ACTWATCH OUTLET SURVEY RESULTS

Thailand, 2016
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1.1 background
Overview of ACTwatch
ACTwatch is a multi-country research project implemented by Population Services International (PSI). Standardized tools and approaches are employed to provide comparable data across countries and over time. ACTwatch is designed to provide timely, relevant, and high quality antimalarial and malaria diagnostic testing market intelligence, including information on artemisinin-based combination therapies (ACT), the most effective treatment for malaria. The project was launched in 2008 with funding from the Bill and Melinda Gates Foundation (BMGF) and is currently funded through 2016 by the BMGF, UNITAID, and the Department for International Development (DFID).

Research methods implemented include outlet and household surveys, supply chain studies, key informant interviews, and a new module to document private sector fever case management practices using observation and client exit interviews.

What are the project goals and objectives?

The goal of the ACTwatch project is to provide policymakers with actionable evidence to inform and monitor national and global policy, strategy, and funding decisions for improving malaria case management and elimination efforts.

The objectives include:

1) Generation of relevant, timely, and high quality antimalarial market evidence;

2) Identification of strengths and gaps in the antimalarial market performance of the public and private sector, and market readiness to adhere to national guidelines;

3) Dissemination of evidence at national, regional, and international levels, and

4) Reaching policy-makers, donors, and programmers with timely evidence to inform policy, strategy, and funding decisions.

Why is ACTwatch relevant?

ACTwatch data provide timely and practical evidence for national malaria programs and their partners. The project monitors antimalarial markets in the context of policy shifts and investments in the scale-up of first-line ACT and blood testing using malaria rapid diagnostic tests (mRDTs). This has included adaptation of project methods for the evaluation of the Affordable Medicines Facility-malaria (AMFm) pilot.

In the Greater Mekong Subregion (GMS), the evidence is also important to help inform malaria control strategies that have focused on the containment of artemisinin resistance, and a more recent commitment to eliminate malaria in the region by 2030. The emergence of malaria parasites resistant to artemisinin in the GMS is a serious threat to the recent gains and current ambition of elimination of Plasmodium falciparum in the region. As ACTwatch provides market intelligence regarding the performance of both the public and private sectors, as well as provider readiness to adhere to national treatment guidelines, this information will be critical to knowing where there are gaps and opportunities within the different markets.

ACTwatch has implemented nearly 50 outlet surveys since 2008. Over 200,000 public and private sector outlets have been screened for the availability of antimalarials, and 50,000 outlets have been audited over the course of the project. ACTwatch has gathered information on branded and generic antimalarial medicine price and sales for over 300,000 antimalarial products.
What are the outlet surveys?

Outlet surveys are the core component of the ACTwatch. In the GMS, project countries include Cambodia, Lao PDR, Myanmar, and Thailand. In sub-Saharan Africa (SSA), outlet surveys have been implemented in Benin, the Democratic Republic of Congo (DRC) (in Kinshasa and Katanga), Kenya, Madagascar, Nigeria, Tanzania, Uganda, and Zambia.

In 2015, with funding from the BMGF, ACTwatch expanded into the GMS. ACTwatch conducted its fourth outlet survey in Cambodia in 2015, a follow-up from surveys implemented in 2009, 2011, and 2013. It was complemented by a fever case management survey, using exit interviews and interviewer observation to address provider practices. In Myanmar, a fourth sub-national outlet survey was conducted in the eastern part of the country in 2015, where surveys have been conducted on a yearly basis since 2012. Unique to Myanmar’s ACTwatch survey in 2015, a nation-wide assessment was conducted, covering coastal areas and borders with India in addition to domains in Eastern Myanmar. In 2015 and 2016, outlet surveys were implemented for the first time in Lao PDR and Thailand, providing a snapshot of the antimalarials available in these markets.

This report presents outlet survey data from Thailand, implemented in 2016.
What questions are answered by the ACTwatch Outlet Survey?

- What types of outlets in the public and private sectors are distributing antimalarials and providing malaria blood testing?

- What types of antimalarials and mRDTs are available and distributed by public and private sectors?

- What proportion of public and private sector antimalarial-stocking outlets are stocking: 1) quality-assured ACT; 2) non quality-assured ACT; and 3) malaria blood testing?

- What is the antimalarial market share of quality-assured ACT relative to the market share for other types of antimalarials?

- What is the consumer price for antimalarial medicines and malaria blood testing among private sector outlets?
1.2 background
Thailand Context
Important gains in malaria control have been achieved in recent years in Thailand. Confirmed malaria cases have declined substantially since 2000, but half of the population still live in areas with ongoing malaria transmission. Major plasmodium species include Plasmodium falciparum (Pf) (38%) and Plasmodium vivax (Pv) (54%), with transmission of both Pf and Pv malaria concentrated along border areas with Myanmar and Cambodia. In 2014, there were 37,921 reported confirmed cases and 38 reported deaths, with most of these confirmed cases occurring among mobile and migrant populations from Myanmar and Cambodia. Malaria transmission occurs year-round in many rural areas, but peak transmission occurs twice yearly, from June to August and again from October to November.

Sources of treatment for malaria

Access to free diagnosis and treatment of malaria is available at many public sector facilities throughout Thailand, including most district and provincial hospitals, some health promotion hospitals, malaria clinics, malaria posts, and also in mobile clinics in certain highly endemic areas. The Bureau of Vector Borne Disease (BVBD) has established approximately 200 malaria clinics throughout malaria-endemic provinces, mostly along international borders, which are equipped to provide free laboratory diagnostics and malaria treatment.

Additionally, approximately 250 community-based malaria clinics have been established in malaria-endemic provinces, referred to as “malaria posts”, managed by one Malaria Post Worker each. For each malaria post in a village with a large migrant population, one Migrant Health Volunteer is recruited to provide free malaria diagnostic services using microscopy or malaria rapid diagnostic tests (mRDTs) to migrants, increasing access to early malaria diagnosis and treatment among vulnerable populations and foreign nationals along international borders. Additionally, in conflict-affected southern villages, one Community Health Worker is hired for each malaria post to support malaria services. All of these services are provided free of charge to both Thai citizens and migrants.

