A Malaria Elimination Guide to Targeted Surveillance and Response in High-Risk Populations

Module 1: Planning Targeted HRP Surveillance and Response

The Malaria Elimination Initiative

UCSF Institute for
Global Health
Sciences

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

shrinkingthemalariamap.org

Contents

Acronyms and Key Terms

Case, index	A case of which the epidemiological characteristics trigger additional active case or infection detection. The term "index case" is also used to designate the case identified as the origin of infection of one or a number of introduced cases.
Case, locally acquired	A case acquired locally by mosquito-borne transmission.
Case, imported	Malaria case (or infection) in which the infection was acquired outside the area in which it is diagnosed. In keeping with the WHO Surveillance operations manual, the origin of imported cases can be traced to a known malarious area outside of the elimination area to which the case has travelled.
Case investigation	Collection of information to allow classification of a malaria case by origin of infection (i.e., imported, indigenous, induced, introduced, relapsing or recrudescent).
Case notification	Compulsory reporting of all malaria cases by medical units and medical practitioners to either the health department or the malaria control program, as prescribed by national laws or regulations.
Catchment area	A geographical area defined and served by a health program or institution, such as a hospital or community health center, which is delineated on the basis of population distribution, natural boundaries and accessibility by transport.
Chemoprophylaxis	Administration of a medicine, at predefined intervals, to prevent either the development of an infection or progression of an infection to manifest disease.
Confirmed malaria case	Malaria case (or infection) in which the parasite has been detected in a diagnostic test (i.e., microscopy, a rapid diagnostic test or a molecular diagnostic test).
Focus group discussion (FGD)	A technique which uses in-depth group interviews amongst participants selected as part of a specific population. In the context of this Module, the specific population will be suspected or known HRPs or community members.
Formative assessment	A process by which different approaches are used to collect information to summarize what is known, believed and done in relation to populations at high risk of malaria.
High-risk population (HRP)	Sub-groups of people who share social, demographic, geographic or behavioral characteristics that place them at higher risk of malaria infection due to increased exposure to Anopheles mosquitoes. Examples include mobile and migrant populations, miners, forest workers, farmers, students studying outside at night, security guards, and cross-border travelers.
Importation rate	Number of malaria infections per unit time and per unit population that are brought into an area from another locality.
Incidence, malaria	Number of newly diagnosed malaria cases during a defined period in a specified population.

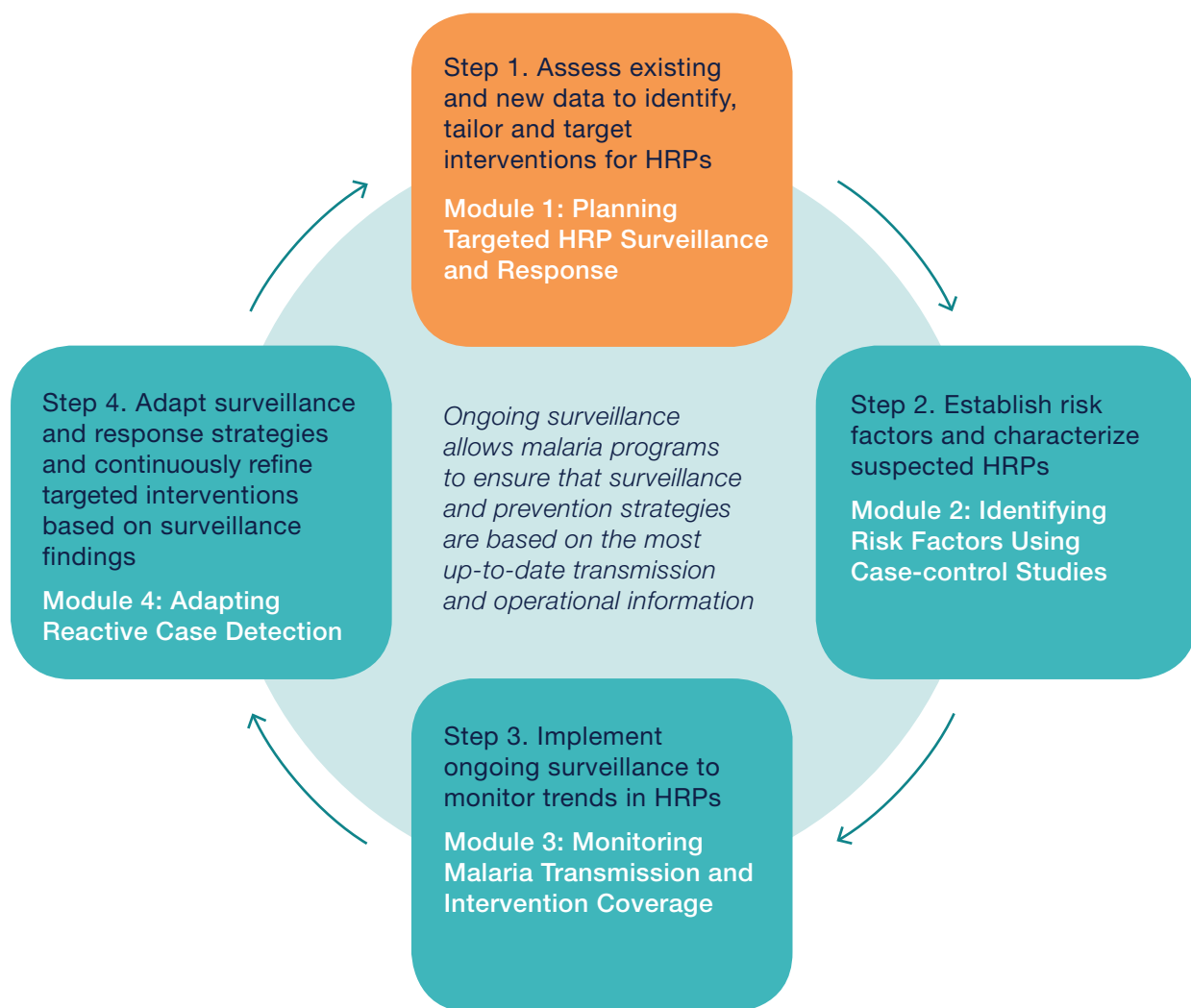|	
Key Informant Interview (KII)	An in-depth interview with a person, known as a Key Informant, selected for their perceived knowledge and expertise around a particular subject. In the context of this Module, the specific population would be suspected or known HRPs or community members and stakeholders.
Mobile and migrant population (MMP)	Persons who move from one area to another (whether internally or across international borders) for short period of time (mobile) or in changing their permanent residence (migrant). Defining time periods for this movement vary, but mobile populations are often defined as those that move within the last 6 months and migrant populations as those that have moved in the past 6-12 months.
National Malaria Program (NMP)	The national-level malaria program of the government, which may be called National Malaria Control Program or National Malaria Elimination Program.
Qualitative data	Descriptive data that typically describes the attributes of properties of an object and is not numerical in nature. This may include information from interviews, direct observation or written documents.
Reactive case detection	Screening and testing provided to a subset of a population in a given area in response to the detection of an infected person. Typically carried out around the index case household within a given radius.
Suspected malaria case	Illness suspected by a health worker to be due to malaria, generally on the basis of the presence of fever with or without other symptoms.
Time-location sampling (TLS)	A sampling method used to access and survey people at specific venues and times where HRPs are more likely to be present (e.g., forest worksites or border crossing points). TLS seeks to produce a representative sample of high-risk individuals who frequent the kind of venues included in the survey.

Definitions were adapted from WHO malaria terminology.
WHO malaria terminology. (2017, June). Retrieved July 27, 2017, from http://apps.who.int/iris/bitstream/10665/208815/1/WHO_HTM_GMP_2016.6_eng.pdf

Overview of Module 1

Module 1 is a step-by-step guide on implementation of a formative assessment to gather, update, review and synthesize current knowledge of malaria high-risk populations (HRPs) to inform programmatic decision-making. The formative assessment includes four components:

1. Review, collation and analysis of existing data to determine available evidence on HRPs
2. Qualitative data collection to assess characteristics and risk behaviors, access to malaria services, and operational information relevant to planning interventions and targeting surveillance (e.g., access points, mobility patterns and preferences)
3. Mapping of potential venues and access points of HRPs such as worksites, travel patterns and social networks that will help to optimize implementation of surveillance strategies
4. A framework for integrating the results from the above components, to inform programmatic action and next steps

Figure 1: Generating and using evidence: steps in the surveillance cycle for targeting HRPs

Step 1. Assess existing and new data to identify, tailor and target interventions for HRPs

Module 1: Planning Targeted HRP Surveillance and Response

Step 2. Establish risk factors and characterize suspected HRPs

Module 2: Identifying Risk Factors Using Case-control Studies

Step 3. Implement ongoing surveillance to monitor trends in HRPs

Module 3: Monitoring Malaria Transmission and Intervention Coverage

Step 4. Adapt surveillance and response strategies and continuously refine targeted interventions based on surveillance findings

Module 4: Adapting Reactive Case Detection

Ongoing surveillance allows malaria programs to ensure that surveillance and prevention strategies are based on the most up-to-date transmission and operational information
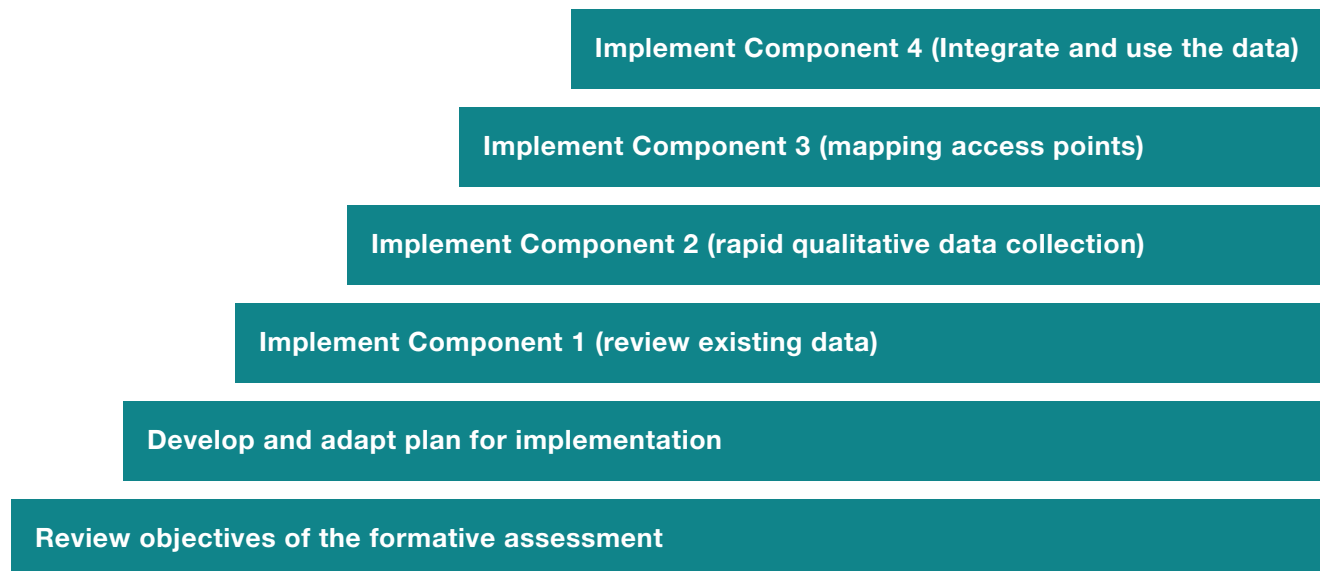
The Module consists of an operational guide to help programs and partners design, implement, and interpret the formative activities. Sample protocols and thematic guides for data collection tools are provided that can be adapted to local contexts.

Malaria HRPs can occur across all types of transmission settings. The Module is structured in a flexible way to answer a range of programmatic questions that focus on gaps in coverage and access in higher endemic settings, and more operational questions to target specific groups in lower endemic settings. Depending on the existing evidence and needs of the malaria program, a subset of Module 1 components may be needed. The Module should require 2–3 months to implement, depending on available data and scope of activities.

Module 1 links with the other modules in the HRP Guide (Figure 1, previous page).

Figure 2 . Key steps in the HRP formative assessment

Implement Component 4 (Integrate and use the data)

Implement Component 3 (mapping access points)

Implement Component 2 (rapid qualitative data collection)

Implement Component 1 (review existing data)

Develop and adapt plan for implementation

Review objectives of the formative assessment

Introduction to the HRP Formative Assessment

What is a Formative Assessment of Malaria HRPs?

A formative assessment of malaria HRPs is a process by which different approaches are used to collect information and summarize what is known, believed and done in relation to populations at high risk of malaria. The assessment is intended to rapidly provide information to help national malaria programs (NMPs) determine whether they must gather further data or move directly to the design and delivery of surveillance and response strategies tailored to HRPs. Box 1 contains details on contextualizing HRPs.

