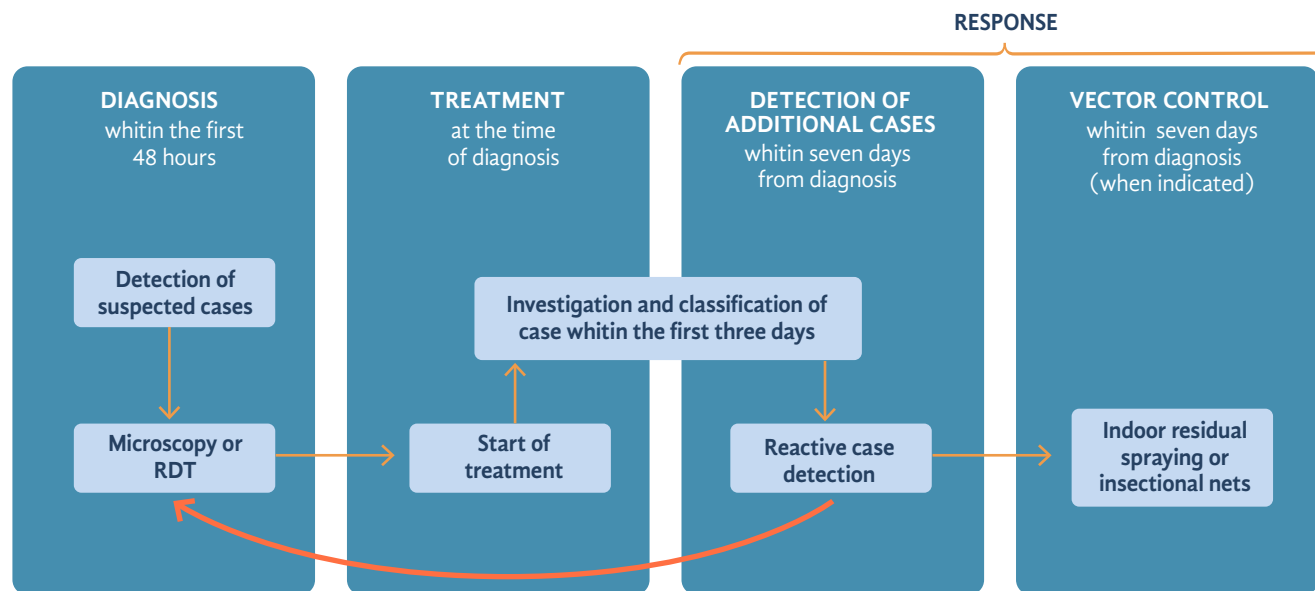
WHY IS EARLY TREATMENT SO IMPORTANT FOR MALARIA ELIMINATION?

Humans with malaria are the only reservoirs for the parasite. Therefore, the sooner the person is treated, the less likely it is that mosquitoes will become infected when they bite an infected person.

The DTI-R strategy (Figure 1) consists of four components:

1. **Diagnosis:** Every suspected malaria case should be diagnosed by microscopy or RDT within 48 hours from symptoms onset.
2. **Treatment:** Appropriate treatment according to national protocols should be available for all confirmed cases, beginning on the same day of diagnosis.
3. **Investigation:** Each case should be investigated and classified within three days from diagnosis to determine the response actions.
4. **Response:** Each case or cluster of cases should trigger basic actions involving timely detection and treatment of other cases (reactive detection) within seven days from diagnosis.¹ Reactive vector control activities, in addition to proactive or routine activities, especially long-lasting insecticidal nets (LLIN) and indoor residual spraying (IRS), form part of the integrated response to the malaria focus, as applicable.²

Figure 1. Diagram of the DTI-R Strategy



Note: RDT: Rapid Diagnostic Tests.

Source: Pan American Health Organization. Manual for stratifying malaria risk and the elimination of foci. Washington, D.C.: PAHO; 2022. Available at: <https://iris.paho.org/handle/10665.2/58253>.

- 1 Reactive case detection is mentioned in the WHO's *A framework for malaria elimination* and the *Pan American Health Organization's Malaria surveillance, monitoring, and evaluation: a reference manual*. Contact tracing is a common intervention in the control of infectious disease. However, it is important to note that no studies have evaluated the efficacy of reactive (or proactive) detection in interrupting malaria transmission. See World Health Organization. *A framework for malaria elimination*. Geneva: WHO; 2017. Available at: <https://www.who.int/publications/item/9789241511988>; Pan American Health Organization. *Malaria surveillance, monitoring & evaluation: a reference manual*. Washington, D.C.: PAHO; 2017. Available at: <https://www.paho.org/en/documents/malaria-surveillance-monitoring-evaluation-reference-manual-2018>.
- 2 While vector control actions are included as a key response element following detection of transmission in an area, the primary form of intervention consists of systematic actions, especially the use of insecticidal nets (LLIN) or indoor residual spraying (IRS), planned proactively according to risk stratification.

The DTI-R strategy is based on individual care that becomes a collective preventive measure which gains further importance when the entire malaria health care network applies it on a large scale. Essentially, DTI-R is about achieving early diagnosis and treatment, as well as a call to detect and prevent any further cases from each detected case. The purpose of this manual is to organize these DTI-R interventions into operational units, called foci or 'microareas'.

WHAT IS DTI-R?

