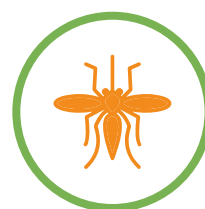


The GEMS Program

Greater Mekong Subregion Elimination of Malaria through Surveillance

Strengthening private sector case management and surveillance to accelerate malaria elimination in Cambodia, Lao PDR, Myanmar and Vietnam







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1

Malaria Free

Malaria elimination is in sight and 2030 is the year by which Asia Pacific Leaders have committed to its achievement. With drug and insecticide resistance spreading in the Greater Mekong Subregion (GMS), and the first target of *P. falciparum* elimination in Cambodia just three years away, time is short. There is also a growing recognition that for elimination to be successful, a business-as-usual approach is insufficient and risks unravelling decades of unprecedented progress and lives saved. Strategies need to constantly change in response to new data to ensure that all infections are rapidly detected, appropriately treated, and tracked in a central national surveillance system.

The private sector remains a significant source of health care for a sizeable proportion of the population in the GMS, especially for at-risk groups including forest goers and mobile workers in remote areas beyond the reach of the public sector. Each National Malaria Control Program (NMCP) in the subregion has recognized the private sector as critical to achieving their ambitious malaria elimination targets. Effectively engaging private service delivery points and worksites to test, treat, and report cases in accordance with national guidelines will be critical, as will ensuring that this data is merged with national statistic.

Malaria respects no borders, and nor does information. Evidence-based decision-making and a shared sustained commitment across the region will be imperative to elimination success, and PSI is partnering with NMCPs to achieve this.

60-80%

Estimated number of malaria cases in the GMS seen by the private sector.

What can we learn from the previous program to eliminate malaria?

...a long-term commitment with a flexible strategy that includes community involvement, integration with health systems, and the development of agile surveillance systems is needed.¹

Previous efforts to eliminate malaria made significant progress in the 1950s-70s, however many gains were lost when interventions ended before the job was complete. Fortunately, we have a wealth of experience and elimination success stories to draw upon. These efforts highlight the importance of:

Ongoing political and financial commitment to elimination is critical, yet increasingly difficult as the number of cases goes down, and the cost per case increases. Continued investment needs will be high, and may not be in line with the population's perceived immediate needs², particularly once elimination has been achieved to consolidate and maintain this status and prevent resurgence.

Integrated surveillance. An effective malaria surveillance system enables decision-makers to identify the areas and population groups most affected, identify trends that require special intervention, and assess the impact of control measures.³ Surveillance systems need to quickly process information from all providers – public and private – from the national to the community level (including mobile populations), to enable quick and accurate decision-making and course corrections.^{4 5} As elimination progresses, the system must be able to track malaria down to the last case, and then continue to monitor for new outbreaks.

Strong health systems. While debate continues on the appropriate level of integration of malaria elimination with health services, countries who have achieved elimination have had prolonged malaria control programs that link epidemiological services with rural public health.⁶ Health systems must ensure universal coverage of early diagnosis and effective treatment through the most appropriate channel: public, private and community-based.⁷

Importance of flexibility. Elimination programs need to be able to adapt and pivot quickly in response to data and other evidence, and to incorporate the use of new tools. “A lack of flexibility, an incapacity to adapt to changing situations, and a lack of coordination between control programs and research institutions have all been identified as important obstacles to advancement in malaria control and elimination”.⁸

Global best practices, local adaptation. Lessons learned highlight that “no single strategy can be applicable everywhere”, and that effective approaches must reflect the historical, social and cultural context.⁹ Similarly, communities should be active participants in understanding and acting on the health issues that affect them.

¹Nájera JA, González-Silva M, Alonso PL (2011), Some Lessons for the Future from the Global Malaria Eradication Programme (1955–1969). *PLoS Med* 8(1): e1000412. doi:10.1371/journal.pmed.1000412

²World Health Organization (2015), Strategy for Malaria Elimination in the Greater Mekong Subregion (2015-2030), p. 33

³World Health Organization (2012), Disease Surveillance for Malaria Elimination: An Operational Manual”, p. 1

⁴Nájera, op cit

⁵Li S et al., *Malaria Journal* 15:45 (2016), Shifting from control to elimination: analysis of malaria epidemiological characteristics in Tengchong County around China-Myanmar border, 2005-2014. DOI 10.1186/s12936-016-1089-9

