Malaria Elimination in the Greater Mekong Subregion (GMS)

Malaria Policy Advisory Committee (MPAC)
10-12 April 2019
Malaria elimination in the GMS: Targets

By 2020 or earlier
- Transmission of *P. falciparum* malaria interrupted in all areas of multidrug resistance (and in Cambodia)
- All species of human malaria eliminated in Yunnan Province, China

By 2025
- *P. falciparum* malaria eliminated in all countries of the GMS
- All species of human malaria eliminated in Cambodia and Thailand

By 2030
- All species of human malaria eliminated in all countries of the GMS
Malaria cases in the GMS (2012-2018)

Confirmed Cases

- **2012**: 600,000 cases
- **2013**: 500,000 cases
- **2014**: 400,000 cases
- **2015**: 300,000 cases
- **2016**: 200,000 cases
- **2017**: 100,000 cases
- **2018**: 50,000 cases

Death Cases

- **2012**: 600 deaths
- **2013**: 500 deaths
- **2014**: 400 deaths
- **2015**: 300 deaths
- **2016**: 200 deaths
- **2017**: 100 deaths
- **2018**: 50 deaths

Source: WHO subregional database
Parasite Incidence and Malaria Death by GMS Countries, 2003-2018

Source: World Malaria Report
Case burden in Cambodia remains high but has started to decrease in 2H 2018.

Source: WHO subregional database. Myanmar cases only include public sector data.
Progress: Cases are concentrated

Annual Parasite Incidence (API) by District*

2016
2017
2018

Source: WHO subregional database. *Viet Nam data are provincial level.
Monthly case trend in GMS by species

**Total confirmed cases (2016-2018)**

- **P. falciparum cases**
  - 2016
  - 2017
  - 2018

- **P. vivax cases**
  - 2016
  - 2017
  - 2018

Source: WHO subregional database, excluding mix cases
Progress toward Pf elimination

Total confirmed cases (2016-2018)

Source: WHO subregional database, excluding mix cases
Incidence of Pf in the GMS

Pf+Mix Incidence by District*

2016

2017

2018

Source: WHO subregional database. *Viet Nam data are provincial level. Myanmar data in 2018 do not include reports from CSOs.
Progress toward Pf elimination (2017 compared to 2018)

Changes in Pf+Mix Cases from 2017 to 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Myanmar</th>
<th>Cambodia</th>
<th>Thailand</th>
<th>Lao PDR</th>
<th>Vietnam</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>89110</td>
<td>-17912</td>
<td>-7036</td>
<td>-564</td>
<td>97</td>
<td>118</td>
</tr>
</tbody>
</table>

% change
- Myanmar: -34%
- Cambodia: -26%
- Thailand: -39%
- Lao PDR: 2%
- Vietnam: 4%
- 2018: -28%

Source: WHO subregional database
Significant progress in districts with multidrug resistance

% Change in Pf Cases (2015 vs. 2018)

Pf Incidence (2018)

Source: WHO subregional database
Thailand is nearing Pf elimination

Pf + Mix cases in 2018
(n = 876 cases)

Progress toward Pv elimination

**Total confirmed cases (2016-2018)**

- **P. falciparum cases**
  - 2016
  - 2017
  - 2018

- **P. vivax cases**
  - 2016
  - 2017
  - 2018

Source: WHO subregional database, excluding mix cases
Progress toward Pv elimination (2017 compared to 2018)

Changes in Pv+Mix Cases from 2017 to 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Cases 2017</th>
<th>Cases 2018</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>Thailand</td>
<td>71768</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>Lao PDR</td>
<td></td>
<td>-4010</td>
<td>-42%</td>
</tr>
<tr>
<td>2017</td>
<td>Vietnam</td>
<td></td>
<td>-593</td>
<td>-12%</td>
</tr>
<tr>
<td>2017</td>
<td>Myanmar</td>
<td></td>
<td>163</td>
<td>2%</td>
</tr>
<tr>
<td>2017</td>
<td>Cambodia</td>
<td></td>
<td>525</td>
<td>10%</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td>26779</td>
<td>125%</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td>94551</td>
<td>32%</td>
</tr>
</tbody>
</table>

% change: -42% to -12% to 2% to 10% to 125% to 32%

Source: WHO subregional database
In 2018, more than 60% of cases were *Pv* or *Pv*+ *Pf*

Relative importance of *Pv* cases is likely to increase as countries approach elimination.