The private sector plays an important role in Thailand’s healthcare system, with many private clinics run by public-sector physicians during evenings and weekends. However, in 1995, Thailand banned unauthorized sale of antimalarials in the private sector as a strategy to control the spread of drug resistance. Private hospitals can administer malaria treatment with case-by-case authorization from the BVBD, and non-governmental organizations (NGOs) are authorized for malaria case management as long as they are affiliated with a provincial health office or university.

Malaria control and elimination strategies

In 2014, the World Health Organization (WHO) used available evidence about artemisinin resistance to define a 3-tier stratification system for targeting action to address drug resistance. Areas designated as Tier 1 are prioritized for immediate multifaceted response to contain or eliminate resistance. Areas designated as Tier 2 are prioritized for intensified malaria control to reduce transmission and/or limit the risk of emergence or spread of resistant parasites. Tier 3 areas have no evidence of artemisinin resistance and limited contact with Tier 1 areas. Malaria control in these areas focuses on vector control, increasing coverage with confirmatory testing, and treatment with quality-assured ACT.
Thailand Malaria Case Management Guidelines:

1. All suspected malaria cases should receive a diagnostic blood test (either blood smear or mRDT), and no presumptive treatments should be administered.

2. Since 2008, the recommended first-line treatment for uncomplicated Pf malaria in adults has been a 3-day regimen of artesunate (AS) 50mg/tab and mefloquine (MQ) 250mg/tab with a single dose of primaquine (30mg) on day 3. However, implementation of dihydroartemisin piperaquine (DHA PPQ) as the first-line treatment for Pf malaria began in late 2015 with official nationwide implementation taking place in 2016.

3. In the case of treatment failure, the second-line treatment for Pf malaria is quinine + doxycycline or clindamycin, or artesunate tablets + doxycycline or clindamycin, with a single dose of primaquine on day 1.

4. First-line treatment for Pv and Plasmodium ovale (Po) malaria is chloroquine (250mg/tab) and a daily dose of primaquine (15mg) for 2 weeks.

5. Treatment for Plasmodium malariae (Pm)malaria should follow the same guidelines as Pv and Po but without primaquine.

6. The first-line treatment for severe malaria is intravenous or intramuscular artesunate or quinine, followed by the oral first-line ACT regimen.

7. The recommended first-line treatment for malaria in pregnancy is quinine for Pf malaria and chloroquine for Pv, Po, and Pm malaria during any gestational period. The patient should receive a confirmatory blood test after delivery.
Given progress in malaria control in recent years, Thailand has set the goal of eliminating malaria by 2024 with the intermediate goal of eliminating malaria from 80% of the country by 2020. Provinces with confirmed artemisinin resistance have been prioritized for immediate multifaceted response to contain or eliminate resistant parasites as soon as possible. These provinces include Tak, Kanchanaburi, and Ranong Provinces on the Myanmar border and Trat, Surin, and Srisaket Provinces on the Cambodia border.

The Global Fund Round 10 grant supports the BVBD and several partner NGOs for containment of artemisinin resistance and has equipped both the government and NGOs with the funds needed to conduct containment activities along the border regions. These activities have included administering Directly Observed Therapy (DOT) and Information, Education and Communication (IEC)/Behavior Change Communication (BCC) to migrants along the Thai-Myanmar border, monitoring drug quality, and providing technical assistance to health care facilities for case management, day-3 follow up, and quality of care for severe malaria. In addition, through a collaboration between BIOPHICS and the BVBD, an electronic Malaria Information System (eMIS) for monitoring various aspects of artemisinin resistance, including early case detection, investigation, and tracking as well as drug compliance, was developed and implemented in 2009. To address malaria control among migrants and refugees, there are several NGOs managing ongoing activities in Thailand related to malaria case management among these vulnerable population groups.
In Thailand, the country targets elimination of malaria transmission from 80% of country areas by 2020.

Specific objectives to achieve this goal include:

1. Detect malaria cases (both asymptomatic and symptomatic) and ensure effective diagnosis and treatment and gametocyte clearance.

2. Prevent transmission of malaria parasites through effective vector control and personal protection measures among vulnerable populations.

3. Support elimination of malaria parasites through comprehensive behavior change communication, community mobilization and advocacy.

4. Provide an effective management system (including surveillance, monitoring and evaluation, and operational research) to enable rapid and high quality implementation of the strategy.

5. Interrupt malaria transmission in target districts.
Thailand timeline

1949
Thailand Malaria Control Program initiated.

1953
Malaria diagnosis is free of charge in the public sector.

1957
Chloroquine resistance first detected in Thailand.

1960
Sulfadoxine-pyrimethamine (SP) resistance first detected in Thailand

1965
Primaquine is used for radical treatment of Plasmodium vivax (Pv) malaria.

1990

1995
Artesunate mefloquine (ASMQ) implemented as first-line treatment for Plasmodium falciparum (PF) malaria in areas with drug resistance

1995
Artemisinin-based Combination Therapy (ACT) is free for all ages in public sector

1995
The government bans the unauthorized sale of antimalarials in private sector

1991
National guidelines stipulate that patients of all ages should receive a malaria confirmatory diagnostic test
2000
2-day ASMQ becomes first-line treatment for Pf malaria nationwide.

2001
Presumptive treatment of malaria phased out

Universal Care Scheme (UCS) implemented: health care free of charge for registered citizens in the public and private sectors.

