FEVER DIAGNOSTIC PRACTICES

PATIENT FLOW

PATIENT FLOW FOR INITIAL FEBRILE ILLNESS DIAGNOSTICS

The public healthcare system is the first point of care for febrile patients in both low and high transmission areas

- “Most febrile patients in Thailand would go first to a public facility as they provide good quality care and free of charge.” MORU, Thailand, Researcher (CRP)

Private sector is mostly for foreigners or affording patients in urban zones. Urban areas are also low malaria transmission areas

- “Private sectors hospitals are mostly for high-end patients that have a private medical insurance, as these hospitals are usually not covered by UHC.” S.M.R.U, Thailand, Lab technician

Most patients with febrile symptoms living in malaria endemic areas go to malaria clinics while patients in non-endemic area go to regular public clinics

Sources: Interviews, Advent ion
THAILAND | FEVER DIAGNOSTIC PRACTICES

FEVER AND MALARIA DIAGNOSTIC ALGORITHM AND PRACTICES

Case management of febrile illnesses varies by region
- “Thailand is the only exception in the GMS region where they are already distinguishing between regions, since malaria has been eliminated in some regions for a while, and have slightly different case management profiles.” MORU, Thailand, Researcher (CRP)
- “In Bangkok for instance, it is very unlikely that the first-line test will be for Malaria, except if the patient comes from a malaria endemic area like the border or if the patient comes from a neighboring country like Cambodia. There is so little malaria cases in Thailand now, that it is only tested if there is a strong clinical evidence.” S.M.R.U, Thailand, Lab technician

**DIAGNOSTIC GUIDELINES**
- First-line malaria diagnosis at hospitals and malaria clinics: Microscopy
- First-line malaria diagnosis at malaria posts: RDTs
- Type of RDT used: Pf + all species (Combo)

**TREATMENT GUIDELINES**
- Treatment guidelines recommend directly observed treatment (DOT) until completion of treatment for both Pf and Pv and case follow-up to monitor treatment response with microscopy
- First-line treatment of unconfirmed malaria:
  - First-line treatment of Pf: DHA-Pip with single low-dose primaquine (PQ)
  - First-line treatment of Pv: Chloroquine + Primaquine (CQ+PQ)
- Second-line treatment of Pf and Pv: Quinine+Doxycycline (QN+D)
- Treatment of severe malaria: QN+D

**LEGEND**
- 🔄 FULLY ALIGNED
- 🅱️ GENERALLY ALIGNED
- 🆕 RARELY OR NOT ALIGNED

**ADHERENCE TO GUIDELINES**

**FEBRILE ILLNESS DIAGNOSTIC ALGORITHM**

Patient with fever

- Patient has danger signs: Yes → Refer to inpatient facility
  - No → Alternate diagnosis

- Presenting with the clinical features of malaria: No → Alternate diagnosis
  - Yes → Microscopy test
    - If negative: Alternate diagnosis
    - If positive: First-line treatment + ask patient to come back if danger sign or persisting fever

Thailand's malaria treatment guideline is designed to avoid further drug resistance with no treatment recommendation for unconfirmed malaria and adoption of DOT and case follow-up to monitor treatment response

Sources: WHO, Interviews, Advent

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### Malaria Testing Practices at Different Health Facility Levels

<table>
<thead>
<tr>
<th>Health Facility*</th>
<th>Number of Facilities</th>
<th>Share of Fever Patients (Est.)</th>
<th>Preferred Malaria Diagnostic Tool</th>
<th>Level of RDT Use (Malaria Diagnostic)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provincial Hospitals</td>
<td>~116</td>
<td>5%</td>
<td>Microscopy</td>
<td>None / Limited</td>
</tr>
<tr>
<td>Community/District Hospitals</td>
<td>~750</td>
<td>24%</td>
<td>Microscopy and RDTs</td>
<td>Limited / None</td>
</tr>
<tr>
<td>Clinics</td>
<td>~10,000</td>
<td>45%</td>
<td>Microscopy and RDTs</td>
<td>Limited / None</td>
</tr>
<tr>
<td>Malaria clinics</td>
<td>~536</td>
<td>5%</td>
<td>Microscopy</td>
<td>None / Limited</td>
</tr>
<tr>
<td>Malaria posts</td>
<td>n.c.</td>
<td>2%</td>
<td>Microscopy and RDTs</td>
<td>High</td>
</tr>
<tr>
<td><strong>Private</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private providers</td>
<td>&gt;343</td>
<td>19%</td>
<td>Microscopy and RDTs</td>
<td>High / Medium</td>
</tr>
</tbody>
</table>

**Microscopy is preferred over RDTs in Thailand except at community level and among private providers.**

RDTs are getting introduced in Community and Health Promotion Hospitals as malaria disappears and the malaria programme is merged with the regular health system.