It is a strategy that seeks to ensure that communities have access to malaria diagnosis and treatment in the shortest possible time and that, once a case is detected, appropriate actions are taken to detect any further new cases.

Four components are proposed for the elimination of transmission foci (Table 1). These should be understood as a cycle or a dynamic process that must be continually adjusted based on the transmission dynamics. The starting point is to delimit and characterize the operational units (foci or microareas). This includes formulating hypotheses that explain transmission in that microterritory. Based on this analysis, the basic detection and treatment intervention (DTI-R microplanning) is designed, which essentially consists of organizing the diagnostic and treatment network in the territory. The actual implementation of the DTI-R is the third component, which must be supported by a fourth element, ongoing monitoring and analysis (focus management). This will introduce new elements to the delimitation and characterization of the operational units, bringing us back to the beginning of a new cycle, in a continuous exercise of operational adjustments.

Table 1. Components for eliminating transmission foci

| Component | Element | Objective |
|--|--|---|
| 1. Delimitation and characterization of operational units ↓ | <ul style="list-style-type: none"> • Delimitation of operational units (foci or microareas). • Analysis of foci transmission dynamics. • Characterization of the health care network at the local level (micronetwork) (gaps, barriers, and needs). • Formulating hypotheses on transmission, how transmission is maintained, the social dynamics determining transmission, and, consequently, the key factors to combat transmission. | Generate the necessary inputs to organize diagnosis, treatment, and investigation activities (micronetworks) as well as the response. |
| 2. Microplanning: organization of diagnosis, treatment, investigation, and response actions ↓ | <ul style="list-style-type: none"> • Emphasis on organizing passive detection. • Direct, guide, and stimulate demand. • Liaise with various actors in the micronetwork. • Optimize active detection. • Optimize vector control measures for adult mosquitoes. • Dynamic exercise with weekly cycles to analyze and reorganize actions. • Local supervision model. | Implement a local model for surveillance and case management to diagnose within 48 hours, same-day treatment, and appropriate investigation and response. |
| 3. Implementation of DTI-R actions in foci ↓ | <ul style="list-style-type: none"> • Detection, diagnosis, and treatment in health posts and the community. • Stimulate and guide demand. • Data recording and reporting. • Active case detection and investigation. • Vector control activities. | Implement the local model or network to detect, diagnose, treat, investigate, and undertake vector control actions. |
| 4. Management and supervision of operations, analysis. Return to component 1 and continue with cycle. ↓ | <ul style="list-style-type: none"> • Supervision • Management of supplies • Training of personnel in network • Data analysis | |

Note: DTI-R: diagnosis, treatment, investigation, and response.

Source: Adapted from Pan American Health Organization. Manual for stratifying malaria risk and the elimination of foci Washington, D.C.: PAHO; 2022. Available at: <https://iris.paho.org/handle/10665.2/58253>.

HOW IS DTI-R ORGANIZED IN A TERRITORY WITH MALARIA?

By **delimiting** and **characterizing the operational units**, and **microplanning** (organizing the case detection and treatment network, and the local team responsible for supporting that network).

3. STRATIFICATION

The World Health Organization (WHO) defines malaria risk stratification as the “classification of geographic areas or localities according to factors that determine receptivity and vulnerability to malaria transmission.”³ Receptivity is understood as an ecosystem’s capacity to allow malaria transmission, while vulnerability refers to the risk of importation of the parasite.

The proposed strata are:

- **Stratum 1.** Non-receptive.
- **Stratum 2.** Receptive, with no indigenous cases and no risk of importing the parasite. This includes eliminated foci, with no imported cases or no immigration from endemic territories.
- **Stratum 3.** Receptive, with no indigenous cases but with risk of importing the parasite. This includes eliminated foci, with imported cases or with immigration from endemic territories.
- **Stratum 4.** Receptive, with indigenous cases. This includes active and residual foci. This stratum should, in turn, be subdivided into areas with fully established transmission and areas with very low transmission (strata 4A and 4B), so that intensified surveillance actions can be targeted in the latter to accelerate elimination.⁴

Table 2 presents the main DTI-R actions according to the different strata into which localities, foci/microareas, or municipalities are classified.

Table 2. Malaria interventions: generic activities by stratum

| Component | Stratum 1 (non-receptive) | Stratum 2 (receptive, no risk of importing parasite) | Stratum 3 (receptive, with risk of importing parasite) | Stratum 4 (4-A and 4-B-local transmission: active and residual foci) |
|---|--|--|---|---|
| Systematic or routine vector control | NA | NA | Routine vector control (in prioritized localities or based on increased receptivity or vulnerability) | Routine vector control with high coverage of the at-risk population (LLIN or IRS) |
| Passive detection | Passive detection with diagnosis available in reference health units of local networks | Passive detection with diagnosis available in reference health units of local networks | Passive detection with diagnosis available at local levels and in transit and migration areas | Passive detection with diagnosis available in localities with transmission and according to transmission dynamics |
| | NA | NA | Information, education, and communication (IEC) to stimulate demand | IEC to stimulate demand |
| | Training of health personnel | Training of health personnel | Training of health personnel | Training of health personnel |

³ World Health Organization. WHO Malaria Terminology: 2021 Update. Geneva: WHO; 2021. Available at: <https://www.who.int/publications/item/9789240038400>.