2002
Scale-up of malaria clinics from 200 (initially) to 329 (in 2010) and establishment of 460 malaria posts.

2008
Artemisinin resistance first detected along Thai-Cambodia border

Electronic malaria information system (e-MIS) implemented to help identify and control resistance

ASMQ first-line treatment changed from 2-day to 3-day course

2009
Artemisinin-resistance containment project begins in seven provinces along Thai-Cambodia border

2015
Dihydroartemisinin piperazine (DHA PPQ) introduced as first-line treatment in eight of 29 malaria-endemic provinces (four from each border area)

2016
DHA PPQ officially implemented as first-line treatment for Pf malaria nationwide

2008
National guidelines stipulate that quinine and doxycycline should be used as treatment for severe malaria

National guidelines stipulate that treatment of Pv malaria is chloroquine and primaquine (14 days)
1.3 background
Outlet Survey Methods
ACTwatch implements standardized methods and questionnaires that allow for comparisons between countries and survey rounds. A full census of all outlets providing malaria care and a full audit of all available antimalarials provides a complete picture of the antimalarial market.

How is the sampling conducted?

A representative sample of clusters is selected from each research domain. Typically, a one-stage probability-proportional-to-size cluster design is used to select clusters within each domain, with cluster population serving as the measure of size. The primary sampling unit, or cluster, is usually an administrative unit with 10,000 to 15,000 inhabitants. In Thailand, a representative sample of sub-districts was selected in each research domain. The two research domains include WHO Tier 1 and 2 provinces near the Myanmar border and WHO Tier 1 and 2 provinces near the Cambodia border. Selection of units with PPS was completed based on population estimates obtained from the 2014 Thailand Population and Housing census.

A booster sample of pharmacies was implemented to yield a sufficient sample size for estimating private sector malaria testing and treatment availability for this outlet category. For the booster sample, the boundaries for the outlet census were extended to the district-level for pharmacies in districts that (1) contain a selected sub-district and (2) share a national border with Myanmar or Cambodia.
Selected areas are displayed at one administrative level above the cluster level, due to limitations from the available geographic files. Thus, areas indicated as “Selected” signify a district that contains at least one selected sub-district where a census of all outlet types was conducted, and areas indicated as “Not selected” signify a district that does not contain any selected sub-districts. Areas indicated as “Selected” and which are located along an international border with Myanmar or Cambodia were booster districts, meaning that pharmacies were screened across the entire district. Administrative areas were excluded based on district-level malaria incidence data.
What types of outlets are screened?

The main types of outlets screened include public and not-for-profit health facilities, community health workers, private health facilities, pharmacies, drug stores, grocery stores and itinerant drug vendors. Outlets are classified using these broad definitions across each of the ACTwatch countries. However, within each country, a range of outlet types are considered relevant and included.

In Thailand, outlets eligible for screening in the public sector included provincial and district hospitals, sub-district hospitals, malaria clinics, malaria posts / border malaria posts, not-for-profit hospitals and health centers, and migrant health volunteers, and in the private sector, private hospitals and clinics, pharmacies, drug stores, grocery stores, village shops, diagnostic laboratories, and mobile providers. These outlets were classified according to broader outlet definitions during the analysis phase.

How are the outlets identified?

The ACTwatch outlet survey includes all outlets with the potential to sell antimalarial medicines. As many of these outlets may be unregistered, mobile, or recently opened, official listings of these shops and their locations are not typically available. A census approach is therefore implemented, supported by the use of key informant interviews with local officials, local maps, and lists of registered outlets where available.

What is an outlet census?

This involves a team of data collectors moving systematically through a defined area in order to identify all outlets that have the potential to sell or distribute antimalarials.

What happens after an outlet is identified?

The outlet is screened for availability of malaria medicines or malaria diagnostic testing. Outlets are included in the survey if they have antimalarials or malaria diagnostic tests in stock at the time of survey or if they had antimalarials in stock in the previous 3 months. Permission to conduct the interview is obtained from the main provider.

How is information on antimalarials and malaria rapid diagnostic tests (mRDTs) captured?

Among outlets with antimalarials or malaria diagnostic tests in stock, a full audit of the antimalarials and mRDTs is conducted. Information is recorded for each unique antimalarial and mRDT identified in the outlet.

What information is recorded on audit sheets?

The audit sheet captures product information from the product package including the brand name, the manufacturer, country of manufacturer, formulation and strength. The audit sheet also captures information from the provider including the amount sold/distributed in the last seven days and retail price. If a particular product is available in multiple package sizes, strengths, or formulations, an audit sheet is completed for each unique product. Information gathered for every antimalarial and mRDT in stock allows for a complete picture of the market in regards to availability, price, and relative market share.
A Closer Look at the Outlet Types

What types of outlets were included?

The study population is defined as all outlets with the potential to sell or distribute antimalarial medicines and/or provide malaria blood testing. The classification of different outlets was based discussions with national stakeholders to determine appropriate categories of outlets to screen as part of the census approach.

### Public Sector Outlets

<table>
<thead>
<tr>
<th>Outlet Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria Case Management (MCM) Public Health Facilities</td>
<td>Public sector outlets typically equipped and authorized to provide malaria case management to the general population, including provincial and district hospitals; malaria clinics; and malaria posts. Malaria clinics are specialized clinics operated by the BVBD and equipped with a trained microscopist providing malaria diagnosis and treatment free of charge. Malaria posts are community-based malaria clinics located in remote areas equipped to test for and sometimes treat malaria. In areas with large migrant populations, a migrant health volunteer is also employed by the malaria post.</td>
</tr>
<tr>
<td>Sub-District Hospitals</td>
<td>Public sector hospitals at the sub-district level that are not typically equipped or authorized to provide malaria case management.</td>
</tr>
</tbody>
</table>

