The studies encouraged in this toolkit are primarily intended to guide action, either immediately or through information sharing leading to collective regional strategies. Localized study approaches for example, participatory rural appraisal and BCC design activities may be so action-focused that they are not commonly identified as research. Others - large population-based surveys, for example - require clear presentations to policy makers as well as regional dissemination using common indicators and definitions. Study designers should consider action issues before data collection begins.

This toolkit is targeted more to programme managers rather than to researchers. Its objective is to help managers oversee and manage the surveys component within their programme strategy, decide the kind of study that would be most useful for them, based on grant applications to be made or reported, programmatic decisions to be made or problems to be solved. The toolkit follows a decision-tree format, asking important questions and recommending study approaches based on answers. It presents methodological choices and present examples from recent reports.
Decision-tree framework for selecting study methods for malaria interventions in mobile and migrant populations
Contributors

Wayne Stinson, Independent Consultant [Author]
Bayo Fatunmbi, WHO ERAR Surveillance, Monitoring and Evaluation
Catherine Smith, University of Queensland
Deyer Gopinath, WHO ERAR Malaria and Border Health
Glaister Leslie, Malaria Consortium
Jaime Calderon, International Organization of Migration,
National Malaria Control Programs in the six Greater Mekong subregion countries
Nigoon Jitthai, USAID Regional Development Mission for Asia, Bangkok
Soy-Ty Kheang, Chief of Party/Regional Director PMI/ USAID Control and Prevention of Malaria (CAP-M)
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acronyms</td>
<td>vi</td>
</tr>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>1.1 Who are MMPs, and why should we study them?</td>
<td>1</td>
</tr>
<tr>
<td>1.2 What is a study?</td>
<td>2</td>
</tr>
<tr>
<td>1.3 Audience and format of this toolkit</td>
<td>3</td>
</tr>
<tr>
<td>2. The “Decision-tree” approach to survey management</td>
<td>4</td>
</tr>
<tr>
<td>2.1 Decide on your primary objective</td>
<td>4</td>
</tr>
<tr>
<td>2.2 Ask if a formal study is the best way to get required information</td>
<td>7</td>
</tr>
<tr>
<td>2.3 Consider methodological options</td>
<td>8</td>
</tr>
<tr>
<td>3. Overview of different study methodologies</td>
<td>11</td>
</tr>
<tr>
<td>3.1 If your objective is to generate quantitative indicators</td>
<td>11</td>
</tr>
<tr>
<td>3.2 If your objective is to identify MMP clusters, target those most at risk and quantify seasonal numbers</td>
<td>12</td>
</tr>
<tr>
<td>3.3 If your objective is to improve programme effectiveness</td>
<td>13</td>
</tr>
<tr>
<td>3.4 If your objective is to improve continuity</td>
<td>15</td>
</tr>
<tr>
<td>4. Information to action</td>
<td>17</td>
</tr>
<tr>
<td>5. The decision-tree algorithm</td>
<td>19</td>
</tr>
<tr>
<td>Annexes</td>
<td></td>
</tr>
<tr>
<td>1. Systems analyses</td>
<td>21</td>
</tr>
<tr>
<td>2. Programme effectiveness studies</td>
<td>23</td>
</tr>
<tr>
<td>3. Population-based surveys</td>
<td>26</td>
</tr>
<tr>
<td>4. Migrant mapping and risk analysis</td>
<td>29</td>
</tr>
<tr>
<td>Bibliography</td>
<td>31</td>
</tr>
</tbody>
</table>
**Acronyms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCC</td>
<td>Behaviour change communication</td>
</tr>
<tr>
<td>ERAR</td>
<td>Emergency Response to Artemisinin Resistance</td>
</tr>
<tr>
<td>GMS</td>
<td>Greater Mekong Subregion</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning Satellite</td>
</tr>
<tr>
<td>IEC</td>
<td>Information, education and communication</td>
</tr>
<tr>
<td>IRS</td>
<td>Indoor Residual Spraying</td>
</tr>
<tr>
<td>ITN</td>
<td>Insecticide Treated Net</td>
</tr>
<tr>
<td>LLIN</td>
<td>Long-lasting insecticide treated net</td>
</tr>
<tr>
<td>MARC</td>
<td>Myanmar Artemisinin Resistance Containment</td>
</tr>
<tr>
<td>MMPs</td>
<td>Mobile and migrant populations</td>
</tr>
<tr>
<td>PMI</td>
<td>President’s Malaria Initiative</td>
</tr>
<tr>
<td>PSI</td>
<td>Population Services International</td>
</tr>
<tr>
<td>RBM</td>
<td>Roll Back Malaria</td>
</tr>
<tr>
<td>SME</td>
<td>Surveillance, Monitoring and Evaluation</td>
</tr>
</tbody>
</table>
1. Introduction

Malaria is declining almost everywhere in the Greater Mekong Subregion (GMS), and several countries that suffered from high burdens just a decade ago are now aiming to eliminate malaria – a major achievement if successful. In fact, elimination would bring major economic and social benefits to virtually every country in the region, because of reduced health care costs and increased economic productivity. Malaria weakens workers, makes mothers anemic and decreases children’s cognitive development. It has been with us for 500 000 years, but diligent efforts can eliminate it and must be pursued.

Two major challenges confront the region, nevertheless, and have led WHO to declare a public health emergency. One is that all available medications, both historically and now, have been weakened and eventually made ineffective by parasite resistance. The only drugs available now, which are artemisinin-based compounds, are rapidly developing resistance, and can only be “saved” by eliminating all malaria in areas affected by resistance. More is at stake than the success or failure of malaria control in the GMS, moreover, because Africa has far more malaria than the Mekong area; and the enormous gains made in malaria control there since 2005 will be seriously jeopardized if resistance spreads.

A second major challenge – the subject of this toolkit – is that malaria primarily affects migrant and mobile populations (MMPs), who are often the most difficult to reach and are particularly vulnerable because they move in and out of high transmission areas (especially forests). MMPs are often unpopular or worse, because they are not part of the local community, may speak a different language, and may even be considered illegal, yet in some cases they provide the muscle that makes countries grow and prosper. They may even be blamed for spreading resistant malaria – yet they are actually the first to suffer and the most prominent victims. MMPs are in fact the most challenging “target” group for both resistance management and malaria elimination, and ways must be found to better serve their needs.

1.1 Who are MMPs, and why should we study them?

There is general agreement that we do not know what we need to know about migrant and mobile populations in order to reach them – to ensure that they protect themselves against infectious diseases, that they obtain prompt and high-quality services when sick, and – very important for malaria, tuberculosis and other conditions – that they take all necessary steps to complete treatment and eliminate pathogens that may contribute to drug resistance. As managers responsible for MMP services, we must obtain funds, procure commodities and train staff for the populations at greatest risk in our coverage zones, and these include “strangers” who may be difficult to identify and count.

