



Mobile and migrant populations and malaria information systems

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Contributors

Charles Delacollette, Independent Consultant [Author]

Arantxa Roca, Malaria Consortium

Bayo Fatunmbi, WHO ERAR Surveillance, Monitoring and Evaluation

Deyer Gopinath, WHO ERAR Malaria and Border Health

Moe Ko Oo, Mekong Basin Disease Surveillance (MBDS)

Prayuth Sudathip, Vector Borne Disease Control Programme, Thailand

Siv Sovannaroeth, National Center for Parasitology, Entomology and Malaria Control, Cambodia

Soy Ty Kheang, Chief of Party/Regional Director PMI/USAID Control and Prevention of Malaria (CAP-M)

Walter Kazadi, WHO ERAR Coordinator

Yonas Tegegn, WHO Thailand

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Acronyms

ACT	Artemisinin combination therapy
ASEAN	Association of Southeast Asian Nations
BCC	Behaviour change communication
CAP-Malaria	Control and prevention of malaria project
CBM	Community-based management; Cross border malaria
CNM	Cambodia National Malaria Control programme
DOT	Directly observed treatment
FFP	Free-forward program
FSAT	Focal screening and treatment
GDP	Gross domestic product
GMS	Greater Mekong subregion
IEC	Information, education and communication
IHRs	International Health Regulations
IDP	Internally displaced population
IPD	Inpatient department
MBDS	Mekong basin disease surveillance
MC	Malaria consortium
MED	Most essential data
MDA	Mass drug administration
MDR	Multidrug resistance
MMP	Mobile and migrant populations
MMW	Mobile malaria worker
MoD	Ministry of Defence
MSAT	Mass screening and treatment
NGO	Nongovernmental organization
NMCP	National malaria control programme
NSP	National strategic plan
OPD	Outpatient department
PCR	Polymerase chain reaction
PMI	President's malaria initiative
PMW	Plantation malaria worker
QA	Quality assurance
qPCR	Quick PCR
RDT	Rapid diagnostic test
SMS	Short messaging system
TES	Therapeutic efficacy study
UAE	United Arab Emirates
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees

1. Surveillance and response in malaria control, elimination and prevention of reintroduction strategies: MMP context

The Greater Mekong subregion (GMS) countries (Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam, and Yunnan province, China) have strengthened their routine malaria surveillance systems especially during the last 10 years resulting in successfully documenting progress against time-bound impact and outcome programmatic targets (Figure A).

Figure A: Progress and Remaining challenges of malaria surveillance in GMS countries

Progress	Remaining challenges
<ul style="list-style-type: none"> ◉ GMS countries are increasingly using similar case definitions allowing comparison between countries, provinces and districts in the GMS ◉ an increasing proportion of suspected patients is accurately tested ◉ monthly and annual estimates of the number of confirmed malaria cases; the proportion of confirmed malaria cases that are <i>P. falciparum</i>; and the number of deaths attributed to malaria ◉ improvements in completeness and delays in reporting along with computerized databases and solutions for data entry and analysis 	<ul style="list-style-type: none"> ◉ to support specific and timely decision at local level ◉ routine malaria data are deriving from passive case detection in public health facilities only with little involvement of private health-care facilities and private providers within the system ◉ persisting low health-care coverage and access in remote locations; access to basic health services by mobile populations and migrant workers in some countries ◉ unequal distribution and varying levels of reporting from public health facilities ◉ lack of systematic inclusion of data from other sources such as community malaria workers, private practitioners, traditional healers, shopkeepers, faith-based organizations, and self-treated cases

A routine malaria information system is, among others, expected to provide accurate and timely data to contribute to the following action-oriented objectives:

1. early detection and prevention/control of malaria epidemics;
2. documentation of malaria elimination over years (zero transmission) in previously active foci and early detection / documentation of imported cases in nonactive foci;
3. identification and proper management of patients possibly infected with drug (e.g. artemisinin) – resistant *falciparum* and *vivax* parasites.

To address some of the above-mentioned limitations at the national level, routine malaria information systems have to be continuously strengthened in order to capture essential missing information. For example, by further increasing the proportion of suspected patients being tested in public and private facilities including in remote locations; by monitoring the accuracy

of malaria diagnosis (microscopy and RDTs); by ensuring completeness and timely reporting of data from different sources; and by maintaining high capacity of health staff and administrators in overall data management including use for programme action and consolidated reporting.

Mobile and migrant populations (MMPs) essential in the malaria elimination equation:

However, strengthening malaria control interventions and locally managed surveillance and response mechanisms as part of primary health-care systems to match the above-mentioned objectives will remain only partially successful if MMPs (Annex 1) are neglected and not part of the malaria control and elimination equation. Innovative MMP strategies linked to multisectoral surveillance and response mechanisms will contribute to prevent and control malaria epidemics, to document local transmission and prevent malaria reintroduction and will be of benefit to address multidrug resistance (MDR).

MMPs have to systematically be identified and fully incorporated in any strategies and policies to effectively progress towards elimination and prevention of reintroduction of malaria

Provision of Health care for MMPs in the Mekong region: Mobile and migrant populations, groups or individuals are highly vulnerable to malaria because of barriers/obstacles to access to “basic” and “quality” health-care services for both health and malaria curative and preventive services. Routine information generated by health or malaria surveillance systems pertaining to MMPs is highly dependent on the degree of access to and use by MMPs of efficient (primary) health-care services since most peripheral data are, at least, collected and sometimes analysed by such peripheral services.

World Health Organization (WHO) Member States have also agreed in 2005 to implement more stringent health regulations with mandatory reporting of some severe communicable diseases across boundaries¹ (Box 1).

Box 1: International Health Regulations (IHRs)

The stated purpose and scope of IHRs are “to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade.” Because IHRs are not limited to specific diseases, but are applicable to health risks, irrespective of their origin or source, they will follow the evolution of diseases and the factors affecting their emergence and transmission. IHRs also require Member States to strengthen core surveillance and response capacities at the primary, intermediate and national levels, as well as at designated international ports, airports and ground crossings. They further introduce a series of health documents, including ship sanitation certificates and an international certificate of vaccination or prophylaxis for travelers.

¹ Alert, response, and capacity-building under the International Health Regulations (IHRs). An Emergency Committee is made up of international experts to provide technical advice to the WHO Director-General in the context of a “public health emergency of international concern” (PHEIC). www.who.int/ihr/publications/9789241596664/en/

Building on existing well-supervised health-care delivery channels: In order for any surveillance system to perform well, it should build on existing well-supervised health-care delivery channels, either public or private, their ability to attract and manage clients (patients); timely and effective reporting and, eventually, build on the capacity of district managers to orient specific community action based on simple data analysis. However, static public and private health-care providers, even if performing well, cannot provide health services and proper malaria information to all MMPs, especially, for example, individuals coming from other countries (inbound migrants) or unregistered workers or individuals moving far away from their home within their home country where access to static health-care facilities is impaired. To reach those individuals or groups, extra services are needed that can in turn help to improve surveillance. Building a separate surveillance and response system, which has no or few links with existing or additional health staff or volunteers providing basic services, does not make any sense and is not sustainable. If additional skilled staff are requested at the peripheral level, there is also a critical need to ensure that enough human resources are available at the upper decision level (usually at district or provincial level) to ensure supervision, analysis of data and informed decisions. An additional challenge in some countries is the unregulated private providers who are generally not reporting any data to health and malaria officials and are thus not contributing to any surveillance and response mechanisms.

Health-care coverage matters in improving surveillance in general and malaria surveillance in particular. It includes geographical access (less than 5 km distance or one hour walk, as per who standards), financial access (affordability of services), mitigation of cultural and language barriers, etc.

2. MMPs in the GMS: context within malaria programmes

In GMS, the movements of MMPs are largely related to occupation and economic related drivers (trade, plantation, extractive industries, etc.) versus those movements of populations driven by conflicts, natural disasters, etc. seen in other parts of the world. It is important for country programmes to accurately identify the extent of malaria risk faced by various types of MMPs and to develop much clearer terminology to identify groups at increased risk of malaria.² Despite growing knowledge of this shifting and heterogeneous risk environment, the tendency is still to refer to migrant and mobile populations as a homogenous risk group, rather than to more clearly identify the situations in which population mobility shapes malaria transmission and epidemiology. Clearer definitions will help to prioritize interventions, facilitate cross-border discussions and ensure clarity and accuracy in messaging. Approaches are also needed to avoid unnecessary programme duplication by grouping together subgroups of MMPs that can be engaged through similar interventions.

