Updates on ABCDR study in Tanzania

10th RBM-VCWG Meeting
Geneva, Switzerland
29th January, 2015

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Study Overview

- 8 districts in Tanzania – 3,420 households in 76 villages

- Retrospective study: Durability of Olyset campaign nets

- Prospective study:
  - Olyset
  - PermaNet2.0
  - Netprotect

- Compare durability over 3 years

- Attrition, physical degradation, bio-efficacy & chemical content

Net Landscape Tanzania

All collected nets (n = 6,537)
- LLINs: 3%
- Untreated nets: 20%
- No label: 77%

Data from return net database
Oct – Dec 2013

All LLINs (n = 5,054)
- LLINs: 96%
- Untreated nets: 4%
- No label: 1%

All Olyset nets (n = 4,852)
- Olyset: 93%
- PermaNet: 7%
- BASF: 1%
- Others: 1%

Olyset net sizes
- Single: 7%
- Double: 93%

Untreated net sizes
- Single: 49%
- Double: 51%

LLINs: light blue (81%) blue white stripe (16%) white (2%) others (<1%)
Attrition of campaign nets

Attrition = \frac{\text{number of light-blue Olyset nets collected}}{\text{reported number of campaign nets received}}

- Add unique identifiers to distinguish nets for monitoring—labels fall off
<table>
<thead>
<tr>
<th>Condition</th>
<th>4 years (n=24)</th>
<th>3 years (n=122)</th>
<th>2 years (n=48)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;80% <em>Anopheles</em> 24hr mortality (WHO cone)</td>
<td>20 (83.3%)</td>
<td>98 (80.3%)</td>
<td>31 (64.6%)</td>
<td>149 (76.8%)</td>
</tr>
<tr>
<td>&lt;80% <em>An.</em> 24 hr mortality &amp; &gt;10% blood-feeding</td>
<td>1 (4.2%)</td>
<td>5 (4.1%)</td>
<td>4 (8.3%)</td>
<td>10 (5.2%)</td>
</tr>
<tr>
<td>(WHO tunnel)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;15.0 g/kg permethrin (HPLC)</td>
<td>9 (37.5%)</td>
<td>28 (23.0%)</td>
<td>5 (10.4%)</td>
<td>42 (21.7%)</td>
</tr>
<tr>
<td>‘Too torn’ ¹</td>
<td>13 (54.2%)</td>
<td>42 (34.4%)</td>
<td>21 (43.8%)</td>
<td>76 (39.2%)</td>
</tr>
</tbody>
</table>

¹using hole counts, proportionate Hole Index (pHI) >643 & hole surface area >790cm²
Prospective Study
Attrition at “Year 1”

- 10,598 nets distributed Oct-Dec 2013 – equal numbers of 3 LLIN brands
- 10 months follow up (Aug-Oct 2014): 9,684 nets accounted for

Net still in household?

- YES 76.5% (n=7,405)
- NO 23.1% (n=2,236)

In use?

- YES 71.2% (n=5,262)
- NO 28.8% (n=2,128)

Nets no longer used for sleeping
- 13.9% (n=310)

Nets used elsewhere
- 85.1% (n=1,903)
n=2,128 nets not currently in use

- **net too old/too torn** 2%
- **enough nets currently in use** 5%
- **used a different net** 8%
- **net too hot/dirty/small** 11%
- **other** 14%
- **e.g. bed bugs, no place to hang, makes me sneeze**
- **save net for future use/visitors** 28%
- **no mosquitoes** 17%
- **user did not sleep here there last night** 15%
## Hole counting