⁴ For example, a 4A stratum might include areas with three or fewer than three cases per epidemiological week per investigation team and a 4B stratum would include those with more than three cases.

| Component | Stratum 1 (non-receptive) | Stratum 2 (receptive, no risk of importing parasite) | Stratum 3 (receptive, with risk of importing parasite) | Stratum 4 (4-A and 4-B-local transmission: active and residual foci) |
|---|---|--|--|---|
| Proactive detection | NA | NA | <ul style="list-style-type: none"> Proactive case detection (mobile and migrant population) Fixed scheduled actions (e.g., one per month) or more specific actions based on changes in vulnerability | <ul style="list-style-type: none"> Proactive case detection Periodicity: e.g., one or two per month |
| Timely reading of slides | Reading slides within 48 hours from sample collection | Reading slides within 48 hours from sample collection | Reading slides within 48 hours from sample collection | Reading slides within 24 hours from collection |
| Diagnostic quality control | Direct control, indirect control, training, and supervision | Direct control, indirect control, training, and supervision | Direct control, indirect control, training, and supervision | Direct control, indirect control, training, and supervision |
| Location of cases | NA | NA | NA | <ul style="list-style-type: none"> Georeferencing of localities with cases Mapping of major characteristics of foci |
| Treatment and follow-up of cases | Treatment available in reference health units of local networks | Treatment available in reference health units of local networks | Treatment available at local levels and in transit and migration areas | Treatment available at all points of diagnosis |
| | Early treatment (starting within 24 hours from diagnosis) | Early treatment (starting within 24 hours from diagnosis) | Early treatment (starting within 24 hours from diagnosis) | Early treatment (within 48 to 72 hours from symptom onset) |
| | Follow-up of all cases | Follow-up of all cases | Follow-up of all cases | Follow-up of all cases (if there are many cases, adherence to treatment should be based on appropriate guidance and partial supervision) |

| Component | Stratum 1 (non-receptive) | Stratum 2 (receptive, no risk of importing parasite) | Stratum 3 (receptive, with risk of importing parasite) | Stratum 4 (4-A and 4-B-local transmission: active and residual foci) |
|---|---|--|--|---|
| Investigation of cases, foci, and response | Investigation of all cases | Investigation of all cases | Investigation of all cases | Investigation of all cases and foci or microareas (if there are many cases, differentiate only between local and imported cases at the point of diagnosis, without going to the locality to complete the case investigation) |
| | Reactive case detection | Reactive case detection | Reactive case detection | Reactive case detection (when there is an index case or cluster of cases) |
| | NA | Entomological surveillance when a case is detected | Entomological surveillance when a case is detected | Entomological surveillance (foci investigation) to guide vector control as needed |
| | NA | Vector control (LLIN or IRS) in response to a case (if vectors are found) | Vector control (LLIN or IRS) in response to a case (if vectors are found) | Vector control (LLIN or IRS) in response to a case, in situations of very few cases, and in localities not covered by vector control |
| Routine entomological surveillance | NA | NA | Entomological surveillance at sentinel sites | Entomological surveillance at sentinel sites |
| Malaria risk surveillance | NA | Monitoring the influx of people from endemic areas and factors influencing receptivity (irrigation, deforestation, etc.) | Monitoring the influx of people from endemic areas and factors influencing receptivity (irrigation, deforestation, etc.) | Monitoring the influx of people from endemic areas and factors influencing receptivity (irrigation, deforestation, etc.) |
| Information systems and data analysis | Mandatory reporting of confirmed cases, record of diagnoses made, and weekly analysis | Mandatory reporting of confirmed cases, record of diagnoses made, and weekly analysis | Mandatory reporting of confirmed cases, record of diagnoses made, and weekly analysis | Mandatory reporting of confirmed cases, record of diagnoses made, and weekly analysis |

Note: DTI-R: diagnosis, treatment, investigation, and response; IEC: information, education, and communication; NA: not applicable; LLIN: long-lasting insecticidal nets RDT: rapid diagnostic tests; IRS: indoor residual spraying.

Source: Adapted from Pan American Health Organization. Manual for stratifying malaria risk and the elimination of foci. Washington, D.C.: PAHO; 2022. Available at: <https://iris.paho.org/handle/10665.2/58253>.

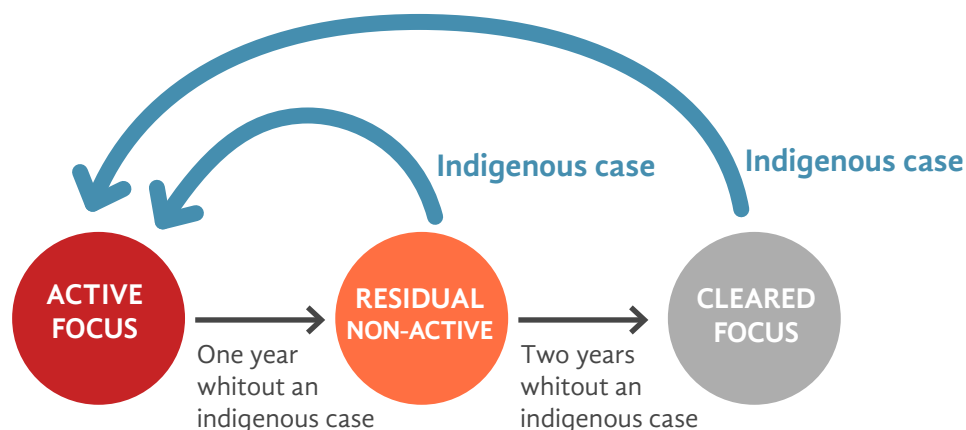
4. MICROPLANNING

Characterizing the operational units is an exercise of local epidemiological analysis (microepidemiology) aimed at organizing malaria actions across the microterritories. This consists primarily of delimiting and characterizing the operational units (foci or microareas) and understanding the main factors, the dynamics that determine transmission in that microterritory and the key aspect to organizing the interventions.

