Integrating *Aedes* Into Existing Malaria Vector Control Systems In Africa

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Aedes-Borne Emerging and re-remerging diseases

Weetman et al, 2018

<table>
<thead>
<tr>
<th>Infection</th>
<th>Estimated Population at Risk</th>
<th>Percentage of African Population</th>
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<tbody>
<tr>
<td>Chikungunya</td>
<td>271 million</td>
<td>23%</td>
</tr>
<tr>
<td>Dengue</td>
<td>750 million</td>
<td>63%</td>
</tr>
<tr>
<td>Yellow fever *</td>
<td>21 million</td>
<td>2%</td>
</tr>
<tr>
<td>Zika</td>
<td>406 million</td>
<td>34%</td>
</tr>
<tr>
<td>At least one of the above</td>
<td>831 million</td>
<td>70%</td>
</tr>
</tbody>
</table>

* The value for yellow fever has been adjusted to account for reductions in the population at risk following vaccination programmes.
What explains the expansion of these emerging/re-emerging diseases?

• Proliferation of *Aedes* as a result of:
  • global trade (Reiter and Sprenger, 1987) and unplanned urbanization;
  • inefficient implementation of vector control programmes due to
    - inadequate human, financial, and infrastructural capacities;
    - erratic water supply and associated water storage practices;
    - ineffective waste disposal;
Preventing emerging and re-emerging Aedes-borne diseases

- Yellow fever - vaccine
- Chikungunya – no commercially available drugs/vaccines
- Zika – no commercially available drugs/vaccines
- Dengue – Vaccine (Dengvaxia: safety concerns for mass administration)

_Preventing/reduction:_ depends largely on controlling mosquito vector populations or interrupting human–vector contact
Vector Control and challenges

• **Historical successful *Aedes* control programmes**
  - Yellow fever in the Americas (1900s to 1960s)
  - Dengue in Singapore (1970s to 1980s) and Cuba (1980s to 1990s)

• **Issues with vector control**
  - Expanding *Ae. aegypti* populations
  - Expansion of urban centres with poor sanitation
  - Human travel networks
  - Inadequate vector control infrastructure
  - Insufficient resources
  - Insecticide resistance
  - Inadequate political will
  - **Vertical implementation**
Integrating *Aedes* control into existing disease vector control systems
Integrating *Aedes* control into existing diseases vector control systems

Roiz et al, 2018
Integrating *Aedes* control into existing diseases vector control systems

Roadmap to Support the Implementation of the Global Vector Control Response In the WHO African Region 2018-2019

West African *Aedes* Surveillance Network (WAASuN)
Integrating *Aedes* control into malaria vector control systems

- Integrated *Aedes* and *Anopheles* surveillance-Monitoring and Evaluation of control programmes
  - Shared sentinel sites
  - Mosquito collection
    - Adult - (might be easier)
    - Larvae (might be complicated)

https://www.cdc.gov/museum/images/history/mosquito-large.jpg
Integrating *Aedes* control into malaria vector control systems

- Integrated *Aedes* and *Anopheles* control
  - Synergizing tools and approaches

<table>
<thead>
<tr>
<th>Ae. aegypti</th>
<th><em>LLINs</em></th>
<th>IRS</th>
<th>Zooprophylaxis</th>
<th><strong>House screening</strong></th>
<th>Larval Source Mgmt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlikely significant impact</td>
<td>Impact</td>
<td>Unlikely significant impact</td>
<td>Impact</td>
<td>Impact – consider cost and feasibility</td>
<td></td>
</tr>
<tr>
<td>Day biter</td>
<td></td>
<td>Day biter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ae. albopictus</td>
<td>Unlikely significant impact</td>
<td>Impact</td>
<td>May have some relevant impact</td>
<td>Impact</td>
<td>Impact consider cost and feasibility</td>
</tr>
<tr>
<td>Day biter/exophilic</td>
<td></td>
<td></td>
<td>Unlikely significant impact</td>
<td></td>
<td></td>
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<tr>
<td>An. gambiae s.l.</td>
<td>Impact</td>
<td>Impact</td>
<td>Some impact</td>
<td>Impact</td>
<td>Impact consider cost and feasibility</td>
</tr>
</tbody>
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* [http://www.cdc.gov/malaria/how_can_i_help.html](http://www.cdc.gov/malaria/how_can_i_help.html)

** [https://www.sciencedirect.com/science/article/pii/S0140673609608710#fig3](https://www.sciencedirect.com/science/article/pii/S0140673609608710#fig3)
Integrating *Aedes* control into malaria vector control systems - **Challenges**

- Same understanding of “Integration”

Integration: Inter & intra-sectoral collaboration – single vector

Integration: Inter & intra-sectoral collaboration- multiple vectors
Integrating *Aedes* control into malaria vector control systems - **Challenges**

- **Funding**
  - Not enough funding schemes for *Aedes* surveillance and control
  - Fear from the NMCP of sharing their “small” budget
- **Training** – lack or insufficient number of well trained stuff on *Aedes* and *Aedes*-borne diseases
- **Insufficient political will**
Integrating *Aedes* control into malaria vector control systems – *some steps towards more integration*

- Same understanding of “integrating”
- Strengthening inter and intra-sectoral collaboration with multiple vectors
- Identifying diseases overlaps and control opportunities
- Training – Adding expertise on *Aedes* to *Anopheles* experts’ competence
- Funding agreement
- Political will
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Thank you !!!