Insufficient or lack of implementation of radical cure with primaquine in Cambodia and Lao PDR

Source: WHO subregional database
<table>
<thead>
<tr>
<th>Country</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>50%</td>
<td>48%</td>
<td>46%</td>
<td>73%</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>60%</td>
<td>63%</td>
<td>51%</td>
<td>47%</td>
</tr>
<tr>
<td>Myanmar</td>
<td>40%</td>
<td>43%</td>
<td>32%</td>
<td>51%</td>
</tr>
<tr>
<td>Thailand</td>
<td>67%</td>
<td>76%</td>
<td>84%</td>
<td>83%</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>54%</td>
<td>44%</td>
<td>37%</td>
<td>38%</td>
</tr>
</tbody>
</table>
Common priorities in GMS (MPAC, October 2018)

- Technical support at sub-national levels in highest burden areas to improve implementation and coordination

- Monitor drug efficacy and update/implement national treatment guidelines

- Improve surveillance and scale-up elimination phase activities (e.g. case and foci investigation)

For each category, it is encouraged to explore innovative approaches
Common priorities in GMS (MPAC, October 2018)

• Technical support at sub-national levels in highest burden areas to improve implementation and coordination

• Monitor drug efficacy and update/implement national treatment guidelines

• Improve surveillance and scale-up elimination phase activities (e.g. case and foci investigation)
Cases are highly concentrated in a few health centres in Cambodia and Lao PDR.

In both Cambodia and Lao PDR, top 20 facilities account for approx. 40% of cases, while top 50 account for approx. 60% of cases in 2018.

Source: WHO subregional database. Cambodia/Lao PDR data are at commune/HC levels; Thailand data are at district level; and Viet Nam data are at Provincial level.
Challenges: Accessibility in remaining endemic areas
Most cases are among forest goers (Results from UCSF and MSF)

Prevalence of all malaria parasites (RDT)
(% of all positive case, Champasak, Lao PDR)

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (n=4,942)</td>
<td>0.12</td>
</tr>
<tr>
<td>Forest goers (FTAT) (n=2,906)</td>
<td>3.1</td>
</tr>
<tr>
<td>Villages (MTAT R1) (n=17,821)</td>
<td>0.06</td>
</tr>
<tr>
<td>Village (MTAT R2) (n=7,091)</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Prevalence in malaria in ACD (PCR)
(% of positive Pf case, N= 2772 (Preah Vihear, Cambodia)

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No risk (n=613)</td>
<td>0.0</td>
</tr>
<tr>
<td>Forest goers (n= 914)</td>
<td>2.5</td>
</tr>
<tr>
<td>Plantation (n= 850)</td>
<td>2.0</td>
</tr>
<tr>
<td>Rice Field (n= 165)</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Source: UCSF (Lao PDR) and MSF (Cambodia).
Forest sites are widely dispersed

Possible Forest Sites in Me Mang, Mondulkiri, Cambodia

Source: WHO subregional database.
Mobility patterns, group size and access to communications differs significantly across forest goers. As a result, there is no one-size-fits-all solution to reaching forest goers.

To develop effective and tailored intervention strategies, it is helpful to work hand-in-hand with the community, government and partners.

This will also improve the ownership of the communities in resource-scarce settings.
Remaining challenges in GMS

• Technical support at sub-national levels in highest burden areas to improve implementation and coordination

• Monitor drug efficacy and update/implement national treatment guidelines (e.g. replacing ineffective first-line, identifying second-line ACT and implementing P. vivax radical cure)

• Improve surveillance and scale-up elimination phase activities (e.g. case and foci investigation)
### Efficacy of ACTs in GMS (2010-2018)