Who are the MMPs, or – perhaps better stated – who are the MMPs at greatest risk? This toolkit does not propose a fixed definition of MMPs nor of their subcategories (up to a dozen definitions have been proposed), but it does encourage anyone conducting MMP studies or communicating results in regional fora to state clearly what population group has been studied.
Programmes will define their own study populations based on specific operational concerns; however, the following types of people are likely to be of special concern:

<table>
<thead>
<tr>
<th>We need to know where and how many people are at high risk of malaria, not just now but during the life cycle of current programme plans and grants. We also need to know more about population movements, living and working conditions, access to services, and knowledge and behaviour so as to tailor communication to special populations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø Anyone exposed to heightened malaria risk because he or she moves into a high transmission zone, usually in or near a forest, especially if he or she comes from a low transmission area; families of such people who may be exposed to malaria after their return.</td>
</tr>
<tr>
<td>ø Anyone in high transmission or artemisinin-resistant areas with restricted access to preventive or curative services because they are not locally registered, deliberately avoids official contacts, or speaks a minority language.</td>
</tr>
</tbody>
</table>

More specifically, the following are usually considered MMPs:

| ø Seasonal workers who may lack access to established health services because they originate elsewhere; |
| ø Miners, tree cutters and others who may avoid government services because their activities are not officially approved; |
| ø Members of minority ethnic groups; |
| ø Soldiers, border police and other security forces who travel through forest areas (sometimes with their families). |

Note that distinctions between internal and external migrants, and between temporary and longer-term migrants, are primarily important in terms of effect on access to commodities and services and their comprehension (or incomprehension) of national languages.

### 1.2 What is a study?

A study, as defined for this toolkit, is an effort to collect new information about MMPs, regardless of whether results are intended for theoretical application or for immediate problem-solving. Studies may be sophisticated and robust (easily generalized to other settings) or “simple” and programmatic, with primary relevance to the local setting. They should be “special,” i.e., not frequently repeated, but they need not (by this definition) require formal research approval or even English-language translation. Results may be quantitative (statistical or providing “counts” of MMPs), or qualitative (descriptive), but they should be “objective,” that is, not influenced by preconceptions or personal opinions. This is not a universal definition of “study” but rather an operational one for the purpose of this toolkit. In fact, many of those doing “studies” may consider them as routine data-based problem-solving, rather than research. (Even routine problem-solving should be objective and rigorous, however, and should be reported so that others may learn.)
MMPs are very important participants in many studies which this toolkit will not consider: programme assessments, operations research, epidemiological analyses, entomological studies, and therapeutic efficacy studies, for example. Programme managers striving to improve services should make ample use of these resources, but the toolkit will not consider them as MMP studies because they focus on programme interventions (where MMPs are objects) rather than on the MMPs themselves (MMPs as subjects).

1.3 Audience and format of this toolkit

This toolkit is targeted to programme managers rather than to researchers. Its objective is to help managers oversee and manage the surveys component of the ERAR SME strategy. Ideally it should help managers decide the kind of study that would be most useful for them, based on grant applications to be made or reported, and decisions to be made or problems to be solved. The toolkit will follow a decision-tree format, asking important questions and recommending study approaches based on answers. It will present methodological choices and present examples from recent reports. A literature “repository” being developed alongside the toolkit will identify and provide easy access to many recent studies.
2. The “Decision-tree” approach to survey management

You are probably considering a study because your team wants to “know more” about MMPs, or perhaps because an important donor/funder/stakeholder requires quantitative reports. These are valid reasons, of course, but you may need to be more specific and more certain that a study (rather than use of existing data) is the best way to get what you need.

Studies are expensive (especially for human resources), take lots of time to complete and report, and may attract multiple “owners” and agendas.

Since MMP settings change so fast, the situations they were intended to describe may have moved on before results become available.

Multiple approval requirements, some perhaps not foreseen, may delay implementation.

2.1 Decide on your primary objective

If you nevertheless need a formal study, start by asking why:

Do you need to report population-based data to your stakeholder(s)/donor(s)?

Do you have reliable information on where MMPs live and work as well as their numbers, and can you project where they will be several years from now?

Do you know how to make services and preventive activities more effective for MMPs?

Do you know how to reach MMPs before they enter high-risk areas and after they return?

Do you need to report population-based data to the Global Fund or other donors/funder/stakeholder?

Donors justifiably require quantitative data, and you need them as well to track progress. The question is whether to develop a big survey for this or to rely on simpler but perhaps less valid
methods until you know more about MMPs, especially where and how many there are (a survey based on an unknown or highly transient population may be difficult to interpret).

Surveys typically employ one or more questionnaires addressed to a sample of respondents. To ensure correct interpretation, planners must design and translate questions with great care, and data collectors must ask them without attempting to influence responses. They must also find the right people to interview.

Some indicators relate specifically to MMPs (some even to MMP subcategories), but others refer to the general population in a specified area. Estimates will not be valid, though, if those most vulnerable to malaria cannot be reached for an interview, making traditional population-based surveys inappropriate for highly unstable areas or populations. Techniques exist for overcoming this problem, notably respondent-driven sampling (RDS, described below), but estimates derived from RDS cannot be easily merged with those from other sampling frames.

**Do you have reliable information on where MMPs live and work and where they are most vulnerable to malaria? Can you project where they will be during the lifetime of upcoming grants?**

You must have this information (especially estimates of the future) to obtain adequate grants and to plan services and commodities. However, “guesses” may not be easy to quantify because MMPs are often “hidden” or so highly transient that numbers are a mere snapshot in time. Some of the worst malaria outbreaks in recent years have occurred because of unexpected population movements or because even well-anticipated changes could not be adequately quantified for grant requests. Moreover, the total number of persons at heightened risk of malaria because of forest work may be far greater than those present at any specific time, because of seasonal turnover.

Mobility is not by itself a risk factor for malaria, but the places where mobile populations go and the conditions they encounter there may be risky, especially if movement has been from a low malaria transmission area to a high one (or the reverse for sick persons). Forest work and plantation work during biting times are both high risk. So is sleeping rough in vulnerable settings. Crossing a small river to another country may significantly reduce access to health care – or perhaps increase it depending on destination. Living conditions, work environments, mosquito species and biting behaviour, even the general prevalence of malaria in the region, will all affect malaria vulnerability.

The types of surveys required for “migrant mapping” and risk analysis are very different from those needed to produce population-based indicators. Risk analysis, moreover, may require specialized epidemiological and entomological studies described elsewhere in this toolkit.

**Do you know how to make services and preventive activities more effective for MMPs?**

Managers who know risk factors also need to know how to help MMPs to respond, through both preventive actions and better case management. Do you know how to increase the likelihood that forest workers will carry and use LLINs, or that persons with fever will respond quickly and seek appropriate treatment? Do you know what MMPs are doing well now so you
can encourage it without unnecessarily introducing unfamiliar concepts? Do MMPs trust the 
public health system, or can it be modified so that they do? You may even want to know how 
you can make your existing services more attractive to MMPs.

While specific risk factors will take time to change, as described above, there may be much 
that can be done to improve services and educate MMP responses; managers need to know 
the specific factors that make MMPs vulnerable to malaria.

- Where do MMPs work, and when (if at all) might they be exposed to infectious biting? 
  What do they do during evening biting hours, and do they sleep under an insecticide 
treated bednet or hammock?
- What do MMPs know and do to prevent malaria, and where do they go for advice or 
drugs when sick?
- If treatment-seeking behaviour is inappropriate, do managers and staff know why and 
  what can be done to improve it?
- Do managers understand underlying health beliefs and family and community interactions 
  that affect BCC messages and media as well as interpersonal communication?