### Private Sector Outlets

<table>
<thead>
<tr>
<th>Outlet Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private not-for-profit health facilities</td>
<td>NGO or mission hospitals and clinics that provide health care to the general population including mobile and migrant populations. Certain private not-for-profit health facilities are authorized to provide malaria case management dependent on affiliation and government approval.</td>
</tr>
<tr>
<td>Private for-profit health facilities</td>
<td>Private for-profit hospitals and clinics that provide health care to the general population. Certain private for-profit hospitals are authorized to provide malaria case management dependent on government authorization.</td>
</tr>
<tr>
<td>Pharmacies</td>
<td>Pharmacies are licensed and regulated by a national regulatory authority and are staffed by a qualified pharmacist. Pharmacies are not authorized to provide malaria case management.</td>
</tr>
<tr>
<td>Drug stores</td>
<td>Drug stores do not have a licensed pharmacist on staff and sell only herbal and over-the-counter medicines. Drug store are not authorized to provide malaria case management.</td>
</tr>
<tr>
<td>General retailers</td>
<td>Grocery stores and village shops. General retailers are not authorized to provide malaria case management.</td>
</tr>
<tr>
<td>Itinerant drug vendors</td>
<td>Drug vendors who typically distribute medicines within a radius of their home and are not licensed with any national authority. Itinerant drug vendors are not authorized to provide malaria case management.</td>
</tr>
</tbody>
</table>
2.1 results
Market Landscape

Availability of antimalarials and diagnostics among all screened outlets

This section describes availability of antimalarials and malaria tests among all outlets that were screened in the survey. There was considerable diversity across outlet types with regards to availability of antimalarials and malaria tests. Results suggest relatively high availability among Malaria Case Management public health facilities. In sub-district hospitals, which are not typically authorized to distribute antimalarials, there was low availability of antimalarials and malaria tests. In the private sector, availability of both antimalarials and malaria tests was negligible.
Several strategies have been implemented in Thailand to ensure increased access to antimalarials and diagnostic tests in the public sector, including the establishment of over 300 malaria clinics and 460 malaria posts, mostly along international borders. Provincial and district hospitals are also typically authorized to provide malaria case management, but authorization is not typically extended to the level of sub-district hospitals. There is also a constant focus on regulation of the private sector since 1995, when heavy restrictions on sale of antimalarials through the private sector were first implemented in an effort to control the spread of drug resistance. Certain private health facilities are still authorized to test for and treat malaria with case-by-case approval from the BVBD.

What is the availability of antimalarials across the public and private sector outlets in 2016?

In the public sector, almost all malaria case management (MCM) public health facilities had an antimalarial in stock on the day of survey (94.9%). MCM public health facilities included provincial and district hospitals, malaria clinics and malaria posts. Only 3.8% of sub-district hospitals were stocking antimalarials. In the private sector, 2.6% of private for-profit health facilities and 2.9% of pharmacies had antimalarials available. Antimalarials were not available at any other private sector outlet type (drug stores, general retailers, itinerant drug vendors).
What types of public and private sector outlets stocked malaria tests in 2016?

In 2016, availability of malaria tests among outlets varied considerably across the public and private sector and by outlet type. Among all outlets screened in the public sector, the percentage of MCM public health facilities with at least one malaria test in stock on the day of the survey was 96.1%. Only 4.1% of sub-district hospitals had a malaria test. In the private sector, availability of malaria tests was low, with only 3.8% of private for-profit facilities stocking a malaria test. Other private sector outlet types did not have tests available.
2.2 results
Market Composition

*The relative distribution of outlets stocking antimalarials and diagnostics*

This section summarizes market composition by illustrating the distribution of outlets stocking at least one antimalarial and the distribution of outlets stocking malaria blood testing. Public sector outlets account for the majority of outlets that stock malaria testing and treatment in Thailand.
What does the antimalarial market composition look like?

Public outlets accounted for the majority of outlets stocking antimalarials in Thailand, illustrating that most of the service delivery points for antimalarial treatment include public health facilities and sub-district hospitals. Three quarters of the antimalarial-stocking outlets were MCM public health facilities (75.0%). Sub-district hospitals comprised 12.6% of the antimalarial market composition. Private sector outlets accounted for 12.4% of outlets stocking antimalarials, including private for-profit health facilities (3.8%) and pharmacies (8.6%).

**ANTIMALARIAL MARKET COMPOSITION, 2016**

*In 2016, the majority of the antimalarial-stocking outlets were from the public sector, and most commonly MCM public health facilities. The private sector accounted for less than 15% of the anti-malarial-stocking outlets in 2016.*
What does the malaria blood testing market composition look like?

The public sector, including MCM public health facilities (96.1%) and sub-district hospitals (4.1%), accounted for the majority of outlets with malaria blood testing available. Private for-profit health facilities accounted for 3.8% of the malaria diagnostic market composition, with no other private sector outlet types stocking malaria blood tests.

**DIAGNOSTIC MARKET COMPOSITION, 2016**

The antimalarial and malaria blood testing market composition are similar in Thailand, with the exception of pharmacies, which do not stock malaria tests.
2.3 results
Antimalarial Availability

Availability of different types of antimalarials, among outlets with antimalarials in stock

This section shows the availability of: 1) the national first-line treatment for *Pf* malaria at the time of the survey, artesunate mefloquine (ASMQ); 2) the current national first-line treatment for *Pf* malaria, dihydroartemisinin piperaquine (DHA PPQ); 3) the national first-line treatment for *Pv* malaria, chloroquine; and 3) any antimalarial that is not part of the national treatment guidelines. Results show that ASMQ availability is variable in antimalarial-stocking public and private health facilities, while chloroquine availability is generally high. DHA PPQ was almost entirely unavailable at the time of the survey.
How does ACTwatch present availability of different antimalarial categories?

The availability of specific antimalarial medicines is restricted to those outlets that have antimalarials in stock. For example, the availability of ASMQ is measured as the proportion of outlets stocking ASMQ, among all outlets with at least one antimalarial in stock.

Is the national first-line treatment for \( Pf \) malaria (ASMQ) available in the public and private sectors?