The following is a suggested list of categories of MMPs that are relevant for GMS malaria programmes to consider:

1. remote (forested) populations;
2. seasonal agricultural workers (individuals or families) in farm plantation (rubber, cassava, oil palm, coffee, corn, orchards, sugar cane, bamboo, etc.);
3. populations involved in:
 - long-term official/planned mega or large projects (hydroelectric dams, road construction, pipelines, gem mines, logging, gold and mineral extraction, etc.);
 - industries producing commodities and services in malaria endemic areas;
 - long-term internal migrants from nonendemic to endemic provinces (or vice versa);
 - moving from “poor” to more attractive locations/provinces (for months or years);
 - relocation (official or otherwise) to forested areas to establish farms;
4. individuals or group of individuals (small or big) working in the (deep) forest from the nearby forest-fringe villages for a various number of nights (generally days or weeks or/and generally unplanned) for clearing forest to expand land, collecting forest products, hunting, logging; or working in small gold mines, charcoal sites, bee honey collection, etc.;

² Smith, Catherine and Maxine Whittaker. “Beyond mobile populations: a critical review of the literature on malaria and population mobility and suggestions for future directions,” *Malaria Journal* 2014, 13:307

5. internally displaced population (IDP) and refugees;
6. civil service officers (agronomists, forestry staff, etc.);
7. security forces, border patrols' population (and with their families);
8. populations crossing borders (seeking economic opportunities- migrant workers and individual business);
9. national populations back home from abroad;
10. foreigners and tourists;
11. United Nations (UN) soldiers (from/to Mekong Subregion) as part of UN peacekeeping operations abroad.

From a malaria programme perspective, given the heterogeneity of population mobility in the GMS, the approach moving forward to malaria elimination could be to address mobility as a system involving multiple demographic groups (Figure B).

Malaria interventions targeting MMPs: Experience in the GMS

There are multiple factors that influence and drive the movement of different subsets of the moving populations within and across borders. It is important for programmes then to understand these dynamics before assuming any intervention within national borders or those targeting cross-border populations at risk.

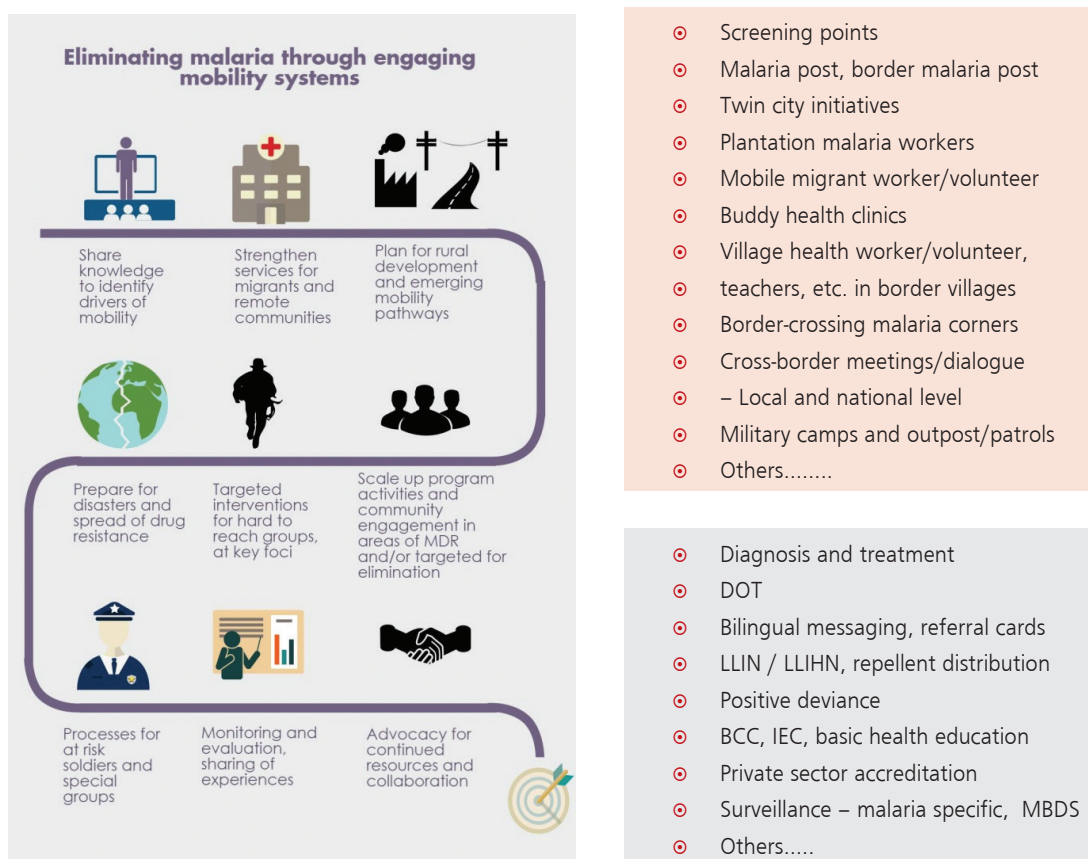
Malaria programmes and partners in the GMS have identified several categories of MMPs that require specific health and malaria system approaches and simple-to-more-complex interventions in comparison to the static/resident population either within the same country or across countries. National programmes supported by technical and financial partners have piloted and implemented innovative strategies and policies expected to improve access of MMPs to essential malaria information and services (encompassing surveillance).

In the absence of static health-care delivery services, innovative ways of delivering and supervising basic malaria services have been piloted in some countries. **Strategies and tools currently are conceptualized and are based on what we think is best or would work (Figure C). Very few of these have been evaluated, or if they have, perhaps not robust enough to provide recommendations beyond a single project intervention. More than often, an evaluation budget is not part of the intervention/activity design.**

Figure B: Pictogram of some of the important MMPs in the context of
GMS malaria programmes



Figure C: Mobility systems and current malaria interventions in GMS countries



3. Creating an enabling environment for a sustainable malaria surveillance and response: MMP context

The expansion of malaria interventions can be used as an entry point for strengthening health systems, including maternal and child health services and laboratory services, and to build stronger health information and disease surveillance systems. In turn, an overall strengthening of health systems and infrastructures will be critical to improving national malaria responses.

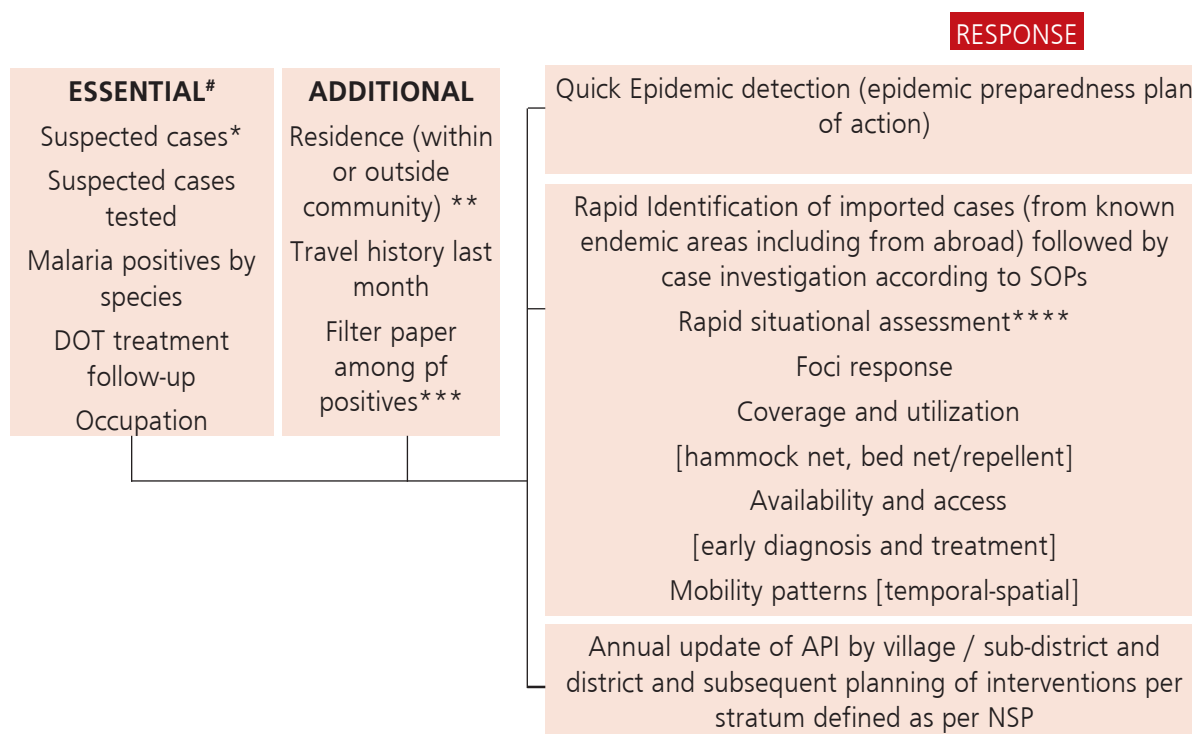
From a strict malaria surveillance and response viewpoint, the enabling environment in the context of MMPs would include:

1. **Strong health systems and health workforce** are keys to drastically reducing both the disease burden and the potential for disease transmission and, in the context of MMPs and malaria, enable the creation of systems that facilitate the adoption and roll-out of innovative new tools and strategies within the shortest possible time frame.
2. **Community surveillance** through a network of both volunteers and workers in various settings/environments where MMPs reside/engage in employment. These networks should be linked to the formal health systems in service delivery; monitoring and reporting; and, where relevant, incentives considered.
3. **MMP policies** in the form of existing laws, policies and legal frameworks (health, labour and immigration) of a particular country as well as other documentation as they relate to or affect the access of migrants (internal, inbound and outbound) to health services, particularly, those for malaria.
4. **MMP strategies.** National malaria control programmes should identify and incorporate in their planning/strategies nonhealth government agencies, key private sector actors and key development actors involved in rural development processes. This would have the objective of having, among others, (i) specific suggestions for employers of MMPs to build collaboration in allowing programme access to worksites; (ii) Memorandum of Understanding (MoU) for cross-sectoral cooperation in containing drug-resistant malaria and malaria elimination; (iii) a statement of support for agencies working to improve processes for documented border-crossing, making legal migration channels more efficient and accessible to poor migrant workers, and for agencies working to improve labour conditions of migrant workers.
5. **Malaria as a notifiable disease.** This should pertain to countries or group of neighbouring countries officially engaged towards malaria elimination and prevention of reintroduction of malaria; malaria (confirmed) should be considered as a “notifiable disease” by all health-care providers within and across countries irrespective of patients’ origins and citizenships.

In the context of having an 'MMP sensitive' surveillance system within overall programme/health surveillance systems (individual countries in GMS and the subregion as a whole), two important considerations are discussed here:

- (1) the definition and set-up of the minimum essential data for surveillance³ (Figure 1); and
- (2) a cross-border malaria (CBM) surveillance and response mechanism⁴ (Figure 3)

Figure 1: Building an effective local, national and supranational response from the most essential and routinely generated information: A suggested basic reporting system at peripheral level (at client contact)




* ideally standardized definition needed across countries based on clinical algorithms

** ideally village or at least subdistrict/district

*** first to be implemented in large MMP clusters potentially in big factories, farms, industries, etc.

**** PRA= Participatory Rural Appraisal, rapid KAP= Knowledge, Attitude and Practice; FG=Focus Group; IDI= in depth interview

Who?	Volunteers and/or workers	
Frequency?	Ideally on a weekly basis	
How?	For example, by VHF, phone, SMS, email, GPS, enabled tablets, etc.	
What?	As minimum, malaria case reporting among suspected patients including zero confirmed ^{##}	

Ideally, the list of surveillance data to be shared should be short with only key relevant items directly linked to or triggering practical field actions according to standard operating procedures (SOPs). This short list should include national malaria reporting format and database, capturing both public and private (formal/informal, where relevant). The list should be easy to manage electronically through basic or feasible SMS/database and feedback mechanism.

Where feasible, this can also include essential stock reporting (RDT/ACT) to trigger rapid replenishment.

3 Elimination of tropical disease through surveillance and response; Xiao-Nong Zhou, Robert Bergquist and Marcel Tanner: *Infectious Diseases of Poverty* 2013, **2**:1; <http://www.idpjournal.com/content/2/1/1>; Mueller I, Slutsker L, Tanner M (2011) Estimating the Burden of Malaria: The Need for Improved Surveillance. *PLoS Med* 8(12): e1001144. doi:10.1371/journal.pmed.1001144.

4 WHO (2012). Disease surveillance for malaria elimination, operational manual.

Cross-border malaria (CBM) surveillance

With the focus increasingly shifting towards malaria elimination, the need for regional CBM initiatives has become of paramount importance in ensuring that the risk of malaria parasite importation is greatly reduced.⁵ From the viewpoint of malaria elimination and to trace positive and MDR cases across borders, effective intercountry subregional malaria control and elimination efforts require standardization and harmonization of policies and practices as well as synchronization of key interventions, standardized surveillance, information collection and reporting between all participating countries. Effective management and delivery of a CBM initiative comprises five steps as illustrated below:

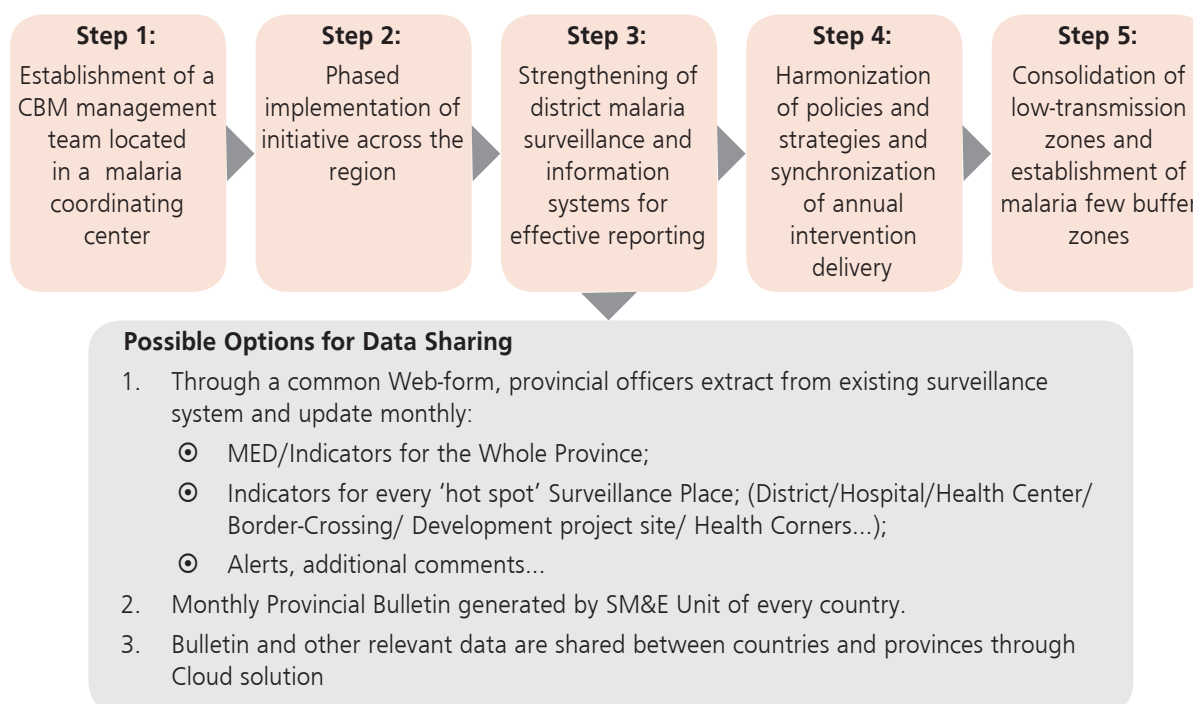


Figure 2: Basic principles to strengthen malaria surveillance/information system and response within CBM initiatives

- Standardization of case definitions, minimum essential data (see Figure 1) and targets to be used in the districts on both sides of the border and agreement on formats and timing** of monthly/quarterly and annual reports.
- Annual updating of the **targeted populations by various malaria risk groups by the lowest administrative level within the border districts.**
- Existing passive reporting from all health units and community health workers; field malaria workers are recorded in registers** with periodic checks for accuracy and completeness.
- Weekly and monthly surveillance reports from all health reporting units or sentinel sites are used **to monitor early warning for outbreaks and trigger a rapid response to contain, through agreed SOPs, any expansion of transmission or contain secondary spread from an index malaria case.**
- Operational **programmatic tracking of the malaria commodities delivered/utilized and in stock and the estimated coverage of the target populations.**

Adapted from Cross-Border Malaria Control an operational manual for joint cross- border malaria control and elimination programmes, (draft, WHO 2012).