The WHO proposes three types of foci (Figure 2):

- **Active:** indigenous cases have been detected within the current calendar year.
- **Residual non-active:** the last indigenous case was detected in the previous calendar year or up to three years earlier.
- **Cleared:** no indigenous cases for three years or more.⁵

Figure 2. Classification of malaria foci



Source: Adapted from Pan American Health Organization. Manual for stratifying malaria risk and the elimination of foci. Washington, D.C.: PAHO; 2022. Available at: <https://iris.paho.org/handle/10665.2/58253>.

This manual uses the concept of a focus in terms of an operational approach (based on operational units) to delimit an area or a sector composed of localities—or neighborhoods in urban areas—(microareas) that should be addressed jointly because of their geographical proximity, epidemiological links, sharing the same transmission dynamics, and the operational advantages of being covered by the same field team.

The focus or microarea may include an entire sector where localities are linked by population mobility (e.g., an entire sector of a municipality with farms and localities where workers move from farm to farm and between population centers). In situations where transmission is still very widespread, foci tend to be more extensive and may even, in some cases, correspond to the internal administrative division of municipalities (parish, village, or communal sector, among others) or to the territories established in primary health care micronetworks. Access roads can also guide the delimitation of operational units. In territories where access is primarily by river, a focus could include all localities located along the riverbank; or in rural areas where populations only inhabit lands along access roads, it could include population centers that extend

⁵ World Health Organization. A framework for malaria elimination. Geneva: WHO; 2017. Available at: <https://www.who.int/publications/item/9789241511988>.

along these roads. Gradually as transmission is interrupted, this operational unit (active focus) could be reduced to one or more localities (e.g., a gold mine and the location where miners spend the night or carry out their economic activities). In either case, a microterritory must be established where anti-malaria operations are based on a permanent exercise of microepidemiology that can be adapted, planned, and supervised. This is the fundamental change when transitioning to malaria elimination.

Table 3 summarizes the four steps in the delimitation and characterization of operational units, the main aspects of which are detailed below:

- **Step 1:** Determine the distribution of cases across the territory, identifying localities and clusters of localities with ongoing transmission.
- **Step 2:** Understand population determinants that affect or may affect malaria transmission: relations between communities, distances, and population movement routes, as well as factors that determine transmission (e.g., whether transmission is due to the arrival of imported cases or a very closed community where transmission continues; whether transmission is conditioned by economic activity or perpetuated by relapses due to *P. vivax*). In this step, a hypothesis about the transmission must be established, as well as the related social dynamics and key elements impacting it.
- **Step 3:** Characterize the territory according to the organization of the DTI-R. This involves analyzing the network, how diagnostic points (microscopy and RDTs) are distributed and if appropriately located, if there are any gaps, delays between sample collection, slide reading, and starting treatment, and barriers communities face in accessing malaria diagnosis. It also requires an analysis of the structure of the local field team available to cover the territory and its distribution, as well as analyzing vector control needs and coverage.
- **Step 4:** Delimit the operational units (foci or microareas) and organize the local team to cover these microareas according to the factors that determine the transmission and logistics of the operation (analysis of steps 1, 2, and 3). Microareas are defined based on: a) the proximity between localities, b) whether they share the same transmission dynamics, c) the relationships between populations and common access routes, and d) how the territory is divided into sectors for surveillance and service delivery.

Table 3. Delimitation and characterization of operational units

| Step | Information | Activity |
|---|--|--|
| 1 Analysis of the epidemiological situation in the selected area (municipality, region) | <ul style="list-style-type: none"> • Malaria cases by locality. • Transmission dispersion. • Localities with ongoing transmission. • Localities with sporadic transmission. • Key localities in the spread of transmission. | <p>In the municipality or administrative unit</p> <ul style="list-style-type: none"> • Review case records. • Analyze available maps and sketches. • Interview health team in charge. • Available entomological information. |
| | <ul style="list-style-type: none"> • Malaria transmission in localities. • How transmission relates to other localities. • How transmission relates to other foci. • How transmission relates to imported malaria. • How occupational activities relates to household transmission. • Economic activities and other aspects of social and cultural dynamics related to transmission. • Health care network: sectorization and organization of the local health network. | <p>In the localities</p> <ul style="list-style-type: none"> • Visit sectors with the highest number of cases, those identified as hot spots. • Interview affected persons or relatives in sectors with the highest number of cases (origin of cases, access to diagnosis). • Interview community agents (review of records, instruments, transmission dynamics, times between symptom onset, diagnosis, treatment, and investigation). • Reactive case detection, active detection (criteria). • Visit main points recognized as anopheline breeding sites. |
| 2 Analysis of transmission dynamics and formulation of transmission hypotheses | <ul style="list-style-type: none"> • Formulation of a hypothesis about transmission dynamics. | |
| | <ul style="list-style-type: none"> • Location of microscopy stations. • Location of rapid testing sites. • Number of microscopists and volunteers. • Access to diagnostic posts in each locality. • Operational model of diagnostic process. • Location of volunteer workers, their distribution, roles, supervision strategy, and access to localities. • Cultural aspects that may limit access and the opportunity for diagnosis. • Time between symptom onset and diagnosis. | <p>In the municipality:</p> <ul style="list-style-type: none"> • Interview the health team. • Analyze maps or sketches with location of posts. • Analyze distances and care routes. • Review laboratory records. <p>In the localities:</p> <ul style="list-style-type: none"> • Interview the community agent. • Review community agent records. • Interview patients, family, and other community members. |
| | <ul style="list-style-type: none"> • Time from diagnosis to treatment • Availability of medications. • Prescription and dispensing conditions*. • Measures to ensure treatment adherence. • Management of supply inventories. • Cultural aspects that can limit the timeliness and quality of treatment. | <ul style="list-style-type: none"> • Interview the health team. • Review treatment records if available. • Review available medicines. • Inventory records. |
| 3 Analysis of the health network and malaria operation in each microarea | <ul style="list-style-type: none"> • Reactive case detection: coverage and timeliness. • Coverage by vector control interventions. • Cultural or other aspects that limit access to and use of vector control interventions. | <ul style="list-style-type: none"> • Interview the health team. • Review records if available. |