At the time of the survey, the recommended first-line treatment for uncomplicated \( Pf \) malaria in adults was a three-day regimen of artesunate mefloquine (ASMQ) plus primaquine (PQ). Approximately two thirds of public sector outlets (66.5%) with antimalarials in stock were stocking ASMQ on the day of the survey. Availability of both ASMQ and PQ was slightly lower in this sector (64.6%), and most notably among sub-district hospitals. Among antimalarial-stocking private sector outlets, ASMQ was only available at private for-profit health facilities (11.5%), with all ASMQ-stocking private for-profit health facilities also stocking PQ.
Is the national first-line treatment for *Pf* malaria (DHA PPQ) available in the public and private sectors?

At the time of the survey, the first-line treatment for uncomplicated *Pf* malaria in adults was in the process of transitioning to dihydroartemisinin piperaquine (DHA PPQ) plus PQ, but it had only been implemented in eight of 29 study provinces. DHA PPQ was only found in 5.7% of MCM public health facilities and in no other outlet types.

### AVAILABILITY OF THE FIRST-LINE DHA PPQ, 2016

*Less than 6% of antimalarial-stocking MCM public health facilities had DHA PPQ available, and no other outlet types were stocking this antimalarial.*
Is the national first-line treatment for *P. vivax* malaria (chloroquine) available in the public and private sectors?

The first-line treatment for uncomplicated *P. vivax* malaria in adults is a 3-day regimen of chloroquine plus PQ, but chloroquine is also nationally recommended for treating rheumatic disease and gout. Nearly nine in ten public sector outlets (89.0%) with antimalarials in stock had chloroquine available on the day of the survey. Availability of both chloroquine and PQ was slightly lower among these same outlets (80.9%). Among antimalarial-stocking private sector outlets, chloroquine was available at nearly three quarters of the antimalarial-stocking private sector (private for-profit health facilities, 77.5%; pharmacies, 71.9%). Nearly all chloroquine-stocking private for-profit health facilities were also stocking PQ (74.8%), but both chloroquine plus PQ was not available at any pharmacies. It is unclear whether outlets were stocking chloroquine as a means to treat patients with rheumatic disease and/or gout, rather than malaria.

Almost three quarters of antimalarial-stocking private sector outlets had CQ in stock. However, given that national guidelines also recommend CQ for the treatment of rheumatic disease and gout, it is unclear whether availability of this medicine in the private sector is for treatment of malaria.
Chloroquine 250 mg
Lot No  A570264
Mfd
Exp 16-5-16
Are treatments that are not part of the national treatment guidelines available in the public and private sectors?

Antimalarial medicines that were found during the outlet survey and are not listed in the national treatment guidelines were primarily artesunate tablets without mefloquine, doxycycline, or clindamycin, or mefloquine tablets without artesunate. Approximately one in five MCM public health facilities had an antimalarial medicine that was not in the national treatment guidelines (21.2%), but availability was highest in private for-profit health facilities, where nearly half were stocking an antimalarial not listed in the national treatment guidelines (48.1%).

**Availability of Antimalarials That Are Not Part of the National Treatment Guidelines, 2016**

About 1 in 5 MCM public health facilities and nearly half of antimalarial-stocking private for-profit health facilities had an antimalarial treatment available that was not part of the guidelines.
2.4 results
Malaria Diagnostic Availability

*Availability of malaria diagnostics, among outlets with antimalarials in stock*

This section summarizes availability of malaria blood testing, including both malaria microscopy and rapid diagnostic testing, among outlets with an antimalarial in stock. The results show high availability of confirmatory malaria testing among both public and private health facilities. No pharmacies with antimalarials had malaria blood testing available.
Malaria RDTs (mRDTs) are meant to be available throughout all of the public sector, from MCM public health facilities down to the level of malaria posts. However, mRDTs are typically meant to serve as back-up use in case of a power outage, as there is an emphasis on diagnosis by malaria microscopy. Malaria diagnosis training for public health facility workers is provided by both the BVBD and the President’s Malaria Initiative (PMI), with a focus on quality case management. One hundred percent of positive slides and 10% of negative slides are sent to the next highest level of health facility for confirmation by a quality control microscopist, and any lower-level microscopist displaying a pattern of misdiagnosis will receive a refresher training.

Among outlets with antimalarials in stock, is confirmatory testing available?

The availability of malaria blood testing (including microscopy and mRDTs) was high among antimalarial-stocking outlets in the public sector. Over nine in ten (94.7%) of public health facilities had tests available. In the private sector, 91.2% of private for-profit health facilities had blood tests available, whereas no pharmacies had blood tests available. Most MCM public health facilities had malaria microscopy (68.4%) but less than half had mRDTs (42.1%). Sub-district hospitals stocking malaria tests only had mRDTs. Over nine in ten private for-profit health facilities had malaria microscopy (91.2%), and nearly three quarters had mRDTs (72.8%).

AVAILABILITY OF MALARIA BLOOD TESTING, 2016

The majority of public sector outlets that had antimalarials available also had mRDTs or microscopy available. Most antimalarial-stocking private for-profit health facilities had malaria blood testing available, but no pharmacies had any malaria tests in stock.
2.5 results
Readiness for Malaria Case Management

Readiness to test for and treat Pf and Pv malaria according to national treatment guidelines

This section summarizes readiness to test for and treat both Pf and Pv malaria according to national treatment guidelines, which requires stocking malaria testing, ASMQ or DHA PPQ, chloroquine, and primaquine. The results show moderate readiness for malaria case management among antimalarial-stocking public sector outlets and low readiness in the antimalarial-stocking private sector.
In order to manage malaria cases according to national treatment guidelines, an outlet would need to be stocking a malaria blood test (either mRDTs or microscopy), as well as ASMQ or DHA PPQ and primaquine for treatment of Pf malaria and chloroquine and primaquine for treatment of Pv malaria.