Box 1. Contextualizing HRPs

In all malaria transmission settings (i.e., high, moderate and low), some populations are at higher risk of malaria than others. Defining HRPs and understanding the context in which they are found is essential to optimize access and improve surveillance. HRPs may be defined and conceptualized in a variety of ways, as follows:

- Limited access to health services (testing and treatment) and routine interventions, e.g., people living in remote, isolated places and/or of low socioeconomic status, highly mobile populations

- Specific occupations, e.g., forest workers, night-time security guards

- Behavior and locations most associated with malaria risk, e.g., sleeping outdoors and irrigations schemes

- Larger organizational systems, e.g., small scale commerce, nomadic agriculture or mining. Populations in these categories may share similar characteristics that put them at higher risk of malaria than others

As transmission declines and intervention coverage increases, malaria risk becomes increasingly clustered in space and people sharing specific risk factors. This often leads programs to shift from a broad, geographically targeted approach to including more active, person-centered approaches to targeting and tailoring interventions. Both of these programmatic approaches can be directly informed by the results from this module, which may be implemented as a broad scoping exercise or more targeted activity, and support NMCP strategies to reach the unreachable.

In this module, we will provide guidance for four formative assessment components:

1. **Review of existing data** to determine existing evidence and prioritize HRPs

2. **Rapid qualitative data collection** to plan interventions for suspected or known HRPs

3. **Mapping and enumeration** of potential venues, transit and access points to provide targeted interventions for HRPs

4. **Integrate and use the data** to inform programmatic action and next steps

These components are implemented through a phased approach illustrated in Figure 2 (previous page) and should be reviewed and adapted with key stakeholders and partners to align with programmatic timelines and priorities.

Review of existing data

This component includes a desk review of documents (e.g., manuscripts, reports and compiled data) and review of routine surveillance data available through data repositories and information systems. In some settings, a health facility registry review can provide more detailed information on cases. Data relevant to known HRPs should be considered where available (e.g., data on conflict/displacement, forestry, agriculture, labor, migration and climate), as they may explain certain patterns of transmission.

Rapid qualitative data collection

Qualitative data collection is carried out through direct interaction with individuals on a one-to-one basis and/or in a group setting. These data provide

detailed information on the unique perspectives and experiences of malaria HRPs and community stakeholders in relation to access to malaria services, risk behaviors and opportunities to improve delivery and uptake. Qualitative data collection includes:

- **Focus group discussions (FGDs):** Moderated discussions with members of HRPs or stakeholders

- **Key Informant Interviews (KIIs):** Semi-structured interviews with HRP members and stakeholders who have knowledge or experience with HRPs

Mapping and enumeration of potential venues, transit and access points

Venue identification and mapping includes:

- **Venue and mobility mapping:** Map all venues in locations or areas where HRPs gather, transit through or spend time. Mapping provides physical maps and listings of venues where members of the population can be accessed for venue-based surveillance and response

- **Enumeration:** Systematically observe and count the number of HRP members present during high-attendance times at specific venues or transit points. Enumeration provides information on how many HRP members could potentially be accessed at each venue

Integrate and use the data

A framework is provided to guide analysis, stakeholder engagement and synthesis of results from the above components to inform decision-making and action. See Box 2 for a list of data required for planning and decision-making.

Box 2. Key data for planning and decision-making

A formative assessment should be tailored to the local context, but aims to gather actionable information on:

- Characteristics of populations at high risk of malaria
- Gaps in existing surveillance data collection systems and intervention strategies: who is missed and why?
- Organizing frameworks for HRP risk behavior and accessibility (e.g., gold mining operations or seasonal farming)

- Known risk factors and behavior of populations at high risk for malaria (e.g., mobility, housing, outdoor activities and environmental surroundings)
- Barriers restricting access to malaria treatment and preventive measures, to identify structural interventions
- Perceptions and use of malaria treatment and preventive measures, to select optimal packages
- Perceptions around alternative delivery platforms, and potential gatekeepers restricting access
- Existing organizations working with HRPs, to improve outreach and uptake
- Information on security and other operational factors related to HRPs to inform surveillance approaches
- Locations where HRPs can be reached and estimation of population size

Who Should Conduct the Formative Assessment?

NMP staff familiar with the context and epidemiology of malaria should be involved in all stages of the formative assessment from planning to dissemination and utilization of the findings. In most contexts, it is usually helpful to involve technical partners with expertise in malaria elimination, social sciences and/or qualitative research methods in the formative assessment.

When Should the Formative Assessment be Conducted?

Formative assessments are critical at the early stages of program planning or prior to implementing studies or interventions for suspected or known HRPs. Ideally, it would be used to establish a baseline after the overall program objectives have been determined, and before extensive project planning has been completed.

Some countries may wish to use the Malaria Matchbox Tool, which is a toolkit created by the RBM Partnership to End Malaria and the Global Fund to Fight AIDS, Tuberculosis and Malaria. The Matchbox Tool is designed to assess equity in malaria programs through a detailed analysis of how biological, social, economic, cultural and gender-related factors can influence malaria prevalence in a country or

geographical region.[1] The Malaria Matchbox Tool and the HRP Guide Module 1 both recognize that a "one size fits all" approach will not accelerate progress towards malaria elimination. A better understanding of the specific experiences and needs of populations will allow for tailoring of interventions and ensure equitable coverage.

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1   RBM Partnership to End Malaria and the Global Fund to Fight AIDs, Tuberculosis and Malaria. Malaria Matchbox Tool: An Equity Assessment Tool to Improve the Effectiveness of Malaria Programs: Geneva.

Refine the Objectives of the Formative Assessment

The overall objective of the formative assessment is to inform effective planning and implementation of malaria surveillance and response strategies in HRPs. The size and scope of the formative assessment will depend on programmatic priorities and the extent to which HRPs are already known. Findings from the review of existing data and higher-level qualitative data may be used to narrow the focus of qualitative data collection and inform objectives for Components 2 and 3. This phased implementation is shown in Figure 2.

The following section provides examples of specific objectives for different components of the formative assessment. Objectives should be adapted to the local context in close consultation with NMP and sub-national health authorities.

Objectives of the Formative Assessment

Component 1: Review of existing data

This component aims to define patterns of malaria risk and intervention coverage in terms of person (e.g., age, gender, socioeconomic status), place (where), and time (when) based on existing data and knowledge.

Specific objectives:

1. To describe the characteristics of malaria cases based on existing data (e.g., their age, gender, occupation, origin of infection, residence and travel history)

2. To identify sub-groups of people perceived or known to be at higher risk of malaria

3. To identify and describe gaps in access to health services, malaria surveillance and intervention coverage among HRPs

4. To review contextual information relevant to known or suspected HRPs for understanding the organizing systems of populations (e.g., occupations, religion, displacement) and influences upon them

These objectives are covered in the implementation of the formative assessment.

Component 2: Rapid qualitative data collection

This component aims to use rapid qualitative methods to collect actionable information to inform the selection, design and delivery of strategies tailored to specific needs of HRPs.

Specific objectives:

1. To identify suspected or known HRPs and describe malaria burden, treatment-seeking behavior, intervention coverage and organizational frameworks

2. To design intervention packages and delivery platforms, based on malaria exposures, acceptability and preferences

3. To improve outreach and messaging strategies for HRPs

4. To provide detailed information for NMP planning and operations for targeted strategies

Component 3: Mapping and enumeration of venues and access points

This component aims to identify and map venues where specific groups of HRPs are more likely to be found in preparation for Module 3 (Monitoring Malaria Transmission and Intervention Coverage) or implementation of targeted surveillance and response strategies.

Specific objectives:

1. To develop a list of all possible venues where HRPs may be found

2. To determine days and times when HRPs are likely to be present at each venue in sufficient numbers for delivery of possible interventions or survey recruitment

3. To provide actionable information on where and when to target surveillance and response interventions for HRPs

Component 4: Synthesis and decision-making

This component aims to provide a framework for synthesizing the results to inform programmatic action and next steps.

Specific objectives:

1. To collate and integrate results from all formative activities

2. To share findings and recommendations from the formative assessment with community members, stakeholders and policy makers, to inform program strategies and decision-making

Adapt Objectives of the Formative Assessment

The NMP should adapt the objectives of the different components so that they are realistic, relevant to available data and useful to the program.

The following questions should be considered when adapting the objectives:

1. What level of surveillance data are available (aggregated vs case-based) and in what form? Objectives in Component 1 should be adapted according to existing knowledge of HRPs, data availability and resources available for data collection.

2. What level of evidence on HRPs exists?

   » **If high-quality data on HRPs already exist and/or resources/timelines are limited:** increase the focus on operational and logistical data collection.

   » **If evidence to identify potential HRPs is limited:** adapt objectives of Component 2 to explore characteristics and behaviors of populations perceived to be at higher risk of malaria. A quantitative assessment of malaria risk factors can also be conducted (Module 2).

3. Is the scope of the assessment manageable considering the resources available and required timelines? It is usually necessary to restrict the assessment to priority HRP(s) and/or geographies.

4. Which groups are higher priority? Based on the results from Component 1 and higher-level qualitative data collection, NMPs may prioritize geographies or specific HRPs based on the burden of malaria, role in maintaining transmission, and likelihood of achieving sustainable impact.

Planning for the Formative Assessment

Once you have refined the objectives, it is time to plan for implementation of the formative assessment.

Engage with Stakeholders

Stakeholder engagement is critical for advocacy and securing support of leadership at the national and subnational levels. Stakeholder engagement is especially important for effective formative assessment planning due to the unique socioeconomic and behavioral characteristics of HRPs. The NMP should identify all relevant stakeholders, including subnational level partners and organizations working with known or suspected malaria HRPs. Consultative meetings should be held to build consensus on objectives, methods, logistics and funding of the formative assessment. Stakeholder engagement should be continued throughout the formative assessment to foster collaboration, ownership, accountability and acceptance of the results.

Assemble the Formative Assessment Technical Team

A team of experts should be formed to oversee the technical and operational aspects of the formative assessment. The team should be made up of NMP staff, collaborating academic institutions and other relevant partners.

Identify Funding for the Formative Assessment

Building on the engagement with relevant stakeholders, the NMP should prepare a budget and mobilize funds to conduct the formative assessment. The budget should include the following:

- Consultant fees (if applicable)
- Personnel costs: principal investigator, project coordinator, data collectors, driver
- Supplies and equipment: printing, recorders, batteries, stationery, laptops, timers, cell phones, airtime
- Development of work plan
- Adaptation, translation and pre-testing of data collection tools
- Training of field teams
- Transport costs to field sites, including vehicles and drivers
- Allowances for field staff
- Meetings and workshops
- Community engagement and communication materials
- Incentives/transport refunds for participants
- Data management and analysis: data entry, transcription, translation (if needed)
- Report writing and dissemination of findings
- Administrative costs
- Other relevant costs, based on country context

Funding requests should be prepared and submitted in accordance with the donor/government funding cycles. Formative assessments can be funded through research grants to collaborating institutions or donors through their implementing partners. Domestic resources from national and subnational governments can be mobilized to support formative assessments.

Develop the Formative Assessment Work Plan

Planning is important to guide implementation of the formative assessment and to ensure the objectives are attained. The NMP should develop a detailed work plan for formative assessment implementation.

The plan should include the following:

- Geographic locations of selected data collection sites
- Number of planned FGDs and KIIs
- Selection and training schedule of data collection teams
- Composition of the assessment teams, number of staff per team and their experience
- Roles and responsibilities of the assessment teams (NMP staff, consultants, data collectors, subnational level health managers and partners)
- Lead implementing partners for each activity

- Schedule for field supervision visits
- Procurement plan for data collection materials
- Detailed travel and other logistics

Obtain Approvals and Sensitize Communities for the Formative Assessment

When conducted as a programmatic activity, the formative assessment may not require ethical review. However, qualitative data collection involves engagement with human subjects and is often considered research. At a minimum, informed consent is required from all individuals participating in the FGDs and KIIs. Whether or not ethical approval is required, letters of approval from the relevant authorities at the national and subnational level should be obtained.

Engagement with subnational level stakeholders should start early to garner support from the target community and select suitable data collection sites. Sites selected for data collection should be informed of the assessment in advance, including targeted HRPs and how information will be used by the NMP.

Component 1: Review Existing Data

This section provides guidance, templates and procedures for reviewing existing data.

Identify Key Data Sources and Documents for Review

The NMP should hold meetings with its partners and stakeholders to identify key data sources for the formative assessment. Box 3 summarizes the primary considerations in selecting data sources and documents for review.

> ### Box 3: Assessing available surveillance data
>
> - What level are case data available centrally? (individual case reporting vs aggregated by health facility or district)
> - If case data are available at individual-level, is the same information available for people testing negative for malaria? This would allow a case-control analysis.
> - If case data are not individual-level, is a registry review at health facilities feasible?
> - Are any additional data (e.g., place of residence, travel history, occupation) available in the registry books that are not captured at the higher level?
> - What other data (e.g., slide positivity rate, intervention coverage) are routinely reported and at what level?
> - Is active surveillance carried out? (case investigation, reactive case detection or proactive screening)

Documents and data sources to be included in the review may include:

- Documents from governmental organizations, community organizations, and employers relevant to the target population:
  » Programmatic documents (e.g., strategic plans, annual reports)
  » Policy documents
  » Minutes of relevant meetings
  » Peer reviewed journal articles
  » Conference proceedings

- Reports of qualitative and quantitative studies
- Malaria Indicator Survey (MIS) reports
- Demographic and Health Survey (DHS) reports
- Unpublished data from regional, national or local academic institutions or consortia
- Health Management Information System (HMIS)
- Aggregated databases (e.g., District Health Information Software, DHIS2)
- Patient registries at health facilities
- Databases for active surveillance (e.g., reactive case detection, mass screening, case investigations)

Adapt Data Entry Templates

Excel data entry templates for desk review and review of passive and active surveillance data are available for download. The templates should be adapted to match the lowest level of analysis and key indicators (Table 1). Any key variables missing in the routine surveillance systems should be noted.