| Step | Information | Activity |
|------------------------------|--|--|
| 4 Delimitation of microareas | <ul style="list-style-type: none"> • Delimitation of foci, identification of localities that make up a focus. • Organization or appointment of the local team to supervise and cover the foci. | <ul style="list-style-type: none"> • Analysis of data obtained in components 1, 2, and 3. |
| 5 Expected results | <ul style="list-style-type: none"> • Delimitation of operational units (foci or microareas). • Identification of key social and ecological aspects linked to transmission. • Formulation of transmission hypotheses to guide improvements in the DTI-R strategy. • Identification of gaps in the DTI-R strategy. • Identification of network strengthening needs (location of diagnostic posts, improvements in detection processes and routes, and in DTI-R). • Proposals to optimize passive and active case detection. • Identification of key cultural aspects that need to be taken into account for the implementation of the DTI-R strategy in communities. | |

Note: *Refers to knowledge of treatment protocols, patient counselling when prescribing medications (e.g., the importance of primaquine adherence), calculation of doses by weight, and delivery of medications in appropriate packaging, among others.

DTI-R: diagnosis, treatment, investigation, and response.

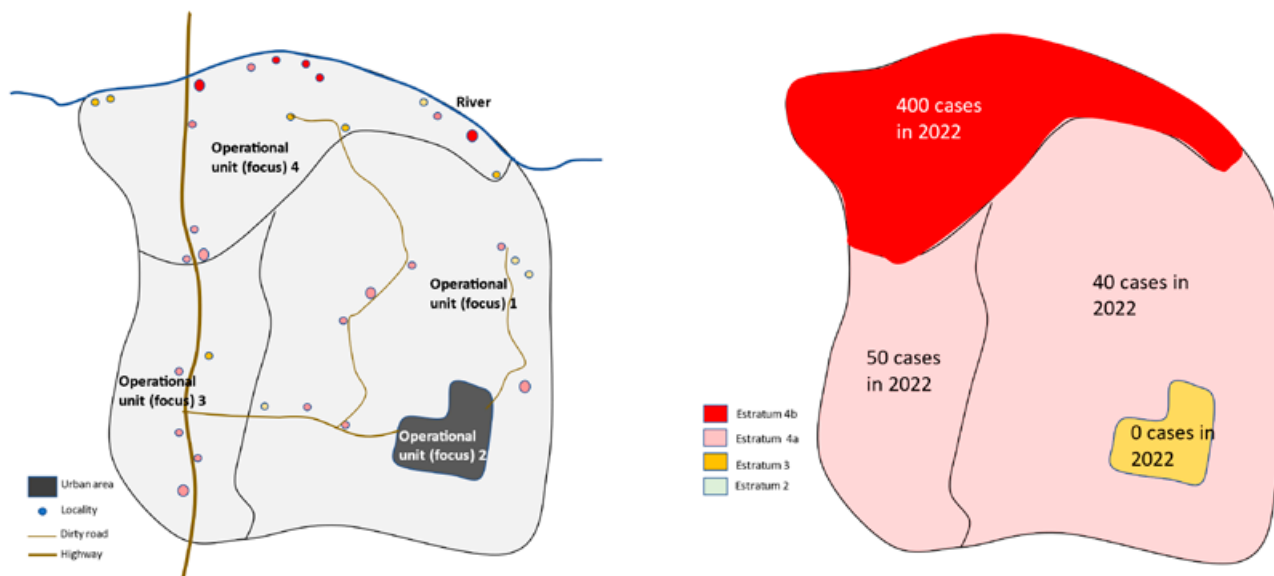
Source: Adapted from Pan American Health Organization. Manual for stratifying malaria risk and the elimination of foci. Washington, D.C.: PAHO; 2022. Available at: <https://iris.paho.org/handle/10665.2/58253>.

Once the operational units have been delimited and characterized, the next step is to classify the units (foci or microareas) and the localities in each as active, residual, cleared foci or areas without risk (strata 1, 2, 3, and 4). This makes it possible to implement the package of interventions and surveillance activities established in national regulations for each stratum in each operational unit (focus or microarea) (Table 2). This approach operationalizes national malaria norms and helps to select actions that can be adapted to the local context. Table 2 presents the different DTI-R activities for each stratum. The ultimate goal of stratification is to determine the interventions required by each epidemiological situation.