Studies focused on service improvement may include numbers but are usually best if they 
explore situations in depth using focus groups and key informant interviews. Such surveys 
generate a wealth of qualitative information about specific MMPs and settings but may be difficult 
to generalize to those living differently. Many studies have been done but the programmatic 
responses they provide are local and may be difficult to generalize to other settings.

Do you know how to reach MMPs before they enter high-risk areas and after 
they return?

MMPs are commonly studied at their destination points rather than at their points of origin, yet 
at destinations they are often remote, isolated from services and perhaps “illegal” or otherwise 
cut off from authorities. Malaria (and especially artemisinin resistance) is particularly concentrated 
along borders, yet the health care context – the “migrant system” (Smith and Whitaker) (see 
Figure 1) – often changes dramatically at just the point when it needs to be at its strongest. 
Forest-based workers returning to their places of origin, whether internal or across borders, may 
carry resistant parasites to home clinics where there is limited malaria expertise.

Analyses that encompass the full range of MMP movements may help to:

- Reach MMPs before they embark on transit, to advise on malaria risks and possibly to 
distribute LLINs
- Identify potential sources and agents for BCC during transit (buses, taxis)
- Identify “touch points” in transit, where LLINs might be distributed or emergency care 
  offered
- Strengthen services close to MMP destinations
- Prepare public health services and families at points of origin to receive MMPs and 
  respond to possible illness.
A very important reason for knowing more about personal movements, especially in artemisinin-resistant areas, is to guide creation of post-treatment surveillance systems for malaria patients who may move on within the 28-day follow-up period.

### 2.2 Ask if a formal study is the best way to get required information

It is vitally important to malaria elimination worldwide that we learn more about MMPs in this region and share that information with others. It is even more important that we strengthen services; and the time and money that we spend on research may be excessive if it detracts from services. As a manager, you must set priorities.

One example of existing information is that held by locally based staff who may know a great deal about MMP movements and risks but have not been encouraged to communicate it.

Your first option may be to try to use existing information, especially if it has been neglected in past decision-making:

- Do lower level staff feel empowered to take action based on local knowledge, and can ways be found to increase upward communication?
- Might enhanced internal communication (perhaps stimulated by small grants and technical support) produce more useful information than a formal study?
Would greater national attention to routine surveillance data and HMIS yield significant information and encourage better reporting?

Can cooperative enterprise managers tell you their plans so that you can project labour flows?

Is it even possible that security forces could confidentially alert health authorities to changes in official and family movements, including periodic cycling between low- and high-transmission areas?

Some of this – especially the last – may be unlikely but is worth considering before approving a study. Note also:

- Studies can be costly and time consuming. Results may be outdated by the time they become available.
- Because studies are infrequent and “special,” they may attract multiple owners (i.e., try to serve too many purposes at once) OR to become so “controlled” as to become “unnatural.”

At the end of the day, you may well need a formal study, but it is important to know why and to sort out perhaps conflicting objectives before proceeding to design.

### 2.3 Consider methodological options

While refined methodological design is best left to research experts, managers should know the basic choices that have to be made and provide overall guidance. Your objective will be to get required answers as quickly as possible, at least cost in funds and staff time; whereas a
researcher’s mandate is to maximize validity and reliability. These interests are both very important and not inherently incompatible, but compromises may be unavoidable. Broadly speaking, there are several methodological options:

- **Questionnaire-based surveys**
  - based on defined geographic areas (e.g., artemisinin resistance Tier 1)
  - focused on defined population groups (e.g., plantation workers, forest workers)

- **Migrant mapping**
  - Comprehensive mapping
  - Employment-based mapping
  - Epidemiological studies
  - Entomological assessment

- **Programme effectiveness studies**
  - Ethnographic approaches
  - Participatory rural appraisal, positive deviance models
  - Key informant interviews/focus group discussions
  - Health systems research

- **Analyses of migrant systems**

These options are more fully described in *Annexes 1–4*. 
Note that a major issue in each case is how to get a representative sample of MMPs (especially in settings where they are “hidden” or transitory).

Table 1: Common study objectives and options for malaria surveys among MMPs:

<table>
<thead>
<tr>
<th>If your objective is...</th>
<th>And you need to...</th>
<th>Then consider this...</th>
<th>And these issues...</th>
</tr>
</thead>
</table>
| To measure population-based indicators | Report to donors | Professionally designed survey with special samples for MMPs | • How to include MMPs in sample  
• How to ensure that survey “captures” MMP needs  
• How to ensure results are timely  
• How to ask questions in MMP languages |
| | Guide local engagement and community participation | Community-designed questionnaire representing all population segments |
| To know where vulnerable MMPs live and work and how many are there at different seasons | Plan grant proposals, locate facilities, develop HR plans, order commodities | Migrant mapping; employer/owner surveys | • How to identify MMP clusters  
• How to estimate the number of MMPs  
• How to predict rapid changes and modify budgets when needs change  
• Are GPS data possible? |
| | Target services to the most vulnerable population groups | Epidemiological studies; entomological assessments |
| To improve service quality and effectiveness (including BCC) | Develop national BCC strategies and messages | Studies of health-seeking behaviour, based on a representative sample | • What risk factors increase malaria vulnerability?  
• Do LLIN distribution procedures reach MMPs?  
• Do BBC approaches reflect MMP settings? and options? |
| | Strengthen local programmes and outreach for specific groups | Participatory rural appraisal, positive deviance models, process improvement approaches |
| To strengthen continuity of prevention and treatment services | Plan services and BCC at points of origin, transit, and destination, including cross-border and interdistrict collaboration | Interviews with MMP key informants regarding places of origin, transportation routes and methods, and seasonality | • Can study design include neighbouring cross-border districts; also low-transmission points-of-origin?  
• How can forest-goes be reached before they travel to remote areas?  
• Will study results affect services at touch-points in low transmission transit areas? |
| | Same as above but for specific population groups | Process improvement models |
3. Overview of different study methodologies

The rest of this toolkit provides an overview of different study methodologies and how they can help you achieve your desired objectives. Details of each suggested approach is given in Annexes 1–4.

3.1 If your objective is to generate quantitative indicators...

Population-based surveys can be very attractive – and are sometimes essential – but they can also be misleading if based on inappropriate samples or poorly designed questionnaires. They are usually the only way to measure household-level rates and ratios because they generate numerators and denominators at the same time, but the families that can be easily reached for surveys are often not the ones with the weakest access to health care. Some difficulties can be overcome at the community level and through specialized sampling techniques, but even specialists may find the challenge difficult if population groups are ill-defined or uncertain.