Table 1: Essential set of indicators recommended in the WHO Surveillance, Monitoring and Evaluation Manual[2]

Clinical data	Residence and nationality	Demographics and risk factors
• Date of diagnosis • Method of diagnosis • Test result • Parasite species • Name of health facility	• Village • Sub-district • District • Province • Nationality	• Age • Gender • Occupation • Imported/local transmission • Travel history (destination and dates) • Malaria prevention (IRS, ITN use at residence and during travel)

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2   World Health Organization. Malaria surveillance, monitoring and evaluation: a reference manual, Geneva: WHO, 2018

Recruit Staff

A minimum number of staff is needed to carry out a review of existing data. A field coordinator may be able to carry out all data collection activities. If a registry review is required, additional staff may be needed. Collaboration with a local university and involvement of students/interns for these activities is often an efficient way to conduct the review and build local capacity. A skeleton team of two students/interns can conduct the reviews and data extraction alongside the Field Coordinator. The team should be supervised by more experienced program staff and/or researchers.

Conduct the Review

Conduct the desk review

Following the planning meetings with the NMP, a full desk review should be carried out on all potentially relevant reports, publications and grey literature.

Material required

- Copies of reports and relevant publications or grey literature, including:
  - » Documents from governmental organizations, community organizations, and employers relevant to the target population (e.g., programmatic or annual reports, policy documents, meeting minutes, academic literature, and conference proceedings)
  - » Reports from qualitative or quantitative studies by regional, national or local academic institutions or consortia (including MIS/DHS reports and any reports or manuscripts)
  - » Unpublished data from regional, national or local academic institutions or consortia
- Excel template 'Desk review' (available for download)

Procedures

1. Carry out a literature review in PubMed using the terms "malaria + high + risk + populations + [NAME OF COUNTRY]". Look specifically for reference to any high-risk geographies or populations, in relation to behavioral, occupational or treatment-seeking factors.

2. Read all publications found, as well as reports and grey material identified through meetings with the NMP and partners.

3. Complete the Excel template 'Desk review' to provide an accessible summary of key findings and sources. Include aggregate data like slide positivity rate and intervention coverage where available.

Review passive surveillance data

The review should cover a 2–3 year period. If a registry review is included in this activity, including individuals who test negative for malaria will provide a comparison to the malaria cases and can identify potential risk factors. Where test negative data are not available, census data may provide an appropriate comparison.

Material required

- Health information data reporting platforms (e.g., HMIS, District Health Information Software, DHIS2, and other centralized data reporting systems)
- Patient registries from health facilities
- Excel template 'Passive surveillance data' (available for download)

Procedures

1. Complete the standardized data entry in the Passive Surveillance Excel template for each sheet:
   - Sheet 1: Column definitions
   - Sheet 2: Data entry

2. Fill out as much of the data entry sheet as possible. Data entry should be at the lowest level possible (individual if available). Indicators to be collected through passive surveillance are shown in Table 2. These are based on individual patient level data but can be adapted to the local context if individual data are not available.

3. Once the data entry is complete, use the pre-formatted pivot tables on 'Sheet 3: Analysis' to summarize characteristics of malaria cases and non-cases (if available) by age, gender, location, and time.

Table 2: Passive surveillance indicators

Field name	Label
Clinical data	
ID	ID number
Date	Date of diagnosis (MM/DD/YYYY)
Year	Year (YYYY)
Age	Age of patient
Sex	Gender of patient
Facility	Health facility where patient was seen for testing
Tested	Tested for malaria
Test_res	Confirmed malaria case
Species	Malaria parasite species identified
Dx_method	Method of malaria testing
Fever_hist	History of fever in the last 30 days

Tx	Received treatment?
NP_tx	Treated according to national policy guidelines?
Referral_up	Was the patient referred to higher level facilities?
Death	Death of case
Dist_dx	District diagnosed
HF_dx	Health facility diagnosed
Residence and nationality	
Province	Province
District	District
District_pop	Population of district where malaria test was done
Sub-district	Sub-district
Village	Village of residence
Residence	Address of patient
Nationality	Nationality
Dist_res	District of residence
Village_res	Village of residence
Demographics and risk factors	
Local	Local malaria cases
Imported	Imported malaria cases
Recent_travel	History of travel in the last 30 days
Travel_dest	Travel destination
Date_dep	Date of departure for travel (MM/DD/YYYY)
Date_ret	Date of return from travel (MM/DD/YYYY)
Prev	Malaria prevention used

IRS	Insecticide residual spray used
Net_res	Bednet used at home
Net_trav	Bednet used during travel
Occupation	Occupation

Review active surveillance data

This activity collates data collected through any active surveillance activities, including case investigation, reactive case detection and any other mass screening activities. More detailed data are often collected during these activities and may be useful to profile malaria cases. Active surveillance data are usually available at the individual level.

Although there is no straightforward comparison group to quantify risk factors, active surveillance data can still provide information on case characteristics and indicate suspected HRPs.

Material required
- Databases from case investigations, reactive case detection and other mass screening activities
- Standardized Excel template for 'Active surveillance data' (available for download)

Procedures
1. Complete the standardized Excel template each sheet as shown in Table 3.
2. Once the data entry is complete, use the pre-formatted pivot tables in the 'Analysis' tabs of the active surveillance Excel documents to summarize characteristics of malaria cases and non-cases (if available) from each type of activity.

Table 3: How to enter active surveillance data in Excel Template

Sheet	Active case surveillance	Indicators
Sheet 1	Case definitions	
Sheet 2	Case investigation & reactive case detection	• Type of surveillance • Type of population & size • Type of site • No. of people screened per month • No. of cases detected per month
Sheet 3	Mass screening	• Type of surveillance • Type of population & size • Type of site • No. of people screened per month • No. of fevers per month • No. of cases detected per month
Sheet 4	Individual level data (if available)	Enter individual level data (same indicators as outlined in sheet 2&3 above).

Analysis

Surveillance data should be analyzed by person, place and time in order to visualize spatial and temporal patterns of malaria transmission.

Person

Analysis by person includes describing profiles of malaria cases by sociodemographic characteristics (i.e., age, gender, residence, occupation), travel history and occupational factors. The analysis is stratified by source of infection (imported or locally acquired). These factors can be analyzed using pivot tables in the Excel templates provided with this Module or with public-domain software tools such as EpiInfo. The proportion of cases with specific sociodemographic characteristics can be compared to aggregate census data to identify whether age and gender are likely risk factors.

Place

Case numbers and local and imported incidence rates should be calculated for the smallest geographical area for which there is reliable population data (i.e., enumeration area, village or health catchment area). Where capacity exists, geographical maps of incidence rates can be generated and used to visually identify 'hotspots' of transmission and statistically evaluate environmental correlates such as land cover, rainfall and proximity to water bodies.

Time

Temporal analysis involves profiling malaria case numbers, incidence rates and importation across time (annual and monthly). If multiple years of data are available, base rate changes between years can be calculated to document seasonal patterns and infection trends over time.

Box 4. Case Study: Retrospective Data Review in Nepal

A review of existing data in three historically high burden districts in the Far West Terai in Nepal found that over half of malaria cases were imported based on travel history. The imported cases were predominantly adult male laborers who traveled to malaria endemic areas of India.

The number of imported cases had two distinct peaks occurring between April–June and August–September, corresponding to periods when travelers returned to Nepal for agricultural activities and festivals. Imported cases were characterized as lacking basic understanding of malaria transmission and prevention, rarely using insecticide treated nets while traveling, not seeking treatment when ill or having a preference for informal private providers. Low use of public sector health services by the migrant population was identified as a key gap in routine surveillance.

The review recommended targeted strategies to improve the quality of routinely collected travel histories in case-based surveillance and mapping of possible sources and sinks of malaria transmission.

Component 2: Rapid Qualitative Data Collection

This section provides step-by step descriptions on how to implement rapid qualitative data collection methods to inform HRP surveillance and response. Box 5 outlines the key steps for developing the qualitative data collection plan.

Engage with the Target Community and Stakeholders

The success of the qualitative data collection and, in a broader sense, the overall formative assessment of malaria HRPs will depend largely on stakeholder awareness and understanding of the project. The project team can build understanding and garner support for the project through meetings with the NMP, as well as regional-level, district-level and local government officers. In the early planning stages and, more importantly, closer to the start of data collection, meetings should be held with local health care providers, village elders, and leaders of religious and community-based organizations in the target community. Endorsement of community leaders for the data collection should be sought before field work begins. When engaged with the project, community leaders can be very helpful resources, providing access to HRPs or identifying initial participants or venues for FGDs. In particular, when targeting populations with special considerations (Box 6), this type of community engagement is critical. The project team is responsible for clearly explaining the purpose of the rapid qualitative assessment, data collection methods, selection of participants and how the findings will be used. Any problems or concerns raised by community members should be promptly addressed.

The project team should also meet with other organizations that work with the targeted HRPs. Such meetings can be useful avenues to identify possible participants and foster collaborations.

Once endorsement from the community and its leaders is obtained, meetings may be held with members of targeted HRPs to explain assessment objectives and procedures. Marketing materials, such as flyers and posters, may promote HRP awareness of the assessment. These materials must be tested to ensure they are culturally appropriate and respectful of the targeted HRPs.

The project team should maintain close coordination and communication with community leaders and other stakeholders from both the target and general population throughout the data collection process in order to foster continued support and recruitment for the project. It is important to plan feedback sessions with the broader community once data are analyzed – this process will help identify any problems with the findings, increase participation in and support for future interventions or strategies, and increase the quality of the work.

Box 5: Steps for developing the rapid qualitative data collection plan

- Engage with the target community and stakeholders
- Develop specific questions to be answered through qualitative data collection
- Adapt thematic guides for data collection
- Develop data collection timeline
- Recruit and train field teams
- Select participants for data collection
- Analyze the data
- Use the rapid qualitative data findings in combination with other assessment methods (e.g., data review, mapping) to plan interventions for suspected or known HRPs

Box 6. Special populations

There are well recognized limitations to surveillance approaches in illegal migrant and refugee populations. Implementation procedures should be adapted accordingly when working with these groups, and evidence should be gathered to determine how to best approach and engage illegal migrants, refugees, or other displaced or vulnerable populations. It is especially imperative to focus on sensitivity during implementation and adapt procedures to the population. Only data that is necessary for specific research aims should be collected, and data must be de-identified and stored safely.

There is a growing recognition that civilian and military cooperation will be needed to advance national malaria elimination goals. Qualitative data collection may be amended to identify HRPs within military units, assess high-risk behaviors, and institute the appropriate measures of prevention, diagnosis, treatment, and enhanced surveillance. The Ministry of Health and Ministry of Defense must collaborate closely, sharing data, training exercises, and vector control activities. Challenges for engaging militaries include sensitivity of data, such as mapping of cases and related high-risk activities.

Determine the Key Questions

The NMP should formulate key questions that will be answered with data from the qualitative data collection. Priority questions must be in alignment with the objectives of the overall Formative Assessment (see Introduction) and reflect the priorities of the targeted community and stakeholders.

Key questions may center around interaction of HRPs and instances of potential exposure to malaria risk, for example, outdoor work at night in areas where there are mosquitoes that transmit malaria. Qualitative data collection can also be a useful way to gather information on decision-making of HRPs on whether, when and how they access health services or use malaria prevention tools, and serve to identify barriers to access or use. Prior knowledge and experiences from existing frameworks, such as previous research or WHO documents, can be used to refine the qualitative data priority questions.

Adapt Thematic Guides

After identifying the key questions for qualitative data collection, the next step is to develop the core themes and topic areas which will guide the development of interview questions. Appendix 1 provides a framework for choosing themes and topics for data collection, for example, the identification of sociodemographic and housing characteristics of HRPs, or treatment-seeking behaviors among HRPs. Themes can be added or removed according to the priority questions and availability of existing knowledge or data. Appendix 2 provides a sample for the next step – adaptation of the thematic guide, or interview guide, for a FGD. When formulating the interview questions, it is important to consider how participant responses to the questions will directly inform feasible surveillance and response strategies for HRPs.

Translate thematic guides

The adapted thematic guides should be translated into the preferred local language of the respondents. The translation should be made by a person who is fluent in the local language. Translated guides should be back-translated into the original principal language to check if the meaning of each question was captured correctly. Any deviations from the original meaning should be corrected and the translation rechecked to confirm accuracy.

Adapt note taker templates

A standardized Note Taker Template should be adapted alongside the thematic guides (Appendix 3). The template is used to take structured field notes for analysis.

Pre-test thematic guides

Thematic guides should be pretested with a small number of individuals (3-6) selected from the target population. Individuals who participate in the pretest should not be included in the final data collection. All pre-testing should be carried out in the language that will be used in the interviews. Each thematic guide should be pre-tested separately to:

- Determine how well the questions are understood by the interviewers and respondents
- Identify questions that led to multiple interpretations
- Identify redundant questions
- Determine additional questions to be included

Following the pre-test, the wording of the questions should be improved, redundant questions removed, and any new questions added.