By classifying foci into their respective strata, the corresponding municipality (district or commune) or administrative unit can also be assigned to the same stratum. The municipality must be assigned the highest stratum in which one or more localities or foci within its territory have been classified. For example, a municipality with transmission in a single focus will be classified as stratum 4; it can only be considered without transmission (stratum 3) when no locality is classified as stratum 4. The same principle applies at the national level. A country is still considered endemic even if transmission is limited to a single municipality. Within the municipality, however, interventions will be planned according to the stratum into which the foci or microareas have been classified.

The exercise of delimiting and characterizing the operational units will contribute to the national malaria risk stratification process, which is usually carried out at the central level. Typically, national stratification is based on desk data, preceding local field work. However, stratification is actually a two-way exercise: the process of delimitation and characterization of operational units at the local level enables the central level to define the stratum of the respective administrative units of the country (municipalities, districts, communes, or cantons, among others).

Figure 3. Example of the division of a municipality into operational units (foci or microareas) for malaria elimination



Note: The example is applicable to any administrative decentralization unit in the country (district, commune, canton, etc.).

Source: Authors.

Once the operational units (foci or microareas) have been delimited and characterized, the next stage is to plan or reorganize the network and the local model to implement the DTI-R. This microplanning involves defining the DTI-R network based on transmission dynamics, access routes and existing barriers to access diagnostics, the structure of the service network, and the existing actors. The stratum to which the focus belongs (Table 2) will determine the type of actions required and the intensity of surveillance. Microplanning also establishes the health team in charge of the territory and the network surveillance, supervision, and support actions.

In addition to DTI-R actions, microplanning should determine which localities in the microarea are already covered by planned LLIN or IRS interventions. Understanding that the implementation of vector control usually requires a higher management level, the planning of such actions, as well as related entomological surveillance actions, may fall under the responsibility of the vector control plans of the higher instance (municipality, district, department, or region). Such planned actions constitute the main aspect of vector control in the elimination of foci and should be differentiated from the DTI-R's reactive vector control actions, which should be understood as more specific containment measures, relevant only in contexts of preventing malaria reintroduction.

Microplanning consists of establishing the actors and points where case detection, diagnosis, and treatment will be located (the location of microscopy or RDT health posts, community agents with RDTs, or agents who takes slides where RDTs are unavailable), as well as defining the routes between sample collectors and the microscopy stations (Table 4 describes the contents of microplanning). The microplan should also establish who is responsible for case investigation, reactive and proactive case detection, as well as the mechanisms for the distribution of medicines and diagnostic supplies, and information flows.

Table 4. Microplanning

| Component | Action |
|-------------------------------------|--|
| Passive detection | <p>Passive detection in communities: Who? Where?</p> <p>Passive detection in health units: Who? How?</p> <p>Diagnosis demand-stimulating actions in communities and neighborhoods: Who? How?</p> <p>Intensified suspicion of malaria in at-risk populations or groups.</p> <p>Role of other health agents (health promoters) in passive detection.</p> <p>Role of vector control personnel in passive detection.</p> <p>Compilation of microscopy slides to be read: flows, processes, managers.</p> |
| Diagnosis | <p>Location of microscopy stations.</p> <p>Location of RDT posts (includes community agents).</p> <p>Geographic coverage of microscopy points.</p> <p>Microscopy and RDT opening hours suitable for population.</p> <p>Microscopy slides flows for quality control and accountability.</p> <p>Distribution mechanism for microscopy and RDT supplies.</p> |
| Treatment | <p>Medicines delivery points (same diagnostic points).</p> <p>Medicines distribution mechanism and inventory management.</p> <p>Roles in case follow-up.</p> |
| Investigation and response | <p>Reactive case detection: Who? Where? How?</p> <p>Proactive case detection: Who? Where? When?</p> <p>Case investigation: Who? Where?</p> |
| Routine vector control | <p>Localities that must be covered with LLIN.</p> <p>Localities that must be covered with IRS.</p> <p>Control of mosquito breeding sites: Where? What?</p> |
| Data analysis and management | <p>Information flows of cases.</p> <p>Information flows of persons tested.</p> <p>Roles on case reporting (entering data on the electronic platform).</p> <p>Roles and routines in case analysis.</p> |

Note: LLIN: long-lasting insecticidal nets; RDT: rapid diagnostic tests; IRS: indoor residual spraying.

Source: Authors.

The microplan should be brief and concise (e.g., one page). Rather than planning activities, it should outline the precise structure and operations needed to implement the DTI-R in the microarea. Local (e.g., district-level) teams should be responsible for developing the microplan, as they have the best knowledge of the context of each microarea. This exercise is dynamic so should be updated according to the needs and changes in the operations of the network, flows, routes, roles, and functions.

WHAT IS A MICROPLAN?

It is NOT a document, a list of activities, or a budget.

It IS a structure; an operational model; a work routine; a description of flows, routes, roles, and functions.

