EVIDENCE BRIEF

Larviciding & water management

(DCP4 ID: MALR01-08)
 Cluster: Malaria

FairChoices
DCP Analytic Tool

Larviciding and water management against malaria

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Description of condition and intervention

Conduct larviciding using insect growth regulator and water-management programs in high malaria transmission areas where mosquito breeding sites can be identified and regularly targeted. Types of larvicide are insecticides, insect growth regulators, microbial larvicides, and oils. The standing water can be removed by filling the land or adding chemicals. This help to reduce number of mosquitoes that reach adulthood and transmission of Plasmodium through anopheline mosquitoes and decrease morbidity and mortality from malaria infection. In this evidence brief, we present the effect and cost of the following intervention being analysed in FairChoices:DCP Analytical tool:

Larviciding and water management against malaria

International guidelines

Organization	Indications/recommendations	Applicability in LIC & Lower MIC settings
World Health Organization 2021	WHO guidelines for the treatment of malaria	Yes

Intervention attributes

Type of interventions
Prevention & intersectoral

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Delivery platform
This intervention may be delivered at the community level.

Equity
In addition to considerations like cost-effectiveness and health systems factors, dimensions of equity can be relevant for priority setting. The opportunity for a long and healthy life varies according to the severity of a health condition that individuals might have, so there are inequities in individuals' opportunities for long and healthy lives based on the health conditions they face. Metrics used to estimate the severity of illness at an individual level can be used to help prioritize those with less opportunity for lifetime health. FairChoices: DCP Analytics Tool uses Health adjusted age of death (HAAD), which is a metric that estimates the number of years lived from birth to death, discounting years lived with disability. A high HAAD thus represents a disease less severe in terms of lifetime health loss, while a low HAAD represents a disease that is severe on average, causing early death or a long period of severe disability. It is also possible to estimate the distribution of HAAD across individuals with a health condition. FairChoices shows for each intervention an average HAAD value of the conditions that are affected by respective interventions that have health effects. Additionally, a plot shows HAAD values for around 290 conditions (Johansson KA et al 2020).

Time dependence
Low level of urgency. Treatment outcomes not highly affected by some days of delay.

Population in need of interventions
This is a population level intervention, where benefits accrue to all in the age group 0 to 99 years.

Disease states addressed
This intervention targets to prevent malaria in the population.

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Intervention effect and safety

Table 1: Effect and safety of larviciding and water management for malaria prevention

Effect of intervention		Certainty of evidence
Incidence	Choi, Majambere, Wilson 2019 reported that chemical larviciding using insect growth regulator across all villages was associated with lower malaria incidence RR= 0.24 compared to no larviciding.	See appendix

Model assumptions

Table 2: Summary of model parameters and values used in FairChoices – DCP Analytical Tool

Category	Model parameter	Notes
Intervention	Larviciding and water management against malaria	
Cost calculation		
Treated population	All	
Gender	Male & female	
Age	0 to 99 years	
Treated fraction	Malaria control; high transmission	Country input file indicator
Effect calculation		
Affected Population	With condition	
Affected gender	Male & female	
Affected fraction age	0 to 99 years	
Affected fraction	1	
Comparison	No intervention	
Incidence Reduction (RRR)	0.76	Choi, Majambere, Wilson 2019

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Intervention Cost

The total unit cost for larviciding and water management is estimated to be USD 1.59 per person-year in specified population (SA) (Year: 2006) in a low-income country setting (Kenya).

References

Choi, Majambere, Wilson 2019: Choi L, Majambere S, Wilson AL. Larviciding to prevent malaria transmission. Cochrane Database Syst Rev. 2019 Aug 14;8(8):CD012736. doi: 10.1002/14651858.CD012736.pub2. PMID: 31425624; PMCID: PMC6699674.

Johansson KA et al 2020: Johansson KA, Coates MM, Økland JM, Tsuchiya A, Bukhman G, Norheim OF, Haaland Ø. Health by disease categories. Distributional Cost-Effectiveness Analysis: Quantifying Health Equity Impacts and Trade-Offs. 2020 Sep 30:105.

Worrall E, Fillinger U. Large-scale use of mosquito larval source management for malaria control in Africa: a cost analysis. Malaria journal. 2011 Dec;10(1):1-21.

Appendix

Literature Review for effectiveness & safety

This literature search is an example of a structured, focused review of literature and guidelines. You can choose to do one of the following literature reviews for your Evidence Brief:

Level 1: intervention inputs taken from DCP3 or generated in an ad hoc manner (e.g., quick google search found one study of cervical cancer screening cost-effectiveness that was used to create an effectiveness parameter for that intervention).

Level of evidence of efficacy studies:

1. low (expert opinions, case series, reports, low-quality case control studies)

2. moderate (high quality case control studies, low quality cohort studies)

3. high (high quality cohort studies, individual RCTs)

4. very high (multiple RCTs, meta-analysis, systematic review, clinical practice guidelines).