Develop the Data Collection Timeline

The timing of data collection is crucial, and the project team must take into consideration a number of factors, such as:

- When the findings are needed by the NMP or community, perhaps well before the start of the malaria season in order to plan new interventions or adapt previous iterations.

- Potential availability of participants (e.g., seasonal occupational or cultural events or movement, holidays or travel patterns).

- Number of days needed to train moderators and note takers.

- Number of FGDs and KIIs required (typically, 1–2 sessions can be planned per day for each team depending on participant availability).

- Number of days required to transcribe and analyze the data and complete a report.

Recruit and Train Field Teams

Qualitative data collection is conducted by field teams comprised of Field Coordinators, Moderators and Note Takers. Box 7 provides a detailed description of the roles of the field teams.

Field Coordinator

The Field Coordinator is responsible for the day-to-day oversight of data collection including quality assurance, regular debriefing, and conducting or supporting data management and data analysis. The Field Coordinator directly supervises the field staff and provides team updates on progress. In some cases the Field Coordinator can also serve as a Moderator.

Moderator

The Moderator is responsible for facilitating FGDs and debriefing with the Field Coordinator. The Moderator should ideally:

- Be fluent in the language of the study participants

- Be a university-trained researcher with social sciences background

- Have a clear understanding of the overall assessment objectives and priority questions for qualitative data collection

- Have the skills and experience to ensure participants are relaxed and fully engaged in the discussion.

In some instances the Field Coordinator serves as Moderator for data collection.

Note Taker

Note Takers are responsible for documentation of FGDs and KIIs and play a key role in the debriefing sessions and write-up of results. Note Takers can be recruited from the community or from the university, and must be fluent in the language of the study participants.

Box 7: Responsibilities of field staff

Field Coordinator

- Ensure that field personnel are punctual and have a professional demeanor
- Manage expenses
- Ensure the availability of all survey materials
- Conduct daily debriefings and review field notes to assess the procedures for data collection, challenges, and how to improve data quality (from field notes and audio recordings)
- Supervise and monitor the work of the field teams, particularly early in data collection
- Store documents (consent forms, field notes, enrollment and other forms) and audio files in a safe, secure place

Moderator

- Facilitate FGDs and KIIs to ensure engaged and participatory discussion and high-quality information
- Complete the Debrief Form, if used in the data collection procedures
- Ensure informed consent is obtained for all participants
- Reimburse participants for travel expenses, as required
- Participate in daily debriefing meetings with the Field Coordinator and Note Taker
- Organize documents (consent forms, field notes, enrollment and other forms) and audio files in a safe, secure place until they are handed over to the Field Coordinator
- Transcribe/translate audio recordings (in some settings)

Note Taker

- Ensure that enrollment forms are correctly completed
- Complete a seating chart for participants
- Operate the audio recorder
- Complete the Note Taker Template, if used in the data collection procedures
- Develop a written summary of the discussion, emphasizing main themes and findings from the discussion as well as body language and/or group dynamics
- Participate in daily debriefing meetings with the Field Coordinator and Moderator
- Transcribe/translate audio recordings (in some settings)

Field teams should be trained by experts in qualitative assessment or research methods. Trainings are typically three to five days in length and should focus on building skills in qualitative data collection procedures, ethical considerations, and include practice with the interview guides and tools, such as audio recorders. Box 8 presents a summary of training objectives and considerations.

All field team members must adhere to the ethical principles and standards while undertaking data collection. Most importantly, they must respect and protect the privacy, confidentiality, and autonomy of participants. They must conduct themselves in a professional manner when interacting with participants, fellow staff members, and the general public.

Box 8: Training objectives for field team

Moderator

- Ensure understanding of data collection ethics and processes, such as confidentiality and informed consent
- Ensure literacy and fluency in the language used in the FGDs and KIIs
- Build understanding of objectives of the qualitative data collection
- Develop skills in facilitation of FGDs
- Conduct role play to strengthen ability for rapport development and stimulating discussion

- Train on group dynamics and learn how to encourage discussion
- Practice listening, probing and follow-up questions
- Develop tactics to focus discussion to meet objectives
- Review timing and pacing of interviews
- Review and revise (when necessary) data collection materials (e.g., informed consent)

Note Taker

- Develop understanding of data collection ethics and processes, such as confidentiality and informed consent
- Ensure literacy and fluency in the language used in the FGDs and KIIs
- Ensure ability to take notes (handwritten or typed) rapidly to keep up with the discussion
- Build understanding of objectives of the qualitative data collection
- Establish procedures and processes for note-taking
- Ensure comprehension of objective note-taking (i.e., lack of interpretation or judgement)
- Establish roles and processes for translation and transcription
- Build skills in identifying body language and non-verbal cues of participants
- Conduct role play to practice note-taking
- Build confidence in use of audio recorder

Implement Qualitative Data Collection

Identify community gatekeepers and sensitize community

The implementation phase of the qualitative data collection should begin where the project began – community engagement. With the NMP as a guide, work with the local (district, county or village level) leaders to build awareness of the project, identify insights that will improve data collection, and identify social structures, gatekeepers and stakeholders that should be involved in decision making. Community leaders may help to increase participation rates if

they are knowledgeable and supportive of the project. Actions include:

- Meet with gatekeepers several days prior to data collection (FGD or KII)
- Describe the purpose of the project and ways in which it will benefit the community, and how information will be collected and used
- Seek endorsement of the project
- Seek assistance with participant recruitment
- If a FGD or KII will be scheduled in their community, discuss a good location for the discussion

Focus group discussions: preparation

FGDs bring together a defined group of participants to investigate opinions, beliefs or behaviors in an interactive setting. The following steps should be taken in preparing for and conducting FGDs:

- Identify participants
- Select venue
- Schedule date and time
- Coordinate transport
- Prepare necessary material
- Conduct the FGD
- Finish administration, record keeping and travel or incentive reimbursement

Identify participants

Each FGD should be comprised of 6–10 participants who have similar socio-demographic characteristics. Having similar characteristics encourages individuals to freely share their ideas and perceptions. For this type of data collection, it is good to aim for the following number of FGDs:

- 2–3 FGDs with 6–10 male members of the HRP group
- 2–3 FGDs with 6–10 female members of the HRP group
- 1–2 FGDs with 6–10 community health workers
- If sufficient number of other target participants (e.g., employers, community leaders, and health facility workers) are available, consider conducting 1-2 FGDs with these groups.
- If there is a wide range of ages within the HRPs, it may be necessary to stratify groups by age.

FGD participants can be selected opportunistically using snowball sampling or at gathering points (Appendix 4). Methods for selection will depend on the specific sub-group of interest (e.g., forest workers). Appendix 5 contains a sample script for

recruiting participants for FGDs or KIIs. Potential participants should be screened for eligibility upon first contact, after they agree to participate. A sample of an eligibility screening form is provided in Appendix 6. The purpose of eligibility screening is to ensure that all participants invited to participate in the FGD are part of the population group of interest.

Select a venue

The Field Coordinator should arrange for a venue to use for the FGDs in advance. The venue should be easily accessible to the participants, allow for privacy, be free from distractions, and be comfortable and well-ventilated. Examples of potential venues for FGDs include schools, community centers, health facilities, or church halls. The venue should be communicated to participants during the invitation conversation and a reminder made a day before the scheduled FGD.

Schedule a date and time

FGDs typically last between 1–2 hours. The field team should have a list of dates for FGDs prepared in advance. The field team members should make invitation calls or, if phones are not readily available, field visits to the eligible participants selected for the FGDs. Team members should determine availability of the participants and communicate the date, time and venue of the FGD. There should be 6-10 participants signed up for each FGD.

Coordinate transport

The field team should work with the Field Coordinator to make sure all participants have transport to and from the venue on the day of the FGD. Transport reimbursement should be available to participants who need it. Information about transport reimbursement should be clearly communicated to the participants at the time of selection and a reminder provided on the day of the scheduled FGD.

Prepare materials

The field team should prepare the following in advance of the FGD:

- Audio recorder
- Interview guide (Appendix 2)
- Note Taker Template (Appendix 3)
- Eligibility Screening Form (Appendix 6)
- Debrief form (Appendix 7)
- Informed consent (Appendix 8) with copies for each participant
- Enrollment forms (Appendix 9)
- Flip chart paper

- Markers
- Pens
- Preprinted map of the area (if necessary)
- Name badges
- Refreshments
- Reimbursement log (Appendix 10)

Focus group discussions: implementation

Preparatory stage

The field team should arrive at the venue 45–60 minutes before the start of the FGD to prepare the room and materials.

- Welcome the participants. Be friendly but avoid any conversation around the FGD topics.

- The Moderator should observe the participants to identify behaviors or dynamics that may impact the flow of discussion (e.g., any quiet or talkative participants). The seating arrangement may be adjusted to manage these dynamics.

- Note Takers should assist the participants to complete the enrollment forms (Appendix 9).

- The Note Taker should ensure that each participant has a name badge. For confidentiality, participants should use pseudonyms (i.e., not their real names). Participants can also use numbers or letters in place of pseudonyms. Each participant should be entered into the seating chart by the Note Taker.

Introductory stage

The Moderator should provide a brief introduction of the session and its objectives. The Moderator should inform the participants that the session will be audio-recorded and explain how the recording will be used. If any participant does not want to be recorded, the Moderator should take them aside and ask whether they are still interested in participating in the FGD. If yes, the Moderator should inform the rest of the group that the session will not be recorded and instead the Note Taker will take comprehensive notes during the discussion, which may require more time.

The Moderator and participants should agree on ground rules (i.e., behavior expected for all participants) during the discussion. Examples of ground rules for FGDs include:

- One speaker at a time
- There are no right or wrong answers
- Respect the confidentiality of all participants and do not share the identities of participants nor the contents of the discussion with anyone

Administer informed consent

Most data collection through FGDs requires informed consent, but it depends on the project. If informed consent is required, each eligible individual invited to participate in the FGD should fully understand all the procedures and how their responses will be used. Informed consent procedures are as follows:

- Explain the purpose of the FGD

- Provide each participant with two copies of the informed consent form.

- Read the informed consent form aloud for all participants, then allow time for participants to review the form and ask questions or seek clarifications. If a participant cannot read, the Moderator should read out the form for them in the presence of a witness.

- Answer any questions from the participants.

- Obtain informed consent from each participant to participate in the FGD and for the audio-recording of the session.

- Have the participants sign both copies of the informed consent form.

- Fill in the participant ID number on both copies of the informed consent form. Return one copy to the participant and retain the second copy for project records.

Conduct the FGD

The Moderator plays a key role in directing the FGD. During the discussion, the Moderator must continually assess whether the information will be sufficient to answer the questions and re-direct or follow up on contributions from participants. A well-trained Moderator should be able to recognize when a group is not working well and re-focus the discussion. Box 9 contains detailed procedures to be followed during the FGD.

Box 9. FGD procedures

1. Following informed consent, the Note Taker should switch on the audio recording and begin taking notes on the Note Taker Template (Appendix 3). The Moderator should verbally state the focus group ID and date, before beginning the FGD.

2. The Moderator should ask each participant to introduce themselves in turn, in order of the seating chart and IDs, to relax the group and help distinguish voices in the audio recording.

3. The Moderator should then introduce the ice-breaker topic in the FGD Interview Guide, before turning to the central themes and questions.

4. Flip charts and maps to list and visualize travel patterns and outdoor activities will help to spark participation and input from participants.

5. If/when latecomers arrive; the Moderator or Note Taker should complete the enrolment form, give them a name badge and show them to a seat.

Participants should be allowed to leave the discussion briefly for a restroom break, but the Moderator should try to manage this so that no more than one participant is absent from the discussion at any one time. If participants wish to leave the group altogether, the Moderator should ask them if they approve their contributions to be included in the analysis or whether they'd like to withdraw their contributions altogether. If the latter, this should be noted and, at the data management and analysis stage, their comments should be removed from the transcripts if feasible.

At the end of the discussion, the Moderator should thank the participants, remind them of how the information will be used and how confidentiality will be maintained by the project team, and then offer the participants refreshments and the opportunity to be reimbursed for travel expenses.

Key informant interviews: preparation

KIIs are semi-structured, one-on-one interviews with persons deemed to be experts in a technical area or highly knowledgeable about the subject or population group of interest. Key informants serve as cultural experts, offering insight into the target population and behaviors that may lead to risk. The following steps should be taken in conducting KIIs:

- Identify participants (key informants)
- Schedule date and time of KII
- Coordinate transport
- Prepare materials
- Conduct the KII
- Finish administration, record keeping and travel or incentive reimbursement

Identify key informants

Key informants should include individuals important to and well-informed about HRPs in the proposed project area. They should be able to contribute to the assessment team's understanding of the study population, how best to approach potential participants, and to offer guidance on problems that staff may encounter while implementing surveillance and response in these populations. A diverse group of key informants should be selected to fully tap the range of knowledge present in the community. Examples of key informants include:

- Community leaders of each site
- Leaders of the target HRPs (e.g., employers of cattle herders)
- Researchers familiar with local HRPs
- Healthcare and other service providers
- Persons doing outreach work among HRPs

Typically, 3-4 KIIs with participants in each subgroup of interest should be conducted. If possible, a conscious effort should be made to select different categories of people in each subgroup (e.g., age, gender, education level). A list of key informants, contact information and key demographic and occupational characteristics should be entered into the Key Informant Enrollment Form (Appendix 9). This list can be used to track KIIs conducted and provide an overview of key informant demographics for the analysis and report.