⁵ Cross-Border Malaria Control An operational manual for joint cross- border malaria control and elimination programmes, (draft, WHO 2012)

A suggested practical approach⁶ in achieving the principles outlined in Figure 2 are given below with suggested indicators for a cross border malaria initiative in Box 2.

1st	AGREE	<ul style="list-style-type: none"> For every province, what could be hotspot surveillance places (district/hospital/health center/border crossing health corners...)? Discussion on the relevant indicators for province/hotspot: <i>tested, positive cases, IPD cases, OPD cases, death, Pf cases, day 3 positivity rate, imported cases...</i> Is a Provincial Bulletin enough?
2nd	IMPLEMENT	<ul style="list-style-type: none"> <i>M&E staff from six countries meet and design a common form + bulletin together</i> <i>Train staff to manage cloud solutions</i> <i>Appropriate Incentive</i>
3rd	EXPAND	<ul style="list-style-type: none"> <i>Regular cross-border SM&E meetings</i> <i>Update the system as needed with new indicators/surveillance sites, etc.</i> <i>Creation of bilateral shared folder for country-to-country communications</i> <i>Expand the Web-form solution to sub-provincial units by providing tablets/smartphone</i>

Box 2: Suitable indicators for the generation of a simple monthly bulletin for adjacent cross-border districts:

- total number of MMPs seen at the border post
- proportion or number of MMPs with suspected malaria
- proportion or number tested among suspected MMP patients
- number or proportion of positive cases in suspected MMP patients
- origin (country, province or district) of positive cases
- number or proportion treated according to the treatment policy of the country or province where the border post is
- number or proportion of MMP patients who are followed up

The control and prevention of malaria project (CAP-Malaria) experience with malaria cross-border interventions with the aims of improving malaria case management in HCFs and beyond through community volunteers/workers and communication on both sides of the border. The CAP-malaria experience has helped the national programme in the GMS countries to scale up new interventions such as using non health sector initiatives to promote malaria prevention and health-seeking behaviour. New initiatives to work with the most hard-to-reach forest goers through identified "touch points" have been set up and implemented in Cambodia to make available comprehensive services of malaria prevention and intensified case management in "hot spots" among the most At-Risk Population. Further documentation and assessment of performance of these interventions are, however, needed.

6 Adapted from (Celhay O, 2014) Options for cross-border surveillance and data sharing, Yangon, 2 April 2014.

Implement DOT approach and improve the day-28 follow-up of Pf cases including by SMS or mHealth. **Multi-language patient cards** that contain **essential malaria information** to be shown and to be in use in any health-care facility have been piloted including multi-lingual IEC) packages

Contributing to strengthen malaria surveillance, **exchange of real time essential malaria data and index case investigation (through specific active case investigation forms) in selected twin-cities (district-district or district-township)** where the malaria burden persists and where multidrug resistance is highly prevalent



SOPs (including training packages) have also been designed to strengthen VMWs performance in malaria diagnosis, treatment, patients' follow-up including **surveillance, index case investigation and e-reporting**



Towards malaria elimination, the need for regional cross-border malaria community-based management (CBM) initiatives has become of paramount importance in ensuring that the risk of malaria parasite importation is greatly reduced (WHO, 2012)

Table 1: Suggested approach: Malaria surveillance among MMP groups in GMS countries

Target population	What to do?	Who needs to act?	How to act?
Remote (forested) population [Majority of these populations are ethnic minorities or indigenous races]	Essential malaria to be collected and reported ideally on a weekly basis, for example, by phone/SMS ideally including zero confirmed malaria case reporting among suspected patients. Refer to Figure 1	Health-care peripheral facility network Mobile clinics Community volunteers and/or workers Mobile vendors	<ul style="list-style-type: none"> Facility-based treatment through Malaria posts Improve the connection between volunteers and the existing system, the intensity of regular follow-ups and improve the capacities of the volunteers Mobile malaria outreach/clinics Community level CMV (Community Malaria Volunteer) or VMWs with monthly incentive for in high-risk villages Identify, train, incentives
Seasonal agricultural workers (individuals or families) in farm plantation (rubber, cassava, oil palm, coffee, corn, orchards, sugar cane, bamboos, etc.)	Refer to Figure 1 + In addition: Mapping that can include: <ul style="list-style-type: none"> typology of workers; mobility patterns (from travel histories, etc.); access to health services; status of the patient (resident inhabitant or seasonal workers); the place of origin (district and ideally village of residence on map). 	District/Township/ County team	<ul style="list-style-type: none"> Mapping of plantations to locate farms and plantations where seasonal workers are regularly operating Options to improve access and use of health and malaria services – plantation malaria workers/volunteers, mobile clinics, DOT, mobile vendors, etc. Organize multisectoral workshops or annual meetings, preferably with high-level political support (at least provincial) with landowners to discuss seasonal workers' concerns and practical options to improve access and the use of health and malaria services by mobile workers (<i>who are, in such situations, not usually covered by landowners' health insurance</i>) Analyse surveillance data and respond; periodically update mapping information

Target population	What to do?	Who needs to act?	How to act?
<p>Populations involved in:</p> <ul style="list-style-type: none"> Long-term official/planned large projects (hydroelectric dams, road constructions, pipelines, gem mines, logging, gold and mineral extraction, etc.) Industries producing commodities and services in malaria endemic areas Long-term internal migrants from non-endemic to endemic provinces (or vice versa) (for months and years). Relocation (official or otherwise) to forested areas to establish farms, etc. 	Refer to Figure 1	<p>District (township or county) or provincial health team, supported by the national malaria expert team</p> <p>Ministry of Health</p>	<ul style="list-style-type: none"> technical direction and advice to national or international companies multisectoral discussion and activities at planning stage and alongside development project expansion advocate the set-up (or enforcement) of collaboration between the government and national and local authorities/population with big/small (subcontracted) private companies selected to carry-on and manage mega or small development projects, appropriate regulations and laws (HIA, EIA, etc.) to be followed by private companies and for private companies to follow national or regional regulatory framework and good practices, for example, as recommended by the Association of Southeast Asian Nations (ASEAN). This includes a policy/MoU on mandatory reporting supporting malaria as notifiable disease. advocate with relevant national government agencies in collaboration with international credit banks like ADB or/and WB for the set-up of good practices (CSR or related)*, in general, and good protective health measures in particular designed at planning stage: <ul style="list-style-type: none"> * suggested: <ul style="list-style-type: none"> development project with services linked to health system—such as clinics, hospitals, etc. - for referral; establish on-site/in-house clinic with qualified staff; reporting to local health/malaria authorities on inbound/outgoing worker movements.
<p>Individuals or group of individuals working in the (deep) forest from the nearby forest-fringe villages for overnight over days/weeks for:</p> <p><i>clearing forest to expand land, collecting forest products, hunting, logging, small gold mines, charcoal sites, bee honey collection, etc.</i></p>	Refer to Figure 1	<p>MMWs/forest malaria workers (FMW) (terminology differs from country to country) who are identified among those groups</p> <p>Peripheral health-care staff from the closest health-care facility</p> <p>District or provincial team</p>	<ul style="list-style-type: none"> Forest package/kit which could include among others, anti-pyretic, antimalarial, LLIN, repellent, etc. (according to country policy/strategy) Staff trained to supervise MMW/FMW (report to at least on a monthly basis—reporting on current mobility patterns, replenishment of stocks, supervision, etc.) Ideally, in collaboration with local authorities, discuss and plan workers' activities, consolidate information generated by MMWs and HCF for timely action.

