Health Systems Barriers and Gaps for Malaria Elimination in the Greater Mekong sub-Region

The ACTwatch Group

15th November, 2016
65th Annual Meeting of the American Society for Tropical Medicine and Hygiene
Atlanta, Georgia
Background
Regional Context and Rationale

National malaria elimination goals across the GMS, with urgency due to artemisinin drug resistance.

Malaria market information gaps:

- Private sector readiness, contributions, and performance for appropriate case management and surveillance
- Availability and distribution chain for banned oral artemisinin monotherapy

Outlet surveys address these gaps with standardized information across the region for effective policies and strategies
ACTwatch is a research project implemented by PSI and Ministries of Health in 12 countries

- ~50 malaria outlet surveys conducted between 2008-2016
- Total market approach
- Outlet surveys measure availability, price, and market share in the public and private sectors for malaria medicines & diagnostics
Methods
Study Sites

- **Myanmar** (August 2015-January 2016)
- **Thailand** (February-March 2016)
- **Lao PDR** (November-December 2015)
- **Cambodia** (August-October 2015)

Stratification according to malaria risk and national program design
Outlet Survey Population

Study Population:
- Outlets with antimalarials or with malaria blood testing available

What is an outlet?
- Public health facility
- Community Health Worker
- Private for-profit health facility
- Pharmacy
- Drug store
- General retailer
- Itinerant drug vendor
Sampling

- Representative sample of clusters

- Complete a **CENSUS** of all potentially eligible outlets

- **SCREEN** for antimalarials in stock or malaria blood testing available
Audit: All Antimalarial Products in Stock
Audit: All Antimalarial Products in Stock

Formulation (tablet, syrup, injection, etc.)
Brand/generic names
Strength
Manufacturer
Country of manufacture
Amount distributed in the past week
Retail & wholesale price

<table>
<thead>
<tr>
<th>Audit: All Antimalarial Products in Stock</th>
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<td>Retail &amp; wholesale price</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table, Suppository &amp; Granule Drug Audit Sheet (TSG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table:</td>
</tr>
<tr>
<td>1. Generic name</td>
</tr>
<tr>
<td>2. Strength</td>
</tr>
<tr>
<td>3. Does this base strength?</td>
</tr>
<tr>
<td>4. Amount sold in the past 7 days</td>
</tr>
<tr>
<td>5. Manufacturer</td>
</tr>
<tr>
<td>6. Country of manufacture</td>
</tr>
<tr>
<td>7. Package size</td>
</tr>
<tr>
<td>8. Is this product a fixed-dose combination (FDC)?</td>
</tr>
<tr>
<td>9. Does product have the Green leaf logo?</td>
</tr>
<tr>
<td>10. Amount sold/distributed in the last 7 days to individual consumers [record # of packages / tins described in CSF OR record the total # of tablets / suppositories / granule packs sold]</td>
</tr>
<tr>
<td>11. Stocked out at any point in the past 3 months?</td>
</tr>
</tbody>
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Results
What type of outlets stock antimalarial medicines?
Antimalarial Market Composition

Outlet type, among outlets stocking antimalarials

- Cambodia: N=858
- Lao PDR: N=679
- Myanmar*: N=3859
- Thailand: N=87

* Public health facilities were not included in the Myanmar outlet census
Antimalarial Market Composition

Outlet type, among outlets stocking antimalarials

Cambodia
N=858

Lao PDR
N=679

Myanmar*
N=3859

Thailand
N=87

- Public Health Facility
- Community Health Worker
- Pharmacy
- Drug Store
- General Retailer
- Itinerant Drug Vendor

* Public health facilities were not included in the Myanmar outlet census
Antimalarial Market Composition

*Outlet type, among outlets stocking antimalarials*

- **Cambodia**
  - Public Health Facility: 25%
  - Community Health Worker: 20%
  - Pharmacy: 15%
  - Drug Store: 10%
  - General Retailer: 5%
  - Itinerant Drug Vendor: 5%
  - N=858

- **Lao PDR**
  - Public Health Facility: 20%
  - Community Health Worker: 30%
  - Pharmacy: 15%
  - Drug Store: 10%
  - General Retailer: 5%
  - Itinerant Drug Vendor: 5%
  - N=679

