Malaria surveillance efforts in Cambodia

Dr Arantxa Roca-Feltrer
Joint International Tropical Medicine Meeting
Bangkok, December 2013
Challenges in the Mekong Region

- Drug resistant *P. falciparum* malaria

Source: WHO
Challenges in the Mekong Region

- Drug resistant *P. falciparum* malaria
- Forest related malaria and potent exophagic vectors

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- Drug resistant *P. falciparum* malaria
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- Cross border movement, migration of labour force

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Challenges in the Mekong Region

- Drug resistant *P. falciparum* malaria
- Forest related malaria and potent exophagic vectors
- Cross border movement, migration of labor force

Source: WHO
The Cambodian National Strategic Plan for Elimination of Malaria

**Short-term (by 2015):** To move towards pre-elimination of malaria across Cambodia, bringing level of transmission below 2 cases per 1,000 population for most parts, with special efforts to contain artemisinin resistant *Plasmodium falciparum* malaria.

**Medium-term (by 2020):** To move towards elimination of malaria across Cambodia with an initial focus on *P. falciparum* malaria and ensure zero deaths from malaria.

**Long-term (by 2025):** To achieve phased elimination of all forms of malaria in Cambodia.
Malaria trends in Cambodia

# of Malaria Treated Cases, Severe Cases and Deaths, 2000 to 2012 in Cambodia

Source: Epidemiology Unit, CNM
Malaria trends in Cambodia

Incidence rate of malaria treated cases per 1000 population, Cambodia, 2000 to 2012

Source: Epidemiology Unit, CNM
Malaria surveillance system prior to 2009

Health Information System (HIS):
- Malaria data available down to health facility level
- Lab data not directly linked to the patient

Limited Day 3 information from sentinel site surveillance

Risk stratification based upon distance from the forest using outdated maps (heavy deforestation in areas of the containment zone)
What information was required?

1. Demographic and malaria case data for...

Monthly village level data to be used for statistics, planning and village level stratification, including:

- No. of malaria cases by species ($Pf$, $Pv$), age and sex of the patient
- No. of severe malaria cases
- No. of malaria deaths
- Treatments given

Planning interventions such as mosquito net distribution
Improvements made since 2009?

**Increased** the number of villages with **VMWs and MMWs** to over 1600

Number of Village Malaria Workers (VMWs) villages by year

- 36 Villages
- 264 Villages
- 100 Villages
- 723 Villages
- 276 Villages
- 129 Villages

300 villages
Developed a database to process malaria data from VMWs, health facilities and data relating to mosquito net distribution and management (MIS Database)

- Installed in all 45 targeted Operational Districts
- Individual case data for all patients seen by VMWs and at public health facilities
Improvements made since 2009?

Integration of facility level malaria data from the new online HIS with the VMW and bed net data from malaria MIS database
Improvements made since 2009?

- **Increased** the number of villages with VMWs and MMWs to over 1600
- **Developed** a database to process malaria data from VMWs, health facilities and data relating to bed net distribution and management (MIS Database)
  - Installed in all 45 targeted operational districts
  - Individual case data for all patients seen by VMWs and at public health facilities
- **Integration** of facility level malaria data from the new online HIS with the VMW and bed net data from malaria MIS database
- **Creation of a “Malaria Bulletin”**
## Estimated coverage with LLIN or retreated mosquito net

<table>
<thead>
<tr>
<th>Data</th>
<th>Target</th>
<th>Mobile</th>
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<tbody>
<tr>
<td>No. of persons at risk of malaria</td>
<td>3,348,421</td>
<td>448,273</td>
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<tr>
<td>No. of LLIN distributed YTD</td>
<td>2,072</td>
<td>3,682</td>
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<tr>
<td>No. of LLIHN distributed YTD</td>
<td>1,607</td>
<td>467</td>
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<tr>
<td>No. of conventional nets distributed and retreated YTD</td>
<td>30,903</td>
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<tr>
<td>No. of long lasting nets distributed in last 3 years</td>
<td>2,959,334</td>
<td>4,149</td>
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<tr>
<td>Estimated coverage with LLIN / treated net (1 net / 1 pers)</td>
<td>89%</td>
<td>1%</td>
</tr>
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</table>

1 Pop of target villages  
2 Mobile pop (est from census)

## National Surveillance data for the period Jan - Sep

<table>
<thead>
<tr>
<th>Indicators</th>
<th>HIS</th>
<th>VMW</th>
<th>Total</th>
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<tr>
<td></td>
<td>2012</td>
<td>2013</td>
<td>Change</td>
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<tr>
<td>No. of cases</td>
<td>35,386</td>
<td>18,023</td>
<td>-49%</td>
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<tr>
<td>Malaria cases</td>
<td>22,599</td>
<td>13,270</td>
<td>-41%</td>
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<tr>
<td>Malaria Incidence</td>
<td>57,985</td>
<td>31,293</td>
<td>-46%</td>
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<td>Malaria deaths</td>
<td>35</td>
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<tr>
<td>Mortality rate a</td>
<td>0.24</td>
<td>0.05</td>
<td>-80%</td>
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</table>

1 Cases per 1000 pop  
2 Deaths per 100,000 pop  
3 VMW rates uses VMW village populations

## Trends in Surveillance

### Treated malaria cases from HIS and VMW by month

- **HIS**: Blue line
- **VMW**: Red line
- **All**: Green line

### Severe malaria cases and deaths from HIS by month

- **Severe**: Red line
- **Deaths**: Black line

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**Cambodia Malaria Bulletin** (available at [www.cnm.gov.kh](http://www.cnm.gov.kh))

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**PREVENTION**  |  **DIAGNOSIS**  |  **TREATMENT**  |  **RESEARCH**
Province level surveillance trends – District Malaria Bulletin - Beyond Garki
Median malaria incidence (all species) by OD

Are the MDB and VMW system focusing on the right places?

