



Bed nets may be key in tackling malaria

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3 July 2007. Protection using insecticide-treated bed nets may effectively combat malaria, research led by a Durham University expert has shown.

The research, published in the open access journal PLoS Medicine, suggests that protecting half of all older children and adults would also protect the wider community from malaria, which kills over one million people each year.

Current international guidelines recommend providing subsidised bed nets for young children and pregnant women in order to achieve over 80% coverage in these high-risk groups. However, this strategy appears to overlook the benefits of protecting the rest of the population.

Using recently-developed models of mosquito behaviour and mortality, researchers at the Ifakara Health Research and Development Centre in Tanzania, led by Dr Gerry Killeen, a Wellcome Trust researcher from Durham University's School of Biological and Biomedical Sciences, have shown that if use of the nets can be achieved by 35-65% of older children and adults, this would substantially enhance the protection of the more vulnerable groups, too.

Most human-to-mosquito transmission originates from adults and children over five years of age, who constitute the bulk of the population and are more attractive to mosquitoes.

"Insecticide-treated nets can protect not only the individuals and households that use them, but also members of the surrounding community," says Dr Killeen.

"This is because they kill adult mosquitoes directly or force them to undertake longer, more hazardous foraging expeditions in search of blood to feed on and aquatic habitats in which to breed."

Dr Christian Lengeler, a co-author from the Swiss Tropical Institute, agrees: "Nets have an altruistic value and this needs to be considered when planning programmes."

Malaria is caused by infection with a parasite carried in the salivary glands of the mosquito. The parasite is transmitted when a person is bitten by an infectious mosquito. After a brief sojourn in the liver, it grows and reproduces very rapidly in the blood, leading to symptoms including fever, anaemia and even death. The parasites can be retransmitted to another mosquito if it feeds on an infected person.

The researchers showed that use of the nets can greatly reduce the number of mosquitoes that survive repeated encounters with protected humans. Also, by preventing the mosquitoes feeding on humans, the nets can divert them to feed on other mammals which do not host the malaria parasite, reducing the number of humans bitten and of mosquitoes carrying the parasite.

Dr Killeen and colleagues acknowledge that the financial implications of promoting net use by all age groups across malaria-endemic Africa will be significant, in the order of the total investments in health care in Africa excluding HIV.

"Fully subsidising enough nets to achieve 50% coverage would cost at least \$1 billion, with ongoing recurrent costs of a similar magnitude," he says. "While we need to maximize subsidies for expanded target groups, we also need to ensure those receiving little or no subsidy can buy this essential public health commodity if they wish to."

Dr Killeen is keen to stress his support for the existing personal protection targets for vulnerable groups specified by the Millennium Development Goals and Roll Back Malaria: "The targets of the existing programmes are very worthy in themselves and we remain fully supportive of their continued prioritisation. We need to cover as many young children and pregnant women as possible without forgetting that even partial coverage of entire communities can provide greater and more equitable protection to everyone."

Co-author Patrick Kachur from the Centers for Disease Control and Prevention emphasizes that this is an achievable goal: "A number of African countries are making progress towards the existing targets and should be supported to attain this more ambitious goal by any means necessary. If the full potential of insecticide-treated nets, including community-wide suppression of malaria transmission, can be realised across Africa, we could prevent hundreds of thousands of deaths each year."

The research was welcomed by Dr Alex Mwita, programme manager for the National Malaria Control Programme in Tanzania.

"Malaria is still the commonest and most dangerous disease in tropical Africa today," says Dr Mwita. "In Tanzania it kills over 80,000 children annually and is responsible for 36% of maternal mortality which at 578 per 100,000 live births is one of the highest in the world. Economically, malaria contributes to individual, community and country poverty through lost labour days and in expenses incurred for treatment and"

d prevention.

"This paper is a welcome appeal to the world community to give a respite to the people of Africa, the majority of whom live in abject poverty. Free provision of at least three long lasting insecticide treated nets which last for five years to every household provides real chance for the people of Africa to loosen the tight grip of malaria shackles upon them."

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