⁶Nájera, op cit

⁷World Health Organization 2015, op cit

⁸Nájera, op cit

⁹ibid



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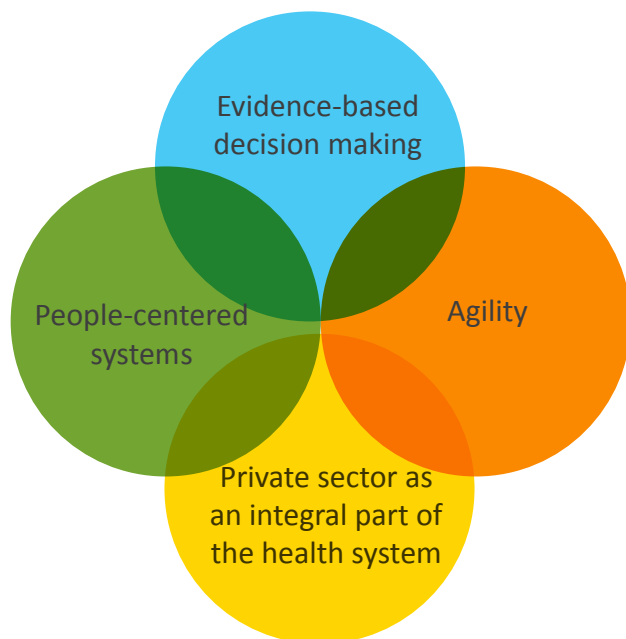
GEMS

In 2016, Population Services International (PSI) launched GMS Elimination of Malaria through Surveillance – GEMS; a four-year program supported by the Bill and Melinda Gates Foundation. GEMS is working with the NMCPs in Cambodia, Lao PDR, Myanmar and Vietnam to strengthen case management and surveillance in the private sector to accelerate malaria elimination. GEMS brings together PSI’s longstanding experience with the private sector in the region, malaria programming across the globe, as well as cutting edge technological tools, a solid logistics infrastructure, strategic partnerships, and new thinking in disease surveillance. The program has five core elements around which the strategy is built (section 4): mapping, provider training and supervision, ensuring secure supply chains, surveillance and active case detection. Technological tools are being adapted and developed to support these key activities (section 5). GEMS will also

contribute to regional molecular surveillance efforts (section 6), and continuously document and share the program’s data and learning (section 7). In addition, four characteristics set GEMS apart from traditional public health programming:

The program has five core elements around which the strategy is built: mapping, provider training and supervision, ensuring secure supply chains, surveillance and active case detection, which are described in section 4. In addition, four characteristics set GEMS apart from traditional public health programming:

- **Evidence-based decision-making:** GEMS consciously uses data to inform decisions in every element of the program, training all team members to work confidently with data, from field staff and stock managers, to technical advisors and strategists. GEMS is also committed to sharing its data and learning with other elimination partners.
- **Agility:** GEMS is intentionally set up to enable the program to experiment and change direction and tactics in response to new information. As such, work plans are expected to shift when more effective pathways are identified.
- **People-centered systems:** Technology is only as powerful as the people who use it and GEMS ensures that its systems are designed to be user-friendly and responsive to the needs of the program and partners.
- **Private sector as an integrated part of the health system:** GEMS views the private sector as an integral partner of the health system, whose providers take pride in knowing that they are contributing to their government’s national elimination strategy and supporting the health of their community.





3

Scope

GEMS Regional Footprint

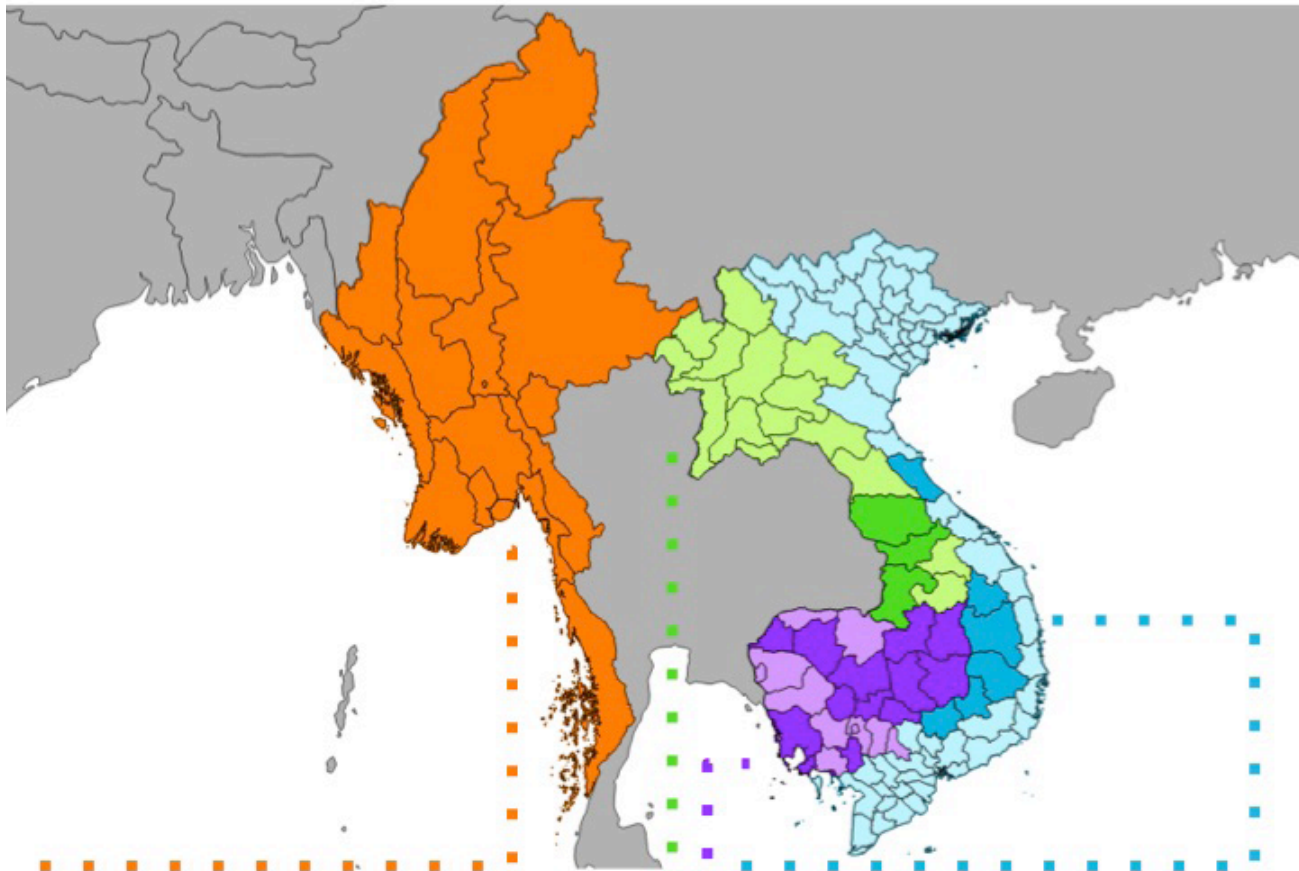
PSI has been working in the GMS subregion for over twenty years. The GEMS program provides an unprecedented opportunity for PSI to assist each NMCP by focusing on their priority geographic areas: Lao's southern provinces, where 95% of Lao's cases are reported¹⁰ the north and north-east of Cambodia, where the highest incidence is recorded and where PSI has its strongest malaria programming; and Vietnam's central region and central highlands, which remain the country's highest area of