How many outlets demonstrated readiness to adhere to national treatment guidelines?

Among outlets stocking antimalarials, the availability of malaria blood testing (microscopy or mRDT) in addition to stocking ASMQ or DHA PPQ, chloroquine, and primaquine among antimalarial-stocking outlets was moderate in the public sector and low in the private sector. Readiness did not differ significantly across antimalarial-stocking MCM public health facilities and sub-district hospitals, with 62% of all antimalarial-stocking public sector outlets demonstrating readiness to adhere to national malaria treatment guidelines. In the private sector, readiness was much lower, with 12% of private for-profit facilities and no pharmacies stocking malaria diagnostics and both first-line treatments.

PERCENTAGE OF ANTIMALARIAL-STOCKING OUTLETS WITH MALARIA BLOOD TESTING, ASMQ OR DHA PPQ, CHLOROQUINE, AND PRIMAQUINE IN STOCK, 2016

Readiness to adhere to national malaria treatment guidelines was moderate in the public sector and low in the private sector.
2.6 results
Distribution of Antimalarials and Tests

Distribution or sales of malaria commodities, among outlets with antimalarials or/and mRDTs in stock

This section summarizes the percentage of outlets with malaria commodities (antimalarials and mRDT) that report selling or distributing antimalarials or tests during the week prior to the survey. This indicator shows how common it is for outlets to distribute malaria commodities to patients. This indicator is particularly important for countries with low and declining malaria endemicity. In Thailand, over half of outlets with malaria testing available reported performing a test in the past week whereas less than one in ten outlets with antimalarials reported distributing an antimalarial treatment within the past week in 2016.
The malaria burden in Thailand has been greatly reduced over the past few years, with confirmed malaria cases experiencing a substantial decline since 2000. Thus the frequency for which providers report distributing or selling a malaria test or antimalarial is of interest in the context of declining malaria prevalence.

Where malaria blood testing and antimalarials are available, was there any distribution to individual customers in the previous week?

Among outlets with malaria blood testing available, tests were reportedly performed within the past week among the majority of public sector outlets (62.2%), but less than half of private for-profit health facilities (41.2%). The median number of tests performed across both sectors in the previous week was 1 test (data not shown). Among outlets with antimalarials in stock, distribution of antimalarials in the past week was less frequent relative to performing malaria blood tests. The percentage of outlets with antimalarials in stock that reported distributing antimalarials in the past week was highest among private sector outlets (18.7%), compared to only 6.0% of MCM public health facilities and no sub-district hospitals.

In the week prior to the survey, nearly two-thirds of outlets with malaria blood testing available reported providing a malaria blood test.

<table>
<thead>
<tr>
<th>Percent of Antimalarial Stocking Outlets</th>
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</thead>
<tbody>
<tr>
<td>MCM Public Health Facility</td>
</tr>
<tr>
<td>Provided malaria testing</td>
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**Percentage of Outlets with Malaria Blood Testing Available that Sold or Distributed a Malaria Blood Test, and Percentage of Antimalarial-Stocking Outlets that Sold or Distributed Antimalarials in the Previous Week, 2016**

Over half of MCM public health facility outlets with malaria testing available reported performing a test in the past week whereas less than one in ten of these outlets with antimalarials reported distribution in the same timeframe.
2.7 results
Diagnostic Market Share

*Relative sale or distribution of malaria tests, in the week preceding the survey*

This section summarizes relative market share for malaria microscopy and mRDTs in the public and private sectors. The majority of malaria blood testing is provided in the public sector, and most testing is performed using malaria microscopy.
Is malaria microscopy or mRDT testing more common in Thailand?

The majority of malaria testing was performed using microscopy (94.8%) compared to mRDTs (5.2%). Nine in ten of the mRDTs distributed in the public sector and all of the mRDTs distributed in the private sector were tests from the manufacturer Standard Diagnostics. One in ten of the mRDTs distributed at MCM public health facilities were from the manufacturer Asan.

What types of outlets distribute malaria blood testing?

The public sector was responsible for the majority of malaria blood testing with 98.1% of the total testing market share. Nearly all of the testing was conducted by MCM public health facilities (97.4%).
MALARIA BLOOD TESTING MARKET SHARE, 2016

The public sector was responsible for 98% of all malaria blood testing in Thailand, and 93% of malaria tests were performed using malaria microscopy.
2.8 results
Provider Knowledge

Provider knowledge of the national first-line treatments for malaria

This section addresses provider knowledge about the first-line treatments for Pf and Pv malaria. The most senior provider in outlets stocking antimalarials was asked to cite the first-line treatment for both Pf and Pv malaria. Providers in the public sector were generally knowledgeable about the first-line treatments, but knowledge was much lower in the private sector.
Do providers know the first-line treatment for uncomplicated Pf malaria?

Providers in the public sector were generally knowledgeable about the national first-line treatment for Pf (ASMQ at the time of the survey) at 70.3% of antimalarial-stocking MCM public health facilities and 86% of antimalarial-stocking sub-district hospitals. In the private sector, only 2.7% of antimalarial-stocking private for-profit health facilities cited ASMQ as the national first-line treatment and no pharmacies had knowledgeable providers (data not shown). Less than half of public sector providers cited both ASMQ and primaquine.
and PQ (49.1%), and no private sector providers included PQ in their response. Very few providers cited DHA PPQ as the national first-line treatment for Pf malaria, but the transition to DHA PPQ had only begun a few months prior to the survey and only in eight of 29 study provinces.

Do providers know the first-line treatment for uncomplicated Pf malaria?