Prepare materials
The field team should prepare the following in advance of the KII:

- Audio recorder
- Interview guide
- Note Taker Template (Appendix 3)
- Debrief form (Appendix 7)
- Informed consent (Appendix 8) with copies for each participant
- Enrollment form (Appendix 9)
- Pens
- Refreshments
- Reimbursement log (Appendix 10)

Contact the target key informant and make an appointment for the interview. Where possible, it is best to conduct the interview in a neutral place where the key informant can talk freely. If the key informant will need to travel, communicate clearly that transport costs will be reimbursed

Key informant interviews: implementation

Introductory stage
The Moderator should introduce the project team and ask the key informant to introduce themselves. Then the Moderator should explain the purpose of the KII and how the information will be used, with assurance that the information they provide will be treated confidentially. It is also important to explain that their opinion is important, and that there are no right or wrong answers.

Administer informed consent
Most data collection through KIIs requires informed consent, but it depends on the project. If informed consent is required, each key informant should fully understand all of the procedures and how their responses will be used. Informed consent procedures are as follows:

- Explain the purpose of the KII
- Provide key informant with two copies of the informed consent form.
- Read the informed consent form aloud and ask if they have questions. If a participant cannot read, the Moderator should read out the form for them in the presence of a witness.
- Answer any questions from the key informant.
- Obtain informed consent to participate in the KII and to have the KII audio-recorded.

- Have the key informant sign both copies of the informed consent form.
- Fill in the participant ID number on both copies of the informed consent form. Return one copy to the key informant and retain the second copy for project records.

Conduct the KII
Similar to a FGD, the Moderator plays a key role in directing the KII, and must continuously assess whether the information obtained is sufficient to answer the questions or requires follow-up with the key informant. A Moderator must be able to re-focus the interview if needed. Detailed procedures and best practices are described in Box 10.

Box 10. KII procedures and best practices

Interview the key informant alone

The interview should be conducted privately. The presence of other people during an interview can prevent honest answers. It is good practice to choose a place for the interview that is semi-private, where others can see the key informant but cannot hear them.

Sequence questions

Begin with less sensitive questions (e.g., factual questions) and move to more sensitive ones (e.g., opinions and judgements) when the key informant is more relaxed. Alternatively, the interview may begin with questions about the present, then move to questions about the past and the future.

Use probing techniques

Encourage key informants to detail the basis for their conclusions and recommendations by asking for specific examples or asking them to elaborate or clarify something.

Maintain a neutral attitude

Be a sympathetic listener and avoid giving the impression of having strong views on the subject under discussion. Neutrality is essential because some key informants will feel pressured to say what they think the interviewer wants to hear.

Never suggest answers to the key informant

Rather than suggest answers, probe in a way that the key informant themselves come up with the relevant answer. Never read out the list of coded answers to the key informant, even if they have trouble answering.

Wrap-up

Alert the key informant that the KII is ending. Go over the key ideas from the interview to seek any clarifications and allow for a few minutes of free discussion. Thank the key informant for their time. Offer refreshments (if included in the project) and an opportunity to be reimbursed for travel expenses.

Data Quality Monitoring

Debrief sessions

- Schedule de-brief sessions with the data collection team after each FGD and KII to review the interviews conducted, discuss and summarize the session, review notes and monitor progress of the data collection. The Debrief Form can be used to structure the session, as it contains a framework for identifying key themes and information obtained from each session.

- Enter detailed field notes into the standardized Note Taker Template during the FGD and KII sessions, or immediately after the interview if notes were taken by hand.

Data monitoring and field visits

Malaria program officers and field teams should meet at least monthly to discuss progress towards the goals of the formative assessment. The meeting should review the number of FGDs and KIIs conducted, discuss data analysis, confidentiality and any other issues related to the assessment. A supervisory group comprised of key stakeholders should conduct field visits for quality assurance checks. The first supervisory group meeting should be conducted within the first week of data collection to identify and address any problems that may affect quality of data.

Data Cleaning and Analysis

Analysis of qualitative data is an on-going process that begins as soon as the data collection starts. The key research questions form the basis of the

analysis, and for the HRP qualitative data collection the questions are likely around the program actions and delivery of interventions targeted to HRP groups. The type and depth of analysis carried out will depend on the objectives of the assessment, and capacity and availability of the team. The analysis described in this section is considered to be a rapid approach. A more rigorous, resource-intensive and research-oriented approach is described in Box 11.

Box 11. Research-oriented analysis

A more systematic qualitative data analysis can be carried out, using transcribed and translated transcripts developed from the audio recordings. It involves sorting out and categorizing notes and transcripts into broad topics or subtopics based on the interview guide and any new themes emerging from the data. Key emerging themes and their underlying linkages are identified to understand similarities and differences in behaviors and access to health services among the HRPs. Sociodemographic characteristics of the respondents (i.e., age, gender, occupation) are analyzed to provide further insights into the data interpretation. This type of data analysis is considered to be guided by grounded theory and works as follows:*

1. Produce transcripts of interviews and detailed notes

2. Code data (using a software program such as Dedoose, NVIVO, or ATLAS TI or using Excel) and identify potential categories or themes for analysis

3. Put together and compare data under the same categories or themes

4. Associate categories that are alike

5. Use relations among categories to interpret the data and generate hypotheses, i.e., explanations about behaviors related to the aims of the formative assessment

6. Intentionally search out data that may refute each hypothesis

7. Present the results using examples from the data

*Bernard, HR (2011). Research methods in anthropology: Qualitative and quantitative approaches. Rowman Altamira.

Qualitative data analysis takes place during and after fieldwork. Debrief meetings are held at the end of each day to share, discuss, and compare findings, observations, and interpretations related to the data collected in each interview. A notes template for the debrief sessions can help teams elucidate the priority themes for each population group or context, which will elicit the priority information from each interview. The debrief sessions identify and contrast relevant themes arising from the data. Notes taken during the debrief sessions can be collated and distilled into brief summary reports for each site and population.

The process of data analysis is continued after completion of fieldwork. The summary reports for each site and population group are reviewed and analyzed according to predetermined topics included in the interview guides. Other emerging themes from the data are identified and included in the analysis. Major themes that emerge from the data are identified and workshopped with stakeholders for feedback and consensus. This rapid qualitative data analysis approach enables malaria programs to identify and key issues and generate information necessary for programmatic decisions.

The final output of the qualitative component of the formative assessment is a brief report with key findings for each of the predetermined and any emergent themes. This report is incorporated into the overall formative assessment report. Appendix 11 provides an example framework for a report on the qualitative data collection.

Box 12 provides an example of the qualitative data collection and results in Namibia.

Box 12. Case Study: Formative Assessment of HRPs in the Zambezi Region of Namibia

A rapid formative assessment was conducted to inform planning for malaria surveillance and response in the Zambezi Region of Namibia. Cattle herders and agricultural workers were identified as HRPs. Both groups spent large amounts of time outside at night without using prevention measures. IRS coverage among agricultural workers was low due to poor housing structures. Both groups reported access barriers to health care due to distances to health facilities, high cost of treatment for foreigners and fears about immigration status.

A venue-based recruitment strategy was recommended for both groups. Potential venues for cattle herders included cattle posts, water points and bars while field campsites, water points at specific campsites, and bars were recommended for the agricultural workers. Collaboration with trusted gatekeepers (i.e., bosses and headmen) was considered essential to allay fears about immigration status for non-Namibian cattle herders and agriculture workers. Malaria screening and treatment using tailored strategies backed up by good communication and positive peer influence was recommended.

Component 3: Mapping and Enumeration

Mapping and enumeration provide key information for location-based surveillance and response strategies. These are particularly appropriate when there is transmission happening outside the home, such as at worksites, bars or fishing villages. These activities will generate a list of specific locations (venues) and times at which the target population is present, and can also be used as a sampling frame for time-location sampling (TLS). TLS is a representative method widely used to survey populations at high risk of infectious diseases at the places and at times where they congregate rather than where they live.

Key procedures include:

1. Mapping locations frequented by HRPs: this leads to a physical map and listing of venues

2. Identifying potential high-attendance times at these locations through FGDs and KIIs

3. Determining the number of HRP members likely to be present during high-attendance times through direct observation ("enumeration")

Map Locations Frequented by HRPs

The following types of locations and areas will be mapped by drawing on existing data, local expert knowledge (including from FGDs and KIIs), and direct observation:

- Areas where HRPs meet and interact with each other (e.g., work sites, border crossings, travel hubs, forest entry points, parks, street locations, markets, bars, restaurants, tea houses, places of worship)

- Places where malaria health services are offered for HRPs and the general population (e.g. health posts, outreach/mobile clinics)

- Locations of activities held by community-based organizations that work with HRPs (e.g. community centers, markets)

- Locations that may present potential barriers to implementation of interventions (e.g., areas off-limits to health outreach due to security, policing, physical barriers or other restrictions)

Hard copy maps and listings of these locations can both be developed. However, no personal names should be included. The names of streets, roads

and/or venues may be changed to protect the target population if there are concerns about illegal activities.

Verify Venues

Formative assessment field staff should visit the potential venues identified in order to:

- Confirm the location and details of how to access each site

- Familiarize themselves with the venues and make sketch maps of the venues and their surroundings (Figure 3). Within the map, staff should indicate:

  » Specific areas where venue-goers will be intercepted for counting

  » Discrete places at or near the venue where participants will be interviewed and activities such as malaria testing conducted

- Determine safety and accessibility of the site for conducting surveys and other surveillance or prevention activities

- Meet with venue officials (i.e., owner or managers) in order to:

  » Confirm whether the venue is still active and establish any closure times/days

  » Obtain permission to conduct interviews and other activities (such as malaria testing) inside or outside the venues

  » Review the map and areas where activities could take place

  » Validate information on days and times of high attendance of HRPs

  » Determine any patterns in the types of individuals that tend to be present at different days and times (e.g., due to work shifts or travel patterns). This information is useful for planning surveillance and other interventions targeted at specific HRPs.

Conduct Enumeration

Enumeration is the process of directly observing and counting the number of individuals present at a venue during a particular time window, generally a

time when high attendance is expected. The result of enumeration is a standardized count of individuals belonging to HRPs subgroups at the venues visited.

Enumeration should be carried out at all potential venues using the Enumeration Summary Form (Appendix 12). The form records details about the venue, actual enumeration time and number of HRPs observed at the venue. There are two different standardized methods for obtaining the count of HRPs who are present at a venue in a specific time period:

- Type I: Enumeration at venues attended exclusively by the HRP. For example, if forest workers are the HRP, then a forest mine would fit under Type I enumeration because all individuals present are likely to be part of the mining operation. In general, work sites are likely to fall under Type I. One or two staff members will count individuals attending each Type I venue during the specified high-attendance period.

- Type II: Enumeration at venues with "mixed" attendance. For example, a public market thought to be a good place to find forest workers would be a "mixed" venue, since many people who are not forest workers are also likely to be present. Two staff members will conduct Type II enumeration. One will count individuals consecutively and one will systematically approach and briefly interview individuals to determine whether they belong to the HRP. A set of standard eligibility criteria should be used. However, it is important to consider how individuals may react when approached and asked such questions. If the venue is a public and/or primarily social space (e.g., a bar), it is often best for staff to briefly engage with the patron in conversation, clearly identify the project and affiliation and conduct the screening verbally in a conversational style and record the results after leaving the patron.

It is best to conduct enumeration at all venues and from start to finish of each high-attendance period. If this is not feasible, enumeration may be conducted at a random sample of venues and/or during a part of the high-attendance period. For example if the high-attendance period is Wednesdays from 18:00 to 22:00 (4 hours), enumeration could be conducted for a shorter 30- or 60-minute period during this window. To extrapolate or "scale-up" the counts to estimate the number of HRPs present during the entire window, the field team will need to make a judgment using the following considerations:

- If individuals are constantly arriving and leaving, then the observed count should be scaled up.

For example, if staff enumerated for 60 minutes of a 4-hour period, then multiply the count by 4).

- If mostly the same individuals seem to be present during the entire period, then the scale-up factor should be adjusted appropriately.

In both Type I and Type II enumeration, duplicate visits by the same individual should not be counted.

Lists of venues, high-attendance times and number of HRP individuals expected can be used directly to inform programmatic activities and feed into the development of a structured sampling frame for TLS (Module 3). Venue notes taken during the site verification visits should be typed and compared with notes taken during the FGDs and KIIs to gain further insights into the venues where HRPs may be accessed.

Alternatives to Enumeration

If direct observation is not feasible, an alternative is to collect estimates of attendance from venue owners. This may suffice where turnover is low or attendance records are kept (e.g., seasonal worksites and schools) but introduce error where there is more variation in attendance between different times of the day and days of the week (e.g., bars). Locations with high attendance and high turnover (such as markets) should use direct observation only.