transmission. These areas are relatively remote and forested, with many of the at-risk individuals being mobile or migrant workers, or members of ethnic minorities. In Myanmar, which harbors over 70% of the regional malaria burden, PSI manages a national program with reach from east to west. GEMS takes full advantage of PSI's existing footprint, with the opportunity for inter-country and cross-border collaboration and learning.



¹⁰Savannakhet, Saravan, Sekong, Attapeu and Champasak. Lao PDR Malaria Programme Review, Vectorborne Diseases Associates LLC, November 2013

GEMS Geographic Focus



MYANMAR

Caseload: 182,452 reported cases (NSP 2016 –2020)
GEMS coverage: National
PSI network size: >20,000 informal providers;
 2,000 franchised outlets
PSI in country: Since 1995

Myanmar reports 70% of the malaria infections in the GMS.

VIETNAM

- **Caseload: 9,331 confirmed cases (NIMPE)**
- **GEMS coverage:** 5 provinces
- **PSI's network size:** 500 estimated private sector delivery points (set up phase underway)
- **PSI in country:** Since 2005

Vietnam has seen a 50% drop in malaria cases since 2014.

LAO PDR

- **Caseload: 50,674 confirmed cases (NSP 2016-2020)**
- **GEMS coverage:** 3 provinces
- **PSI network size:** 500 estimated private sector delivery points (set up phase underway)
- **PSI in country:** Since 1999

Lao's five southern provinces report 95% of the cases.

CAMBODIA

- **Caseload: 56,271 reported cases (MEAF 2015)**
- **GEMS coverage:** 14 provinces
- **PSK's network size:** 568 private providers and 131 work sites
- **PSI in country:** Since 1993

The Thai/Cambodia border has been the Historical epicenter of drug resistance.

4

Five Core Elements



Mapping the private sector



Comprehensive training and routine supervision to ensure high quality malaria care and data reporting



