• **Personal protection:** individual use of ITN, for group at risk.

• **Community protection:** mass effect on vector population => **Vector control**

   NONusers are also protected!

IRS and ITN: large scale coverage
# Randomized Control Trials and Mass Effect

<table>
<thead>
<tr>
<th>Authors</th>
<th>Country</th>
<th>Design</th>
<th>Insecticide</th>
<th>Cluster Unit</th>
<th>Entom. Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habluetzel Cuzin-Outtara et al. 1999</td>
<td>Burkina Faso</td>
<td>ITC-No 2 years</td>
<td>P</td>
<td>±10 villages</td>
<td>EI ↓ &gt; 95%</td>
</tr>
<tr>
<td>Binka</td>
<td>Ghana</td>
<td>ITN-No 2 years</td>
<td>P</td>
<td>120 HH</td>
<td>Not obs.</td>
</tr>
<tr>
<td>Nevill Mbogo et al. 1996</td>
<td>Kenya</td>
<td>ITN-No 2 years</td>
<td>P</td>
<td>100 HH</td>
<td>no mass effect</td>
</tr>
<tr>
<td>Philips-Howard Gimnig et al. 2003</td>
<td>Kenya</td>
<td>ITN-No 2 years</td>
<td>P</td>
<td>village</td>
<td>no mass effect</td>
</tr>
<tr>
<td>D’Alessandro Thomson et al. 1995</td>
<td>Gambia</td>
<td>ITN-UT 1 year</td>
<td>P</td>
<td>village</td>
<td>no mass effect</td>
</tr>
<tr>
<td>Henry</td>
<td>Ivory Coast</td>
<td>ITN-No 1 Year</td>
<td>LC</td>
<td>2 villages</td>
<td>AEI: ↓ 50%</td>
</tr>
<tr>
<td>Sexton</td>
<td>Kenya</td>
<td>ITN-No P</td>
<td>household</td>
<td>Not obs.</td>
<td></td>
</tr>
</tbody>
</table>

**Key:**
- ITC: Insecticide Treated Curtains
- ITN: Insecticide Treated Nets
- UT: Untreated Nets
- P: Permethrin
- LC: LambdaCyhalothrin
Study designs: Individual, household, community designs

- Individual randomized trials (without placebo): PERSONAL PROTECTION
  - high risk individuals: mobile, forest workers, etc
  - Less homogenous exposure
  - More feasible in more defined risk groups e.g. people in plantation
  - Recruitment?
  - Follow up? Adherence?

- House hold randomized trials (with placebo): PERSONAL PROTECTION
  - aversion effect of mosquitoes from repellent users to non users
  - Important spill over effect (exchange of products between the HH)
  - Placebo: feeling of being left out.

- Community randomized trial (without placebo): COMMUNITY PROTECTION
  - Advantage: more uniform impact ;
  - less aversion effect, less exchange of product with the control villages
  - possible mass effect
  - No Placebo:
  - Difficulty of adherence;
  - Feasibility in terms of power re further decrease of malaria
Challenges

• What are the measures for compliance
• What are the entomological measures:
  - Protection against mosquito bites- efficacy
  - In Community based- impact on transmission (serological as proxy for measuring transmission)

Epidemiological results ;
  - Personal protection – compliance
  - Community - prevalence
Indicators

• Personal protection –
  entomological indicators
  adherence;
  malaria infection

Community -
Randomized Control trials: “Contamination”

- Asembo Bay study (Kenya) Gimnig et al. 2003

- The Gambia (Thomson et al. 1995)

Decreased vector density in control villages close to intervention villages. Decreased sporozoite rate in both control and intervention areas.

The movement index of An.gambiae between villages: 17-20% (Despite cross wind)