<table>
<thead>
<tr>
<th>If your objective is to generate quantitative indicators...</th>
<th>What information do surveys produce?</th>
<th>What models can you draw from?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whether focused on geographic areas (e.g., MARC Tier 1) or defined population groups (e.g., plantation employees), surveys produce quantitative indicators, normally stated as proportions, e.g., 60% of children under-five sleep under LLINs.</td>
<td>There are few examples of population-based quantitative surveys, but most cover geographic areas that include MMPs rather than focusing specifically on MMPs; those covering geographic areas may not reliably represent MMPs:</td>
</tr>
<tr>
<td></td>
<td>• % of mobile persons who used an ITN the last time they slept in transmission areas</td>
<td>• Malaria indicator surveys: Recent examples include the MARC baseline survey (2011) and the Cambodia Malaria Survey (2013). Sampling focused specifically on MMPs is often not possible.</td>
</tr>
<tr>
<td></td>
<td>• % of mobile population with fever in the last 3 months who accessed parasite-based diagnosis</td>
<td>• Respondent-driven sampling (RDS): with appropriate techniques, can be used to estimate the number of MMPs of different categories (<a href="http://www.respondentdrivensampling.org/reports/RDSsummary.html">http://www.respondentdrivensampling.org/reports/RDSsummary.html</a>).</td>
</tr>
<tr>
<td></td>
<td>• % with reported fever in the past 2 weeks and who had any test for malaria. (This is not a complete list.)</td>
<td>• Employment-based surveys: Places of employment (especially farms and plantations) may offer easy sampling frames for some elements of the MMP population, but only those who are officially employed. Those who are most difficult to reach – unregistered migrants and individual entrepreneurs (tree-cutters, miners, etc.) remain unrepresented.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Community surveys: Community-based forest-goers are an important component of the mobile population and can easily be interviewed within their household of permanent residence.</td>
</tr>
</tbody>
</table>
3.2 **If your objective is to identify MMP clusters, target those most at risk and quantify seasonal numbers**

Any programme that specifically aims to serve MMPs must know where vulnerable people move, live and work; and they should know roughly how many people are at risk. Since both locations and numbers are in constant flux, they should have data on seasonal ebbs and flows as well as predictions that should outlast donor grant cycles. While it may be relatively “easy” to identify large “authorized” employers and family-owned farms, it may be much harder to map:

- Short-lived seasonal or opportunistic clusters
- Informal entrepreneurs
- Individual forest-goers, some local and some from distant locations or countries
- Groups that do not want to be known
- Non-State actors
- Military
- Armed groups in rebellion.

Obviously not every person who travels is at risk of malaria, nor is every enterprise employing MMPs likely to generate malaria. Irrespective of personal behaviour (discussed below), some environments are inherently risky and others not. Malaria specialists speak of “hot spots” (locations with much malaria) and “hot pops” (population groups such as MMPs who appear especially vulnerable). Spots are identified through epidemiological analyses, environmental and epidemiological studies, and enterprise surveys (discussed here); “pops” can be identified through behavioural studies (discussed below).

<table>
<thead>
<tr>
<th>If your objective is to identify MMP clusters, target those most at risk, and quantify seasonal numbers.</th>
<th>What information do surveys produce?</th>
<th>What models can you draw from?</th>
</tr>
</thead>
<tbody>
<tr>
<td>While not all mapping studies do everything, below is a list of information that they may produce:</td>
<td><strong>Comprehensive migrant mapping:</strong> Comprehensive studies attempt to identify every location. Where MMPs congregate and to obtain estimates of MMP numbers. Researchers obtain lists of registered enterprises and ask local government authorities about other known locations. They then ask informants to estimate population sizes, including family members, although one study from Cambodia commented that farm owners do not keep accurate records. Enterprises which exceed authorized employment levels, moreover, may significantly underreport population size. Migrant mapping provides a snapshot in time and is most useful when linked to routine updates.</td>
<td></td>
</tr>
<tr>
<td>• GPS-marked locations of MMP settlements (“clusters”) as well as temporary areas of activity (tree-cutting, stump clearing, informal mining)</td>
<td>• Estimates of MMP numbers, ideally showing seasonal ebbs and flows as well as future projections</td>
<td></td>
</tr>
<tr>
<td>What information do surveys produce?</td>
<td>What models can you draw from?</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------------</td>
<td></td>
</tr>
<tr>
<td>• Locations of health service facilities and drug-sale outlets, both public and private</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Roads, river transport networks and forest access points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Malaria incidence in different locations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Locations of forest, cleared land, mosquito breeding areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Species and biting behaviour of malaria vectors.</td>
<td>• <strong>Employer surveys:</strong> Mapping need not be comprehensive to be useful, especially in areas where most economic activity occurs in large enterprises. Enterprise owners, while perhaps initially distrustful, may respond well to efforts to support employee health services and other collaboration. (Unauthorized enterprises may be less open, however.) Larger employers may have good estimates of their labour force, though perhaps not of family members or seasonal flows. Additional measures may be needed to estimate future employment levels.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Epidemiological analyses:</strong> Epidemiological analyses can highlight areas of high or increasing malaria transmission and others where malaria risks are low. Similar but perhaps less reliable information may come from key informants.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Ecological studies:</strong> Malaria rises, falls (and may later increase) with development, starting low when forests are left standing, rising significantly when they are cut, and then falling (perhaps dramatically) when the land is cleared. Depending on subsequent development, more modest increases may follow, especially if mobile workers return and economic activity (e.g., rubber tapping) occurs at night. Managers need ecological information on specific local areas, but they may not require a special study.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Entomology studies:</strong> See separate discussion in the entomology chapter of this toolkit.</td>
<td></td>
</tr>
</tbody>
</table>

### 3.3 If your objective is to improve programme effectiveness...

MMPs are real people, not just numbers, and their personal characteristics and environments are highly varied. MMPs typically differ from settled populations, moreover, and may speak unfamiliar languages, requiring information-based efforts to adapt to programmes. Studies that gather such information often rely heavily on qualitative techniques, probing for unique factors that are difficult to quantify; however, many gather quantitative data as well (although sometimes with small samples). Such studies often focus on individual MMP groups, sometimes those working in a limited range of economic enterprises, to facilitate in-depth analysis of risk and behaviour factors.

Studies intended to make programmes more effective for MMPs **consider community perceptions, practices and behaviour, and the quality and accessibility of services.** Up to 11 subcategories of MMPs have been identified (see Surveillance chapter), with each requiring a specialized mix of malaria prevention and treatment services. Programme effectiveness studies
aim to clarify the optimum mix by refining BCC, community health programmes, and clinic services and locations; ideally they should lead to improved quality in the private sector as well. Numerous small information gathering efforts (not necessarily “studies”) may be required because of the diversity of local conditions and MMP clusters. Most studies attempt to link demand and supply factors while concentrating data collection on one side or the other.