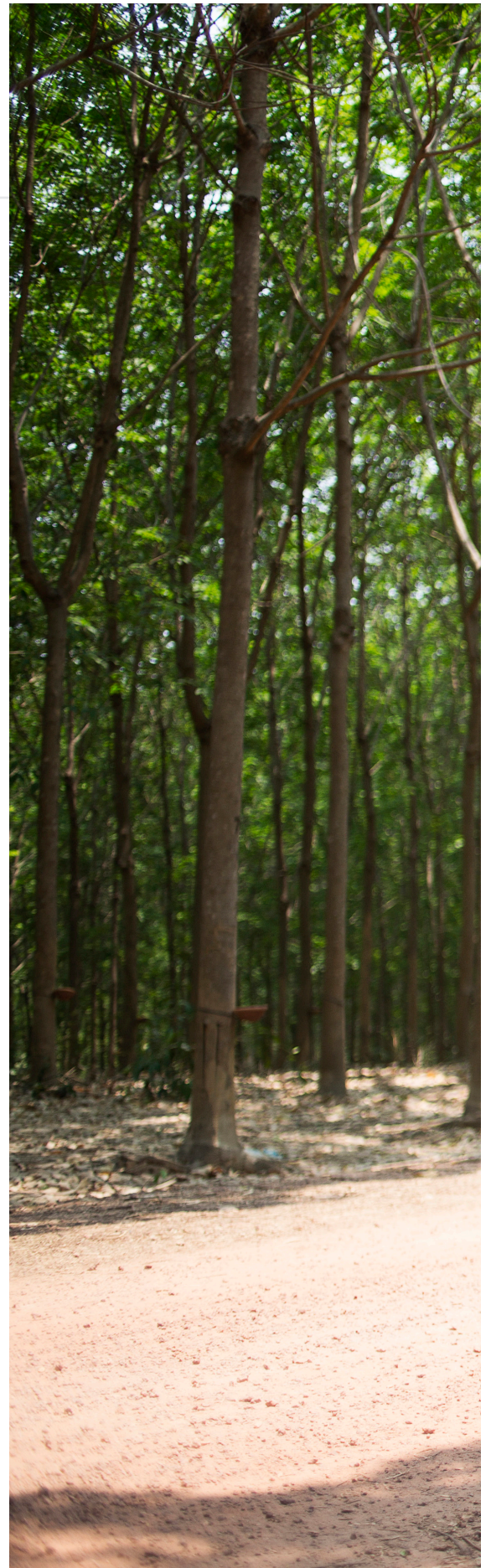
Securing supply chains for quality assured RDTs and first line treatments



Establishing routine reporting systems for all suspected and confirmed cases and promoting data use

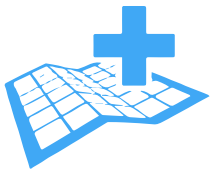


Actively finding and investigating cases









1. Mapping the Private Sector

- Map private health outlets
- Map private industry worksites and assess health services and conditions on site
- Study provider and patient behavior
- Understand mobile workers' movements, infection status, health drivers and motivational factors

Comprehensive maps are essential to pinpoint the location of each privately owned health outlet – specifically clinics and pharmacies – as well as private worksites, that attract significant numbers of mobile migrant workers. PSI is completing outlet and worksite surveys to map the targeted areas in partnership with each NMCP, linked with key data points for each facility or worksite, such as suspected and positive malaria cases at each location.

Private sector health outlets

Mapping of private sector outlets began with evidence generated by PSI's ACTwatch program which has completed outlet surveys in Cambodia since 2009, Lao in 2015, and Myanmar since 2012¹¹. In program target areas not covered by ACTwatch, GEMS is using available lists of registered health service providers as the starting point to identify all other outlets providing malaria services. The final maps will be reviewed with each NMCP to strengthen country strategies for effective private sector engagement and ensure GEMS delivers services where they are needed most for malaria elimination.

Worksites

At-risk worksites predominantly include rubber plantations across northeast Cambodia, central Vietnam and much of Myanmar. In Lao, hydroelectric dam construction is a key source of employment, and across the region, mines are some of the highest risk and simultaneously the most difficult sites to access. Using a full census approach, PSI is working with land concession maps, cross-checking these with registers held by district or commune chiefs, and snowballing on the ground to identify all operating companies in the areas of interest. Once located, PSI is recording: (i) location by GPS, (ii) business type, (iii) seasonal peaks and flows of workers, (iv) health provision on site or the nearest facility, including malaria test and treat services (iv) living conditions, including net space and usage, and (v) families on site.

The resulting maps will be overlaid with updated risk stratification maps, and together this information will help NMCPs and PSI assess the current reach of private outlets and worksites in order to identify program gaps and priorities.

¹¹The methodology in Myanmar used a slightly different approach to standard ACTwatch procedure. Full details of all surveys (including supply chain and household surveys) can be found at www.actwatch.info and K.A. O'Connell, et al. (2013), Methods for implementing a malaria outlet survey: Lessons from the anti-malaria market. *Malaria Journal*, 12:52.



2. Comprehensive Training and Routine Supervision to ensure High Quality Malaria Care and Data Reporting

- Enroll private health outlets and worksites into networks supported by the program
- Provide full training to private health outlets and worksites on testing, treatment and reporting
- Support integrated health care packages to complement the malaria agenda

In consultation with the NMCP and in line with each country's policies, private outlets and at-risk worksites will be enrolled into the program, trained in correct malaria case management and data reporting, and routinely supervised to ensure the quality of their services is assessed against established benchmarks, and continuously improved.

Training

Training will be implemented in partnership with NMCP counterparts using national curriculum to ensure providers are providing care in line with the most recent national policies and guidelines. GEMS trainings include the importance of early blood tests, correct RDT use, ACT age and weight bands, patient counselling on the importance of taking the full course of antimalarials, referrals, and the management of negative cases. Trainings also provide an opportunity to drive home best practices through adult participatory methods, while drawing upon the participants' own experiences, and inspiring a connection to their country's elimination agenda. Following initial training, refresher training will be provided once per year to keep skills sharp and motivation high.

