WELCOME

Larval Source Management Work Stream
3rd Meeting

13.00-15.00h, 7th February 2012
Salon V, IFRC, Geneva
# Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
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<tr>
<td>13.00-13.15</td>
<td>Welcome</td>
<td>Steve Lindsay</td>
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<td>Main points from 2nd Meeting, ASTMH</td>
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<tr>
<td>13.15-13.30</td>
<td>Update on Cochrane Review</td>
<td>Lucy Tusting</td>
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<td>13.30-13.45</td>
<td>2012 plan of work</td>
<td>Steve Lindsay</td>
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<td>Decision-making framework</td>
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<td>Country case-studies</td>
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<td>13.45-14.00</td>
<td>Operational manual</td>
<td>Shiva Murugasampillay</td>
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<td>14.00-15.00</td>
<td>Discussion</td>
<td>Led by Steve Lindsay</td>
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2nd Meeting, ASTMH, Philadelphia, USA
6th December 2011
Main points

Steve Lindsay
What was discussed

1. Presentations:
   - Historical use of LSM – Gerry Killeen (IHI)
   - Cochrane Review of LSM – Julie Thwing (CDC/PMI)
   - LSM in malaria control today – Charles Mbogo (KEMRI)

2. Mike Macdonald (USAID) presented the draft WHO position statement on larviciding on behalf of Jo Lines (LSHTM)

3. Group discussion of position statement led by Steve Lindsay and Mike Macdonald.
What was concluded

1. The WHO position statement does not accurately reflect existing evidence for the efficacy and cost-effectiveness of LSM

2. Countries need technical guidance on LSM

3. Emphasis on need for:
   a) Evidence-based decision making (IVM) (including detailed knowledge of local ecology)
   b) Good management
   c) Quality control of products
Cochrane Review of LSM for malaria control
Update

Lucy Tusting
1. Progress to date

2. Findings

3. Final steps – and your thoughts
Progress to date
Objective

To compare mosquito larval source management (excluding biological control with fish) for malaria control with no larval source management, applied either alone or in combination with other malaria control interventions.
Inclusion criteria

Study designs
- Cluster RCTs
- Cluster non-randomised controlled trials
- Cross-over trials

Interventions
- Habitat modification, habitat manipulation, larviciding, biological control (not fish)

Outcomes
- Primary:
  - Prevalence of parasitaemia
  - Incidence of confirmed malaria
- Secondary:
  - Prevalence of splenomegaly
  - Entomological outcomes: vector density, biting rate, EIR
• Search strategy
• Study review
• Eligibility assessment
• Risk of bias assessment
• Data abstraction

Analysis

Measure of intervention effect = percent reduction plus 95% CI

Human clinical outcomes:
- Incidence of malaria
- Prevalence of parasitaemia
- Prevalence of splenomegaly

Entomological outcomes:
- EIR
- Human biting rate
- Adult anopheline density

- meta-analyses
- data presented in forest plots
- no meta-analysis
- data presented in tables
Findings
Results

2255 abstracts identified by electronic search strategy, 587 from hand search

344 abstracts selected from electronic search, 181 from hand search

507 unique studies identified and assessed for eligibility

13 studies included
(4 cluster RCTS, 8 cluster non RCTs, 1 cross-over trial)
Incidence of confirmed malaria

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NOTE: Weights are from random effects analysis

Strong evidence that LSM is associated with a 69% reduction in incidence (95%CI 58-77%) in these trials
## Incidence of confirmed malaria

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- Reduces incidence
- Increases incidence

*Strong evidence that LSM is associated with a 69% reduction in incidence (95%CI 58-77%) in these trials*
Prevalence of parasitaemia

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Strong evidence that LSM is associated with a 75% reduction in prevalence of parasitaemia (95%CI 49-88%) in these trials
Prevalence of parasitaemia

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**Strong evidence that LSM is associated with a 75% reduction in prevalence of parasitaemia (95%CI 49-88%) in these trials**
Prevalence of splenomegaly

No evidence that LSM is associated with a reduction in prevalence of splenomegaly in these trials.
Prevalence of splenomegaly

No evidence that LSM is associated with a reduction in prevalence of splenomegaly in these trials
Entomology data coming soon.....
Are these friends of yours...?