<table>
<thead>
<tr>
<th>What information do surveys produce?</th>
<th>What models can you draw from?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>If your objective is to improve programme effectiveness.</strong></td>
<td>Programme-specific information normally comes from routine information systems, including programme assessments and supervision visits; but there may be times when special studies are appropriate.</td>
</tr>
<tr>
<td>Studies primarily focused on MMPs typically gather information on individual (as opposed to ecological) risk factors, including:</td>
<td>• <strong>Immersion approaches:</strong> Anthropologists study population groups by living among them, learning their language, and actually participating in (not just enquiring about) their daily lives. Malaria researchers cannot normally afford the time and patience required, so they ask questions of representative subgroups (focus groups) and people who know about them (key informants).</td>
</tr>
<tr>
<td>• Access and health care seeking behaviour</td>
<td>• <strong>Community surveys, participatory appraisals:</strong> Community surveys, mentioned earlier, use questionnaires to request the information (listed in the column on the left of this table). One such approach, Participatory Rural Appraisal (PRA), applies a basket of tools (e.g., mapping, ranking, seasonal calendars, timelines) to engage residents, generally over a number of days. Another, called Positive Deviance (PD), directly links self-discovery with behaviour change. These methods are not generally called studies but can if documented produce much useful information.</td>
</tr>
<tr>
<td>• Knowledge of malaria, its causes and prevention</td>
<td>• <strong>Drug outlet surveys:</strong> Surveys of locations where anti-malarials may be obtained usually focus on private sellers but sometimes include the public sector as well. This can also entail drug availability, as well as drug quality (including presence of substandard and counterfeit drugs).</td>
</tr>
<tr>
<td>• Housing conditions</td>
<td></td>
</tr>
<tr>
<td>• Exposure to infectious biting</td>
<td></td>
</tr>
<tr>
<td>• Preventive behaviours, especially use of LLINs</td>
<td></td>
</tr>
<tr>
<td>• Language and literacy</td>
<td></td>
</tr>
<tr>
<td>• Access to media including BCC messages</td>
<td></td>
</tr>
<tr>
<td>Once they have identified groups and gained trust, focus group discussions and key informant interviews can be used to learn more, often using open-ended questions to benefit from unanticipated information.</td>
<td></td>
</tr>
<tr>
<td>(An alternative technique – one not based on formal research – is to simply talk informally with people, either at a clinic or in their temporary settlements.)</td>
<td></td>
</tr>
<tr>
<td>Direct assessments of BCC and services commonly studied:</td>
<td></td>
</tr>
<tr>
<td>• BCC: Content, quality, language and media</td>
<td></td>
</tr>
<tr>
<td>• Health workers: Number, skills and location of those trained in malaria and referral/treatment</td>
<td></td>
</tr>
<tr>
<td>What information do surveys produce?</td>
<td>What models can you draw from?</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>• Private sector: Availability and quality of outlets and clinics, including diagnostic and treatment services offered and drugs sold</td>
<td>• <strong>Programme assessments</strong>: These are not “studies”, as defined here; but some combine user perspectives as well as supply factors. Programme evaluations consider service quality and outreach, and BCC.</td>
</tr>
<tr>
<td>• Public sector: Quality of case management and prevention services, including dependability of supply systems</td>
<td>• <strong>Net preference studies</strong>: While quantitative studies measure how many MMPs use preventive measures, and other studies (not described here) measure their clinical effectiveness, studies that directly link LLIN supply with demand for and use of nets can reveal a great deal about MMP malaria-related knowledge and behaviour. These can use key informants or more community-based studies.</td>
</tr>
</tbody>
</table>

Note that the best studies look at supply and demand factors together, coming up with measures and predictors of utilization.

### 3.4 If your objective is to improve continuity...

Once MMPs approach their “final” destinations, their need for health services may increase – at just the point where accessibility decreases. Accessibility may decrease because MMPs go to remote places that local people avoid, or because officials may be indifferent or hostile. The employers who hire some of them, and the freelance middlemen who buy forest products from others, may see little to gain in providing health care. While “movement” and “systems” have been implicit in most migrant studies, few outside the HIV arena have given equal attention to points of origin, movements and support systems within single countries and on both sides of international borders (Smith and Whittaker). Studies that give equal attention to both sides of international borders may be particularly necessary but difficult.

It is recognized that there is a need to reach MMPs and the groups who have contact with them at their points of origin (and return), as well as in transit if possible; and some innovative programmes have evolved when this has occurred. The need for continuity will only increase as programmes enter into elimination phase, and individual cases may need 28-day follow-up to ensure treatment efficacy. Links are also required with employers, transporters and MMP “touchpoints” (places where MMPs have contact with people and facilities who might help them).
| **If your objective is to improve continuity.** | Information is needed about MMP origins, destinations and plans for return; also about modes of transport. Information about publicly accessible “touch-points” can be invaluable. (“Touch-points” are locations and facilities that can dispense advice and provide services. Examples include retail outlets, “friendly” border posts, screening points, and perhaps local government facilities that might not normally serve MMPs.) For formally employed workers, information on recruitment networks and company-provided transport can be very helpful.

Points of origin for seasonal MMPs may serve later as destinations when they return; and the capacity of public health facilities for diagnosing and treating any illness they might carry is critically important. Information is needed about skills, equipment and drug availability at this level. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What information do surveys produce?</strong></td>
<td><strong>What models can you draw from?</strong></td>
</tr>
<tr>
<td>Few systems models are available, although partial approaches are common. MMPs are commonly studied at their destination points rather than at their places of origin (perhaps asking about home districts and movements), yet at destinations MMPs are commonly remote, isolated from services and sometimes “illegal” or otherwise cut off from authorities. <strong>Interviews at destinations (predeparture) are appropriate and useful</strong>, but may miss important groups of “hidden” migrants.</td>
<td></td>
</tr>
<tr>
<td>Predestination data sources may produce additional information about how MMPs may be reached before departure and during transit. Sources may include employer recruitment offices and transport operators.</td>
<td></td>
</tr>
<tr>
<td>As noted above, <strong>capacity assessments within local public health facilities on both sides of the border (origin and destination)</strong> are likely to be useful as well.</td>
<td></td>
</tr>
</tbody>
</table>
4. Information to action

The studies encouraged in this toolkit are primarily intended to guide action, either immediately or through information sharing leading to collective regional strategies. Localized study approaches – for example, participatory rural appraisal and BCC design activities – may be so action-focused that they are not commonly identified as research. Others – large population-based surveys, for example – require clear presentations to policy-makers as well as regional dissemination using common indicators and definitions. Study designers should consider action issues before data collection begins. Several recommendations might enhance data-based action:

For programme managers:
- Identify and prioritize study objectives before initiating design; do not turn this decision over to researchers.
- Identity and involve intended data users and implementers in design discussions.
- Encourage simple cross-disciplinary designs, including participatory approaches where appropriate.
- Take every reasonable step to encourage prompt approval and implementation of studies, noting that outdated information will not be useful.
- Require prompt reporting with recommendations, but do not overinterpret preliminary results.

For researchers:
- Understand and respect the programmatic lead, even if ideas differ from yours.
- Engage national and local staff in all phases. Identify one or more co-investigators from national programmes.
- Design cross–disciplinary studies that clarify operational issues, even if they are less useful for theory; give higher priority to practical issues rather than theory.
- Define variables respecting regional consensus; explain operational definitions when interpretations are required.
- Link “special” data collection with routine information systems so that findings can be updated and extended to new area.
- Consider simple implementation “tools” to help programme staff adapt findings to local circumstances.
- Analyse and promptly report study results, noting that conference presentations are insufficient. Results presented at international meetings or in professional journals may not reach people quickly on the ground. Even low-cost local studies are likely to be of interest within and across national borders, and should be reported in writing.
Dissemination of study results (even for “simple” studies) should be done in ways that add to the growing regional knowledgebase on MMPs, and could be facilitated by WHO. Studies that define important variables operationally should clearly describe key elements so that others may compare results. Studies that were mainly intended to solve local problems should report the way in which information was gathered so that others may adapt them.
5. The decision-tree algorithm

In developing a decision-tree algorithm, a suggested simplified but essential flow of questions are suggested below:

1. Do you have essential data that you need to report to your stakeholder(s)/donor(s)?
   a. If yes, consider a survey to better identify migrant locations and numbers (question 2).
   b. If population-based data are a high priority, look first for existing data:
      i. Community surveys
      ii. NGO project reports
   c. If data are still needed, consider a population-based survey
      i. General population-based survey
      ii. Employer-based survey
      iii. Community surveys or surveys

2. Do you have reliable information on where MMPs live and work as well as their numbers, and can you project where they will be several years from now?
   a. If yes, consider a qualitative survey (question 3).
   b. If not, are you mostly missing recent arrivals and transient populations (requiring only key informant interviews)?
   c. Or do you need a comprehensive study?
      i. Migrant mapping
      ii. Employer-based survey

3. Do you have the information you need to adapt service delivery and BCC to MMP needs and preferences?
   a. If services are as effective as you think they can be, consider an MMP systems analysis (question 4).
   b. If not, consider a qualitative study among “accessible” MMPs
      i. Ethnographic study
      ii. Community survey of malaria-related knowledge and behaviour
      iii. Focus group discussions and key informant interviews

4. Do you know how to reach MMPs before they enter high-risk areas and after they return?
   a. If yes, work with partners to strengthen continuity of care
   b. If not, develop a systems analysis with multiple partners
First decide on your primary objective

- **Do you need to report population-based data to your stakeholder(s)/donor(s)?**
  - If population-based data are a high priority, look first for existing data:
    i. Community surveys
    ii. NGO project reports
  - If data are still needed, consider a population-based survey
    i. General population-based survey
    ii. Employer-based survey
    iii. Community surveys or surveys

- **Do you have reliable information on where MMPs live and work as well as their numbers, and can you project where they will be several years from now?**
  - If not, are you mostly missing recent arrivals and transient populations?
    - If yes, you have this information already, then consider a qualitative survey
    - Or do you need a comprehensive study?
      i. Migrant mapping
      ii. Employer-based survey
  - If services are already as effective as you think they can be, consider an MMP systems analysis
    - If population-based data are a high priority, look first for existing data:
      i. If yes, work with partners to strengthen continuity of care
      ii. If not, develop a systems analysis with multiple partners
  - If not, consider a qualitative study among “accessible” MMPs
    i. Ethnographic study
    ii. Community survey of malaria-related knowledge and behaviour
    iii. Focus group discussions and key informant interviews

- **Do you know how to make services and preventive activities more effective for MMPs?**
  - If services are already as effective as you think they can be, consider an MMP systems analysis
    - If population-based data are a high priority, look first for existing data:
      i. If yes, work with partners to strengthen continuity of care
      ii. If not, develop a systems analysis with multiple partners
  - If not, consider a qualitative study among “accessible” MMPs
    i. Ethnographic study
    ii. Community survey of malaria-related knowledge and behaviour
    iii. Focus group discussions and key informant interviews

- **Do you know how to reach MMPs before they enter high-risk areas and after they return?**
  - If not, consider a qualitative study among “accessible” MMPs
    i. Ethnographic study
    ii. Community survey of malaria-related knowledge and behaviour
    iii. Focus group discussions and key informant interviews
Annex 1
Systems analyses

What they are?

Systems analyses are efforts to “move beyond a focus on mobile populations as a demographic
group towards approaching and responding to mobility as a multifaceted system.” (Smith and
Whittaker). Elements of this system include multiple population groups, official and unofficial
authorities, economic sectors, and network groups (including transportation). HIV programmes
have worked within this broader framework, with significant impact on service outreach and
performance. Similar analyses for malaria are less common; when done, they should include
efforts to describe repeated movements from originating points to destinations, as well as the
interactions MMPs have with touch points between them.

What information should they produce?

Once MMPs approach their “final” destinations, their need for health services may increase – at
just the point where accessibility decreases. Accessibility may decrease because MMPs go to
remote places that local people avoid, or because officials may be indifferent or hostile. The
employers who hire some of them, and the freelance middlemen who buy forest products
from others may see little to gain in providing health care. Use of public health facilities (when
available) may entail long travel and absence from sources of income, making self-treatment
more likely. Services may be better if and when MMPs return to home communities, but most
health systems make no provision for continuity of care, especially across international borders.

What should malaria control programmes know about MMP movements and potential access
to care?

- Points of origin and transit, including prior periods of short-term residence
- “Recruitment” method (how information about destinations is obtained and who
  provides it)
- Onward destinations, which may or may not be places of origin
- Recruitment networks, including employer offices, which facilitate MMP entry into
  mobile systems
- Border crossing points, if any
- Forest entry points and routes (including roads, rivers and paths)
- Shops, facilities, people and offices along the way that interact with MMPs and might
  provide BCC or referral
- Modes of transport, including the people who interact with MMPs
- Quality of health facilities and outlets (public and private) that may serve MMPs at
destination points
Referral systems, if any, to maintain contact with recently-treated MMPs once they move on

Malaria preparedness of health facilities at MMP places of return.

While many studies gather some or all of this information, few do so with the aim of strengthening contacts prior to and after destination points.

What are some recent examples in this Region?

- **MMP survey at destinations**: Respondent-driven sampling on the Thailand-Cambodia border. Can malaria cases be contained in mobile migrant workers? RDS study on frequency of return: Cambodian and Myanmar mobile workers interviewed in eastern Thailand about places of origin and frequency of return. Cambodians came from provinces across that country, whereas those from Myanmar were more concentrated. Some Cambodians visited their country frequently (up to 72% in the past three months), and 32% to 68% said they would eventually return; by contrast, most workers from Myanmar had never returned there, and only 4% had plans to do so.

- **MMP survey upon return**: Situational Assessment on the Health of Cambodian Irregular Migrants Study of Cambodians deported from Thailand: This is a study of Cambodians recently deported from temporary migration to Thailand or Vietnam, with comparison groups drawn from the settled population at both border treatment. Most migrants report harsh treatment in the neighbouring country, partly due to their irregular status.

- **Mapping of migrant system**: NGO attempting to strengthen BCC and services for forest goers analysed transport routes (including rivers), brokers, and “touch points” where malaria prevention and treatment might be strengthened.

**Tools**

**Advantages and disadvantages**

- Information about MMP contacts before entering high-risk area is very important for preventive outreach.

- People who have contact with even “hidden” MMPs may provide referrals and even treatment, if managers know who they are.

- Transit routes and modalities, if known, provide excellent opportunities for BCC.

- Information about public health facilities at places of return may guide quality improvements.

- Cross-border studies may facilitate joint cross-border planning and implementation, but only if financial resources and political approvals are in place.

**Recommendations**

Use systems model as a tool for encouraging cross-border and multisectoral collaboration, but do not prioritize a study if there is no ability to act on findings.
Annex 2
Programme effectiveness studies

What they are?
Programme effectiveness studies look at both user and supply-side factors with an aim to increase coverage and appropriate use. On the demand side, they are an effort to “know the people better,” to understand how their living and working conditions, as well as their access to and use of health care, affects malaria; a common objective, for example, is to improve BCC and use of LLINs. On the supply side, programme effectiveness studies may involve BCC and programme assessments as well as studies of private sector outlets. Most studies consider both demand and supply factors, but concentrate information collection in one or the other. At least two techniques link information–gathering directly to programme improvement.

