

Asia Pacific Malaria Elimination Network APMEN

Inventory of Information and Guidance Documents on Larviciding for Malaria Control, Especially in Elimination Environments

INTRODUCTION

This comprehensive literature review was undertaken as part of a series of situational analyses conducted by the Asia Pacific Malaria Elimination Network (APMEN) to address the needs for quality management and skills for vector control and entomological approaches in countries that have malaria elimination as a national or sub-national objective. It is possible that the last remaining sources of vector larvae may become the last strongholds for malaria in elimination.

The APMEN Vector Control Working Group posed the questions:

1. Do we know enough about the use of larviciding as a vector control method in elimination environments to provide technical support to APMEN Country Partners?
2. If not, what role should APMEN play to develop, operationally research, and strengthen this knowledge and evidence base?

METHODOLOGY

- Online literature search with Google Scholar, PubMed and Scopus, using the following key words: vector control, elimination, malaria, guidelines, standard operating procedures, larviciding, vector management and biological control.
- Grey literature search through the World Health Organization library.
- Access to a database for a Cochrane Review on vector control (see acknowledgements).
- Articles published from 1955 through 2012 were sought in order to capture earlier references and manuals on larviciding and the use of vector control during the malaria eradication period.
- In total, 347 articles, books and manuals were reviewed, with 117 which met the following inclusion criteria:
 - Provided detailed information on larviciding in control or elimination environments from any country, and region, or at the global level;
 - Covered mosquito management for any vector-borne, human public health diseases;

LARVAL CONTROL METHODS REVIEWED:

Chemical Control – Organophosphates
Chemical Control - Insect Growth Regulators
Biological Control – Microbial Larvicides
Biological Control – Fish

FINDINGS

The literature provided insights into operational aspects of a range of chemical, biological and fish related larviciding methods. The name; active ingredient formulation and dosage; duration and place to derive optimal benefits from larviciding; mosquito susceptibility; locations of use; larviciding programme implications based on their availability, were noted; and if mentioned, elimination applications.

Based on the literature review, invertebrate control generally remains in experimental stages and its effectiveness has not been fully assessed, does not seem effective or is still in the experimental stages.

Review of available manuals and guidelines and operating manuals on use of larviciding in general and elimination environments in particular was undertaken.

DISCUSSION

A large body of literature exists on the types of larvicides and their corresponding suitability for the environmental and vectoral contexts in the Asia Pacific region.

Very few larvicides have been specifically tested or explicitly discussed as suitable for elimination settings.

Detailed studies found on the suitability of larviciding for vectors found in China, India, Sri Lanka, Solomon Islands, Malaysia, Indonesia and Thailand, but not for other Asia Pacific countries. This is an evidence gap that needs to be addressed.

Some sources provided useful operational data on the use of larvicides, their safe handling and storage, and other operational details. Few studies or manuals discussed the monitoring and evaluation of larvicides use in programmes.

None of the literature reviewed covered detailed costs, cost-effectiveness data or cost comparisons between different larvicides and/or vector control methods.



DISCUSSION - SITES FOR LARVICIDING

- The recent interim position statement on The Role of Larviciding for malaria control in Sub-Saharan Africa (WHO 2012) noted, in the context of sub-Saharan Africa, there was a specific limited role of larviciding in malaria vector control.
 - It noted that adult mosquito control with ITNS and IRS are currently the most cost-effective interventions and have greater potential impact than larviciding. It also notes a need for more quality evidence on larviciding role in urban and low transmission settings.
- In the Asia Pacific Region many APMEN countries have larval breeding sites which may be good targets for larviciding. The above mentioned position statement identified the following criteria for larviciding to be effective—few fixed and findable breeding sites. The following are incriminated vector species in APMEN countries that meet the criteria.

Incriminated vector species in APMEN countries meeting criteria -few, fixed and findable

1	<i>An. aconitus</i> ,	China, Indonesia
2	<i>An. anthropaghus</i> ,	China, DPRK
3	<i>An. culicifacies</i> ,	Sri Lanka
4	<i>An. farauti</i> ,	Indonesia
5	<i>An. flavirostris</i> ,	Phillipines
6	<i>An. maculates</i>	Bhutan, China, Malaysia, Indonesia, Phillipines
7	<i>An. minimus</i> ,	Bhutan, China,
8	<i>An. pseudowilmori</i>	Bhutan, China,
9	<i>An. sinensis</i> ,	China, DPRK, South Korea
10	<i>An. stephensi</i> .	China
11	<i>An. subpictus</i> ,	Indonesia, Sri Lanka
12	<i>An. sundaicus</i> ,	Indonesia, Peninsular Malaysia,

APMEN IN RESPONSE TO LITERATURE CALLS FOR:

- Continued identification of literature on larval source management activities and studies in the Asia Pacific region that are not currently published or available to the public..
- A review of current methods of application and development of guidelines as much literature might be out of date
- A detailed costing of larviciding
- Increased advocacy for political commitment and policy for larval source reduction as a potentially important aspect of elimination strategies
- Identify and support larviciding /IVM training for countries for target vectors

ACKNOWLEDGEMENTS

This work is a product of the APMEN Vector Control Working Group, and all working group members have contributed to the content, analysis and review of this documentation note.

Special acknowledgment to the Cochrane Review of Vector Control group who generously shared their library database with APMEN. This database was compiled by Julie Thwing and Lucy Tusting, with the support of the Centers for Disease Control and Prevention Library Services, the London School of Hygiene and Tropical Medicine Library Services, the Armed Forces Pest Management Board Literature Retrieval System, the WHO Library and Archives Service, and the Cochrane Infectious Diseases Group.

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