Target population	What to do?	Who needs to act?	How to act?
Internally displaced people (IDP) and refugees	Refer to Figure 1 + Assess and respond to the health burden, improve general and malaria surveillance (e.g. to detect epidemics and monitor multidrug resistance).	<ul style="list-style-type: none"> The national malaria programme 	<ul style="list-style-type: none"> Engage NGOs and related partners and UN agencies (UNDP, IOM) working in refugee camps and with other IDPs to include system Including surveillance (malaria) into national malaria surveillance systems (e.g. this is now routinely done in Thailand). A practical manual is available: Interagency handbook (2006): Malaria control in complex emergencies: http://whqlibdoc.who.int/publications/2005/924159389X_eng.pdf
Civil service officers, at risk, in malaria/forested areas (agronomists, forestry staff, surveyors, etc.)	Refer to Figure 1 + Surveillance data have to include the occupancy status as for other MMP categories, consolidated in routine surveillance data analysis and action.	Ministry of Health	<ul style="list-style-type: none"> Intersectoral workshops and meetings with relevant Ministries engaging such staff in order to: <ul style="list-style-type: none"> access (and use) the latest updated information pertaining to prevention and curative malaria interventions (requirement for short-time chemoprophylaxis could be envisaged in such groups as per MoH guidelines, information on facility access, forest package/kit; inform on malaria burden and surveillance data in such groups.
Security forces, border patrols' population (and their families)	Challenges are around reporting sensitivities. Ideally, consolidate surveillance data at least on a monthly basis at provincial level from security forces managed (outpatient or inpatient) at health-care facility level and at military-managed health-care units/facilities. Surveillance data should include travel history and other few items as described Refer to Figure 1 (to the level possible as per country specifics)	National malaria programme: Ministry of Health:	<ul style="list-style-type: none"> Engage border patrol forces into educational programmes on malaria prevention and control targeting cross-border population but also residents at border areas. Small research projects, such as TES or performance of RDTs and QA microscopy, might contribute to strengthen collaboration between civil and noncivil staff and promote exchange of data and consolidation. Facilitate regular technical and policy dialogue of mutual interest between ministries in charge of national security and the Ministry of Health including specific national control or elimination programmes, meetings that could contribute to the exchange of data and new technical information to update guidelines, etc.

Target population	What to do?	Who needs to act?	How to act?
Population crossing borders (trade, businesses, employment)	<p>Malaria screening points at/around strategic locations of border crossings are useful to provide information on malaria prevalence by:</p> <ul style="list-style-type: none"> • sites • nationality • location of origin and • travel history <p>From malaria elimination viewpoint, the objective is to trace positive and MDR cases across borders and standardized surveillance and information collection and reporting between participating countries.</p>	<p>National malaria control programme, NGOs</p>	<ul style="list-style-type: none"> • Establish malaria screening post/mobile units at official border sites to test and treat (free of charge) cross-border people on a voluntary basis following proper information campaigns supported, for example, by border billboards and other suitable Information, education and communication (IEC) tools. • How to act - CBM initiatives policy <p>Refer to Figure 2</p> <ul style="list-style-type: none"> • From official cross-border sites, unusual large population movements (refugees), can also be documented and communicated to MoH to potentially proceed with immediate interventions, such as screening and treatment operations including MSAT/FSAT or even MDA.
Returnees back home from abroad, foreigners and tourists	<p>The CDC travel medicine website (http://wwwnc.cdc.gov/travel/) and WHO international travel health (http://www.who.int/ith/en/), provide guidance for travelers and also provide direction to prevent travelers from tropical diseases including recommended medicines to prevent and cure malaria infections according to country and areas to be visited.</p> <p>Malaria information gathered from these services should be articulated with the national (malaria) surveillance web-based system.</p> <p>In malaria elimination countries, this is also mandatory for all health-care private providers to notify and cross-check by PCR all positive malaria cases (to be radically treated) with their exact location to be ultimately recorded in and monitored as part of the centrally managed National Malaria Register.</p>	<p>Ministry of Health:</p>	<ul style="list-style-type: none"> • Web-based information to tourists and workers expected to work abroad especially in tropical countries and other Mekong countries. • IEC/BCC materials are provided on predeparture of workers or tourists through the Quarantine Bureau including information on how to screen and treat nationals who are febrile upon return paying attention to the country of origin. • Establishing mandatory screening points in international airports and borders (limited value if nonofficial entry points (porous border) still exist). However, it may be important for countries in elimination or already eliminated with immigration of foreigners/immigrants, especially, workers coming from various malaria endemic countries all over the world. <p>National malaria programme:</p> <ul style="list-style-type: none"> • National strategies' specific malaria preventive policies for tourists and foreigners • Make information available through travel agencies and airways companies

Target population	What to do?	Who needs to act?	How to act?
UN soldiers (from/to Mekong Subregion) as part of UN Peacekeeping Operations Abroad	<p>To minimize the spread of multidrug resistant parasites outside the GMS* and as part of malaria elimination efforts</p> <p>* WHO-GMP (2014): <i>Malaria and UN peacekeepers: recommendations for the prevention of transmission of artemisinin resistant parasites</i></p>	UN field peacekeeping health unit	<p>Effective treatment of existing infections before deployment:</p> <ul style="list-style-type: none"> either to all soldiers: administration of full treatment course of an effective antimalarial medicine as directly observed treatment (DOT) in the country of origin plus a single dose of primaquine (0.25 mg base/kg) to all soldiers before deployment; or radical treatment as above to all soldiers positively screened by qPCR; retention of soldiers at least for two weeks (after radical treatment) in a malaria-free area prior to deployment; <p>Effective malaria chemoprophylaxis for the duration of the deployment</p> <ul style="list-style-type: none"> which should be initiated before deployment to a malaria endemic area and be continued for four weeks upon return (or one week in case of atovaquone-proguanil); <p>Prompt diagnosis and effective treatment of positive cases and reporting of all cases, after deployment of UN peacekeepers.</p>

4. Surveillance systems for GMS

The use of existing common platforms/networks for disease surveillance in GMS countries for improved malaria surveillance, focused on areas of high malaria transmission as well as documented artemisinin resistance areas and data sharing across borders with focus on subnational/district level reporting capacity.

Most countries are computerizing data (including zero reporting) that are sent to both provincial and national levels and copied to the MBDS secretariat, which is electronically consolidating all information including computerizing paper-based data. Completeness and timeliness differ country by country from 20% to 80% due to frequent staff changes and lack of motivation/rationale to exchange data for action.

MBDS plans to scale up the use of smartphone applications with online forms to be easily filled-in, verified and sent to upper decision levels and cross-border provinces.

The WHO Emergency Response to Artemisinin Resistance (ERAR) Hub has initiated a web-based regional database containing ERAR and relevant malaria data that has been developed. It has incorporated several folders including: monthly surveillance data from six countries, an ERAR scorecard and cross-border malaria data. Data are disaggregated by administrative level and tier. There is room for expansion to contain vector control, financial, Therapeutic efficacy study (TES), pharmaceutical data and to establish linkages with country databases as well as partners' initiatives. Preparation for this will include field visits to consult with national malaria control (NMCP)/M&E and partners, advocate for ERAR input into country M&E plan and data use at regional, national and Tier 1 levels. To strengthen surveillance and monitoring, the system for data entry and analysis has been updated and a retraining of the data assistants is being organized (WHO ERAR annual report, 2014).

Setting up a supranational exchange platform

To share information including surveillance data from the above sources and to take early decisions, the Short messaging system (SMS) has proved useful and cost effective in some Mekong⁷ and non-Mekong countries.⁸ More complex internet-based systems in countries like China, Malaysia or Thailand⁹ benefiting from a strong communication network allow for more powerful and complex data management and mapping of information to take place with online electronic forms on a quasi-real time basis as experienced by national programmes in China, Malaysia or Thailand. Based on specific country e-forms, cloud systems could be set up and used not only to facilitate exchange of essential malaria data but also common cross-border data analysis and cross-border interventions (see further in the cross-border section).