<table>
<thead>
<tr>
<th>Country</th>
<th>Scheme</th>
<th>Year</th>
<th>N of studies</th>
<th>Tx failures min</th>
<th>Tx failures max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Myanmar</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artemether-lumefantrine</td>
<td>2010-17</td>
<td>24</td>
<td>0.0</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Artesunate-mefloquine</td>
<td>2011-13</td>
<td>5</td>
<td>0.0</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>Artesunate-pyronaridine</td>
<td>2017-17</td>
<td>2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>DHA-piperaquine</td>
<td>2010-17</td>
<td>15</td>
<td>0.0</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>Cambodia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artesunate-mefloquine</td>
<td>2010-18</td>
<td>16</td>
<td>0.0</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>Artesunate-pyronaridine</td>
<td>2014-18</td>
<td>7</td>
<td>0.0</td>
<td>18.0</td>
</tr>
<tr>
<td><strong>Lao PDR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artemether-lumefantrine</td>
<td>2010-17</td>
<td>9</td>
<td>0.0</td>
<td>17.2</td>
</tr>
<tr>
<td></td>
<td>DHA-piperaquine</td>
<td>2016-17</td>
<td>2</td>
<td>13.3</td>
<td>47.4</td>
</tr>
<tr>
<td><strong>Viet Nam</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DHA-piperaquine</td>
<td>2010-17</td>
<td>39</td>
<td>0.0</td>
<td>46.3</td>
</tr>
<tr>
<td></td>
<td>Artesunate-pyronaridine</td>
<td>2017-18</td>
<td>5</td>
<td></td>
<td>N = 153; TF = 3.9%</td>
</tr>
</tbody>
</table>
Remaining Challenges in GMS Malaria Elimination

- Technical support at sub-national levels in highest burden areas to improve implementation and coordination
- Monitor drug efficacy and update/implement national treatment guidelines
- Improve surveillance and scale-up elimination phase activities (e.g. case and foci investigation)
Challenge: Issues in Surveillance

Key Areas of Work

Data Collection and Reporting
- Include surveillance data from partners and private sector
- Timely reporting of aggregated data to the national database
- Implement case-based surveillance and iDES

Data Use
- Analyse & share surveillance data especially sub-national levels
- Take timely programmatic actions

Validation
- Regular validation of surveillance data
- Surveillance assessment
WHO hosted an annual GMS surveillance meeting (November 2018), with the objectives to:

- Exchange information on surveillance progress, and challenges within GMS countries
- Strengthen surveillance in elimination phase (e.g. case and foci-investigation)
- Discuss proposed mechanism to utilize the WHO regional data-sharing platform (RDSP) for cross-border collaboration
- Brainstorm the future priorities for malaria surveillance in the GMS
Major Objectives

1. **Country Offices** continue support to national malaria elimination programmes

2. **HQ and Regional Offices** ensure timely technical support

3. **Mekong Malaria Elimination** (MME) team addresses partnership coordination and cross-country issues

MEAC: Malaria Elimination Advisory Committee; NMCP: National Malaria Control Programmes
Partner Coordination: 3 Key Layers

- **Information**: Exchange information on activities. Regularly share key updates (e.g. new project, publication, meeting)

- **Coordination**: Ensure there are neither overlaps nor gaps in our activities. Maintain close contact among partners that operate in the same provinces/districts

- **Collaboration**: Establish joint projects with clear definitions of responsibilities for each partner and NMCP
WHO facilitates information exchange (e.g. publications, website, mailing list, sub-regional and national meetings) so that partners are better informed about each other’s activities.
Examples of results from partner mapping with CHAI

Partners working at national level (Lao PDR)

Source: WHO subregional database and CHAI survey
Cross-Country Collaboration: Regional Data Sharing Platform (RDSP)

- All GMS countries are sharing their surveillance data to the WHO RDSP monthly.
- RDSP enables monitoring towards malaria elimination, detailed data analysis, and share data across the subregion (e.g. cross-border meetings).
• GMS countries significantly reduced the number of malaria cases from 2012-2018. In 2018, countries made significant progress towards Pf elimination, especially Cambodia, Myanmar and Thailand.

• Malaria cases are concentrated in small geographical areas among forest goers, requiring a focused and tailored strategy for these population (inc. prophylaxis).

• WHO continues to support National Malaria Control Programmes to address challenges and priorities and the Mekong Malaria Elimination (MME) programme continues to support communication, partner coordination and cross-country activities.