- **Myanmar**
  - Public Health Facility: 20%
  - Community Health Worker: 30%
  - Pharmacy: 15%
  - Drug Store: 10%
  - General Retailer: 5%
  - Itinerant Drug Vendor: 5%
  - N=3859

- **Thailand**
  - Public Health Facility: 20%
  - Community Health Worker: 30%
  - Pharmacy: 15%
  - Drug Store: 10%
  - General Retailer: 5%
  - Itinerant Drug Vendor: 5%
  - N=87

*Public health facilities were not included in the Myanmar outlet census*
Availability of first-line and non-first-line antimalarials
Antimalarial availability

Among outlets with at least 1 antimalarial in stock

<table>
<thead>
<tr>
<th>Country</th>
<th>Public N</th>
<th>Private N</th>
<th>Percent antimalarial-stocking outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>467</td>
<td>858</td>
<td>95%</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>236</td>
<td>394</td>
<td>80%</td>
</tr>
<tr>
<td>Myanmar</td>
<td>1,263</td>
<td>2,596</td>
<td>70%</td>
</tr>
<tr>
<td>Thailand</td>
<td>72</td>
<td>19</td>
<td>60%</td>
</tr>
</tbody>
</table>

- **First-line Pf**
- **First-line Pv**
- **First-line Severe**
Antimalarial availability

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<td>72</td>
<td>19</td>
<td>Carolina</td>
</tr>
</tbody>
</table>

Among outlets with at least 1 antimalarial in stock

- First-line Pf
- First-line Pv
- First-line Severe
- Second-line
- Not NTG
Market share: Distribution of first-line and non-first-line antimalarials
Antimalarial market share

Volumes distributed

<table>
<thead>
<tr>
<th>Market Type</th>
<th>Cambodia</th>
<th>Laos</th>
<th>Myanmar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>20%</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>Private</td>
<td>80%</td>
<td>90%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Percentage of total market volume

- First-line Pf/Pv
- First-line Pf
- First-line Pv
- First-line Severe
- Second-line
- Not in NTG
Antimalarial market share

<table>
<thead>
<tr>
<th></th>
<th>Cambodia</th>
<th>Lao PDR</th>
<th>Myanmar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-line Pf/Pv</td>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-line Pf</td>
<td></td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>First-line Pv</td>
<td></td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>First-line Severe</td>
<td></td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Second-line</td>
<td></td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Not in NTG</td>
<td></td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Volumes distributed

- Public
- Private
- Public
- Private
- Public
- Private
Antimalarial market share: Cambodia

Chloroquine tablets
ACT:
- Artemisinin piperaquine (Artequick)
- ASMQ non-fixed-dose combination
Antimalarial market share: Lao PDR

Chloroquine injections

Chloroquine tablets

Volumes distributed
Antimalarial market share: Myanmar

- First-line Pf/Pv
- First-line Pf
- First-line Pv
- First-line Severe
- Second-line
- Not in NTG

Volumes distributed:
- SP tablets
- Quinine tablets
- Mefloquine tablets
- Chloroquine injection
- Arteether injection

Types of non-first-line medicines:
- Artemether tablets
- Artesunate tablets
- Quinine injection
- Arteether injection

Bar chart showing:
- Percentage of total market volume
- Public vs. Private sectors in Myanmar
Where antimalarials are distributed, is confirmatory testing available?
Confirmatory testing availability

Among outlets with at least 1 antimalarial in stock

Percent antimalarial-stocking outlets

Cambodia | Lao PDR | Myanmar | Thailand

Public Facility | CHW | Private Facility | Pharmacy | Drug Store | General Retailer | Itinerant Drug Vendor
Antimalarial market share
Antimalarial market share

Cambodia

- Total
- Public Facility
- CHW
- Private Facility
- Pharmacy
- Drug Store
- General Retailer
- Itinerant Vendor

Lao PDR

- Total
- Public Facility
- CHW
- Private Facility
- Pharmacy
- Drug Store
- General Retailer
- Itinerant Vendor

Myanmar

- Total
- Public Facility
- CHW
- Private Facility
- Pharmacy
- General Retailer
- Itinerant Vendor

Testing Available

Testing Not Available
Are cases managed in the private sector reported into national surveillance systems?
Caseload Reporting to Government or NGO