<table>
<thead>
<tr>
<th>Category of Hole</th>
<th>Hole Size Description</th>
<th>Hole Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 1</td>
<td>Smaller than a thumb (finger)</td>
<td>0.5 - 2 cm diameter</td>
</tr>
<tr>
<td>Size 2</td>
<td>Larger than a thumb but smaller than fist (hand)</td>
<td>2 - 10 cm diameter</td>
</tr>
<tr>
<td>Size 3</td>
<td>Larger than a fist but smaller than a head (head)</td>
<td>10 - 25 cm diameter</td>
</tr>
<tr>
<td>Size 4</td>
<td>Larger than a head</td>
<td>&gt; 25 cm diameter</td>
</tr>
</tbody>
</table>
# Physical degradation

Following WHO protocol; hole counts in the field of 6,134 nets

<table>
<thead>
<tr>
<th>Category</th>
<th>pH1</th>
<th>Hole surface area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>0 - 64</td>
<td>&lt;79 cm²</td>
</tr>
<tr>
<td>Damaged</td>
<td>65 - 642</td>
<td>80–789 cm²</td>
</tr>
<tr>
<td>Too torn</td>
<td>643+</td>
<td>&gt;790 cm²</td>
</tr>
</tbody>
</table>

- **32% (1,969)** No Holes
- **68% (4,165)** With Holes
- **32% (1,969)** No Holes
- **51% (2,126)** Good
- **35% (1,434)** Damaged
- **14% (605)** Too torn

- **90% (5,529)** “Good nets” Serviceable
- **10% (605)** “Unserviceable”
1. At what level does net loss and degradation occur?
   - ENVIRONMENT
   - HOUSEHOLD
   - SLEEPING SPACE
   - INDIVIDUAL USER

2. When does a net stop being truly protective against mosquitoes?
   ➔ Correlating semi-field tests using whole nets from the field with WHO cut-offs and laboratory tests

3. What happens to nets when they are no longer deemed useful to sleep under?
Acknowledgements

Global Health and Vaccination Research (GLOBVAC)

Hans Overgaard, NMBU
Sarah Moore, IHI & Swiss TPH
William Kisinza, NIMR
Renata Mandike, NMCP
Jason Moore, LSHTM & IHI
Ubydul Haque, John Hopkins
Rose Nathan, IHI
Honorati Masanja, IHI
Olivier Briët, Swiss TPH

Zawadi Mageni, IHI & LSTHM
Dennis Massue, NIMR & Swiss TPH
Karen Kramer, NMCP & Swiss TPH
Albert Kilian
Jo Lines, LSHTM
Erasto Maziba, IHI
Richard Amaro, IHI
John Bradley, LSHTM
Olivier Pigeon, Walloon Agricultural Research Centre
Thank you!!!
## Perceptions of net vs its WHO categorization

<table>
<thead>
<tr>
<th>Condition Description</th>
<th>Good</th>
<th>Damaged</th>
<th>Too Torn</th>
</tr>
</thead>
<tbody>
<tr>
<td>The net is still in a good condition and can be used without restrictions</td>
<td>80.1%</td>
<td>32.2%</td>
<td>12.0%</td>
</tr>
<tr>
<td>(n=3,279)</td>
<td>(n=462)</td>
<td>(n=73)</td>
<td></td>
</tr>
<tr>
<td>This net is beginning to fall apart and should be replaced soon</td>
<td>19.5%</td>
<td>62.3%</td>
<td>64.0%</td>
</tr>
<tr>
<td>(n=800)</td>
<td>(n=893)</td>
<td>(n=387)</td>
<td></td>
</tr>
<tr>
<td>This net is no longer usable and definitely needs to be replaced</td>
<td>0.4%</td>
<td>5.5%</td>
<td>24.0%</td>
</tr>
<tr>
<td>(n=16)</td>
<td>(n=79)</td>
<td>(n=145)</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>n=4,095</td>
<td>n=1,434</td>
<td>n=605</td>
</tr>
</tbody>
</table>
WHO degradation category by district

% of LLINs per WHO degradation category

BAGAMOYO  KINONDONI  KILOSA  IRINGA  MBOZI  GEITA  KAHAMA  MUSOMA

District

good  damaged  too torn