Potential and cost-effectiveness of LSM

Silas Majambere and Eve Worrall

Slides used in this presentation were contributed by:
Lucy Tusting, Ulrike Fillinger and Peter DeChant
Historical evidence

• LSM was a important intervention against malaria in the early 20th century – pre DDT IRS

• While not all programmes succeeded, there were some notable successes

• Examples include:
  • Tennessee Valley, USA
  • Panama Canal zone
  • An. gambiae elimination: Brazil (1940), Egypt (1945)
  • Israel
Mosquito larval source management for controlling malaria (Review)

Tusting LS, Thwing J, Sinclair D, Fillinger U, Gimnig J, Bonner KE, Bottomley C, Lindsay SW
Findings

- In certain settings, LSM reduced malaria incidence by up to 75% and parasite prevalence by 68% - 89%

- In SSA, LSM was effective in rural Kenya and urban Tanzania

- In the flood plains of the Gambia River, larviciding by ground teams did not significantly reduce malaria incidence or parasite prevalence
Summary

• In Africa and Asia, LSM is a policy option alongside LLINs and/or IRS for malaria control in both urban and rural areas where a sufficient proportion of larval habitats can be targeted

• Further research needed to evaluate the role of LSM in rural Africa where larval habitats are more extensive

• LSM should be implemented with rigorous M&E of both clinical and entomological outcomes
Cost analysis

What is it?
Measuring and comparing costs in a systematic way (over time, between programmes)

• Useful for
  • Programme budgeting
  • Identifying cost drivers and efficiency savings (economies of scale)
  • Comparing cost of alternative delivery strategies and programmatic approaches (this was done extensively for ITN distribution)
# LSM : Cost Analysis

<table>
<thead>
<tr>
<th>Location (population protected)</th>
<th>Bti</th>
<th>Price of Larvicide ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total cost</td>
</tr>
<tr>
<td>Dar es Salaam (592,338)</td>
<td>CG</td>
<td>632,048</td>
</tr>
<tr>
<td>Vihiga (609,324)</td>
<td>WG</td>
<td>477,050</td>
</tr>
<tr>
<td></td>
<td>CG</td>
<td>807,510</td>
</tr>
<tr>
<td>Mbita (55,558)</td>
<td>WG</td>
<td>114,574</td>
</tr>
<tr>
<td></td>
<td>CG</td>
<td>142,077</td>
</tr>
</tbody>
</table>

Worrall and Fillinger (2007)

---

Depends mainly on:
- amount and type of formulation;
- human population density relative to habitat density;
- the potential to target the intervention in space and/or time.

$1-3 per person/year
Cost effectiveness analysis

What is it?

Measuring and comparing costs and consequences of more than one intervention

- Costs measured in standardised way
- Effectiveness
  - Expressed as cases, deaths, DALYs averted
  - Measured using RCT, transmission models, operational data
- Comparator very important – no intervention, or an existing level of an intervention, i.e. LLIN coverage
- Cost effectiveness requires a decision rule/threshold to be meaningful
LSM: Cost effectiveness analysis

• Cost per infection averted lower in high incidence scenario
• This is in the same range as cost per case averted with ITNs and IRS
• LSM is as cost effective as other vector control interventions
• But cost effective is not the same as affordable
Affordability and Financing

- If you have a fixed budget, the only way to afford this is to cut back elsewhere (opportunity cost), this is probably not desirable
- If there are additional finances for the new intervention then the opportunity cost is likely to be low
- No data on LSM financing
- But trend in LSM increasing
Supporting LSM implementation

• Opportunity to gather evidence for/against LSM
• Domestic funding to be encouraged
• Follow the recommendations of the WHO’s LSM manual (planning, M&E, choice of larvicides, etc.)
• Engage industry for long lasting larvicides
Innovation and LSM

• Improved and new spraying technologies
• Mapping technology