Integrating malaria services with primary health care

With rapidly declining malaria caseloads, sustaining the relevance of malaria-specific health providers to their communities, maintaining their skills and knowledge and, crucially, keeping them active as surveillance points, will be key. Based on existing health needs data and additional studies, PSI will expand the basket of services and products offered by health outlets and worksite staff to ensure their value is retained and patient traffic is increased despite declining malaria cases. Additional commodities being considered range from child health (oral rehydration solutions, zinc, deworming, pneumonia treatment and nutritional supplements), to family planning products, as well as treatment for some non-malaria fever.

Supervision and Support

In addition to periodic training, PSI is providing routine supervision and support through one-on-one visits; a proven strategy to reinforce key behaviors. PSI staff – often doctors or pharmacists by training – are able to answer providers' technical questions and serve as a vital source of updated information. In addition, all providers in PSI's networks are undergoing a rigorous quality assessment of their service provision, providing an opportunity to give immediate feedback.







3. Securing Supply Chains for Quality Assured RDTs and First Line Treatments

- Supply private sector health service delivery points with RDTs and quality assured ACTs
- Conduct regular commodity forecasting with NMCPs
- Develop SOPs and support transition to national systems where planned

Reliable supply chains are the lifeline of any public health program, and vital for an elimination program. PSI will work with each NMCP to ensure that appropriate delivery strategies are in place to ensure an uninterrupted supply of quality assured first-line treatments and RDTs are available at the outlet level. GEMS is adapting to the logistical and contextual issues of each country.

In **Cambodia**, PSK's¹² malaria supply chain uses a dedicated fleet of PSK vehicles and representatives to move products across the country. Due to frequent shifts in Cambodia's national treatment guidelines in response to multi-drug resistance, PSK is working with CNM to switch out and replace first-line drugs where necessary. In addition, GEMS will support the country's detailed forecasting to identify anticipated gaps and find solutions.

In **Lao PDR**, PSI is working with with the NMCP and CHAI to strengthen the existing public supply chain to carry NMCP-provided products from the central level in Vientiane, through the provincial level, to the district level, down to

outlets. PSI teams, located at the district level, will be on hand to support this system as necessary.

In **Myanmar**, PSI uses a hybrid system composed of its own supply chain to distribute RDTs, as well as two commercial importers. The latter moves ACTs to over 20,000 health outlets across the country, with the advantage that this provides a supply line to insecure areas that are inaccessible to PSI's field teams, particularly parts of Rakhine State, Kachin State and northern Shan State.

In **Vietnam**, given the strength of the public health care system, PSI and the NMCP are beginning discussions to determine how GEMS can support the stocking of private sector outlets in line with the national treatment guidelines.

¹²PSI has localized in Cambodia under the name Population Services Khmer (PSK)



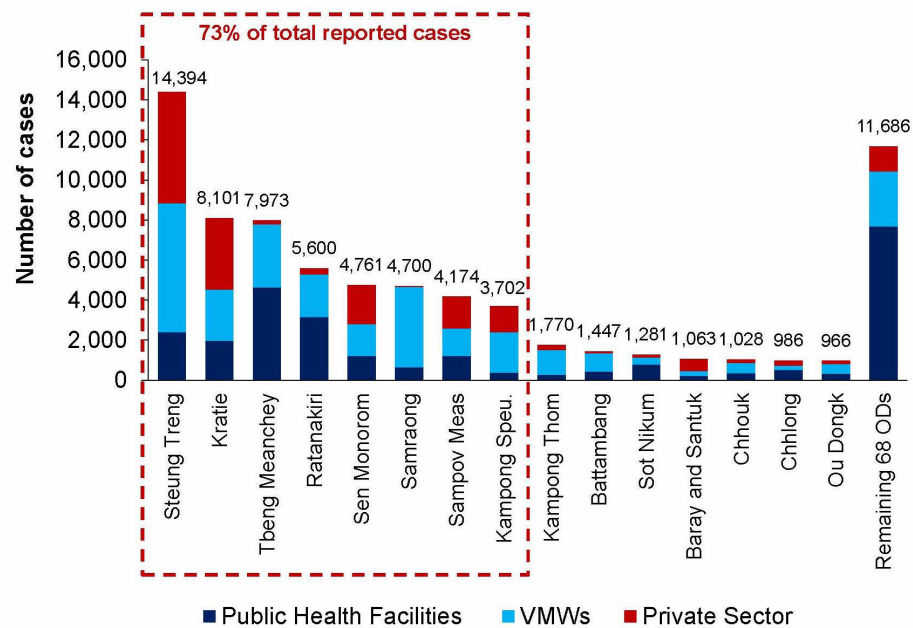
4. Establishing Routine Reporting Systems for All Suspected and Confirmed Cases and Promoting Data Use

- Merge existing and new data into one DHIS2 platform
- Launch a phone app for electronic data collection
- Work with NMCPs to incorporate private sector data into national information systems
- Routinely review data with NMCPs

At the elimination stage, surveillance becomes more challenging as the malaria burden decreases, and also more critical, as each case must be identified and investigated. A shift from a passive approach to a proactive one that supports better and faster operations is key. To ensure that data-based decisions can be made, essential information will be made available in real time. PSI will work in each country to merge its data sources from private sector providers – including RDT and ACT sales or distribution records, testing rates, caseload data and quality assurance scores – and make it available through customized DHIS2 dashboards.¹³ This information will be combined with public sector data to give NMCPs a complete picture of malaria patterns in their country. One of the clearest

illustrations of combined public and private caseload data is in the Cambodian Malaria Elimination Action Framework, as shown below.