5. MALARIA MANAGEMENT IN OPERATIONAL UNITS

When organizing actions to combat malaria in foci or microareas, a responsible team must be established, along with clear functions and tasks to implement and supervise the microplan activities. The main result of microplanning should be to define the structure of the malaria diagnosis and treatment network, and of the team responsible for the core activities of the malaria health units or posts. The functioning of this network also requires supervision, adequate supplies, analysis, epidemiological investigation, and training. This support is just as important as the core activities of the DTI-R itself at the point of care. The ongoing analysis of information is the essence of the operation. Equally important is the supply of medicines, and direct supervision of posts and collaborators.

It is also necessary to have a team responsible for coordinating the operation in each operational unit (focus, microarea, sector, or other basic operational unit within which the intervention is organized). This sectorization of the territory and the assignment of responsibilities is a key part of the operational changes aimed at transforming active malaria foci into eliminated foci. In most endemic countries of the Region of the Americas, responsibility for managing this is generally shared among the primary health care network, epidemiology services, and vector-borne disease programs, and these responsibilities have generally been decentralized. Table 5 provides a summary of the main tasks of the malaria team in the focus.

Table 5. Focus management actions

| Action groups | Focus management actions |
|--|--|
| Monitoring DTI-R actions by local team | Supervise and support the installation of new detection and diagnostic points. |
| | Supervise and train health unit personnel and community agents in malaria suspicion, diagnosis, and treatment. |
| | Supervise and coordinate reactive case detection (DTI-R) and case investigation actions. |
| | Plan, monitor, and evaluate proactive case detection actions. |
| Managing supplies | Ensure antimalarial supplies and monitor stocks. |
| | Coordinate the supply and stock of rapid tests and microscopy. |
| Coordination with other bodies (municipality, region), including vector control | Eliminate barriers and resolve health care problems in health units. |
| | Supervise and control the quality of the activities carried out by microscopists by the corresponding reference instance in the network. |
| | Manage microscopy solutions (points, equipment, microscopists). |
| | Manage involvement of the community, the private sector, and other actors. |
| | Organize and execute foci investigation actions. |
| | Coordinate the planning, execution, and supervision of entomological surveillance actions. |
| Support with data management and analysis | Coordinate interventions with IRS, LLIN, and larval source management activities. |
| | Analyze detection indicators (cases tested, positivity) and gaps in access to diagnosis. |
| | Monitor data quality and case classification. |
| | Monitor and correct errors in the case and person examined information process (data recording, reporting, flow). |
| | Routine weekly analysis on the main operational variables. |

Source: Authors.

Data management and analysis

Data analysis provides the intelligence for a malaria operation and is among the functions of the local team. The operation must be analyzed at the level of the operational unit (focus, microarea, or other type of operational sectorization as established by the respective model). Health personnel in the local team (health unit and volunteer collaborators) must gain the analytical skills needed to guide actions. Regardless of the malaria burden, front-line staff involved in the detection and reporting of cases should also be the primary users of the information. Whatever the local management model, one person should take on the role of coordinating the recording, reporting, and analysis of the data on the foci, including routine weekly analyses.

Minimum data to be generated and consolidated periodically by the operational unit to inform the DTI-R:

- Number of weekly cases by place of residence or probable place of infection, and by species.
- Number of weekly cases by place of diagnosis.
- Number of samples examined per week and positivity by locality⁶ or by diagnostic post (microscopy or RDT).
- Number of samples examined and positivity by type of detection (active or passive).
- Time between symptom onset, diagnosis, and treatment.
- Cases by age and special groups (pregnant women).

DTI-R supervision

The main monitoring activities consist of supervising detection and diagnostic points and other health units in the network, including:

- Ensuring adequate passive detection, malaria suspicion, and use of fever algorithms where malaria is part of differential by community agents and personnel of health units.
- Use of RDT by community agents and health units.
- Taking and sending slides, and managing related information.
- Prescribing treatment, counseling, patient follow-up, treatment monitoring.
- Availability of microscopy supplies and channeling of slides to the laboratory.
- Management of antimalarials, inventories, and other supplies such as RDTs.
- Information management (collection, entry, and analysis).
- Reactive detection and measures in response to the detection of cases or clusters requiring additional detection actions.

⁶ Locality can refer to a village, community, neighborhood, colony, etc.

SUPERVISION

Volunteers and other community actors should be monitored on an ongoing basis.

Decisions based on information analysis and supervision:

- Need for more diagnostic posts (expansion of the diagnostic and treatment network).
- Relocation of diagnostic posts.
- Changes in the hours diagnostic posts are open to the public.
- Workload distribution at the diagnostic posts.
- Need to increase detection of suspected malaria at detection points.
- Need to take actions to stimulate and guide demand among the population or to eliminate barriers in the management of febrile patients.
- Need for adjustments between passive and active case detection efforts.
- Need for training programs or other activities to enhance diagnostic capacity.
- Need for additional human resources to help with case investigation or treatment supervision activities.
- Need to increase support for the network of community workers and the services available at the health units in order to increase the provision of community health services.
- Need to improve data recording and information processes.
- Review prioritization of localities targeted for vector control. Review the need to adjust LLIN and IRS coverage.
- Need for actions to enhance the use and care of LLIN and the acceptance of IRS.

LOCAL MANAGEMENT CYCLE

The combination of local information analysis and supervision makes this approach a kind of cycle, since it is both the endpoint of the process and the starting point for delimitation and characterization of a focus. When shifting from a control to an elimination strategy, it is essential to recognize the need to constantly reformulate and readjust operations at the local level in response to changes in transmission dynamics.