What information should they produce?
Programme effectiveness studies typically generate information about community malaria risks, knowledge about malaria, use of LLINs, what people do when sick, and so forth. In the case of MMPs, they may capture significant information about housing conditions, population movements, and access to health facilities. From the supply side, they look at BCC messaging and media, malaria worker training and placement, and importantly, private drug sellers and treatment services.

What are some recent examples in this Region?
Studies of this nature are frequent, as they must be because the many MMP groups vary widely.

- **Immersion approaches:** Malaria and population dynamics in Cambodia; Ethnographic investigations in three remote areas (Bourdier): Authors spent approximately 10 days each in Pailin, Samlaut and Trapaeng Prasat (in their words) to “have a deeper understanding of the social mechanisms underlying the population’s behaviour.” They looked particularly at “1) migration patterns . . . from original homelands to the new temporary adopted places; 2) ways of insertion and relations; 3) the place of health issues in a complex set of perceived risks in day-by-day life; 4) responses and attitudes towards health problems and visible symptoms: therapeutic associations, access to care and treatment from self-medication to health services.”

- **Community surveys:** Malaria baseline community survey of ethnic minority groups in five provinces of Lao PDR: Community-based survey in five southern Lao provinces to support BCC. Researchers interviewed 900 households in 60 villages, asking 72 questions based on four themes. (i) General village information, (ii) knowledge and understanding of malaria, (iii) prevention of malaria and (iv) health-seeking behaviour. They also conducted separate focus groups with community leaders, men and women; and key informant interviews with district health authorities, health workers and health volunteers.
Community surveys: An Assessment of the Malaria Knowledge, Treatment-seeking Behaviours and Preventive Practices among Mobile and Migrant Populations in Western Cambodia based on a Respondent Driven Sampling Approach: Study used RDS to identify MMPs in four rural locations and ask about malaria knowledge, prevention and treatment-seeking behaviour. Most respondents heard or saw health messages on radio, TV and billboards and through family and friends. Sleeping habits made most respondents vulnerable to mosquito bites. Despite low health insurance coverage, most respondents sought treatment for their most recent illness. Study results “provided real insights into how the programme can be adapted and better targeted to the difficult-to-reach populations... Improved and targeted prevention and control strategies are needed for mobile populations (more specifically forest-goers and farm workers), such as expanding the distribution of long-lasting insecticide treated hammock nets and repellents...”.

Participatory appraisal.

Drug outlet surveys: ACTWatch Cambodia Outlet Survey, 2013: Survey of public facilities and private outlets where anti-malarial drugs could be obtained. Information concerned current and recent availability of all drugs by type, including artesunate monotherapy and chloroquine.

Programme assessments: Assessing Access to Malaria Prevention and Treatment Resources among Mobile Workers and Migrants in Tak Province, Thailand: Study in Tak Province, along Myanmar border. Information obtained from 62 qualitative interviews (in three languages), including eight focus group discussions, 31 community in-depth interviews, 11 key informant interviews, and 10 in-depth interviews with health providers. Seasonal calendars (SC) were developed through focus groups and with migrant workers from a commercial farm.

Net preference studies.

Tools

- Questionnaires, discussion guides
- Community calendars and timelines
- Numerous others depending on context

Advantages and disadvantages

- Programme effectiveness studies are essential for adapting services and BCC to specific MMP subcategories.
- MMP diversity and rapid environmental changes necessitate frequent replication of simple study models. Larger studies should identify common concerns and develop simple tools to guide managers in gathering location-specific information.
- Participatory approaches may link directly to process improvement, but require expert facilitation.
Qualitative studies offer insight into the diversity of MMP conditions but are less useful than quantitative studies in tracking changes over time and for reports to donors.

Recommendations

- Studies should be small, quick and as participatory as feasible; but should then be replicated for individual subpopulations.
- Dissemination should be in the form of information guides and study tools as well as recommendations for service and BCC improvement.
Annex 3
Population-based surveys

What they are?
Population-based surveys gather data on household and personal knowledge, beliefs and practices – in this case regarding malaria prevention and treatment and general health-related behaviour. They are an effort to quantitatively measure the attributes of a defined population, and as such they require a statistically robust sample. Robust sampling in turn requires clear identification of the population of interest – something that is usually difficult for MMPs.

What information should they produce?
Surveys produce quantitative indicators, normally stated as proportions, e.g., 60% of children under five sleep under LLINs. Examples of indicators under current discussion in GMS include:

- % of households that own an LLIN
- % of households that own at least one LLIN for every two persons
- % of respondents knowing that LLINs can prevent malaria
- % of households at risk of malaria with at least one long-lasting insecticidal net/insecticide-treated net and/or sprayed by IRS in the past 12 months
- % total population sleeping under an ITN/LLIN the previous night
- % of mobile people who used an ITN the last time they slept in transmission areas
- % of respondents who could name any ACT
- % of mobile population with fever in the last 3 months who accessed parasite-based diagnosis
- % with reported fever in the past 2 weeks and who had any test for malaria.

(This is not a complete list. Please consult ERAR and Global Fund principal recipients for updated guidance.)

What are some recent examples in this Region?
- **Myanmar Artemisinin Resistance Containment Project Baseline survey, Final report:** In early 2012, the Department of Medical Research of Lower Myanmar conducted a baseline survey in Tier 1 and 2 areas for the Myanmar Artemisinin Resistance Containment (MARC) project, including a household questionnaire among other tools. As stated in the summary, the purpose “was to assess the overall malaria prevalence in the containment areas (Tier 1 and Tier 2), to assess and monitor the availability of oral artemisinin monotherapies . . . and to serve as baseline for the MARC strategic and Monitoring and Evaluation Framework.” Samples for the household component were drawn from “a list of all registered and unregistered families in the village obtained...
from local authorities, with additional information provided by village based volunteers wherever possible.

- **Respondent-driven sampling on the Thailand-Cambodia border II. Knowledge, perception, practice and treatment-seeking behaviour of migrants in malaria endemic zones:** RDS was used to select 1719 respondents representing two subcategories of MMPs (Cambodian and Myanmar) in Thai areas bordering Cambodia. The authors summarize the methodology as follows: “Health care workers and survey staff from each study area were trained in RDS methodology. The teams then chose six initial participants, or ‘seeds’ in the target community at each study site. These seeds received three uniquely numbered and identifiable coupons to recruit other participants in the community. Those participants, once interviewed, received 2–3 coupons to recruit additional participants, and the survey continued in this way until the required sample size was reached. The social network size was defined as all migrants living in the same community that the participant knew by first name or vice versa, and with whom they had met in the previous month.” Respondents were questioned about migration histories and malaria knowledge and practices.

- **Malaria community survey of ethnic minority groups in five provinces of Lao PDR:** Researchers interviewed 900 households in 60 villages, asking 72 questions based on four themes. (i) General village information, (ii) knowledge and understanding of malaria, (iii) prevention of malaria, and (iv) health-seeking behaviour. They also conducted separate focus groups with community leaders, men and women; and key informant interviews with district health authorities, health workers and health volunteers.