Among private sector outlets

Among private outlets w at least one antimalarial in stock and/or malaria testing available.
Substantial gaps in private sector readiness and performance for malaria case management are likely to hinder national Pf elimination goals:

- Outlets stocking antimalarials in the GMS are generally authorized to do so
  - However, 1 in 5 antimalarial stocking outlets in Cambodia were unauthorized itinerant drug vendors, general retailers and drug stores

- Fewer than half of antimalarial stocking private sector outlets had the first-line treatment for Pf available across countries with the exception of 70% availability in Cambodia.
The most widely available and distributed antimalarial in Lao PDR is the second-line treatment for *Pv*, chloroquine.

1 in 3 private sector outlets were stocking a medicine not in the NTGs in Cambodia and Myanmar. Most concerning was the availability and distribution of oral artemisinin monotherapy in Myanmar.

Over half of antimalarials distributed in Lao PDR and Myanmar were distributed by outlets without confirmatory testing available, suggesting presumptive treatment was common.

Although the private sector distributes the majority of antimalarial treatments in Cambodia, Lao PDR and Myanmar, most outlets are not contributing caseload data to national systems.
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@PSIimpact

FOLLOW US
linkedin.com/company/population-services-international

VISIT US
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2015/16 Outlet Survey Sample Sizes

- **Cambodia:** 26,664 outlets screened, 1,308 met screening criteria, N=1,303
- **Lao PDR:** 7,586 outlets screened, 725 met screening criteria, N=724
- **Myanmar:** 28,267 outlets screened, 4,416 met screening criteria, N=4,394
- **Thailand:** 13,651 outlets screened, 104 met screening criteria, N=104
## Refusal Rates

<table>
<thead>
<tr>
<th>Country</th>
<th>Refused Screening</th>
<th>Eligible, Refused Drug Audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>50 / 27,201 (&lt;0.01%)</td>
<td>0 / 1,308 (0%)</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>10 / 7,662 (&lt;0.01%)</td>
<td>0 / 725 (0%)</td>
</tr>
<tr>
<td>Myanmar</td>
<td>88 / 28,664 (&lt;0.01%)</td>
<td>10 / 4,416 (&lt;0.01%)</td>
</tr>
<tr>
<td>Thailand</td>
<td>126 / 13,952 (0.01%)</td>
<td>0 / 104 (0%)</td>
</tr>
</tbody>
</table>
### National Treatment Guidelines

<table>
<thead>
<tr>
<th>Country</th>
<th>Pf first-line</th>
<th>Pv first-line</th>
<th>Severe first-line</th>
<th>Second-line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>DHA PPQ or ASMQ FDC + PQ</td>
<td></td>
<td>Artesunate IV/IM or Artemether IV/IM</td>
<td>Pf/Pv: Quinine + doxy or tetra</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>AL + PQ</td>
<td></td>
<td>Artesunate IV/IM</td>
<td>Pf: Quinine + doxy Pv: Chloroquine Severe: Quinine IV/IM</td>
</tr>
<tr>
<td>Myanmar</td>
<td>AL, ASMQ or DHA PPQ + PQ</td>
<td>CQ + PQ</td>
<td>Artesunate IV/IM</td>
<td>Pf: Other first-line ACTs or artesuante + doxy, retra or clinda Severe: Artemether IV/IM or quinine IV/IM</td>
</tr>
<tr>
<td>Thailand</td>
<td>ASMQ non-FDC + PQ *2016: DHA PPQ + PQ</td>
<td>CQ + PQ</td>
<td>Artesunate IV/IM</td>
<td>Pf: Quinine + doxy or artesunate + doxy or clinda Pv: CQ Severe: Quinine IV/IM</td>
</tr>
</tbody>
</table>
Itinerant Drug Vendors

Cambodia

- Typically currently or previously were employed at a public or private facility or pharmacy, and often have some sort of medical training.
- Operate from their homes, and/or provide mobile services.
- Tend to have testing available, and stock and distribute ACTs.

Myanmar

- Typically do not have medical training or affiliation with a facility or pharmacy.
- Provide mobile services.
- Tend to stock non-artemisinin therapies, and 1 in 5 have oral AMT; nearly half of antimalarials distributed are ACTs.