Distance to forest based from 2004 and updated based on local knowledge
Are the MDB and VMW system focusing on the right places?

Median malaria incidence (all species) by OD

(Cases per 1000 per year)

- **0.00 - 1.05**
- **1.06 - 3.03**
- **3.04 - 5.29**
- **5.30 - 8.74**
- **8.75 - 23.08**
Re stratification of all at risk villages in Cambodia based on village level incidence. Currently updating village stratifications based on 2011 incidence data.

<table>
<thead>
<tr>
<th>Code</th>
<th>Village</th>
<th>Pop</th>
<th>Repts</th>
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<th>VMWCas</th>
<th>HFCases</th>
<th>Inc</th>
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</table>
What information was required?

2. Real time data to facilitate rapid response

<table>
<thead>
<tr>
<th>Alert</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real time data about individual patients still positive after 3 days (an indication of drug tolerance)</td>
<td>Patients to be interviewed to identify possible sites (hotspots) of transmission</td>
</tr>
<tr>
<td>Rapid identification of all Pf cases in drug resistant areas</td>
<td>Ensure appropriate testing, DOTS treatment (Malarone) and follow up</td>
</tr>
<tr>
<td>Real time data from health facilities about stock levels of malaria drugs</td>
<td>To prevent stock outs and supply drugs on a timely manner</td>
</tr>
</tbody>
</table>
Use of mHealth technology to report malaria cases
Is this enough?

**FULL COVERAGE OF QUALITY INTERVENTIONS IN PRIORITY AREAS**

- Action 1. Increase quality and coverage of key interventions in the private and public sector
- Action 2. Engage health and non-health sectors to reach high risk populations
- Action 3. Implement measures to ensure continuous and uninterrupted supply of essential commodities

**TIGHTER COORDINATION AND MANAGEMENT OF FIELD OPERATIONS**

- Action 4. Strengthen coordination of field activities
- Action 5. Monitor staff performance and increase supportive supervision
- Action 6. Promote the integration of containment, elimination and malaria control while maintaining the focus on resistance

**BETTER INFORMATION FOR ARTEMISININ RESISTANCE CONTAINMENT**

- Action 7. Improve collection and use of data to target operations
- Action 8. Fast-track priority research and refine tools for containment and elimination
- Action 9. Increase monitoring of antimalarial therapeutic efficacy and strengthen the therapeutic efficacy networks worldwide
- Action 10. Increase monitoring of insecticide resistance

**REGIONAL OVERSIGHT AND SUPPORT**

- Action 11. Enhance accountability and exchange of information
- Action 12. Build political support at all levels
- Action 13. Facilitate progress and regional cooperation on pharmaceutical regulation, production, export and marketing
- Action 14. Create regional community of practice on approaches to high-risk populations
- Action 15. Support cross-border coordination

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**EMERGENCY RESPONSE TO ARTEMISININ RESISTANCE IN THE GREATER MEKONG SUBREGION**

**REGIONAL FRAMEWORK FOR ACTION**

2013-2015

*World Health Organization*
Is this enough?

6 Priority interventions:

- Insecticide treated nets
- Indoor residual spraying
- Early diagnosis and treatment
- Private sector interventions
- Surveillance
- Behaviour change communication

Focus on evaluating responses to hotspots/outbreaks/ eventually single Pf cases
Focus on reaching/monitoring populations at risk and hard-to-reach populations (e.g. MMPs).
Current gaps…

…relevant to malaria elimination

Integration of routine M&E data focusing on hard-to-reach populations into MIS

Respondent driven sampling on MMPs

Verboice technology
Current gaps…

…relevant to malaria elimination

- Integration of routine M&E data focusing on hard-to-reach populations into MIS (e.g. RDS)

- Re-active/pro-active case detection including standardised methodologies
- Exploration of novel deployment strategies (e.g. FSAT) and endorsement of alternative indicators to transmission intensity (e.g. serology)
- Exploration of the role of subpatent parasitaemias (clustering?)
Way forward: reactive case detection - Pailin

Passive case detection

INDEX CASE -> Health facility

Village malaria worker
Way forward: reactive case detection - Pailin

Passive case detection

INDEX CASE ➔ Health facility

Village malaria worker

Active case detection

INDEX HOUSEHOLD

Better understanding on the level of clustering of asymptomatic parasitaemia at household level

# visits needed to screen all?
Current gaps…

…relevant to malaria elimination

► Integration of routine M&E data focusing on hard-to-reach populations into MIS (e.g. RDS)

► Re-active/Pro-active case detection including standardised methodologies

► Exploration of novel deployment strategies (e.g. FSAT) and endorsement of alternative indicators to transmission intensity (e.g. serology)

► Exploration of the role of subpatent parasitaemias (clustering?)

► Need indicators to evaluate the impact of primaquine regimens. (ACT plus primaquine ==> radical cure, reduced transmission and decrease ArtRes spread)

► Regional surveillance system/early warning system