Recognizing that perfect data systems are only one piece of the surveillance puzzle, GEMS will invest in the often overlooked link: people trained to routinely use data to inform their decision making. This will include creating alerts in DHIS2 dashboards to trigger action, and building in logic checks throughout the data flow from the feverish patient to the DHIS2 system. Instinctive data use and evidence-based discussions among all partners will be paramount to inform a continually evolving strategy to eliminate malaria.



¹³District Health Information System 2 (DHIS2) is open-source software created by the University of Oslo. More international organizations and governments are switching to this platform, which PSI is encouraging in the GMS region. <https://www.dhis2.org/>



5. Actively Finding and Investigating Cases

- Implement active case detection
- Trigger case investigation

As we move from a control to elimination context, GEMS will shift from passive to active case detection. Strategies will vary across the four countries in line with national policies and country context, including caseload, resources, suspected transmission sites and at-risk populations.

In **Cambodia**, GEMS is using biannual deworming campaigns on rubber plantations as opportunities to offer free malaria test and treat services. Between the first and second campaigns, the voluntary test rate increased from 8% to 13%, and all positive cases were successfully treated. In addition, PSK is piloting two new methods: one re-active and one pro-active.

- **Re-active:** “Cash for fevers” will offer plantation workers who test positive for malaria a cash incentive to bring in family, friends or colleagues who may also have been exposed to malaria, for testing.
- **Pro-active:** “Screen and treat on entry” has been

welcomed as a positive initiative by many plantation managers and will be piloted as a policy for new workers as part of their induction. In this way, onward transmission will be reduced and plantations cleared of infection will be protected.

The GEMS program in **Lao PDR** and **Vietnam** will explore possibilities for active detection with the NMCPs once the program is better established. In **Myanmar**, with the current caseload, active case detection is not currently a priority, however GEMS will begin piloting pro-active case detection beginning in 2017.

In all GEMS countries, it is expected that cases identified through the private sector will be investigated by the public sector. GEMS will link to established and planned mechanisms, including phone hotlines and direct district-level reporting of cases to trigger this process.



5

The Tool Box

Cross cutting tech solutions

As cell phone penetration and internet access surge across the region, PSI is investing in the development and roll out of intuitive tech solutions. These tools are designed to significantly reduce data reporting times, improve completeness and data reliability, and ease information management. Specifically, the tools allow providers to report cases as soon as they find them; PSI staff to rigorously score providers on the quality of their care; and to ensure all decision-makers have access to private sector data through customized dashboards to meet their needs.

The malaria case surveillance app

In Cambodia, PSI and the NMCP co-developed a visual malaria case surveillance phone app, designed to make the task of submitting data on every suspected and confirmed malaria case as simple as possible for the provider. The tool has already demonstrated results by reducing a two-month lag time between a patient presenting at a facility, and the data reaching the central data system – to a matter of hours. Reported data is verified against used RDTs collected by PSI from the outlets. The tool has been adapted for Lao and Myanmar to reflect national policies and needs, with experimental modules to capture travel history.



Key Features

- Offer highly visual, user friendly screens and built-in checks to capture all key data points.
- Reports data with the push of a button on the provider's smart phone.
- Summarizes patient records to inform the provider, keeping reporting motivation high.
- Automatically uploads data into DHIS2 for mapping and graphing to inform decisions.

Health Quality Network Improvement System (HNQIS)

PSI staff are now equipped with tablets loaded with an app containing a quality assurance checklist, feedback scripts and a scoring tool. Conducted with a real or simulated case, the app generates a quality score, which allows for immediate positive reinforcement, and discussion of areas needing improvement. The same app also automatically generates a visit schedule based on provider scores and