Providers in the public sector were generally knowledgeable about the national first-line treatment for Pf (chloroquine) at 81.8% of antimalarial-stocking MCM public health facilities and 86.0% of antimalarial-stocking sub-district hospitals. In the private sector, nearly one in three providers cited chloroquine as the first-line treatment (31.5%), with approximately one in five antimalarial-stocking private for-profit health facilities and 38.9% of pharmacies citing chloroquine (data not shown). Fewer providers at MCM public health facilities cited both chloroquine and PQ (65.2%), but all sub-district hospital and private for-profit facility providers who cited chloroquine also cited PQ. No pharmacy providers cited both chloroquine and PQ.

The majority of providers at public sector outlets demonstrated correct knowledge of chloroquine as first-line treatment. Knowledge of chloroquine as first-line treatment was lower in the private sector, at approximately one third of all private sector providers.
2.9 results
Differences across Domains

*Key indicator differences, across two research domains*

This section addresses differences in key findings across the two research domains: areas in Thailand along the Myanmar border and areas in Thailand along the Cambodia border. The Thai-Myanmar domain showed higher availability of antimalarials and higher provider knowledge of first-line treatments and was the only domain with antimalarial-stocking pharmacies. Malaria diagnostic availability did not differ significantly across domains.
Several key indicators were different when comparing results across the two research domains: the areas in Thailand along the border with Myanmar, and the areas in Thailand along the border with Cambodia. Antimalarial availability, including results by antimalarial category, showed slight differences across domains, as did antimalarial market composition and provider knowledge of first-line treatments. However, malaria diagnostic market composition, availability of malaria diagnostics, and readiness for appropriate malaria case management did not show any significant differences across domains.

How does the availability of antimalarials differ across domains?

In both the public and private sectors, antimalarial availability was slightly higher in the Thai-Myanmar domain compared to the Thai-Cambodia domain. Almost 100% of MCM public health facilities in the Thai-Myanmar domain were stocking antimalarials, compared to only 86% in the Thai-Cambodia domain. Availability of antimalarials not in the national treatment guidelines was similar in the public sector across domains, but higher in the private sector in the Thai-Cambodia domain (data not shown).
How do the antimalarial and malaria diagnostics market compositions differ across domains?

The antimalarial market composition is similar across domains, with the exception of pharmacies. While pharmacies did not contribute to the antimalarial market composition in the Thai-Cambodia domain, they comprised 12% of the antimalarial market composition in the Thai-Myanmar domain. The malaria diagnostics market composition did not differ significantly across domains (data not shown).

Antimalarial-stocking pharmacies were only found in the areas of Thailand bordering Myanmar.

ANTIMALARIAL MARKET COMPOSITION BY DOMAIN, 2016

Pharmacies comprised 12% of the antimalarial market composition in the Thai-Myanmar domain but did not contribute to the market composition in the Thai-Cambodia domain.
How does the availability of first-line treatments differ across domains?

ASMQ availability was slightly higher in the Thai-Myanmar domain across all antimalarial-stocking outlet types, while DHA PPQ was only found in the Thai-Cambodia domain (data not shown). Chloroquine availability was slightly higher across all outlet types in the Thai-Cambodia domain.
AVAILABILITY OF CHLOROQUINE AMONG ANTIMALARIAL-STOCKING OUTLETS, BY DOMAIN, 2016

Chloroquine availability was slightly higher in the Thai-Cambodia domain across all outlet types.
How does the availability of malaria diagnostics differ by domain?

Among antimalarial-stocking outlets, availability of malaria diagnostics did not differ significantly across domains beyond a slightly higher availability among public sector outlets in the Thai-Myanmar domain. No antimalarial-stocking pharmacies had malaria blood testing available.

**AVAILABILITY OF ANY MALARIA BLOOD TESTING, BY DOMAIN, 2016**

*Malaria blood testing availability among antimalarial-stocking outlets was only slightly higher among public sector outlets in the Thai-Myanmar domain.*

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**LEGEND**

- Thai-Cambodia Domain
- Thai-Myanmar Domain
How does overall readiness for malaria case management differ by domain?

Among antimalarial-stocking outlets, availability of ASMQ or DHA PPQ, chloroquine, primaquine, and malaria blood testing, indicating readiness to manage malaria cases according to national treatment guidelines, did not differ significantly across domains beyond a slightly higher readiness among public sector outlets in the Thai-Myanmar domain. No antimalarial-stocking pharmacies demonstrated readiness to manage malaria cases.
How does provider knowledge of the first-line treatments differ across domains?

Providers in the Thai-Myanmar domain were more knowledgeable about first-line treatments for both Pf and Pv malaria across all public sector outlet types compared to providers in the Thai-Cambodia domain. Most notably, 100% of providers in sub-district hospitals in the Thai-Myanmar domain correctly stated ASMQ and chloroquine plus primaquine as the first-line treatments for Pf and Pv compared to just 50% in the Thai-Cambodia domain for the same indicators.
CORRECT KNOWLEDGE OF THE NATIONAL FIRST-LINE TREATMENT FOR PV, CHLOROQUINE, BY DOMAIN, 2016

Provider knowledge of chloroquine as first-line treatment for Plasmodium malaria was higher in the Thai-Myanmar domain compared to the Thai-Cambodia domain across all public sector outlet types.
3.0 summary
Summary
The outlet survey included an audit of all available antimalarials in the public and private sectors, which included screening more than 13,600 outlets for antimalarial availability and auditing antimalarials in 79 public sector and 25 private sector outlets.

Findings from the 2016 ACTwatch malaria diagnostic and medicine outlet survey show that availability of malaria diagnostics or at least one antimalarial is relatively high in the public sector among facilities typically designated for malaria case management (MCM), which includes provincial and district hospitals, malaria clinics, and malaria posts. Malaria diagnostic and antimalarial availability was low among other outlet types, including sub-district hospitals and outlets in the private sector. Of the 13,594 private sector outlets that were screened, only 25 met the eligibility criteria: 14 of 241 screened private for-profit health facilities and 11 of 605 screened pharmacies. These results provide evidence to confirm that the private sector is not a common source of antimalarial diagnosis or treatment in Thailand.