Operations to combat malaria should not be viewed as a task to be performed, but as a problem to be solved. To this end, it is essential to use local information and have a team with the necessary interest and training to understand the problem and adapt the solutions accordingly.

ANNEX. MICROPLAN EXAMPLE

Microplanning the Las Claritas focus (operational unit): urban area and villages 1 and 2

Municipality: Las Claritas

Department: North Cajicá

43 localities. 22 localities with malaria transmission in the last three years (in red).

Structure of the network for passive, reactive, and active case detection

| Localities | Passive case detection | Reactive case detection | Proactive case detection |
|----------------------------|--|--|---------------------------------------|
| El Huerto district | Malaria microscopist | VBD inspector | VBD inspector |
| El Terminal | | | |
| El Arenal district | Las Claritas Hospital (microscopy) | Hospital | Hospital |
| Los Apóstol district | Health post | Health post | Health post |
| Central district | Health center | Health center | Health center |
| Finca La Oculta | CHW (locality La Oculta) (RDT) | CHW (locality La Oculta) VBD Team 1: other localities | VBD Team 1 (malaria microscopist) |
| Locality La Oculta | | | |
| Km 11 | | | |
| Km 9 | | | |
| Los Campesinos Cooperative | | | |
| Los Cerezos | CHW (Lo Cerezos) (RDT) | CHW | VBD Team 1 (RDT) |
| Finca La Hormiga | | | |
| Los Escondidos | | | |
| Caracol | | | |
| Las Claritas Corregimiento | CHW (Quebrada Larga) (RDT) | CHW (Quebrada Larga) VBD Team 1: other localities | VBD Team 1 |
| Quebrada Larga | | | |
| Las Delicias | | | |
| Finca Loma Alta | | | |
| Los Naranjos | | | |
| Los Mosquitos Site | Las Florez Health Post Microscopist | Las Florez health post (RDT) | VBD Team 2 Las Florez microscopist |
| La Molienda Site | | | |
| Las Florez I | | | |
| Las Florez II | | | |
| Km 18 | | | |
| Km 21 | | | |

| Localities | Passive case detection | Reactive case detection | Proactive case detection |
|---------------------------|------------------------|-------------------------|---------------------------------------|
| Finca La Platanera | | | |
| Finca Los Rodriguez | None | VBD Team 1 | VBD Team 1 |
| Finca Las Claritas | | | |
| El Arrozal | CHW | VBD Team 2 | VBD Team 2 Las Florez microscopist |
| El Molino | CHW | CHW | VBD Team 2 Las Florez microscopist |
| Carbonera I | | | VBD Team 2 |
| Carbonera II | Carbonera Health Post | VBD Team 2 | Las Florez microscopist |
| Las Minas | CHW | CHW | VBD Team 2 |
| Km 27 | | | |
| Km 29 | CHW (Km 29) | VBD Team 2 | VBD Team 2 |
| Km 30 | | | |
| Km 33 | | | |
| Km 35 | | | |
| La Lejura | | | |
| Quebrada Larga | None | VBD Team 2 | VBD Team 2 |
| Los Aguacates | | | |
| Finca El Rebentao | | | |

Note: CHW : community health workers; VBD: vector-borne diseases RDT: rapid diagnostic tests.

Information flows and reporting

| Place of recording | Place of notification (entered into electronic system) |
|----------------------------------|--|
| Hospital | Hospital |
| Localities covered by VBD Team 1 | Malaria microscopy point |
| Localities covered by VBD Team 2 | Las Florez health post |

Note: VBD: vector-borne diseases.

Supervision and supply of diagnosis points

| Supervisor | Supervised point |
|---------------|------------------------------------|
| VBD inspector | Malaria microscopist |
| | Las Claritas Hospital (microscopy) |
| | Health post |
| | Health center |
| VBD Team 1 | CHW (La Oculta) (RDT) |
| | CHW (Los Cerezos) (RDT) |
| | CHW (Quebrada Larga) (RDT) |
| VBD Team 2 | Las Florez health post (RDT) |
| | CHW El Arrozal |
| | CHW El Molino |
| | Carbonera Health Post |
| | CHW Las Minas |
| | CHW (Km 29) |

Note: CHW: community health worker; VBD: vector-borne diseases; RDT: rapid diagnostic tests.

VBD Team 1: **Jaime Montoya** and **Dennis Diaz**.

VBD Team 2: **Roberto Navarro** and **Cesar Gonzalez**.

All malaria-endemic countries in the Region of the Americas have taken on the challenge of eliminating the disease and taking actions to steer their health programs and strategies in that direction.

This simplified and more operational version of the *Manual for Stratifying Malaria Risk and the Elimination of Foci, aimed at field personnel*, provides guidance on how to implement basic malaria elimination activities. The proposed approach is to guide a transition in malaria operations towards a more foci-centered approach, with operations organized at the most local level.

This document is based on the need to identify and define operational areas (foci or microareas) where specific diagnosis, treatment, investigation, and response (DTI-R) interventions should be implemented. However, while these interventions may be standardized at the national level, they must be guided above all by a clear understanding of the transmission dynamics at local levels. A fundamental concept in the shift from a malaria control to a malaria elimination strategy is the need to constantly reformulate and adjust local operations in response to changes in transmission dynamics. Operations to combat malaria should not be viewed as a task to be performed, but as a problem to be solved. It is essential to have local information and a team with the necessary interest and training to clearly understand the problems and adapt the solutions accordingly.

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