A.M.G.M. Yapabandara
M.B. Wickramasinghe
W.P. Fernando
Josephat Shililu
Robert Novak
Junko Yasuoka
Richard Levins
Thomas W. Mangione
K. G. Samnotra (India)
Prem Kumar (India)
Conclusions

• LSM reduces morbidity from malaria where breeding sites are fixed, discrete and easily identifiable, i.e. not in The Gambia

• LSM may complement other methods of vector control in malaria control and elimination programs

• LSM requires major financial, technical, and operational inputs
Limitations

• Many poor quality studies
  – Only four cRCTs
  – High risk of bias
  – Need further research

• Heterogeneity in design, setting, population, LSM

• Unreported data means entomology meta-analysis is not possible
Next steps

- Entomological data (now)
- Submit draft review (end February 2012)
- Update search
- Further review & publication
Thank you
Acknowledgements

Julie Thwing (CDC)
Steve Lindsay (LSHTM)
Kimberly Bonner (CDC/Princeton)
John Gimnig (CDC)
Uli Fillinger (LSHTM)
Christian Bottomley (LSHTM)
Rob Newman (WHO)
Paul Garner (LSTM)
Sarah Donegan (LSTM)
Tomas Allen (WHO archives)
LSM Work Stream: 2012 Plan of Work

Steve Lindsay and Shiva Murugasampillay
2012 deliverables for RBM

1. ‘Establish a decision-making framework for deciding where LSM will work’

2. ‘Support the development of the template on country case studies’

3. ‘Support the development of an operational manual on LSM’

...by end of April
Who are they for?

1. Decision-making framework for LSM. Booklet designed for NMCPs/NGOs – should I consider LSM for malaria vector control? Go – No Go.

2. Country studies. Exemplars of what it takes to run a successful LSM program for those interested in establishing a LSM program.

1. Decision-making framework
Decision-making framework for LSM – the booklet

- What is LSM?
- Evidence for efficacy
- Economics of LSM
- Minimum requirements before embarking on LSM
- Where to do LSM and where not to
- When to start LSM and when to stop
- What’s needed for implementation
- What’s needed for monitoring
- Role in IVM
Possible template...
Insecticide Resistance Action Committee (IRAC) (2011)

Prevention and Management of Insecticide Resistance in Vectors of Public Health Importance
Flow Chart 1: Resistance Management Best Practice

How do I prevent or delay the onset of insecticide resistance?

- Conduct baseline susceptibility studies before commencing any large scale programme using WHO Test Kit or CDC Bottle Bioassay.

- Check susceptibility levels at least once a year in several set locations. Record and compare results with baseline study.

- Little or no change in susceptibility:
  - Continue with current strategy if impact on vectors and disease transmission is good.

- High level of survivors in tests:
  - Conduct further tests, evaluate susceptibility against all approved MoA classes. Where possible, undertake assays to identify resistance mechanism.

- Small increase in survivors, no field control failures:
  - Increase monitoring. Rotate to alternative MoA insecticide if possible.

- Existing insecticide class is resisted but all other classes effective:
  - Change MoA class of insecticide.

- Other classes of insecticides also resisted, may indicate existing resistance or cross-resistance:
  - Choose class of insecticide not resisted include larvicides with different MoA classes of insecticides where practical.

- All classes resisted:
  - Use MoA class that still provides best control. Ensure IVM is used, include larvicides with different MoA to adulticides where practical.

Flow Chart 3: Simplified diagram indicating possible steps in a resistance monitoring programme


3rd meeting of the Larval Source Management Work Stream, 7th February 2012
2. Country case studies
Four case studies, to be available online:

1. Malindi, Kenya
2. Dar-es-Salaam, Tanzania
3. Zambia
4. India (LSM in Urban MCP)
Two-page summary for each country:

1. **Background**: topography, climate, urban or rural, primary and secondary vectors, main type of breeding sites, local health system

2. **Description of intervention**: baseline mapping, type of LSM, frequency and duration of application, structure of program, funding, community involvement

3. **Data on co-interventions**: e.g. coverage with LLINs, MDA

4. **Effect of intervention**:
   - Baseline and post-intervention data on human clinical and entomological outcomes