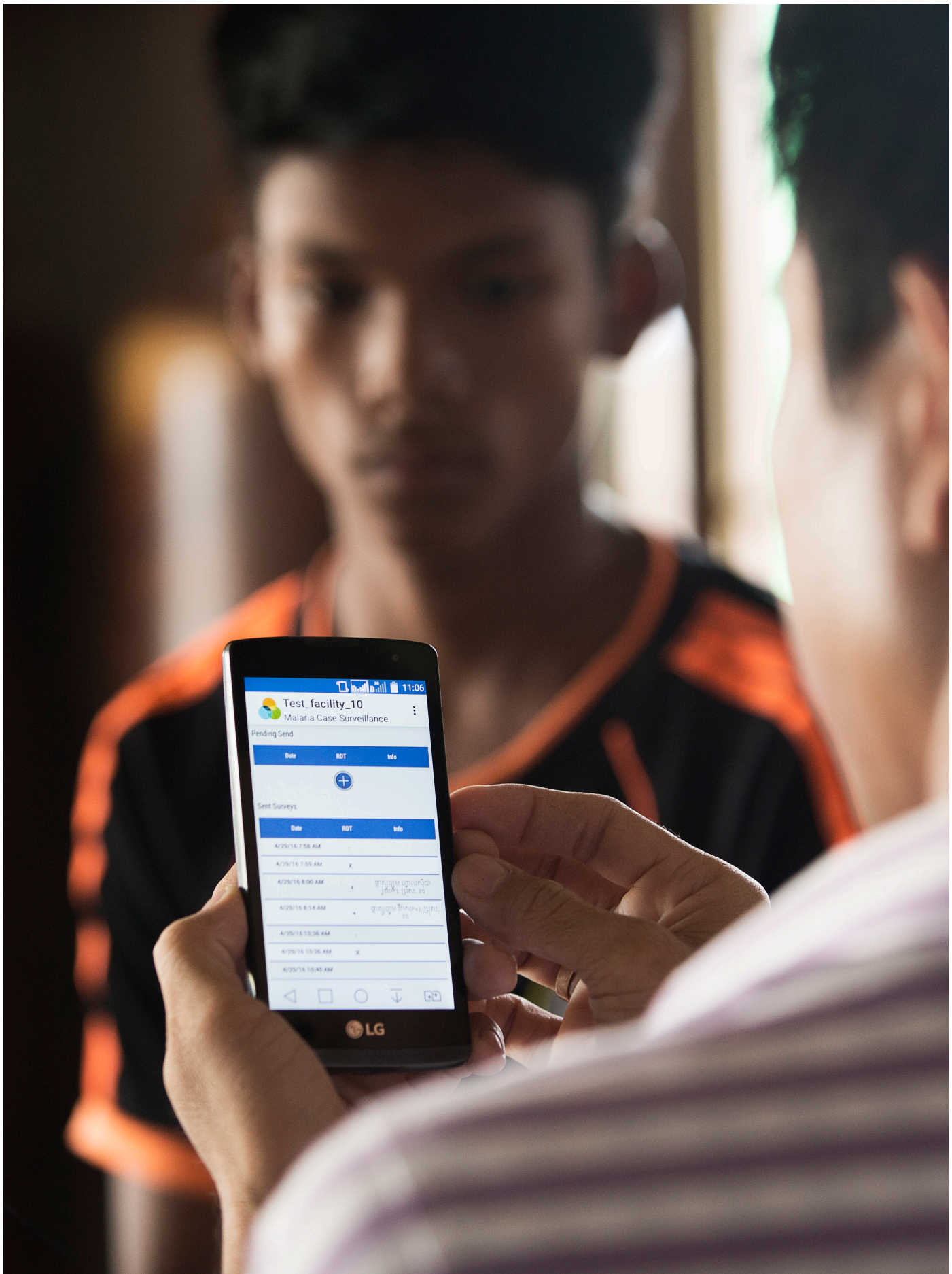
their patient volume, whereby a high scoring provider with few fever patients is revisited in three months, whereas a poorly performing provider with a high load is revisited much sooner. The tool, with online and offline functionality, examines: (1) Provider skills in asking for the patient's recent history and probing for danger signs, (2) correct RDT use, (3) correct treatment knowledge, (4) workplace assessment, and (5) accuracy of their reporting. All data are automatically uploaded into DHIS2.

Key Features

- Scores provider quality of care and patient service against standardized checklists.
- Prompts staff to provide consistent and immediate feedback to support behavior change.
- Uploads data automatically into DHIS2 for analysis.
- Allows PSI to prioritize follow-up support based on provider quality and patient volume.



²Savannakhet, Saravan, Sekong, Attapeu and Champasak. Lao PDR Malaria Programme Review, Vectorborne Diseases Associates LLC, November 2013



DHIS2 – Visual systems and data for decisions

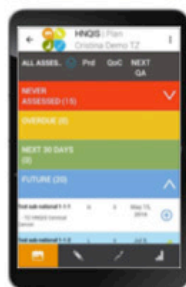
DHIS2 is a management information system that makes it easier to collect, manage, and explore program data from health interventions. It is an open source technology developed by the University of Oslo, and is being adopted by a number of NGOs and Ministries of Health. DHIS2 is being rolled out across all PSI countries to facilitate data-driven decisions by presenting relevant health information in real-time. As a flexible, web-based information system, DHIS2 goes beyond data collection and offers powerful visual analytics that illustrate program trends and presents

information to inform program strategy. DHIS2 allows users to track individual cases while also analyzing the big picture.

GEMS is configuring DHIS2 to provide the program and each NMCP with the full set of private sector data that can be extracted, overlaid and analyzed as needed: all data from positivity, testing and reporting rates, to quality scores and stock levels can be viewed by location and over any given time period. NMCPs will be able to merge private and public sector data to better inform their decisions.

