Preparing for the next global threat – a call for targeted, decisive action now in Southeast Asia to prevent the next pandemic in Africa

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Study districts in Phu Yen and Quang Tri Provinces (blue outlines)
Current Situation

- Historically, drug resistant strains emerge in Western Cambodia and then spread to Africa
- The newest strains are not just artemisinin-resistant; they are nearly incurable
- Historically, the spread of CQ-resistant strains in Africa resulted in a 2-6 fold increase in mortality
- When the new strains spread in Africa, a 2 fold increase would be
  ~ 8 million deaths over a decade
- Malaria resurgence will dwarf the highly publicized recent outbreaks (11,325 for Ebola, 774 for SARS and very few for Zika virus).

*Gains at risk of being reversed - history appears to be repeating itself*
Current Situation

- Regional artemisinin Initiative (RAI) mid-term review (1)
  - Attempts to contain artemisinin-resistant parasites not succeeded
  - Take urgent action to address the malaria situation in Cambodia
  - Improve the targeting, prioritization and rigor of interventions

- Cambodian Army example
  - Significant transmission reservoir of high drug-resistant malaria
  - In 2010, 5% Pf positive in research screening, in 2016 10% Pf positive
  - Deploying to Africa on peacekeeping missions without PCR screening
  - Mix with militaries in Africa from many endemic areas

- Vietnam
  - Treatment failures have crossed borders into Binh Phuoc Province
  - Many migrant workers in Angola
  - Highly competent organizations wanting to help

*Stop emerging incurable malaria to prevent the next global pandemic*

Example intervention coverage in 2015, Phu Yen Province, Vietnam

- Each household has 2.8 treated nets, **16% use one** in risk areas
- 85% say they take any net to the forest, **53% use one**
- 98% dislike 2014 “hard” Long Lasting Treated Nets resulting in non-use
- RAI hammock nets to 3% of population
- Forest-goers want treated zip-in type hammock nets, none provided

*Despite high program coverage, poor net coverage in the actual transmission hot spots/foci*
Alan Magill Recommended:

• Equation for eradication
• Easier equation – enough of each box
• Eliminate malaria “east of Bangkok” by 2020
• “Accelerate to zero”
• We can do this!!

*Bend the curve*
Together we can “Bend the Curve”

1) Effective guidelines and recommendations √
2) “Cutting edge” real time information √
3) Targeting of foci and MMPs going there □
4) Partners for “Red to green, keep it green” □
1) Effective Guidelines and Recommendations √

Examples:

- WHO √
- MoHs √
- Alan Magill √
- Bill Gates √
- CSIS √

Examples:


*Still need field operations manual (groups of specific execution SOPs)*
2) “Cutting edge” real time information system ✓

*Simple but powerful tools now available*
3) Targeting of actual transmission locations

*Forest transmission hot spots are identifiable and targetable*

*Need partners for field operations*
Goal = “Red to Green, Keep it Green”
(see example below)

*We can do this in partnership*
3) Targeting of risk populations (MMPs)

*Risk populations are readily identifiable*

*Target at homes, in transmission hot spots, and travel check points*
4) Partners for “Red to Green, Keep it Green”

- NMCPs
- WHO
- NGOs
- Global Fund
- BMGF
- USG organizations
- APLMA
- Those who can execute in the field!

*Those who can stop malaria in transmission foci are critical*
*Vietnamese Peoples Army are wanting to help – they can support with the biggest challenges – effective implementation with on-going monitoring in remote, border and restricted areas*
Binh Phuoc-Cambodia “Island*” – Top Priority in Vn!

*Highest priority of 7 forest islands (see ovals) because of high levels of DHA-piperaquine resistance*
Next highest priority “island” in Vn

*Transmission sites in this island already 1/4 mapped*
Information for Action

Example: Image evidence of LLIN use in households

• Definite use (top 2 pics)
• Probable use (next 2 pics)
• Possible use (next 2 pics)
• Definite non-use* (bottom 2 pics, note chickens inside)

*New information technology allows visualization of field operation interventions*
## Example Pay-for-Performance Plan to Rapidly Eliminate Malaria