**Tools**

- RBM Malaria Monitoring and Evaluation Reference Group (MERG): Household survey indicators for malaria control
- PMI Malaria BCC Indicator Reference Guide
- Closed and open-ended questionnaires
- Respondent Driven Sampling Analysis Tool v. 5.6.0 (RDSAT)

**Advantages and disadvantages**

- Quantitative indicators essential for measuring change and comparing regions. Major donors require them as a condition for grants.
- On the other hand, standard sampling frames and procedures only work for stable populations and may not produce valid or reliable estimates for MMPs.
- Cross-sectional and longitudinal comparisons, moreover, may be less useful for MMPs than for other groups because contexts are highly variable and change rapidly.
- “Creative” sampling procedures (RDS, employment-based samples) are recommended for MMP surveys, but RDS in particular requires expert guidance and cannot cover a large area.
Community surveys extremely valuable for local data but rarely suffice for donor reporting.

Recommendations

- Give highest priority to satisfying donor requirements, but start by seeing if available data sources satisfy immediate needs.
- If survey is required, use creative sampling approaches (e.g. RDS) to represent all population groups.
- Consider community surveys but primarily for local measurements.
Annex 4

Migrant mapping and risk analysis

What is it?

Migrant mapping is an effort to determine where migrants live and work, including efforts to quantify their numbers. “Migrant” is variably defined to include both temporary and “permanent” residents; it may or may not include seasonal workers, but ideally should include every visitor, short or long term, who may need malaria prevention and treatment services. A first stage is normally to identify MMP “clusters”: farms and plantations, mines, areas of forest clearance, new settlements, military encampments and so forth. A second step is to estimate population sizes. Not every mobile subgroup is of significant risk of malaria, hence the need for risk analyses based on epidemiology, entomology and livelihood assessment.

Mapping should ideally include GPS coordinates to show roads, clinics and other points of access.

What information should it produce?

Whether comprehensive (covering everyone) or employer-based (more limited), migrant mapping identifies locations where MMPs live and work (“clusters”) and attempts to estimate their numbers. It also shows the location of roads, health facilities, and other resources, ideally on detailed maps. Results augment those available from typical household registration and census counts to show the total number of people needing malaria services and where they live and work. If reflective of planned developments and hiring, they will also indicate where movements or settlements might occur during the full duration of a planning or donor funding cycle.

What are the methodological options?

- Full mapping exercise: identification and mapping of MMP clusters; estimation of population sizes and seasonality; mapping of roads, clinics and other infrastructure
- Employer survey: Mapping focused on identifiable employers and estimated labour force
- Epidemiological analyses: Identification of hot spots and “hot pops”
- Entomological assessments: (See toolkit chapter on entomology)

What are some recent examples in this Region?

- Full mapping exercise: Malaria on the Move. Mapping of Population Migration and Malaria in the South-Eastern Region of Myanmar (IOM). In 2011–2012, the International Organization for Migration (IOM) undertook a comprehensive MMP mapping exercise in eastern Myanmar, aiming to locate migrant pockets; estimate the size of MMPs and their demographic composition; assess migration patterns; and identify factors related to malaria risk and vulnerability. The primary focus was on locating settlements, a stepwise process starting with local officials. A total of 3805 clusters were found in 21
townships, of which 59% were temporary; of 1.12 million residents in the area, 13% were MMPs. Authors recommended that future studies should: define MMPs in the context of malaria; map the entire migration processes from departure, transit, arrival and return as well as associated risks of malaria; assess work environments rather than occupations to determine malaria risk/vulnerability; and integrate qualitative methods. Information should be obtained from the MMPs themselves, moreover, rather than through “expert opinions.”

- **Employer survey:** National Mapping Survey of Plantations and Private Companies in Cambodia (PSI): Researchers obtained lists of land concessions from the Ministry of Agriculture, Forestry and Fisheries and identified other enterprises using snowball techniques. In addition to mapping, the study attempted to determine the peak number of workers by season/month, as well as the availability and accessibility of health services. Authors noted, however, that “the lack of worker lists on many sites and the ebb and flow of workers on a daily basis, means that these data should be interpreted as indicative and not absolute. What is clear is that the number of workers employed at any one time fluctuates dramatically and while some enterprises have extremely well-organized systems for recording the number of permanent and seasonal workers on site, others appear to have much weaker systems to track this data.”

- **Epidemiological analysis:** Malaria Burden and Artemisinin Resistance in the Mobile and Migrant Population on the Thai–Myanmar Border: Epidemiological analysis of 12 years of Shoklo Clinic medical records. Data covered Myanmar migrants and refugees on both sides of the Thai-Myanmar border.

**Tools**

- See attached data collection form
- Handheld geographic positioning system (GPS)
- Census data

**Advantages and disadvantages**

Migrant mapping exercises are difficult but invaluable. They are difficult because many of the MMP “clusters” most vulnerable to malaria are also those least likely to be recognized by government authorities because they are isolated, “unofficial,” or perhaps too transitory to register. As noted in the PSI Cambodia study quoted above, many enterprises rely on transient labour, or are too small to warrant official attention. For some purposes, predictions of future population movements may be more useful than retrospective analyses, especially in areas prone to rapid change.

**Recommendations**

Better information on the location and movements of MMPs is essential for planning, proposing and reporting; hence, some effort at identifying settlements and estimating populations must be part of every operational plan. Since change is rapid, simple and easily replicated, techniques are preferable to big studies.
Studies of MMP mobility and malaria risk factors


3. Bourdier, Frédéric, Chea Bunnary and Taing Sok Penh. Institut de recherche pour le developpement, “Malaria and population dynamics in Cambodia Ethnographic investigations in three remote areas (Pailin, Samlaut and Trapaeng Prasat), 2010


5. Indochina Research (Laos). Malaria baseline community survey of ethnic minority groups in five provinces of Lao PDR. Undated meeting presentation


**Indicator frameworks**


Strategies for mobile populations


4. Edwards, Hannah Margaret, et. al.” Novel cross-border approaches to optimise identification of asymptomatic and artemisinin-resistant Plasmodium infection in mobile populations crossing Cambodian borders”


7. Informal Consultation on Improving Access to Malaria Control Services for Migrant/Mobile Populations In the Context of the Emergency Response to Artemisinin Resistance In the GMS, Yangon Myanmar. April 2014


Other studies and analyses


Other documents not considered MMP study reports

1. Back Pack Health Worker Team, Provision of Primary Healthcare among the Internally Displaced Persons and Vulnerable Populations of Burma


12. Roll Back Malaria Partnership, “Malaria-Endemic Countries Unite to Extend Malaria Control to Hard-To-Reach Migrant and Mobile Communities,” Undated press release.

13. Roll Back Malaria, “Multisectoral Action to Defeat Malaria,” 2013


The studies encouraged in this toolkit are primarily intended to guide action, either immediately or through information sharing leading to collective regional strategies. Localized study approaches for example, participatory rural appraisal and BCC design activities may be so action-focused that they are not commonly identified as research. Others large population-based surveys, for example, require clear presentations to policy makers as well as regional dissemination using common indicators and definitions. Study designers should consider action issues before data collection begins.

This toolkit is targeted more to programme managers rather than to researchers. Its objective is to help managers oversee and manage the surveys component within their programme strategy, decide the kind of study that would be most useful for them, based on grant applications to be made or reported, programmatic decisions to be made or problems to be solved. The toolkit follows a decision-tree format, asking important questions and recommending study approaches based on answers. It presents methodological choices and present examples from recent reports.