7 CNM, Malaria Consortium and WHO (2012): Moving towards malaria elimination: Tools for strengthening malaria surveillance in Cambodia

8 Tatem AJ, Qiu Y, Smith DL, Sabot O, Ali AS, Moonen B: The use of mobile phone data for the estimation of the travel patterns and imported *Plasmodium falciparum* rates among Zanzibar residents. *Mal J* 2009, 8:287.

9 Meankaew P, Kaewkungwal J, Khamsiriwatchara A, Khunthong P, Singhasivanon P, Satimai W: Application of mobile-technology for disease and treatment monitoring of malaria in the "Better Border Healthcare Programme". *Malar J* 2010, 9:237.

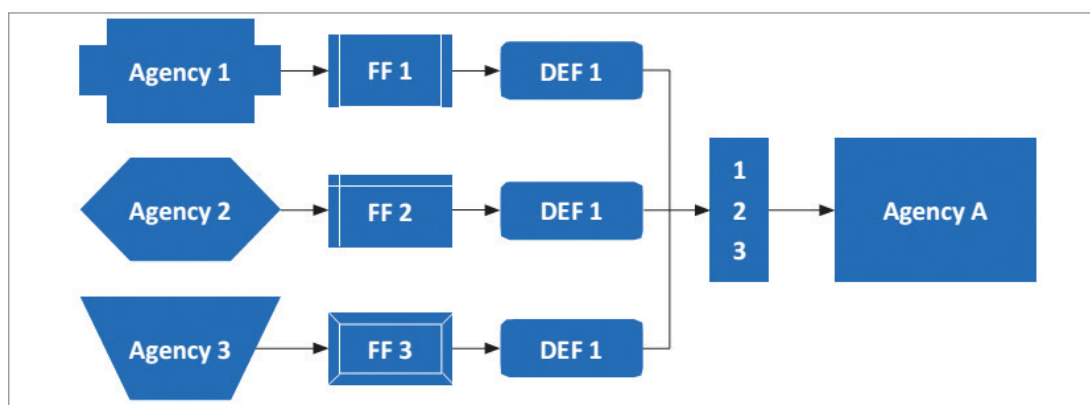
To start such CBM initiatives, which include active exchange of information and joint action, all countries involved have to be willing to work together towards similar goals. In that case, malaria elimination detection and control of epidemics, prevention of reintroduction of malaria and containment/elimination of MDR strains are obvious common time-bond goals even if some GMS countries are more advanced than others.

As expressed previously and from previous experiences in disease elimination/eradication (for example, polio or onchocerciasis eradication programmes), multiple sources of data are available (Figure 3). They are using different operating systems, software and data structure formats.¹⁰

Individual GMS countries as well as the Mekong Subregion do not escape such a fragmented situation triggering innovative strategies to cope with existing mechanisms and, eventually, provide strong subdistrict, district, national and further supranational data for cross-border action.

However, different strategies or options could be selected to eventually analyse the strategic information obtained from different sources and existing national data formats. Either an agreed-upon agency imposes a software or simple enough common structure/coding conventions can be produced by a variety of software packages through **free-forward (FF) programmes converting available (national) data into common data exchange format (DEF)**. So, whatever format used from countries and ministries, essential common data are automatically captured, analysed and released to end-users, wherever they are, through cloud systems (usually provincial or district teams and further field officers).¹¹

Figure 3. Reconciling data from a puzzle of data sources. Agreed-upon Agency A (WHO for polio and onchocerciasis eradication)



The “Free-forward program” – FFP - performs the following steps:

- reads the local database
- selects only the records eligible under the DEF
- defines variables specified in the DEF

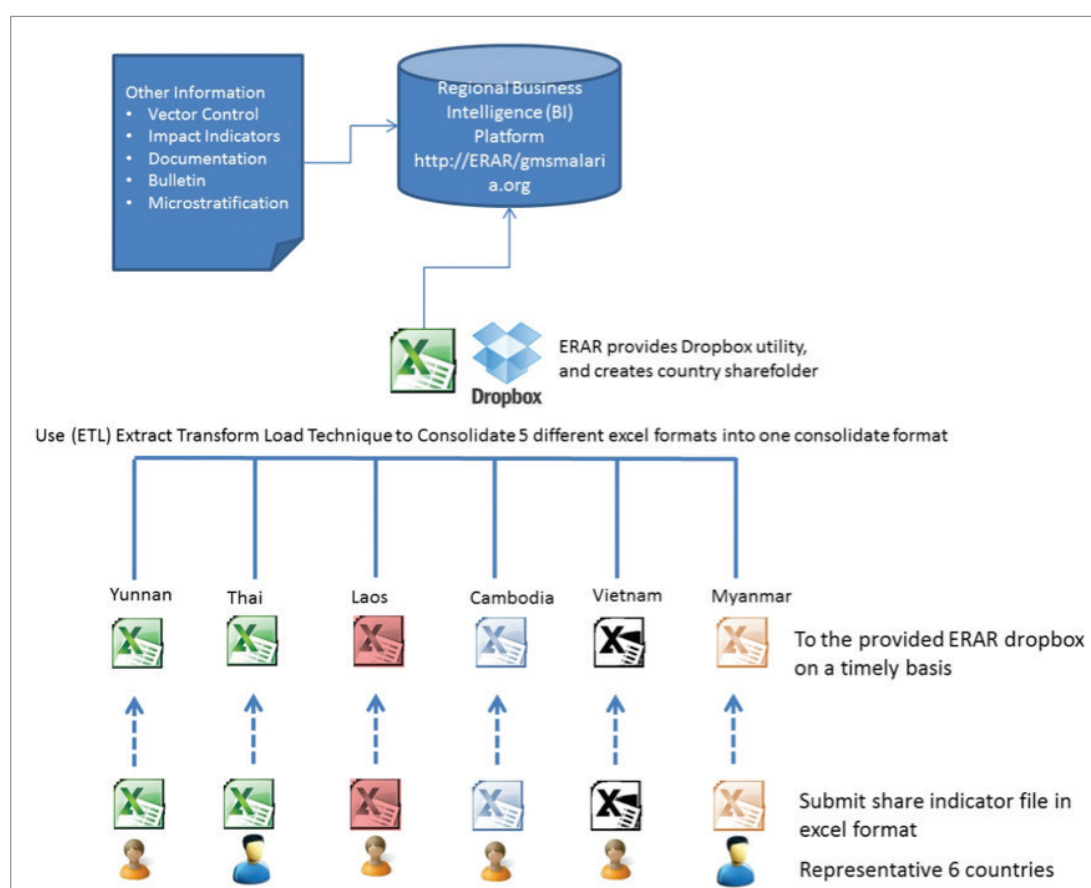
¹⁰ Delacollette, C. From Information to Action: WHO perspectives. Joint International Tropical Medicine Meeting, 3-4 December 2009, Centara Grand & Bangkok Convention Centre at Central World, Bangkok, Thailand. <http://www.google.fr/search?q=joint%20international%20tropical%20medicine%20meeting%202009>

¹¹ The Electronic Data Interchange (EDI) can be formally defined as “The transfer of structured data, by agreed message standards, from one computer system to another without human intervention”. International banks were first developing and implementing such systems to facilitate banking transactions between countries experiencing different systems.

- assigns values in the DEF based on data in the original file
- outputs a file for transmission in the DEF format.

Of course initial data must be computerized ideally at the local level or district/provincial level to allow the above system to efficiently work. From a GMS cross-border surveillance and action perspective, locally computerized data from bordering provinces (following respective national format) are sent to provincial and national epidemiological departments where an agreed FFP creates a DEF, which is sent to Agreed-Upon Agency A (in charge of automatically producing reports in a quasi-real time basis to national and peripheral authorities). This is obvious that each national format must include the minimum set of common cross-border data as suggested earlier in Figure 2. At the present time there are on-going efforts to establish a regional malaria surveillance system within the ambit of the WHO Emergency Response to Artemisinin Resistance initiative for the GMS countries (Figure 4). Electronically, this system would eventually provide a submenu displaying malaria indicators in key cross border sites.