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
<th>Frequency</th>
<th>Unit Cost</th>
<th>Total Units</th>
<th>Unit Type</th>
<th>Interviewees</th>
<th>Cost/Intervention/Year</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Rapid case report and initial investigation</td>
<td>Full interview at initial patient encounter</td>
<td>Each case</td>
<td>$4.80</td>
<td>1</td>
<td>Patient</td>
<td>1000</td>
<td>$4,800</td>
<td>1000 patients, cases will drop 80% in first year</td>
</tr>
<tr>
<td>2.1 Foci response (Village)</td>
<td>Screen* &amp; treat, treat nets, new nets, BCC**</td>
<td>Per case, prioritized</td>
<td>$3.60</td>
<td>300</td>
<td>Village responses</td>
<td>75</td>
<td>$81,000</td>
<td>Only those working in same risk area screened in the village</td>
</tr>
<tr>
<td>2.2 Foci response (Forest)</td>
<td>Screen &amp; treat, treat nets, new nets, BCC, LLIN-ASSA***</td>
<td>With each case, prioritized</td>
<td>$7.20</td>
<td>50</td>
<td>Forest foci responses</td>
<td>40</td>
<td>$14,400</td>
<td>1 km radius (assume 10 huts or 40 people); will be same teams doing foci monitoring and will overlap</td>
</tr>
<tr>
<td>3 Foci monitoring</td>
<td>On-going screen &amp; treat, monitor net use, BCC</td>
<td>Monthly to semiannually, prioritized</td>
<td>$6.60</td>
<td>120</td>
<td>Foci visited</td>
<td>40</td>
<td>$31,680</td>
<td>In accessible locations, 1 km radius (~80%), quarterly visits on average</td>
</tr>
<tr>
<td>4 Forest entry point interventions</td>
<td>On-going screen &amp; treat, monitor net possession, BCC</td>
<td>Continuous</td>
<td>$3.00</td>
<td>10</td>
<td>Forest entry points</td>
<td>548</td>
<td>$16,425</td>
<td>To capture people going beyond accessible locations (~20%), 15 people per check point per day</td>
</tr>
</tbody>
</table>

* Ideally with new ultrasensitive rapid diagnostic test (RDT)

**BCC = behavior change communication, potentially in the form of a "malaria visa" modeled after Exxon Mobile's malaria prevention program

***LLIN-ASSA = Long lasting insecticide treated net around sleeping and sitting areas (e.g. majority of sleeping locations are huts without walls)

Total $148,305
How can “Consortium for Health Action” help?

• Link the partners
• Work cross-borders with mobile and migrant populations
• Engage multi-sector partners (e.g. militaries, forest guard, border police)
  • Reduce them from being a transmission reservoir
  • Have them help with in their areas of strength (e.g. check points, education, monitoring)
• Identify and introduce new solutions (e.g. smart phone reporting, ultrasensitive \textit{Pf} RDT)
• Provide flexible mechanism for leadership to fill “gaps”
  • Most donor and executor partners are large bureaucracies
  • ConsortiumHA can fill this flexible funding gap, while having full accountability of funds
  • Use pay-for-performance mechanisms for rapid and effective action
• Provide on-going independent quality monitoring
• Please advise us if you see other areas
Specific Recommendations

• Address MDR malaria like the emergency it is!
• Target transmission foci and people who go there
• Utilize simple cutting-edge technology ("Red to Green, Keep it Green", should be “game-changing”)
• Develop joint missions with the right leadership for each “island”
• Establish the right partners for coordinated action (consortium of executers and funders)
• Apply military’s strengths (also should be “game-changing”)
• Prepare for the next threat together

*Need targeted decisive action*
Questions??
First Mission After Retirement
BMGF Background Paper

Information Systems to Support Surveillance for Malaria Elimination

Malaria Elimination Initiative, Global Health Group, University of California, San Francisco, California; Public Health Computational and Operational Research (PHICOR), Johns Hopkins School of Public Health, Baltimore, Maryland

Abstract. Robust and responsive surveillance systems are critical for malaria elimination. The ideal information system that supports malaria elimination includes: rapid and complete case reporting, incorporation of related data, such as census or health survey information, central data storage and management, automated and expert data analysis, and customized outputs and feedback that lead to timely and targeted responses. Spatial information enhances such a system, ensuring cases are tracked and mapped over time. Data sharing and coordination across borders are vital and new technologies can improve data speed, accuracy, and quality. Parts of this ideal information system exist and are in use, but have yet to be linked together coherently. Malaria elimination programs should support the implementation and refinement of information systems to support surveillance and response and ensure political and financial commitment to maintain the systems and the human resources needed to run them. National malaria programs should strive to improve the access and utility of these information systems and establish cross-border data sharing mechanisms through the use of standard indicators for malaria surveillance. Ultimately, investment in the information technologies that support a timely and targeted surveillance and response system is essential for malaria elimination.

*Utilize simple cutting-edge technology*