**Sources:** interviews, MoHS, Advention
**MALARIA TESTING PRACTICES**

**MALARIA TESTS PERFORMED**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>'10</td>
<td>0.1</td>
</tr>
<tr>
<td>'11</td>
<td>0.1</td>
</tr>
<tr>
<td>'12</td>
<td>1.4</td>
</tr>
<tr>
<td>'13</td>
<td>1.1</td>
</tr>
<tr>
<td>'14</td>
<td>1.8</td>
</tr>
<tr>
<td>'15</td>
<td>1.8</td>
</tr>
<tr>
<td>'16</td>
<td>1.4</td>
</tr>
<tr>
<td>'17</td>
<td>1.1</td>
</tr>
</tbody>
</table>

**IDENTIFIED MALARIA RDTs USED**

- **Humasis Malaria Pf/Pv Antigen Test**
  - Pf-HRP2
  - since 2016
  - Pv-pLDH

- **SD Bioline Malaria Ag Pf / Pan since 2010**
  - SD Bioline Malaria Ag Pf / Pan POCT since 2015
  - Pf-pLDH and Pf-HRP2
  - ~0.84$ / test
  - >0.3M since 2015

- **Any malaria with pLDH-pan**
  - 1.35$ / test
  - >0.6M since 2010

- **OptiMAL-IT Rapid Individual Malaria Test Kit**
  - Pf-pLDH
  - 2.96$ / test
  - ~0.1M RDTs since 2010

- **Malaria RDT**
  - Unkn.
  - 55$ / test
  - ~0.1M RDTs since 2009
  - WHO Procurement Department

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Malaria is almost exclusively tested with microscopy

Sources: WHO, USAID-PMI, Global Fund, Advetion
### THAILAND | FEVER DIAGNOSTIC PRACTICES

## MALARIA TESTING LANDSCAPE

### HEALTHCARE INFRASTRUCTURE

<table>
<thead>
<tr>
<th>Population (M)</th>
<th>95</th>
<th>16</th>
<th>56</th>
<th>1,324</th>
<th>193</th>
<th>53</th>
<th>69</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare expenditures per capita ($)</td>
<td>115-120</td>
<td>65-70</td>
<td>84</td>
<td>60-70</td>
<td>35-40</td>
<td>55-59</td>
<td>217-225</td>
</tr>
<tr>
<td>Health insurance coverage</td>
<td>~70%</td>
<td>–</td>
<td>~16% =&gt; NHIL</td>
<td>~5-10%</td>
<td>~19%</td>
<td>Negligible</td>
<td>~98%</td>
</tr>
<tr>
<td>Universal health coverage index</td>
<td>73</td>
<td>55</td>
<td>67</td>
<td>56</td>
<td>40</td>
<td>60</td>
<td>75</td>
</tr>
<tr>
<td>Patients with fever being tested (%)**</td>
<td>80%</td>
<td>69%</td>
<td>82%</td>
<td>71%</td>
<td>68%</td>
<td>55%</td>
<td>83%</td>
</tr>
<tr>
<td>Main distribution network</td>
<td>NIMPE</td>
<td>CNM</td>
<td>NDOH</td>
<td>State MoHs</td>
<td>Mix public/private</td>
<td>NVBDCP/CMSD</td>
<td>BVBD</td>
</tr>
</tbody>
</table>

### MALARIA DIAGNOSTIC FUNDING & PROCUREMENT

| Last year total malaria funding ($M) | 16 | 20 | 24 | 226 | 38 | 78 | 21 |
| Share of government funding (%) | ~18% | ~3% | ~100% | ~73% | ~58% | ~8% | ~40% |
| Main procurement decision maker | NMCP | CNM/UNOPS | NDOH / Malaria programme | National and state MoHs | GF / NMCP | NMCP / PMI | NMCP |
| Procurement concentration level | High | High | High | Low | Medium | Medium | High |

### MALARIA DIAGNOSTIC PRACTICES

| Health facilities performing RDTs | Health posts | Lower level facilities | Lower level facilities | Sub-Health/Primary HC | GPs/clinics | Lower level facilities, clinics | Lower level facilities |
| Share of RDT in malaria diagnostic (% of patients) | ~19% | ~74% | ~63% | ~13% | ~20% | ~96% | ~5% |
| Community HCW RDT knowledge | Yes | Yes | Yes | No | Yes | Yes | Yes |
| Quality management system performance | High | Medium | High | Medium | Medium | Low | High |

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**Notes:** (*) Last available year; (**) As per Advention's assumption based on interviews (base case scenario). Sources: WHO, World Bank, GF, interviews, Advention.

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**PRIORITY COUNTRIES***

<table>
<thead>
<tr>
<th>VIET NAM</th>
<th>CAMBODIA</th>
<th>S. AFRICA</th>
<th>INDIA</th>
<th>PAKISTAN</th>
<th>MYANMAR</th>
<th>THAILAND</th>
</tr>
</thead>
</table>

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**Abbreviations:**
- NIMPE: National Institute of Malaria, Parasitology, and Entomology (also CNM);
- NDOH: National Department of Health;
- MoH: Ministry of Health;
- NVBDCP: National Vector Borne Disease Control Programme;
- CMSD: Central Medical Store Depot;
- BVBD: Bureau of Vector-Borne Disease;
- NMCP: National Malaria Control Programme;
- UNOPS: United Nations Office for Project Services;
- GF: The Global Fund;
- PMI: Project Management Institute.

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*Source: FIND*
Malaria RDTs are mostly financed by international donors, except in India, Pakistan and South Africa

NMCPs are key decision makers regarding RDT selection in all countries

Source: Advention