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# Larval Source Management Work Stream

## 4<sup>th</sup> Meeting

13.00-15.00h, 30<sup>th</sup> January 2013  
Salle V, IFRC, Geneva



## Agenda

13.00 – 13.20	Welcome	Prof Steve Lindsay
	Summary of 3 <sup>rd</sup> meeting, Geneva, February 2012	
	Update on Cochrane Review	
	Progress on 2012 work plan: 1. Country case-studies 2. Operational manual 3. Decision-making framework	
13.20 – 13.35	How to make LSM work for IVM	Dr Silas Majambere (IHI)
13.35 – 13.50	LSM for malaria elimination	Dr Birkinesh Ameneshewa (WHO-ASFRO)
13.50 – 15.00	Discussion: Next steps for LSM	All

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**Main points from 3<sup>rd</sup> Meeting,  
Geneva, 7<sup>th</sup> February 2012**



## What was discussed

1. Update on Cochrane Review – Lucy Tusting

2. 2012 Work Plan:

- **Country case studies** – Steve Lindsay
- **LSM Operational manual** – Shiva Murugasampillay
- **Decision-making framework** – Steve Lindsay

3. LSM in Khartoum, Sudan – Hmooda Toto Kafy

4. Discussion

## Next steps agreed

- **Country case studies:**
  - Case studies to be produced for four of the following: Khartoum, Sudan; Malindi, Kenya; Dar es Salaam, Tanzania; Zambia, India, Mauritius, Swaziland, Niger, the Amazon, Angola, Nigeria, Cape Verde
- **Decision-making framework:**
  - Booklet to be produced for program managers to use to decide whether LSM should be considered
- **LSM Operational manual:**
  - To be based around four chapters:
    - i. Introduction
    - ii. LSM policy
    - iii. Management of programs
    - iv. Implementation
  - Draft to be circulated among nominated members of the work stream for input/feedback

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# Update on Cochrane Review of LSM



# Progress on Cochrane Review

**February 2012:** Preliminary analysis complete; entomology data to be added.

**March 2012:** Analysis completed; first draft submitted for peer review.

**July 2012:** Peer review and editors comments received. Major revisions required.

**October 2012:** Search updated to include studies published since first search in October 2010; further work on finalising analysis begins with financial support from Cochrane Infectious Diseases Group.

**Spring/summer 2013:** Submit next (final?) version for peer review.

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## **2012 Work Plan: Progress since last meeting**



# 2012 Work Plan

Activity	Completed
<b>Objective 1. Follow-up with 2011-12 deliverables</b>	
1. Finalise first draft of LSM Operational Manual	Apr-12
2. Support process of review, publication and dissemination of Operational Manual	Dec-12
3. Finalise and disseminate LSM case studies	Oct-12
4. Finalise and disseminate LSM decision-making framework	Ongoing
<b>Objective 2. Maintain LSM network</b>	
1. Secretariat to maintain up-to-date list of WS partners & inform as necessary	Ongoing

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# 1. Country case studies

# Four case studies produced:

<http://www.rbm.who.int/mechanisms/vcwgWorkstream6.html>

1. **Khartoum, Sudan** – Hmooda Toto Kafa (NMCP, Sudan)

2. **Dar-es-Salaam, Tanzania** – Prosper Chaki (IHI, Tanzania)

3. **Mauritius** - Shahina Aboobakar (MoH, Mauritius)

4. **India** - Rajander Sharma (NVDCP, India)

• Information on LSM in Malindi from Charles Mbogo is also available at [http://www.rbm.who.int/partnership/wg/wg\\_itn/docs/ws6/ChMbogo-LSMinUrbanMalindi.pdf](http://www.rbm.who.int/partnership/wg/wg_itn/docs/ws6/ChMbogo-LSMinUrbanMalindi.pdf)

Roll Back Malaria Larval Source Management Work Stream 2012 LSM Case Studies

### Larval Source Management (LSM) in Mauritius

Malaria was first introduced to the island of Mauritius from mainland Africa during the mid 19<sup>th</sup> century [1]. Over a century of malaria control campaigns ensued, including large indoor residual spraying (IRS) operations and widespread larval source management (LSM) projects [2]. Mauritius was declared malaria-free in 1973 by the World Health Organization [3]. However, after a series of cyclones from 1975 to 1976, the country saw a resurgence of *Plasmodium vivax* when migrant workers from malaria endemic countries arrived on the island to repair the damage caused by these cyclones. Once again, the country assumed a control campaign with IRS, larviciding and robust surveillance. Since 1997 no indigenous cases of malaria have been reported in Mauritius and the country is now in the 'prevention of reintroduction' phase [4]. LSM remains a mainstay of the Prevention of Reintroduction Program (PRP), along with a strong surveillance system and a passenger screening program.