Figure 4. Cross-border surveillance and action: possible way forward



Addressing critical challenges – the long-term strategy

		Solutions
The Primary Health Care	Increasing the number, accessibility and performance of peripheral health-care facilities either private or public in such a way that residents and MMPs of any category can “easily” access needed malaria services and information.	Health insurance, easy reference to well-equipped and staffed hospitals and fair contribution from recognized/accredited private health-care providers are huge challenges, especially, in poor-income countries. ¹²
Workload for HCF (and district) staff	<p>Additional in charge of training, supervision and monitoring (including quasi real-time data management) of newly-affected community volunteers and workers generally operating in hard-to-reach locations. Such extra tasks, even if occasionally supported by nongovernment organizations (NGOs) and encouraged through various incentives, are possibly affecting the performance of the routine peripheral HCF services.</p> <p>Regular reporting and management of (surveillance) data, generated by community volunteers or workers, can be affected as well impacting on the quality of data collected and on the overall consolidation of information with data routinely generated by HCFs. This might subsequently delay or mislead the response.</p>	Incentives might help but also could contribute to the unbalanced fragmentation of (health) tasks.
Capacity of district, county, township or/ and provincial management staff	In most countries, as a result of the multiplication of village volunteers and workers or even HCFs, the district/ county and higher levels have to handle extra tasks including data management, surveillance and response. In such conditions, data generated by volunteers are directly sent to central or provincial level and thus not contributing for peripheral staff to analyse data, take timely decision and provide feedback to field staff who are generating (and interested by) such information for action.	If the use of new IT technologies (eHealth or mHealth) seems to be promising, they could serve the central level only without providing the day-to-day or weekly feedback from districts or provinces to HCFs and communities.

12 A. Mills, (2009). Can malaria control be achieved without strengthened health systems? <http://www.tm.mahidol.ac.th/jitmm-2009/jitmm2009-present.htm>.

		Solutions
Set up a clear regulatory framework	The lack/weakness of surveillance (malaria) data from private health providers (to be trained as well) directly affects the overall surveillance and response system. However, even in Thailand, the multiplicity of information sources and running IT systems do seriously affect the performance of the health information system in general and malaria in particular.	Most countries have piloted some strategies, yet if successful, to be endorsed by the GVT/ MoH and further scaled up. The set-up of a single data management center (National Malaria Register) consolidating malaria information, generated from all potential sources, is still a big challenge to be addressed by top policy-makers.
Multi-sectoral dialogue	Engaging district or provincial health teams into and further action under Governor or State authorities are needed but remain challenges. This is again partially linked to the fragility or weakness (number and capacity) of district/provincial health staff to lead and manage health and malaria interventions. MMPs are by essence of multisectoral interest in which sectors other than health should obviously be involved and, sometimes, in conflict alongside with the GVT (regulatory framework with key ministries), MoH (health policy, services and information) and vertical services (or example malaria technical strategies and policies).	Most interventions, such as mapping of large or small projects or farms/ plantations attracting MMPs and meetings with project developers or landowners have to be organized by provincial authorities in which health concerns and potential technical and financial solutions are discussed and, eventually, implemented. The positive contribution including extra funding from private companies, farms, etc. will improve access by MMPs (at least registered MMPs at first instance) to health services and information further strengthening surveillance and response mechanisms.
Screening points or ad hoc "touch points"	Most seasonal cross-border migrant workers are considered "illegal" without temporary work permit. They can, however, take advantage of local health services including being diagnosed and treated but without being officially recorded which is compromising the performance of the (malaria) surveillance and response system. This is a very challenging topic with high local and political sensitivity and conflicting interests.	As the ASEAN economic community is progressing towards free trade and circulation of persons by 2015, (mid- and long-term) solutions are expected to come from various ASEAN fora.

	Solutions	
Security forces and Border patrols	<p>Since security forces are among most mobile populations, special attention has to be paid through continuous dialog and information to engage them in (malaria) data collection, analysis, early reporting and actions in which they could be directly involved (for example during disasters or large emergencies).</p>	<p>Accessing malaria data including travel history from border patrols have been involved alongside with the MoH in malaria operations (e.g. IEC, BCC) targeting cross-border populations and population residing close to borders. Representatives from security forces are systematically invited to join technical meetings organized by the MoH and specific vertical programmes like malaria. Those meetings allow for exchange of health and malaria data but also for updating and harmonizing strategies and policies including procurement between the MoH and Medical Officers engaged in military operations engaged in research studies, for example, to conduct new drug clinical trials, to better protect soldiers operating in at risk malaria situations or to assess the efficacy of antimalarials. Impregnated hammocks and clothes have been first used and assessed among soldiers and chemoprophylaxis is also one of the key measures used during military operations to protect soldiers from malaria and other vector-borne diseases.</p>

		Solutions
Progressively merging vertical information systems like MIS within more integrated and decentralized database and reporting (like HMIS)	Without affecting vertical system performance and specific malaria interventions such as active screenings. Almost all vertical programmes aiming at maintaining disease elimination, have been affected by integration of services including information management. Usually integration means less items recorded in the common database, long procedures for data analysis and so lack of some key information captured on a quasi-real time basis requested to take immediate action.	<p>As part of an elimination and prevention of reintroduction programme, there is a need to document all imported cases in free malaria areas and take immediate actions such as active case investigation and vector surveillance. Usually integrated database does not allow such detailed reporting except if, again, a dialog is maintained between different epidemiological and disease departments and funds are kept available to, maintain the zero reporting, to cross-check accuracy of data generated from the field and to consolidate information from all potential sources at provincial and central level to determine appropriate local interventions.</p> <p>The ideal goal would be the consolidation of one single malaria dataset with mandatory reporting of malaria as a notifiable disease and populated by all potential sources</p>

5. Conclusions

Early surveillance mechanisms and prepared response strategies are vital to be supported and implemented to detect and respond to any epidemics, to early detect imported cases malaria in areas where they have been eliminated and to contribute to the monitoring of malaria elimination and of multidrug resistance.

Surveillance and response tools are usually built on routine health systems delivery, both public and private, which are ideally expected to cover the whole population in a given country. Peripheral health delivery facilities properly staffed are in turn expected to provide basic day-to-day services to all end-users in need but also feed-back information to district or provincial officers in charge of planning and budgeting routine health-care and preventive services including malaria.

District and provincial officers, with technical oversight by national experts are also to set up specific mechanisms to cope with unusual events like malaria epidemics and to reach or maintain the elimination status of a given disease, notably, malaria.

For surveillance and response mechanisms to perform well as part of a country or regional malaria elimination strategy or epidemic detection strategy need to cover, capture and target the whole population in a given country or territory and need to recognize and include all relevant health-care service providers under government stewardship. This would require malaria elimination strategic tools engaging local communities to ensure access by marginalized and nonresident population (so-called Mobile and migrant populations) irrespective of their citizenships, social status and cultures, to suitable and well-equipped local health-care facilities in order to provide them with prompt and effective (malaria) curative and preventive services and proper information.

All countries of the Mekong Subregion are or will be engaged soon in operations leading to malaria elimination and prevention of its reintroduction within regional malaria time-bound elimination goals.¹³

This document provides current country experiences gained, so far, to improve access by MMPs to malaria services and how to connect those services with basic information needed to improve surveillance and response mechanisms to mitigate epidemics, to detect new active malaria foci or to quickly monitor and respond to multidrug resistant parasite strains. This exercise is not only the responsibility of respective ministries of health but is rather multisectoral, engaging almost all ministries, local politicians, leaders and communities where MMPs are living.

From a surveillance and response viewpoint, it is emphasized that some MMP categories are in principle easier to deal with than others. For example, it is anticipated under government stewardship that migrant workers engaged in large development projects usually led by private companies should be easier to be reached and adequately covered by performing health-care services than individuals without work permit in small farms or individuals working for weeks in remote-forested areas. Based on country experiences by programmes, NGOs, private initiatives

13 WHO (2015): Strategy for malaria elimination in the Greater Mekong Subregion: 2015-2030

and Foundations, this guidance document proposes that improvements in surveillance and response mechanisms could be undertaken according to specific situations or context.

Eliminating malaria in the GMS and preventing its reintroduction will depend on the willingness of the politicians and local authorities in the GMS but also outside the GMS (ASEAN community) of not discriminating MMPs¹⁴ and rather considering all of them as ASEAN citizens equally contributing to ASEAN prosperity.

