Fewer Bites for Your Buck: Changing the Frequency of ITN Mass Campaigns for Optimal Cost-Effectiveness

Andrew Glover*¹, Hannah Koenker², Kate Kolaczinski³, Thomas Churcher¹

¹ MRC Centre for Global Infectious Disease Analysis, School of Public Health, Imperial College London, UK

² PMI REACH Malaria, PATH, USA

³ The Global Fund, Geneva, Switzerland

*a.glover18@imperial.ac.uk
Mass Campaign Intervals

- ITN effectiveness wanes notably towards the end of a 3-year campaign cycle.
- Mean net retention is typically less than 2 years in many sub-Saharan African countries.

**Figure A:** PfPR$_{2-10}$ in a high transmission setting with mean net retention of 2yrs.

**Figure B:** National ITN retention.
Mass Campaign Intervals

• Net-retention varies significantly sub-nationally

Cost-effectiveness of switching to 2-year campaigns will also depend on:

• Historical trends in usage (and access)

• Transmission intensity

• Seasonality

• Other interventions (e.g. SMC)

• Population growth

• Human behaviour

• Pyrethroid resistance
• More cases averted from switching from 3- to 2-year intervals for equivalent campaign coverage

• More cases averted by switching from pyrethroid-only to **pyrethroid-pyrrole** over switching to pyrethroid-PBO ITNs for equivalent distribution strategies
Increased campaign frequency and switching to pyrethroid-PBO or -pyrrole nets will incur greater costs…

…if the same level of coverage is achieved per campaign

Increased benefit from more effective nets than increased campaign frequencies per additional $USD spent
If the coverage achieved is reduced for equivalent average annual costings then:

- The projected cases averted under a 2-year distribution strategy remains unchanged in this setting.
- More cases can be averted for the same cost from switching to fewer, but better nets.
### ITN strategy

<table>
<thead>
<tr>
<th>ITN strategy</th>
<th>Pyrethroid-only 3-year campaigns</th>
<th>Pyrethroid-pyrrole 2-year campaigns (equivalent cost)</th>
<th>Pyrethroid-pyrrole 2-year campaigns (equivalent coverage)</th>
<th>Pyrethroid-pyrrole 2-year campaigns (equivalent coverage) with deprioritisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>National avg. annual cases averted (millions)</td>
<td>12.1 (95% CrI: 10.7, 13.2)</td>
<td>14.5 (95% CrI: 13.3, 15.6)</td>
<td>17.0 (95% CrI: 16.0, 18.0)</td>
<td>15.7 (95% CrI: 14.6, 16.8)</td>
</tr>
<tr>
<td>Avg. ann. cost (M USD)</td>
<td>26.6</td>
<td>26.6</td>
<td>42.4</td>
<td>25.4</td>
</tr>
</tbody>
</table>
Summary

• Switching to more effective ITN types is likely to be more beneficial than increasing campaign frequencies

• More cases can be averted for the same cost from switching to fewer, but better nets

• Prioritising 2-year pyrethroid-pyrrole campaigns in areas of higher transmission intensity, and deprioritising lower-transmission settings may be optimal under fixed budgets in some settings
Acknowledgements

Imperial College London:

PATH:
Hannah Koenker

The Global Fund:
Kate Kolaczinski, Htin Kyaw Thu

Funders:

Also thanks to:
Peter Gething and Amelia Bertozzi-Villa, in addition to the many individuals involved in data collection and compilation for the DHS program, and the numerous participants surveyed