Evaluation of Pirimiphos-Methyl Efficacy in Experimental Huts with Partially Sprayed Surfaces Against Natural Populations of *Anopheles gambiae* in Ghana

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Introduction

• Indoor Residual Spraying for Malaria Vector Control

• Insecticide Resistance

• Insecticides for IRS

• Scale Down of IRS Coverage

• Cost-Saving Approaches

• Partial Spraying
Study Area
Experimental Huts and Study Design

- June – November, 2018
- Twelve Experimental Huts
  - Two per treatment arm & control
    - Fully Sprayed
    - Unsprayed
    - Upper half
    - Upper half + Ceiling
    - Lower half
    - Lower half + Ceiling
- Baseline data collection
- Spraying
- Post-intervention data collection
- Volunteers slept in the huts
- Rotated among huts each night
- Mosquito collections
  - Scored as dead/ alive
  - Mortality main outcome
- Data analysis
Results and Discussions
Figure 1: *Anopheles gambiae* s.l. Collected by Location in experimental huts at the Baseline

- A total of 550 *An. gambiae* s.l. mosquitoes were collected at the baseline.
- Ceiling is the most preferred resting location inside the hut & top part from the Veranda.
Figure 2. *Anopheles gambiae* s.l. Mortality in Experimental Huts with Different Spraying Scenarios at the Post Intervention Period
Table 1: Mean Percentage Mortality of *Anopheles gambiae* s.l. In the Nine Rounds of Post-Intervention Period by the Treatment Arms

<table>
<thead>
<tr>
<th>Hut Treatment</th>
<th># Alive (morning)</th>
<th># Dead (morning)</th>
<th>Total collected</th>
<th># Alive (24 hrs.)</th>
<th># Dead (24 hrs.)</th>
<th>% Mortality (over all)</th>
<th>P-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsprayed</td>
<td>1530</td>
<td>16</td>
<td>1546</td>
<td>1322</td>
<td>208</td>
<td>14.5</td>
<td>&lt;0.001***</td>
</tr>
<tr>
<td>Fully sprayed</td>
<td>429</td>
<td>613</td>
<td>1042</td>
<td>242</td>
<td>187</td>
<td>76.8</td>
<td>Comparator</td>
</tr>
<tr>
<td>Lower wall only</td>
<td>765</td>
<td>232</td>
<td>997</td>
<td>541</td>
<td>224</td>
<td>45.7</td>
<td>&lt;0.001***</td>
</tr>
<tr>
<td>Lower wall + Ceiling</td>
<td>475</td>
<td>395</td>
<td>870</td>
<td>277</td>
<td>198</td>
<td>68.2</td>
<td>0.15</td>
</tr>
<tr>
<td>Upper wall only</td>
<td>646</td>
<td>169</td>
<td>815</td>
<td>482</td>
<td>164</td>
<td>40.9</td>
<td>&lt;0.001***</td>
</tr>
<tr>
<td>Upper wall + Ceiling</td>
<td>619</td>
<td>428</td>
<td>1047</td>
<td>351</td>
<td>268</td>
<td>66.5</td>
<td>0.13</td>
</tr>
</tbody>
</table>
Conclusion and Recommendation

- Partial spraying of huts provides similar level of mortality to full spraying when ceilings are included
- Substantial cost-saving for IRS
- Small scale field pilot study
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