This guidance document proposes that efforts should be accelerated to build a regional data sharing and response system in which, WHO, ideally should take the lead with partners articulated and fully engaged. Last but not least, funds matter to maintain and consolidate any surveillance and response system; in this regard, it is also empathized that there is a need to collaborate with other health programmes facing similar challenges like TB or HIV/AIDS or other epidemics of public health importance. On the road to malaria elimination in the GMS, increasing domestic funding on surveillance and response as essential part of the malaria elimination strategy matters and will reflect the actual willingness of Mekong Governments to exchange essential data for their common socioeconomic interest.

14 Smith C and Whittaker M (2014): Malaria elimination without stigmatization: a note of caution about the use of terminology in elimination settings. *Malaria Journal* 13:377 doi:10.1186/1475-2875-13-37.

Annex 1: Definition of mobile and migrant populations by GMS countries

	Myanmar	Combdia	Thailand	Lao PDR	Viet Nam	China (Yunnan)
Source	Myanmar Artemisinin Resistance Containment Framework 2011.	MMIP Strategy, 2013 ^a	Ministry of Public Health ^b	National Malaria Control programme and Ministry of Labour and Social Welfare	National census	
Local population		Permanent resident in the area for more than one year		Permanent resident in the area with official household registered.		Permanent resident in the area included in household register
Migrant	For the purpose of containment of resistant malaria parasites, a migrant is anyone who moves out from their permanent residence and stays in a malaria endemic area for whatever purposes with regards to targeting malaria intervention.	Resident in the area for more than six months and less than one year.	M1 – migrants are in Thailand > six months, majority of whom are presumed to have registered with the Ministry of Labour, registration gives them the right to remain in Thailand for a prescribed period of time (typically 1–2 years) and enables them to access the formal Thai healthcare system.	Resident, who moves out from his or her permanent residence over six months or one year to stay or work in another area with official leaving and working premises [from Ministry of Labour and Social Welfare and Ministry of Home Affairs].	A person is a migrant if the current place of residence at the time of survey and the place of residence five years prior were not the same commune (i.e. smallest administrative unit).	Malaria cases: person with clear evidence of getting infected in another area, especially for the cases which stayed in a malaria endemic area one month before onset.
Mobile population	Any person who moves from one area to another (whether internally or externally) usually for a short period of time (less than 1 month).	Resident in the area for less than six months.	M2 – migrants who stay in Thailand for less than six months are mobile migrants and are usually not registered with the Ministry of Labour; this means that they are residing in Thailand illegally, they do not have any claim to utilize the Thai health-care system (other than the services provided by malaria clinics) and they could be arrested and deported at any time.	Any person who moves from a registered village to another area for the purpose of working or for residence within one month up to a six-month period.		Any person who moves from household registered area to another area for the purpose of residence or working (whether internally or externally).

	Myanmar	Combdia	Thailand	Lao PDR	Viet Nam	China (Yunnan)
External migration	Refers to moving across international borders.			Refers to non-Lao resident moving officially across local or international check points to work or stay in any area of Lao PDR		Refers to people moving across international borders
Internal migration	Movement from one area (province, district or municipality) to another within one country			Refers to Lao resident moving officially to stay or work temporarily in other area of the same country		Movement from one area (province, district or municipality) to another within the same country
Easy-to-reach migrants	Within 5 km of a health centre.			Refers to both internal and external migrants who stay or work with local authority/company, which is documented by the Ministry of Labour and Social Welfare.		
Intermediate to reach migrants	Within reach of VMWs or MMWs.					
Hard-to-reach migrants	Living and working in the hard-to-reach (or) unreached areas of health service delivery either by public or private sector. They may be small groups of 5–10 people or may be any number.			Refers to both internal and external migrants who stay or work unofficially or are undocumented by the provincial Labour and Social Welfare Department and/or Ministry of Labour and Social Welfare.		

	Myanmar	Combdia	Thailand	Lao PDR	Viet Nam	China (Yunnan)
Visitors (from abroad to the country)		Person admitted for short stays for purposes of leisure, recreation, holidays; visiting friends or relatives; engaging in business or professional activities. Visitors include excursionists, tourists and business travellers, visiting relatives who might spend one or two nights in or near the forest. Examples: ecotourism, family event.		Refers to any person who is not resident of the area but stays temporarily (within four weeks of the period) for any purpose.		
Seasonal workers	Agricultural activities occurring during plantation season, rubber tapping season and gold mines (usually in the forest fringes and foothill areas).	Agricultural activities occurring during planting season (end of dry season) and harvesting season (end of rainy season), usually in foothills, plains, valleys. Examples: farming/chamkar, rubber, cassava plantations.		Refers to any person, who is not a local resident, who moves during the harvest season (end of rainy season) to other areas for specific season of agricultural or industrial work.		
Defined separately based on malaria vulnerability index, Population Movement Framework, ecosystems and exposure index		Construction/mine worker, forest workers, and security personnel.				

Annex 2: Example of case investigation form (to be simplified for routine surveillance)

Malaria case investigation form		
Case number:		
Case history		
Date history taken:	Location history taken:	
History provided by:	Relation to patient:	
Name of patient:		
Sex:	Age:	Current nationality:
Full present home address:		
Home GPS coordinates:		
When did the infection take place?		
Reason for diagnostic test		
Passive case detection <input type="checkbox"/>	Active case detection q	
Contact survey <input type="checkbox"/>	Population-based survey q	
Symptoms:		
Date of onset of first symptoms of current clinical episode:		
Blood sample		
Sample taken by:		
Name of health facility:	Clinician name:	
Rapid diagnostic test		
Performed by:	Date:	
Result:		
Manufacturer of test:	Batch number:	
Microscopic examination		
Performed by:	Date:	
Laboratory name:	Location:	
Staining method:		
Plasmodium species:	Parasite density:	
Gametocytes present (<i>P. falciparum</i> only)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Molecular testing and polymerase chain reaction results		
Performed by:	Date:	
Laboratory name:	Location:	
Geographical origin of infection:		
Link to previous attacks:		
Type of medicine:	Doses:	Dates:
Treatment outcome:		

Previous clinical episodes		
Date:	Locality:	
Symptoms:		
Laboratory test results:		
Antimalarial treatment		
Type of medicine:	Doses:	Dates:
Treatment outcomes:		
Where, how, and from whom did the infection possibly take place:		
Length of residence at present home address:		
If residence at present home is less than one year: previous home addresses within the past year, including dates:		
Current occupation:	Place of work:	
Recent travel history to known endemic area(s) (including residual active or new active foci) in the country, in as far as this included possible dusk-dawn exposure to mosquito bites:		
Recent contact with known imported malaria cases (provide details):		
Travel to foreign endemic area(s)/country(ies)		
Within the past year (for <i>P. falciparum</i> Infection)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Within the past three years (for <i>P. vivax</i> infection)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Type of preventive measures taken during the above-mentioned travel to endemic area(s)/country(ies):		
If chemoprophylaxis taken – drug name, dose and duration:		
Blood transfusion within the past three months:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Preliminary conclusion		
Malaria infection likely acquired at (specify locality and source):		

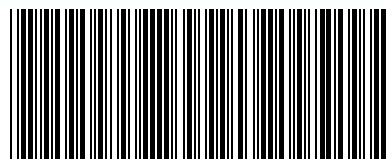
All countries of the Greater Mekong Subregion are engaged in operations leading to malaria elimination and prevention of its reintroduction within regional malaria time-bound elimination goals.

This document provides current country experiences gained, so far, to improve access by mobile and migrant populations to malaria services and how to connect those services with basic information needed that improves surveillance and response mechanisms to mitigate epidemics, to detect new active malaria foci or to quickly monitor and respond to multidrug resistant parasite strains. This effort is recognized to be not only the responsibility of respective ministries of health but is rather multisectoral, engaging almost all ministries, local politicians, leaders and communities where mobile and migrant populations are living.



**World Health
Organization**

Regional Office for South-East Asia
World Health House
Indraprastha Estate,
Mahatma Gandhi Marg,
New Delhi-110002, India
www.searo.who.int



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