Optional: Develop Venue Sampling Frame

If the mapping and enumeration supports the use of a venue-based surveillance and response strategy or a TLS survey, then a sampling frame will be developed based on information gathered through FGDs, KIIs, mapping, verification visits and enumeration. A sampling frame includes:

- Name of the venue
- Day, start time, and end time
- Location details or address of the venue
- Contact information of the venue owner/manager
- Number of HRP members expected during the Venue Day Time (VDT)
- A unique venue ID
- A unique ID for each VDT period

An example of a venue sampling frame is shown in Table 4 and Appendix 13. Each venue and day-time

period listed in the sampling frame should be assigned a unique ID. Additional details on procedures to define VDT IDs are provided in Module 3.

Table 4. Example format of a sampling frame for forest workers

Venue ID	Venue name	VDT ID	Day	Time	# Forest workers expected
B001	Rigos Mine	B001-1	Wed	20:00–22:00	10–15
B001	Rigos Mine	B001-2	Thurs	20:00–22:00	8–10
B001	Rigos Mine	B001-3	Fri	19:00–23:00	15–20
E001	Smith Processing Plant	E001-1	Mon	05:00–08:00	40–60
E001	Smith Processing Plant	E001-2	Mon	12:00–16:00	30–40
C001	Ishowe Palm Plantation	C001-1	Mon	20:00–23:00	5–10
C001	Ishowe Palm Plantation	C001-2	Tues	20:00–23:00	5–10
C001	Ishowe Palm Plantation	C002-3	Thurs	08:30–10:30	20–25
C001	Ishowe Palm Plantation	C002-4	Thurs	20:00–23:00	5–10

Box 13. Case Study: Venue Mapping in Zambezi Region

FGDs with community health workers and meetings with community leaders were used to identify and map potential high-risk locations ("venues") in selected rural areas of the Zambezi region of Namibia in 2015. This information was gathered as part of a formative assessment and planning phase for a malaria survey that used TLS.

Focus group participants identified specific places where individuals regularly congregate in large numbers between sunset and sunrise that they felt met the predefined venue eligibility criteria. Several types of venues were identified, including bars, churches with evening services, construction work sites, and cattle, fishing and police camps. Subsequent data collection was focused on bar and church venues, as these were considered most likely to be accessible and to comprise the largest venue-going populations that could potentially be targeted for malaria.

Best practice in formative assessments for TLS surveys is to directly observe the number of individuals present at suspected peak times at the venues identified (i.e., "enumeration"). Due to time limitations, information on peak days and times was obtained from venue owners and used to construct the survey sampling frame. Although faster and easier, the information on attendance was less accurate and created some challenges during the survey. This highlighted the importance of allocating sufficient time and resources to conduct site verification visits and enumeration through direct observation during the formative assessment, particularly when the results will be used to inform survey activities.

Component 4: Integrate and Use the Data

This section summarizes approaches to integrate and use different types of data generated during the formative assessment and provides examples of data use for planning and decision making within the context of malaria HRPs. The type of data analysis you conduct will depend on data available, the resources and capacity available and the needs of the program.

Integrating Results

Analysis of data collected during the formative assessment is based on the objectives set at the start of the project.

Table 5, below, reviews the type of data collected in the formative assessment, analysis approach, and output. Figure 3, below, shows the different types of data that may be collected during the formative assessment and the way the results can inform the design of an intervention targeting HRPs. Case studies on Lao PDR and Namibia (Box 14 and 15) provide examples of how the formative assessment was implemented, and how the results were interpreted and used to inform intervention implementation to reduce malaria incidence in HRPs.

Table 5: Formative data analysis approaches and outputs

Data type	Analysis approach	Output
Desk review	• Identify reported HRPs • Triangulate (i.e., compare) data from different sources	Brief report[a]
Active and passive surveillance data	• Tabulate cases by key characteristics (e.g., age, gender, testing, residence) • Calculate key surveillance indicators (e.g., parasite prevalence, incidence rates) • Determine proportion of imported and indigenous cases	• Pivot tables • Incidence maps
Qualitative data (FGDs and KIIs)	• Use predetermined themes to categorize information from interviews and group sessions • Review field notes and debrief forms to classify additional information • Use grounded theory to identify other emergent themes	Brief report (highlighting key findings based on the themes)[a]
Venue mapping	• List all possible venues • List high-attendance times	• Venue sampling frame • Venue maps

a The brief reports of the desk review and qualitative data should be incorporated into the main formative assessment report.

Figure 3. Data types and results and integration into final objective
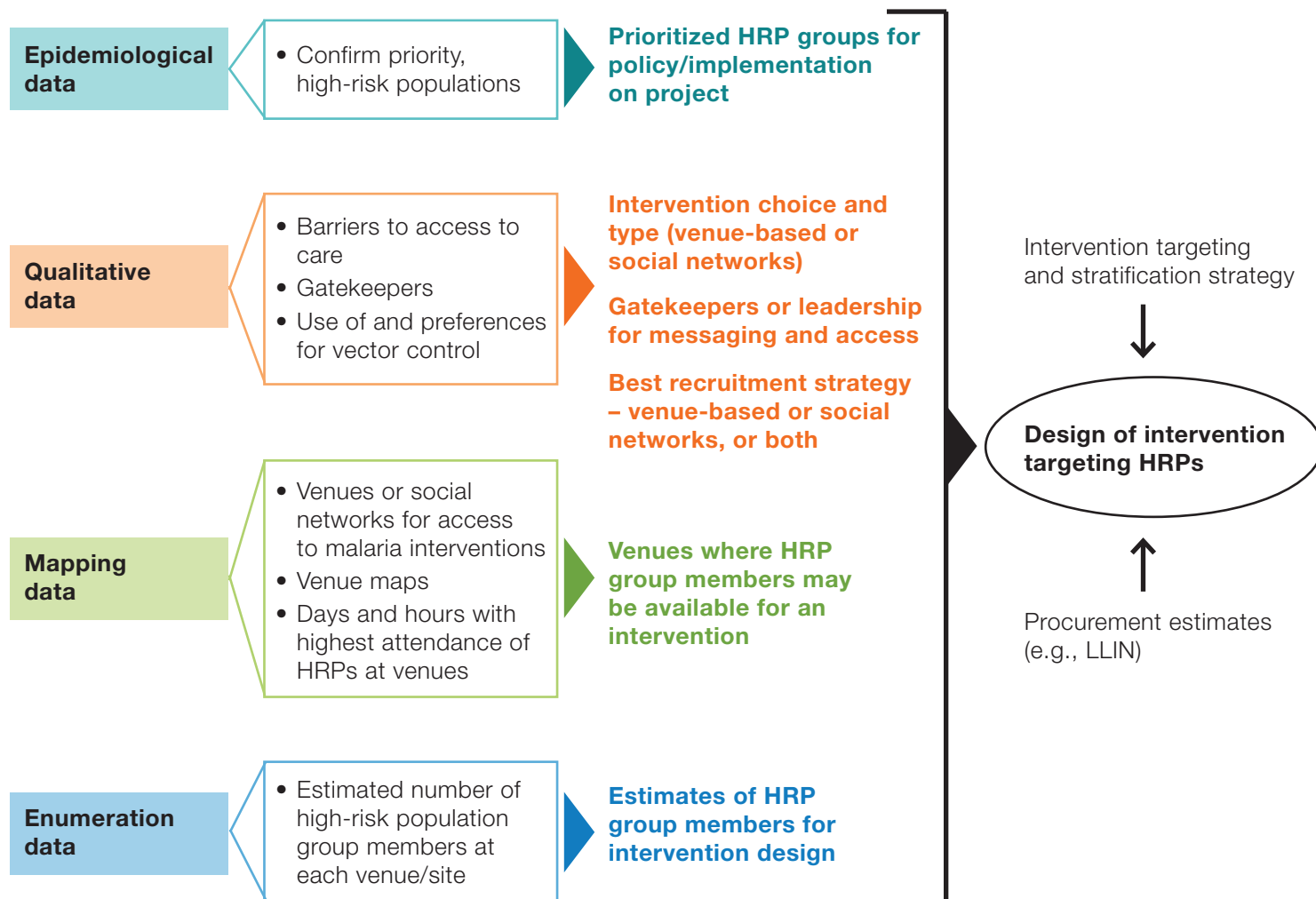
Box 14. Case Study: Use of Formative Findings to Inform HRP Surveillance Strategies in Lao PDR

A formative assessment was implemented in Champasak Province, Southern Lao PDR, to identify and characterize populations at highest risk for malaria infection. The assessment found that the majority of HRPs are village-based Lao nationals who engage in a diverse set of forest-based and agricultural activities depending on the season. Health staff reported that malaria was linked to forest-going activities, but highlighted challenges of outreach to some groups involved in illegal or semi-legal activities and ethnic minorities due to socio-cultural and linguistic barriers.

Contrary to general consensus, very few HRP congregation sites were identified. These findings suggested that venue-based surveillance – as successfully implemented in other settings – would be poorly aligned with the target populations and hence an ill-suited strategy. However, the formative assessment revealed that HRPs welcomed active malaria testing and treatment activities as well as recruiting peers for surveillance activities. The results provided the basis for designing a package of targeted interventions, which included peer navigators who engage in forest-based activities to actively identify, test and treat other HRPs who may be missed during community based interventions.

Box 15. Case Study: Integration of Data to Target interventions for High-Risk Seasonal Cattle Herders in Northern Namibia

A formative assessment in Ohangwena region of Namibia in 2019 used a phased approach to identify malaria HRPs.

Epidemiological data: Case-control studies in Ohangwena in 2012-2014 found that major risk factors included male cross-border travelers, proximity to the Angolan border, and occupations such as small market sales. In 2019, a retrospective data review was conducted at health facilities with a historically high burden of malaria, with a focus on age, gender, occupation, village and classification of imported or local. From these data, the population groups with travel to Angola and a lack of access to malaria interventions were identified as traditional brewers, worm collectors, cattle herders, and seasonal agricultural workers.

Qualitative data: In late 2019, in-depth information was collected through FGDs with HRP groups and KIIs with employers and community leaders. Using a rapid analytical approach, malaria exposures, intervention use and preferences, access points, and movement patterns were identified for each group. Based on the timing of travel and high level of exposure to mosquito bites given the outdoor and evening work, and resulting from workshops with regional and national program managers, cattle herders were identified as a major risk group. Qualitative data findings on cattle herders is included on right.

Mapping and enumeration data: During the qualitative data collection, participants identified venues that HRP members frequent. The data collection team visited a sampling of venues, prioritized by the number of HRPs expected to be there. When visiting, the team recorded geo-coordinates, conducted observations and enumerated the HRP members present during the visit. These data identified the cattle

Profile	Males aged 16-40, mostly Namibian with some Angolans
Exposures	Spend time outside at night in Angola or Namibia during all seasons without prevention measures; sleep in temporary structures or open air when in Angola
Access to care	Seek health care in Namibia, but distance to health clinics can be a major barrier
Travel	Seasonal; mostly north-bound travel during dry season but some cross daily into Namibia for water
Access to future interventions	Preference was for a combination of venue-based and peer-referral interventions, with potential venues including village water points or "cuka" shops. Coordination through headmen and traditional councils is essential.

herder posts and months and times most likely to provide access to the greatest number of cattle herders for the demonstration project.

Results dissemination workshops: Workshops were held pre- and post-formative assessment to discuss current data and findings, and gather expertise, opinions and guidance of the local, regional and national malaria authorities. The outcome of the post-formative assessment workshop was the choice of interventions for the demonstration pilot targeting cattle herders, including the distribution of bednets and presumptive treatment to cross-border cattle herders at water points and through employers.

Workshops and Stakeholder Engagement

The project team should organize a workshop to present the preliminary findings of the assessment to relevant stakeholders. All relevant stakeholders (e.g.. Ministry of Health officials, partners and organizations working with HRPs) should be invited to the workshop. The project team should present the key findings of each component of the formative assessment and allow participants to debate, critique and validate them. Deliberations of the workshop will enrich interpretation of the findings and align recommendations with programmatic priorities.

Another workshop should be held to disseminate the final report of the formative assessment. The targeted audience for this workshop should be senior management levels of the Ministry of Health, donors and partners who can influence funding and operational decisions to support translation of the findings into implementation activities. Suitable activities to disseminate the findings to community-level stakeholders (e.g., community leaders, representatives of HRP subgroups) should be organized. This may be done through community meetings, workshops or interpersonal communication by community health workers. Key messages should be passed to the community stakeholders in a simplified manner and in their local languages.

Data Use for Decision-Making and Planning

Findings of the formative assessment can provide evidence-based information on gaps in malaria HRP surveillance and response strategies. Findings of the assessment can provide direct operational and logistics information on how and where to deliver interventions targeting HRPs.

Strategic planning

Data generated from the formative assessment can be used for strategic planning to define objectives and activities required to reduce malaria transmission among identified HRPs. The formative assessment may also provide good baseline data to monitor and evaluate effectiveness of surveillance and response interventions implemented among the HRPs.

Informed decision-making

Programmatic decisions (policies, strategies, approaches, structures and priorities) must be based on the best available evidence to ensure maximum impact with available resources, improve results and

enhance accountability . Formative assessments can inform decisions on what structures need to be set up to regularly collect and validate surveillance data among HRPs.