Key Features

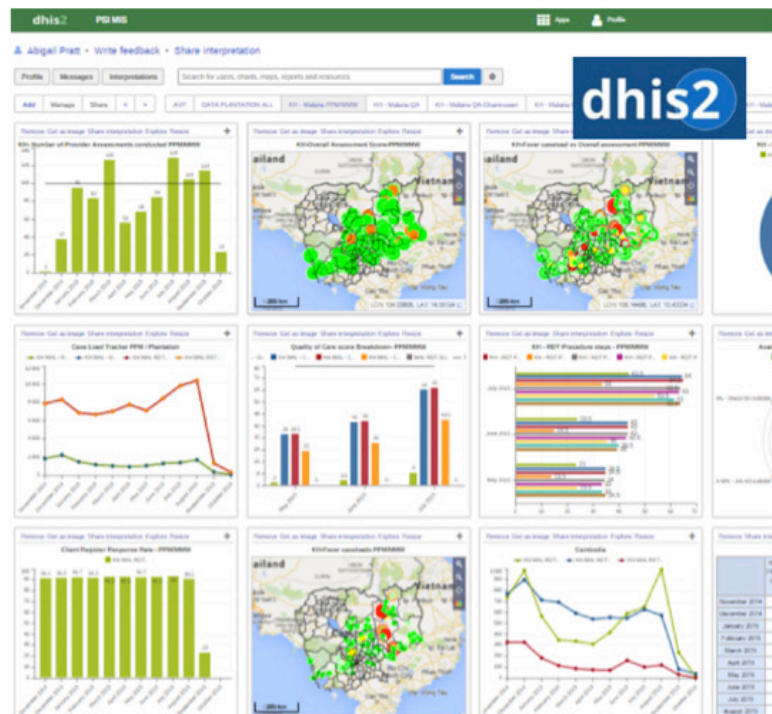
- Provides powerful analytics to inform interventions from the village to regional level
- Generates customized dashboards for clear data visualization, e.g. graphs, maps, charts and tables
- Collates data from paper and electronic sources as it is reported
- Enables creation of standardized custom reports and indicators



Quality Assurance App



Malaria Case Surveillance App



6

Molecular Surveillance

Routinely collecting dried blood spots

- Collect dried blood spot specimens from private sector outlets and worksites for lab analysis
- Disseminate molecular surveillance findings at national and international levels

New drug resistance markers and increasingly sensitive techniques to identify asymptomatic infections distinguish the current elimination drive from the previous global program. GEMS will capitalize on its extensive networks across the region to collect dried blood spots (DBS) on filter papers. From these, parasite DNA will be extracted to identify asymptomatic cases, genetic mutations, including resistance to artemisinin and partner drugs – essential information in the fight against resistance. This is a valuable opportunity for GEMS to contribute to this rapidly growing discipline, with additional scope to identify parasite movements, ascertain if drug resistance is spreading and to contribute to operational decisions, and longer-term research by establishing a DBS repository in the region. Molecular surveillance partnerships are currently planned in Cambodia with MORU, and the Department of Medical Research and the University of Maryland, Baltimore in Myanmar. The resulting data will be shared with NMCPs and other interested researchers, and will inform GEMS strategy.

Surveillance should not only aim to detect the last case, it should be an essential instrument from the start, involved in the identification and study of problem areas, beyond the limits of administrative localities

Nájera JA, González-Silva M, Alonso PL, Some Lessons for the Future from the Global Malaria Eradication Programme (1955–1969), 2011



7

Evidence & Learning

Lessons learned, successes and failures and operational realities are rarely documented during the lifetime of a program. Given the need for rapid iteration with looming elimination targets, GEMS will generate timely and practical insights to contribute to the malaria community's knowledge base. These will include learning and policy briefs, case studies, and data bulletins. In addition, PSI will convene partners to disseminate and discuss data to promote evidence-based strategy dialogue.

A cutting edge process evaluation is built into GEMS to assess the strength and nature of the contribution made by GEMS private sector surveillance to malaria elimination. In addition to ongoing data analysis, the views of NMCPs and participating private outlets will be sought throughout the life of the program to ensure GEMS is continuously improving and adapting to complex and evolving contexts. This feedback will be used to continually challenge program assumptions and expected outcomes to ensure that GEMS is poised to maximize its contribution to malaria elimination in the GMS.

¹⁴WHO (2012), Disease Surveillance for Malaria Elimination: An Operational Manual





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Malaria elimination will only be achieved through partnership, open data sharing and coordination on the ground. GEMS is currently actively working with the following key partners and looks forward to expanding this base over the coming years.

- CNM – Cambodia
- NIMPE – Vietnam
- CMPE – Lao PDR
- NMCP – Myanmar

- 17Triggers (Cambodia)
- Clinton Health Access Initiative
- Mahidol Oxford Tropical Medicine Research Unit (Cambodia)
- University of California, San Francisco's Malaria Elimination Initiative (Vietnam)
- University of Maryland, Baltimore (Myanmar)
- World Health Organization