With regard to the availability of different types of treatment for \textit{Pf} or \textit{Pv} malaria, results were variable in the public sector. Patients testing positive for \textit{Pv} malaria could receive appropriate treatment (chloroquine and primaquine) at 80\% of all MCM public health facilities and 61\% of antimalarial-stocking sub-district hospitals, whereas patients testing positive for \textit{Pf} malaria could only receive appropriate treatment (ASMQ and primaquine) at 60\% of all MCM public health facilities and 73\% of antimalarial-stocking sub-district hospitals. These results suggest that patients testing positive for \textit{Pf} malaria may require referral to a different public health facility in order to receive the appropriate treatment. Furthermore, among MCM public health facilities, readiness for appropriate malaria case management (i.e. outlets with ASMQ or DHA PPQ, chloroquine, primaquine, and malaria blood testing) according to national treatment guidelines was only 62\%. That is, only slightly more than half of the facilities could treat patients who tested positive for either \textit{Pf} or \textit{Pv} malaria.

Observing the types of antimalarials that were available in the private sector, only 3\% of the antimalarial-stocking private sector had ASMQ in stock, but nearly three quarters of these same outlets were stocking chloroquine (73\%). However, because national guidelines stipulate use of chloroquine for treatment of rheumatic disease and gout in addition to malaria, it is unclear whether all of the chloroquine audited is used for treating malaria versus other diseases.

DHA PPQ was only found in the public sector and only in 6\% of MCM public health facilities, reflecting the timeline of the survey in regards to implementation of DHA PPQ as first-line treatment for \textit{Pf} malaria, which had just begun a few months prior to the survey and only in eight of 29 survey provinces.

Nearly half of all antimalarial-stocking private for-profit health facilities and one in five MCM public health facilities stocked an antimalarial not indicated in the national treatment guidelines—mostly artesunate tablets without mefloquine, clindamycin, or doxycycline, or mefloquine tablets without artesunate.

The public sector is responsible for the majority of malaria testing (95\%), and most malaria testing is conducted using microscopy rather than mRDTs (nearly 98\%). Among all outlets with malaria testing available, over half had provided a malaria test in the week prior to the survey, with most tests coming from MCM public health facilities (69.5\%). Provision of a malaria test was less frequent among sub-district hospitals (19.9\%) and private for-profit health facilities (41.2\%). The median number of tests performed in the week preceding the survey was 1.
suggesting that at least during the study period (February-March), these types of facilities in Thailand tend to perform malaria tests on a weekly basis.

The distribution of antimalarials in the week prior to the survey was much lower compared to the provision of malaria tests, with only 6.8% of all antimalarial-stocking outlets having distributed an antimalarial in the previous week. Provision of antimalarials was highest among private sector outlets at 18.7%, while no antimalarial-stocking sub-district hospitals and only 6.0% of MCM public health facilities had distributed an antimalarial.

Provider knowledge of first-line treatment guidelines was moderate in the public sector. In terms of correct knowledge of the first-line treatment for \( Pf \) malaria, just over 70% of public sector outlet providers cited ASMQ. Less than half described ASMQ and primaquine. Very few providers cited DHA PPQ. In terms of knowledge of the first-line treatment for \( Pv \) malaria, knowledge was higher in the public sector with over 80% of providers correctly citing chloroquine. There was a small gap between the number of providers who cited the correct first-line \( Pv \) antimalarial with versus without primaquine. Private sector knowledge of first-line treatment for \( Pf \) malaria was almost zero, but knowledge of chloroquine as treatment for \( Pv \) malaria was slightly higher at 32%. All providers at private for-profit health facilities who cited chloroquine as treatment for \( Pv \) malaria also cited primaquine, but no pharmacy providers included primaquine in their responses.

This study was designed to measure key indicators in 2 research domains: areas of Thailand along the Myanmar border, and areas of Thailand along the Cambodia border. Results suggest moderate differences in key indicators across domains. Antimalarial availability was higher across all outlet types in Myanmar border areas, and this domain was also the only one with antimalarial-stocking pharmacies. Within Myanmar border areas, a higher proportion of providers were knowledgeable about the first-line treatments for \( Pf \) and \( Pv \) malaria across all public sector outlet types. DHA PPQ was only found in Cambodia border areas, and there were no notable differences in availability of malaria testing or availability of an antimalarial not indicated in national treatment guidelines among antimalarial-stocking outlets across domains.

In summary, results from the 2016 outlet survey suggest that public sector outlets designated for malaria case management are typically equipped to provide confirmatory testing for suspected malaria (usually by microscopy), but availability of appropriate treatment is variable, suggesting that a patient testing positive for malaria may need to be referred to a different facility for treatment. Only 61.5% of the antimalarial-stocking public sector and 3% of the antimalarial-stocking private sector had malaria diagnostics and both first-line treatments available, suggesting an opportunity to ensure universal coverage of first-line treatment and diagnostic testing in the public sector and among private sector outlets with authorization to treat malaria. Most outlets stocking malaria blood testing provided a test in the week prior to the survey, whereas distribution of an antimalarial in the previous week was much lower, at less than one in ten antimalarial-stocking outlets. This suggests that providers are frequently conducting confirmatory testing prior to distributing an antimalarial treatment. Provider knowledge of national treatment guidelines was moderate in the public sector and somewhat variable according to the type of malaria. Knowledge was low in private for-profit health facilities, suggesting an opportunity for provider training among private sector outlets with authorization to treat malaria.
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WHAT IS ACTWATCH?
ACTwatch is a multi-country research project designed to provide timely, relevant, and high quality antimalarial market evidence. Launched in 2008 with funding from the Bill and Melinda Gates Foundation, it is currently implemented in 13 countries with additional funding from UNITAID and the DFID. Standardized tools and approaches are employed to provide comparable data across countries and over time.

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