Monitoring and evaluation

An important component of formative assessments is the review of existing data. Data sources reviewed can be used to track surveillance and response indicators and to verify the accuracy of reported information.

Design targeted active surveillance

The formative assessment identifies different subgroups of malaria HRPs and the determinants of the malaria risks to which they are exposed (e.g., economic, social and behavioral factors). Data collected from the assessment can be used to:

- Pilot surveillance strategies that have high acceptance and coverage to increase case detection rates

- Design surveillance strategies that are targeted to specific subgroups (e.g., border screening for travelers or peer referral for migrant workers)

- Implement surveillance strategies in specified venues where the target population is known to congregate (e.g., periodic testing to identify cases at HRP work places, points of entry)

Data use for advocacy

Data collected from formative assessments can be used to develop social behavior change messaging to address information gaps such as lack of knowledge about malaria. Messages tailored to the specific HRP can be developed and disseminated to the identified venues. Findings from the formative assessment can inform selection of effective communication channels such as community events and other strategies of raising awareness of malaria prevention, symptoms and treatment.

Resource mobilization

Data analyzed from the formative assessment can inform resource mobilization strategies for HRPs, including domestic funding. Presenting evidence on malaria cases among HRPs working in specific industries/companies and linking it to days of work lost can be used to advocate for investments in malaria elimination strategies. Funding will be required to initiate targeted surveillance and response strategies among the identified HRPs. Embedding the targeted approaches into routine surveillance is important to ensure sustainability, monitor trends and ultimately reduce transmission to zero.

Appendix 1: Themes and Topics for Qualitative Data Collection (FGD or KII)

Sociodemographic and housing characteristics of malaria HRPs	
A1 What are the social and demographic characteristics common to HRPs in the area of interest?	Sociodemographic characteristics include: age, gender, ethnicity, education level, income, place of residence, occupation (e.g., forest-goers, miners, seasonal agricultural workers, students/school children). These characteristics provide some background information on how risks cluster and help guide how to conceptualize and target HRPs.
A2 What type of houses do HRPs live in and how are they likely to expose them to malaria?	The type of house can affect malaria transmission if the structure has openings through which mosquitoes can get in (e.g., eaves, unscreened windows, holes in the roofing material). The type of wall can affect the effectiveness of IRS (e.g., if mud walls are re-plastered, the effectiveness of insecticide may be lost).
A3 What conditions surrounding the household are likely to increase risk of getting malaria?	Micro-ecological factors around the homestead or work places can increase the risk of HRPs getting bites from that transmit malaria. Examples include proximity to mosquito breeding sites such as open pools of water, favorable hiding places for mosquitoes such as bushes etc.

Behavioral and social cultural characteristics of HRPs	
B1 What kind of occupations do the HRPs engage in? Are those occupations likely to expose them to risk of getting infected with malaria?	HRPs working outdoors (e.g., security guards, forest workers, fishermen, miners, etc) may get malaria because of increased risk of bites from mosquitoes. Students and school-going children may stay outdoors at night, exposing themselves to mosquito bites.
B2 Are there behaviors that are likely to increase HRP exposure to mosquitoes that transmit malaria? (e.g., night time leisure, cultural ceremonies)	Recreational places such as bars and restaurants usually serve drinks and food outside where customers are likely to get mosquito bites. In some communities, funeral rites, weddings and other cultural events are preceded by overnight ceremonies usually held outdoors because of the large number of people involved. These ceremonies are likely to expose people to mosquito bites that can lead to malaria infections.
B3 What do the HRPs know about malaria? Do they have any misconceptions about what causes the disease and how it can be prevented?	Misinformation and beliefs about malaria prevention can affect use of preventive measures such as IRS and ITNs. For example, in western Kenya, there are rumors that houses with IRS have an increase in bedbugs resulting in some households plastering the mud-walled houses after the spray. This possibly reduces the effectiveness of the insecticide sprayed.
B4 What are the sleeping arrangements among the HRPs households and how do they affect coverage and interventions such as ITNs?	Sociocultural norms define how available sleeping spaces in the households are shared. In most settings, ITNs for mass campaigns are distributed based on number of people in the registered households. Even when sufficient ITNs are distributed, some household members may not be covered because of the sleeping arrangements. Older school going children, particularly boys, may habitually sleep in other households that do not have nets for them.

Availability, use and acceptability of preventive measures	
C1 How accessible are malaria preventive interventions (IRS, ITNs, and chemoprophylaxis) among HRPs?	HRPs may be left out of mass ITN distribution campaigns especially if they are migrant workers or residing illegally in their host country. HRPs may live in tents or semi-permanent structures that are not considered eligible for IRS.
C2 How is the use of malaria preventive measures among HRPs?	Beliefs and lack of knowledge about malaria may prevent HRPs from using malaria preventive measures even when they are available. If HRPs do not associate malaria with mosquito bites, they may not use nets provided through mass campaigns or other channels.
Social Behavior Change (SBC)	
D1 Are existing malaria SBC messages understandable to the identified HRPs?	Some key malaria SBC messages may be selected for discussion in the FGDs to determine their appropriateness for the HRPs. Information obtained can be used to improve malaria messaging among HRPs.
D2 What are the most appropriate channels to deliver SBC messages for HRPs?	Access to communication channels such as radio and mobile phones can be explored in FGDs to establish the most effective ways to deliver malaria messaging to HRPs. Effectiveness of social channels such as community-based organizations can also be explored. Information generated from these discussions can also inform the design of SBC messages.
Access to health care services and treatment-seeking behaviors among HRPs	
E1 What are the costs associated with seeking care for malaria among the HRPs, including indirect costs?	Understanding costs associated with seeking care for malaria can inform interventions to increase access. For example, outreach/ mobile clinics to areas where HRPs live can reduce indirect costs associated with transport.
E2 Where do the identified HRPs seek health care for malaria?	Understanding where HRPs seek care (e.g., public or private health facilities, local shops/chemists, traditional healers, community health workers) can be useful to target appropriate responses. For example, if HRPs seek care from private clinics, interventions can be designed to subsidize the cost of antimalarials in those clinics.
E3 What other health services are routinely sought by or delivered to HRPs?	Other health services sought by HRPs (e.g., immunization, HIV care, TB care, ANC) can be important avenues to leverage malaria interventions such as periodic screening among HRPs.
Travel and mobility patterns of HRPs	
F1 What are the travel patterns among identified HRPs?	Travel patterns may influence malaria transmission especially in elimination settings where a majority of cases tend to be imported from other regions. It is important to establish travel patterns among HRPs to identify possible sources of infection. Consider whether travelers are moving from high to low transmission areas and vice versa. Determine any seasonality in travel which may lead to importation of large number of cases (e.g., seasonal migration, holidays).
F2 Are there established travel routes and how long is the duration of travel?	Determine travel routes followed by the HRPs, means of transport used, duration of travel, and overnight stay during travel, where the HRPs spend the night while in transit, etc. Check malaria transmission patterns along the transit routes and establish any possible sources of infection.

F3 Are there any malaria prevention measures taken before, during or after travel?	Establish if travelers use any preventive measures before or during travel, e.g., chemoprophylaxis. This can inform interventions such as screening at border crossings.
Health concerns of HRPs	
G1 What concerns do HRPs have about their health?	HRPs are often underserved populations and may have health concerns that are not considered in existing health programs. These may include challenges such as high cost of seeking care, sub-optimal quality of care provided, low access to preventive measures, and personal concerns such as lack of people to look after them when they are sick, loss of work due to sickness, etc. Identifying these concerns can inform the design of appropriate and targeted response interventions for malaria.
Strategies to effectively conduct testing and treatment for malaria among HRPs	
H1 Are HRPs comfortable with periodic malaria testing and treatment strategies?	Periodic screening and testing is a surveillance approach applied to improve case detection of malaria. Given HRPs are often in vulnerable situations, it is important to identify acceptable testing and treatment strategies that do not impact negatively on their livelihoods and socio-cultural norms. Determining how HRPs would feel about testing and treatment strategies that target them is critical to inform their design and implementation.
Acceptability and feasibility of proposed surveillance strategies and response	
J1 How should testing and treatment strategies targeting HRPs be organized?	Determine where, when and who are acceptable persons to conduct the testing and treatment among the different HRP subgroups.
J2 What are the best ways to recruit HRPs to participate in these strategies?	Present a case scenario of the proposed recruitment strategy (e.g., peer referral) and ask participants how it would work in their context.
Recommendations for future surveillance and response strategies	
K1 What other surveillance and response strategies would work for the HRP groups in the study area?	Getting the perspectives of target communities is critical to inform design and implementation of malaria interventions. Communities can give recommendations of what approaches they think would work in their settings. The recommendations should be reviewed and if considered appropriate, operational research studies can be designed to test them.

Appendix 2: Sample FGD Interview Guide

Date of FGD (dd/mm/yyyy): _____

Facilitator's name: _____

Note-taker's name: _____

Site location: _____

Start time of (24 h clock, hh:mm): __ __ : __ __ **End time of** (24 h clock, hh:mm): __ __ : __ __

No. of Participants: _____

Participant sub-group type: _____

(Mobile and Migrant Population/ Forest workers/ Travelers/ Locally acquired cases/ Community members)

Focus group questions	
Question area	**Examples of questions and probes**
Ice breaker	Are there any symptoms of malaria that you know of?
Risk activities in area	What kinds of activities are people doing in this area that may make them tend to get bitten a lot by mosquitos during the evening or early morning? • Work activities? • Recreational activities? • How much time is spent on each activity on a given day? • What other places do people gather between sundown and sunrise? • Can you describe any activities between sundown and sunrise that people may not want to discuss?
Sociodemographic characteristics of HRPs	Can you describe the different subgroups of HRPs in this area? • Type of activity they do • Places where they work • Places where they live • Age • Education • Income • Ethnicity
Income-earning activities	• What kind of activities do most people who live around here do to generate income? • Is this work done outside during the evenings, early morning and at night?
Work place organization	Can you describe how the work places of the HRP groups are organized? • Are there specific types of locations where different types of people work? • Do different groups of HRPs work at different parts of the workplace? • How do the workers related with their employers? • How do the different HRPs interact with each other? e.g., social groups, traveling together, buying and selling goods and services

Health services and prevention	• How common is it for people to have a fever in this area? • What do people do when they have fever? • Where do they seek treatment? • Are there any reasons why people do not seek care for fever? • Do people do anything else to protect themselves against mosquito bites, at home and while traveling? e.g., medication, repellant, spraying, covered housing
Malaria services	• What types of malaria services, if any, are provided at your work place? • Approximately how many workers did your organization serve this past year? • What challenges and successes has your organization experienced working with this population? • Apart from what your organization is offering, what other malaria services exist for the HRPS in this area?
Travel patterns among HRPs	Do people around here travel to other areas to find work? If yes, • Where do they travel to? • For what kind of work do they travel to the destinations mentioned? • What is the age range of people who travel there? • How often do they go and return? • When do people generally go there? What times of year? • Which of the travel destinations do you think leads to most people getting malaria? Why? • How do people travel there? (e.g., walking, bus, train, motorbike, car) • Do people travel there in groups or alone? If in groups, roughly how many people in a group? • What places do people transit through along the way? • Is an international border crossed during this route? Which ones(s)? • How many days does the journey take? • How many nights, if any, do people stay at this destination? • Where do they sleep while in transit? • Do people usually sleep under mosquito nets when there? Why or why not?
Migrant populations and travelers	• Are there migrants, mobile populations or travelers who come to this area? Can you describe them? (e.g., destinations they travel from, reasons for travel, age, education) • Are there specific types of migrants or travelers who are at high risk of malaria because their travel and why? • How much interaction or contact is there between migrant communities here? • How are the different migrant communities organized? Are there community leaders or migrant associations? • How common is fever among migrants/travelers in this area? • What do migrants and travelers do when they have fever? Where do they seek treatment? • Are there any reasons they do not seek care for fever? • What type of malaria services are provided for migrants and travelers? • What challenges and successes have you experienced working with migrant populations?

Strategies for accessing HRPs	
(a) Peer referral	• How well do you think a method of selecting people to participate in this study through peer referral would work? (i.e., asking a few people to refer their friends to the study team) • How many people working in (malaria risk activities, e.g., forest workers, migrant workers) do you know by name? • How easy is it for you to contact them?
(b) Venue-based sampling	• How well do you think venue-based sampling would work? (i.e., going to select participants at places where they work, e.g., logging or mining site) • What other kinds of places would you suggest we go to find and interview people who engage in this kind of activity? [Ask for specific names] • What times and days do they go to the places you just mentioned? • Are there specific people or leaders who can help us connect with other HRPs (e.g., forest workers, migrant populations)? [Ask for specific names]
(c) Border screening	• How well do you think screening people at border checkpoints would work as a way of selecting participants for the study? • What border locations would be most effective at reaching people who travel to this area? • What kinds of people who travel to the mentioned destination might not be found at these border crossings?
(d) Comparison of recruitment strategies	• Which of the three recruitment strategies (peer referral, venue-based sampling, border crossing) do you think would work better and why?
(e) Potential challenges	• What potential barriers or challenges do you think we might have in trying to reach specific types of HRPs (e.g., forest workers, migrant populations, travelers, students)? • How can we overcome these challenges or barriers?
Willingness to participate in the study	• Do you think various subgroups of people at this area/venue would be interested in participating in this survey that we are planning? • What strategies can we use to overcome any barriers
Study logistics	• Would the HRP group (e.g., forest workers, migrants, travelers) prefer male or female staff to conduct the interview and blood test? If gender doesn't matter, what characteristics matter most? • What kind of incentive do you think would work to encourage people to participate in the study? • What might be some convenient, accessible, safe and confidential locations to conduct the interviews? • Which languages should be used to reach specific HRPs? • The whole procedure for the study (interview, malaria testing and providing information about malaria) will take 1-2 hours. How do you think the different types of HRPs would feel about committing this time to participate in the study? • Some of the questions in the interview may be sensitive, for example, if people are involved in illegal work or travel. What can we do to help participants feel more open to participate in the study?