#### Background

- **Site characteristics:** Mauritius is an island situated in the Indian Ocean, 850km to the east of Madagascar (Fig. 1).
- **Climate:** There are two well-marked seasons: summer and winter. Summer is generally accompanied by heavy showers and occasional cyclones while dry or semi-dry conditions prevail in winter. Mean annual temperature varies with seasons and altitudes, ranging from 21-23°C in summer in the coastal region, and between 16-18°C in winter. Annual rainfall varies from 600-1900mm near the coast to 2500-4450mm in the uplands. The true rainy season extends from December to April.
- **Primary and secondary vectors:** *Anopheles funestus* and *An. arabiensis* were responsible for malaria epidemics between the mid 19<sup>th</sup> and mid 20<sup>th</sup> centuries [2]. In 1948, a vector control scheme based on DDT IRS led to the elimination of *An. funestus* from Mauritius by 1950, with a subsequent fall in the incidence of malaria. This scheme failed to control *An. arabiensis* however, which has never been eliminated from the island.
- **Main type of breeding sites:** *Anopheles gambiae* mainly breeds in clean, fresh sunlit water bodies.
- **Malaria transmission:** No autochthonous cases of malaria have been reported in Mauritius since 1997 however imported malaria cases among visiting or working expatriates and residents returning from malaria endemic countries still occur, with 54 imported cases in 2011.

#### The larval source management program

- **Structure of the control program:** In 2009 the Integrated Vector Management (IVM) Concept was introduced and the public is now involved in reducing larval breeding sites through environmental modification (e.g. maintenance of drains and storm drains and management of solid and bulky waste), which reduces dependence on larvicides. Members of the community are educated by health inspectors who have Power of Entry granted by the 1925 Public Health Act, according to which it is a legal requirement for individuals to remove breeding sites around their homes [5]. Routine larviciding is also conducted island-wide.
- **Baseline mapping and data collection:** All breeding sites in target areas are mapped and new breeding sites are detected during routine surveys once a month.
- **Larviciding:** Former foci of malaria transmission, highly productive breeding sites identified through entomological surveillance and standing water within a 500m radius of the residences of imported cases and migrant workers are treated fortnightly with temephos (Fig 2). In addition,



Figure 1. Mauritius

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## 2. Operational manual

## Progress so far

**March 2012:** It was agreed that the LSM manual would be better as a WHO document; funding offered by GMP.

**May 2012:** First draft completed and submitted to WHO and four reviewers for preliminary review.

**October 2012:** Draft manual circulated to LSM work stream members nominated in February 2012 to give input.

**December 2012:** Revised draft of manual submitted to WHO for further review.

## Our thanks to...

Charles Mbogo (KEMRI)  
Chioma Amajoh (NMCP, Nigeria)  
Egon Weinmueller (BASF)  
Gerry Killeen (IHI)  
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Michael Macdonald (USAID)  
Peter DeChant (VBC)  
Rose Peter (Arysta)  
Shiva Murugasampillay (WHO)  
Uli Fillinger (LSHTM)

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# 3. Decision-making framework

## Progress so far

- First draft complete: ‘ When and where to use Larval Source Management (LSM) for malaria control and elimination in Africa.’
- 27 page A5 document designed for program managers to decide when and where to use LSM.
- To be completed once the LSM Operational manual is finalised, so that the two documents exactly correspond

# Larval control is mentioned for the 1<sup>st</sup> time in a World Malaria Report in 2012

## Larval source management strategies

**WHO recommends that in a few specific settings and circumstances, the core vector control interventions of IRS and ITNs may be complemented by other methods, such as mosquito larval source management.** Anti-larval measures are appropriate and advisable only in a minority of settings, where mosquito breeding sites are few, fixed, and findable (i.e. easy to identify, map and treat). Reports received from national programmes indicate that **27 malaria-endemic countries worldwide use larval control** in certain specific foci of malaria transmission, including 9 countries in the African Region, 5 in the Region of the Americas, 3 in the Eastern Mediterranean Region, 6 in the European Region, 2 each in the South-East Asia and Western Pacific Regions. Various larval control strategies were reported, and many countries engaged in more than one type of larval control activity. In 2011, 9 countries reported activities involving habitat manipulation (temporary changes to vector habitats) and 9 reported some form of habitat modification (long-lasting physical transformations to reduce vector larval habitats). Larval control through chemical larviciding was reported by 16 countries, while 13 reported biological larviciding activities. Reports from endemic countries give an indication of the range of larval control methods employed, although the scale of efforts are not quantified and the impact on individual country malaria burden is not easily measured.

## Discussion: next steps for LSM...

1. Is there further need for operational indicators of success? We have described how to evaluate LSM in the Operational Manual, but is there a need for further guidance here?
2. Should we recommend specific branded products for LSM? WHOPEs currently only has a list of recommended formulations, so for specific products one has to delve into the WHOPEs meeting reports.
3. What (if anything) should we be doing to encourage LSM? Such as capacity building for environmental management (e.g. training courses for program managers run by entomologists and engineers).
4. What (if any) further research on LSM is needed?
5. Anything else?