

# Malaria vector control in humanitarian emergencies: What works? An evidence brief

## Executive summary

- When people are forcibly displaced by (natural or man-made) humanitarian emergencies, they are often exposed to an increased risk of malaria
- There is limited evidence about which vector control tools are most effective against malaria in these settings
- This systematic review confirms that in long-term / chronic emergency settings, insecticide-treated nets are effective at preventing malaria
- In chronic emergencies, other vector control tools (specifically topical repellents, insecticide-treated blankets and insecticide-treated cattle), also showed promise in individual studies
- Many of these interventions have been proven to be effective in chronic emergencies – where randomised controlled trials were conducted, primary health care (with accurate diagnosis) is available – and the evidence is stronger
- There lacks documentation on the efficacy of interventions in the acute phase of emergencies – this knowledge base must be strengthened

## Key implications

- This brief summarises the trial evidence that underpins the latest World Health Organization (WHO) guidelines<sup>1</sup> for malaria control. Specifically, it is recommended to deploy LLINs during long-term humanitarian emergencies.
- There is an urgent need for more evidence on the effectiveness of existing vector control (VC) tools in emergency settings, as well as on new tools to cater to the needs of vulnerable populations in these ‘niche’ and complex settings.
- There is a particular need for guidance on interventions deployed during the acute phase of emergencies.



## Background

In 2022, UNHCR estimated that 103 million people are forcibly displaced by (natural or man-made) humanitarian emergencies<sup>2</sup>. Because of limited healthcare, security issues, and creation of mosquito breeding sites, many of these populations (which are often immunologically naïve) are at increased risk for malaria.

There is an urgent need to know how well existing VC tools work in emergency settings, as well as develop new tools that can cater to the needs of vulnerable populations in these ‘niche’ and complex settings. There is a particular need for evidence on interventions that can complement LLINs and IRS.

An updated systematic review and meta-analysis was requested by WHO to summarise existing knowledge on the efficacy of different VC interventions on malaria during humanitarian settings.

## Limitations

- The number of trials, types of interventions and range of entomological settings examined remains limited.
- It is more difficult to evaluate malaria vector control interventions during the initial “acute” phase of emergency settings. This is mostly down to the duty of care to communities affected by crises and the ethical implications of not providing an intervention (i.e. no control comparison). Also, the need for rapid response is not compatible with planning for complex randomised controlled trial methodology.
- Under these settings, it is often challenging to meet current WHO requirements (of two randomised controlled trials [RCT] with epidemiological endpoints) for approval of new vector control tools.

## Key recommendations

### For NGOs and implementing partners:

It is recommended to purchase ITNs (and if funding permits, next-generation nets) for forcibly displaced populations at risk of malaria.

### For donors and policy makers:

Humanitarian emergency settings are unique – specific guidelines, trial requirements and evidence generation are required for them. More investment in research is thus needed.

## What works?

### In acute (the initial phase of) humanitarian emergency settings:

Only one study (a malaria outbreak in Vanuatu following a tropical cyclone) on ITN use was conducted but it was excluded because it did not detect any malaria cases.

### In long-term humanitarian emergency settings:

Compared to no intervention	<i>P. falciparum</i> incidence [# studies]	<i>P. vivax*</i> incidence [# studies]	Study countries	Quality of evidence (by normal standards)
<b>Insecticide-treated nets (ITNs)</b>	Large reductions (by 45%) [4 RCTs]	Likely to reduce (by 31%) [3 RCTs]	Myanmar, Pakistan & Thai-Myanmar border	Moderate – high
<b>Indoor residual spraying (IRS)</b>	Evidence is very uncertain [1 observational study (OS)]		Pakistan & Sudan	Very low
<b>ITNs + IRS</b>	-	Evidence is very uncertain [1 OS]	Pakistan	Very low
<b>Topical repellents</b>	Likely to reduce (by 42%) [2 RCTs]	Little to no difference [2 RCTs]	Pakistan & Thailand	Low – moderate
<b>Insecticide-treated plastic sheeting</b>	Evidence is very uncertain [1 OS]		Sierra Leone	Very low
<b>Insecticide-treated clothing</b>	Evidence is very uncertain (prevalence only) [1 OS]	-	Kenya	Very low
<b>Insecticide-treated chaddars</b>	Likely to reduce (by 44%) [1 RCT]	May reduce (by 26%) [1 RCT]	Pakistan	Low – moderate
<b>Insecticide-treated cattle</b>	Likely to reduce (by 56%) [1 RCT]	Likely to reduce (by 31%) [1 RCT]	Pakistan	Moderate

\*These interventions are not less effective against vivax but cases contracted pre-intervention relapse at the same rate in intervention and control groups giving the illusion of lower effectiveness compared to falciparum.

The full results are presented in the systematic review and meta-analysis of all nine RCTs and thirteen observational studies to date by Messenger et al. (2023): [https://doi.org/10.1016/S2214-109X\(23\)00044-X](https://doi.org/10.1016/S2214-109X(23)00044-X)

## Key references and additional resources

1. WHO Guidelines for Malaria. World Health Organization (2022) Geneva: World Health Organization.
  2. UNHCR, Figures at a glance (2022) <https://www.unhcr.org/refugee-statistics/>
- Vector control interventions designed to control malaria in complex humanitarian emergencies and in response to natural disasters – WHO Global Malaria Programme (2021) <https://www.who.int/publications/i/item/9789240018754>
  - Vector Control in Humanitarian Emergencies Initiative (2020) – Roll Back Malaria Partnership to End Malaria
  - Malaria control in humanitarian emergencies: an inter-agency field handbook, 2nd ed. World Health Organization (2013).