Appendix 3: Note Taker Template

Focus Group ID: _____   **Date of FGD**: _____

Start time of FGD: _____   **End time**: _____

Meeting place: (brief description of the location of the group, e.g., hospital premises, school hall, community social hall)

Description of group participants/key informant:

Number of participants	
Gender (men, women or mixed)	
Age range	
Professions/occupation (e.g., migrant workers, forest workers, community health workers)	
Other relevant characteristics (e.g., recently treated for malaria)	

Group dynamics (brief description of level of participation)	
Any dominant or dormant participants	
Level of interest (relaxed, anxious, etc)	
Any interruptions	
Other relevant dynamics of the group	

Seating chart: Draw a sketch of the group's seating plan

Running notes of the FGD by theme areas

Themes	Key points raised during the FGD
Risk activities in the study area	
High-risk travel destinations	
Malaria prevention (availability, use and acceptability)	
Treatment-seeking behavior	
Access to health care services	
Acceptability of proposed surveillance strategies	
(a) Border screening	
(b) Mass screening and testing	
Acceptability of recruitment strategies	
(a) Peer referral	
(b) Venue-based recruitment	

Summary of key highlights from the FGD

Appendix 4: Procedures for Recruitment

Recruitment through Snowball Sampling

1. Ask a key stakeholder (e.g., community leader, employer, health professional) to identify an individual that meets the criteria as a member of the subgroup. Alternatively, use all index cases identified through passive surveillance as a starting point for steps 2–3.

2. Complete the eligibility screening form to determine if that person is eligible to participate in the FGD.

3. If the person is eligible, introduce the study (Appendix 5 - Sample Script) and ask that person if they would like to participate. If the individual is eligible to participate in the FGD, record their name and contact details to follow up for scheduling.

4. Then ask if they can provide contact phone numbers or ways to locate others with similar characteristics to themselves that could be recruited for the study.

5. Complete additional rounds of sampling as needed until the sample size for the FGD is reached.

Recruitment through Gathering Points

1. Ask a key stakeholder (e.g., community leader, employer, health professional) to identify locations where members of the study population are likely to gather. For example, forest workers might be found at cafés near forest entry points, while MMPs may be found at bus stops or other transit points near border crossings. Other populations at high risk due to specific recreational or occupational characteristics might be found at locations associated with outdoor night-time activities (e.g., bars) or their occupation (e.g., cattle markets/market stalls).

2. Go to the gathering point and use script (Appendix 5).

Appendix 5: Sample Script for Recruitment of Participants

I come from [NMP/name of institution] and am currently working on a project connected to malaria risk in [district name] in collaboration with [collaborating institutions]. We are conducting a study about malaria risk in association with [occupation/travel/nighttime work].

Snowball Sampling

Someone you know, [insert name], recently participated in this project and provided your contact in case you are interested in participating. We would like to know more about how to better reach individuals who are at risk for malaria. To do this, we want to carry out a group discussion to ask questions about malaria, work or travel, and malaria prevention. Is this something you might be interested in?

At Gathering Points

We would like to know more about how to better reach individuals who may be at higher risk for malaria. To do this, we want to carry out a group discussion ask questions about malaria, work or travel. Is this something you might be interested in?

[If they are interested, continue…]

I will ask you some simple questions now about your work and travel to see if you are eligible to participate. This will take only a few minutes. If you are eligible, we would like to schedule a time for you to participate in a discussion with other people from the community, which will take approximately 1.5 hours. We will not pay you for participation but will reimburse the cost of traveling to participate and provide snacks and refreshment.

Appendix 6: Eligibility Screening Form

Survey Eligibility Screening Form for MMPs

Instructions: Complete the entire screening form for every potential study participant during the study period ("candidate"). Only questions that are not in brackets should be made to the participant. If the person is eligible to enter, continue with the informed consent and if the candidate consents, administer the survey questionnaire.

[Unique ID]	
[Date]	__ __ /__ __ /__ __ __ __ (dd/mm/yyyy)
Does the candidate have confirmed malaria infection by microscopy and/or RDT? *Note: only applicable if recruiting index cases at health facility*	☐ microscopy ☐ RDT ☐ neither → Participant is not eligible
"How old are you?"	☐ Age in completed years ____ ☐ Under 18 years → Participant is not eligible
"Can you comfortably speak and understand the [study language of choice] language?"	☐ Yes ☐ No → Participant is not eligible
"Have you participated in a survey for this study before?" *Note: if recruiting imported index cases at a health facility as a "seed" for other MMPs, may restrict time period from past 7 to 60 days.*	☐ No ☐ Yes → Participant is not eligible
"Did you spend the night outside of [study area] anytime in the past 60 days?	☐ Yes ☐ No → Participant is not eligible
"Please tell me all of the places you spent at least one night outside of [study area] during this time period, and the primary reason for travel." *List district if within study country, list country AND region/province if outside of study country* • Spending the night "in-transit" on the way to another place does not qualify as a destination to be listed. You must have a reason to be there other than just travelling through (i.e. visiting family, pilgrimage, work, recreation)	Destination Reason for travel _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____
Are any of the travel destinations listed above either a) outside of study country or b) in the following list of districts? *Refer below for list of eligible districts.* [INSERT LIST OF HIGH-RISK DISTRICTS]	☐ Participant is eligible to participate as an MMP. Continue to informed consent. ☐ No → Participant is not eligible

Appendix 7: Sample Debrief Form

Debrief Form

(To be completed by moderator in conjunction with note taker & study coordinator)

FGD ID NO. |__|__|__|__|__| **Facilitator Initials**: |__|__|__| **Note-taker Initials**: |__|__|__|

Participant sub-group type:
(Mobile and Migrant Population/ Forest workers/ Travelers/ Locally acquired cases/ Community members)

District:_____ **Date of FGD**: _____ **Date of Debrief**: _____

Participant Names (for confidentiality, these should not be their real names but names adopted for purposes of the FGD)

_____   _____

_____   _____

_____   _____

_____   _____

1. What were the main issues or themes that struck you during this focus group?
2. What new information did you gain through this focus group compared to previous focus groups in this study?
3. What messages did you take from this focus group for intervention design?
4. How would you describe the general atmosphere and engagement of the focus group?
5. How would you describe the group dynamics? Did all participants contribute? Did you feel there was pressure to adhere to dominant viewpoints (what topics)?
6. What else was important about this focus group?
7. Were there any problems with the topic guide (e.g. wording, order of topics, missing topics) you experienced in this focus group?
8. Did the group meet the specific objectives of the formative assessment? Are there any objectives you feel were not met? Why do you think the objectives were not met?
9. Any questions/themes not well understood by the participants? Any modifications to improve understanding of the questions?
10. What were the main points made by the respondents (list according to the predetermined themes based on the objectives of the assessment)

Appendix 8: Informed Consent

Note: The Informed Consent Form should be adapted for other types of HRPs or to meet any organizational/institutional requirements.

Formative Assessment to Characterize Imported Malaria and Identify Strategies for Accessing High-Risk Mobile and Migrant Populations in [country]

The national malaria program of [name of country] is conducting an assessment to characterize imported malaria cases in order to help [country] reach the goal of eliminating malaria. You are being asked to participate due to your knowledge of malaria and involvement in health work in [country, or because you tested positive at one of the health facilities participating in the study or were identified as a member of the mobile migrant populations by another individual who tested positive. The goal of this assessment is to identify strategies for accessing high-risk mobile and migrant population in [country].

This assessment is funded by _____.
and is implemented by the national malaria program _____.

Your participation is voluntary; if you have questions you may ask researchers, all of your responses will be anonymous and kept confidential. Please take your time to make your decision.

Confidentiality

If you agree to participate, you will be asked to participate in a one-on-one interview or discussion within a group of 6 to 10 individuals. A member of the field team will ask you questions to assess potential risk factors for malaria including travel history and use of measures to protect against mosquito bites in your house. You can stop participating in the study at any time. Participation or refusal to participate in this study will not affect your medical care or access to public health services in any way. We will not inform anyone of your participation in the study and your name will be kept confidential by replacing it with a number/identifier that will be used throughout the study.

You can talk to the study coordinator about questions, concerns, or complaints you have about this study. You have been given copies of this consent form to keep for future reference.

Consent

I am 18 years or older. ☐ Yes ☐ No

I understand that my participation is voluntary.
☐ Yes ☐ No

I understand that I do not have to answer questions I do not wish to answer and can stop the interview at any time.
☐ Yes ☐ No

I understand my name and other personal information will be kept confidential.
☐ Yes ☐ No

if you wish to participate in this assessment, please sign or provide a thumb print below.

_____   _____
Date   Participant's Signature/Thumb
                               Print for Consent

_____   _____
Date   Witness signature (if participant
                               does not speak/read English)

_____   _____
Date   Person Obtaining Consent –
                               Printed Name

Appendix 9: Enrollment Forms

Focus Group Enrollment Form

Focus Group ID: |___|___|___|___|___|___| Facilitator Initials: |__|__|__| Note-taker Initials: |__|__|__|

Number of Participants: |__| __| Audio file: |__|__|__| Date |__|__|/|__|__|/|__|__|

No.	Unique ID of Participant	Unique ID of Referring case/person	Age	Community position	Gender M/F	Occupation	Obtained consent? y/n
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Key Informant Enrollment Form

Name	Gender	Date Approached	Successful contact?	Category of KI	Interested?	Interview arranged (date)	Contact No.	Location	Unique ID assigned (6 digits)

Appendix 10: Reimbursement Log

Focus Group name ID: _____   **Date of FGD** (dd/mm/yyyy): _____

District: _____   **Country**: _____

	Name of participant	Location traveled from	Mode of transport	Receipt provided?	Cost of transport	Participant signature/ thumb-print
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Appendix 11: Outline of the Formative Assessment Report

The formative assessment report should include the following:

1. **Executive Summary**
   - Highlights of the key findings and recommendations from the formative assessment

2. **Background**
   - A brief description of malaria epidemiology and control interventions in the area of interest
   - Objectives of the formative assessment
   - Rationale of the formative assessment

3. **Methods**
   - Description of study design
   - Selection of study sites
   - Data collection tools
   - Data analysis and interpretation

4. **Results**
   - Key findings of the formative assessment by component, i.e.,
     » Summary of findings from review of existing data
     » Key findings from FGDs and KIIs
     » Findings of mapping of access points

5. **Discussion**
   - Application of the formative assessment results for malaria programming with special emphasis on design and delivery of targeted surveillance and response strategies among HRPs

6. **Recommendations**
   - Key recommendations from the assessment
   - Follow up plans

7. **References**

8. **Annexes**

Appendix 12: Enumeration Summary Form

Forest Workers' Malaria Survey

Page _____ of _____

To be completed by the enumerator

Area name: _____   **Venue name**: _____   **Venue #**: _____   **Event #**: _____

Team lead: _____   **Enumerator**:_____   **Date of visit**: _____ / _____ / 20__ __

Type of venue: ☐ Logging   ☐ Mining ☐ Agriculture   ☐ Processing plant   ☐ Permit office
☐ Other-specify:_____

VDT period: Day: M Tu W Th F Sa Su   Start: ___:___ am pm   End: ___:___ am pm
(*Tick all the days that apply*)

Actual enumeration period: Day: M Tu W Th F Sa Su   Start: ___:___ am pm   End: ___:___ am pm
(*Should be same as VDT period unless the sampling event was terminated early*)

Observed # potential participants enumerated during enumeration period (Number clicked): _____

Draw area of intercept or line in this space

Comments (weather, safety, etc)

Supervisor sign off: _____   **Team sign off**: _____

Appendix 13: Sample Universe of Venues Enumeration Form

Use a new form for each interview, focus group, and venue verification visit.

Informant ID: _____   **Date**: ____/____/_____

In which locations do members of the HRP that you are in contact with meet?   **Start Time**: ____:____ am pm

In what other places can we find more members of this HRP?

Code	Location name	Address	Venue type	Operating days and hours	Peak days and hours (when attendance is greatest)	No. of forest workers who meet/work at this place during peak times	
						Min	**Max**
Example	*Rigos Mine*	*Km. 70 of Highway 1*	*Mine*	*Th 6pm–8pm* *Fr 6pm–10pm* *Sa 6pm–12am*	*Fr 9pm–10pm* *Sa 8pm–11pm*	*5* *25*	*15* *40*
1							
2							
3							
4							
5							