Mosquito screens found to be cheap and effective in malaria prevention

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Example of ceiling netting

Trials of a screen-based malaria prevention programme in 500 homes in The Gambia, Africa, have led to a 50 per cent reduction in malaria transmission and anaemia in children. A child dies from malaria in Africa every 30 seconds and infection can lead to an increased risk of anaemia, which can also prove fatal. Yet to date, screens have often been ignored in favour of using drugs and insecticides.

The research, funded by the Medical Research Council and the Department for International Development was carried out by scientists

from Durham University, the London School of Hygiene and Tropical Medicine and MRC The Gambia. It tested two types of screens to protect children against malaria. The results are published in *The Lancet.*

The trial was carried out in the homes of 1,085 children living in or around the town of Farafenni. The researchers used two methods to prevent mosquitoes from entering the houses. In the first, screens were attached to windows and doors, and holes in the eaves were closed. The second method was to place a net ceiling inside the house. They then set traps for the insects to enable them to count how many mosquitoes that made it through the screens.

Both interventions were found to dramatically reduce malaria transmission and led to 50 per cent fewer anaemic children in the screened groups compared to those living in unscreened homes. House screening is particularly effective since 80% of malaria transmission occurs when people are bitten by the mosquito vector, *Anopheles gambiae*, indoors at night.

Exposure to mosquitoes indoors was assessed by fortnightly light trap collection and by measuring haemoglobin concentration (the molecule that carries oxygen in the bloodstream). The prevalence of anaemia and parasitaemia (a condition in which parasites are present in the blood) in children at the end of the malaria season were also measured.

Professor Steve Lindsay, MRC researcher and Chair in Disease Ecology at Durham University, said: “Our findings show that screening homes is a cheap, simple public health intervention that can save lives. Mosquito-proofing homes is one of the principal tools that has been associated with protection against malaria, yet it has been ignored during long term anti-malarial drug- and insecticide-driven campaigns.’

“For the first time in a generation malaria is declining in many parts of

tropical Africa and this has led to renewed calls for malaria elimination. Our findings show that screening homes is extremely effective and could play a major role in the elimination of malaria."

Screening of homes against malaria was first trialed in 1904 but this is the first modern trial to show the benefits of screening against malarial infection. Professor Lindsay was also part of the team in the 1980s that developed the bed netting system now widely used in African countries.

House screening works by reducing exposure to malaria-transmitting mosquitoes and has the added benefit of protecting everyone in the room.

The screening option can provide protection for a number of years which means that in the long term it may be a cheaper option than using nets; the average cost of full screening per person protected in the trial was US$9.98, compared with $8.69 for screened ceilings per person protected.

Feedback from the trial was positive, with nine out of ten people who participated wished to have, or to keep, full screening. The system is in its early days and there were some practical issues for example some participants had problems with rats making holes in the screened ceilings and mosquitoes still entering houses when the doors were left open. Comments from trial participants include: "We are ready to maintain the screening even without the MRC", "If it would cost selling a goat to repair our screening, we would do it as we know they are very useful" and "Screened ceilings are like a bednet for the whole house".

More information: Efficacy of two different house screening interventions against exposure to malaria and anaemia in children in The Gambia: a randomized controlled trial, Matthew J Kirby et al., Published in *The* Lancet.