

Latest Cochrane review looks at pyrethroid-PBO nets for preventing malaria in Africa

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Researchers from LSTM have confirmed that using pyrethroid-PBO treated nets to prevent malaria is more effective at killing mosquitoes in areas where there is a high level of resistance to pyrethroids.

The distribution of [nets](#) treated with [pyrethroid insecticides](#) has been very effective in reducing malaria transmission during the past two decades in Africa. However, there has been a rise in the number of mosquitoes developing [resistance](#) to pyrethroids, which is the only class of insecticides currently used to treat nets.

In a new *Cochrane Review*, an independent team of review authors led by Katherine Gleave and Natalie Lissenden at LSTM assessed the efficacy of insecticide-treated nets (ITNs) with added piperonyl butoxide (PBO). This chemical works by blocking an enzyme in the mosquito that prevents pyrethroids from working, to overcome the problem of insecticide resistance.

LSTM's Professor Hilary Ranson is senior author on the review. She said: "We have to find a way to maintain the efficacy of ITNs, which have been a cornerstone of vector control. While these nets are more expensive, the evidence shows that in areas where pyrethroid resistance is high, adding PBO to nets killed more [mosquitoes](#), stopping them from feeding on people and probably reducing the levels of disease."

The review author team looked at results from 15 included studies that compared pyrethroid-PBO nets to standard pyrethroid nets, with one study measuring the impact on malaria infection in humans and the others looking at the impact on the mosquito population. The results show that while there is little or no difference in areas where resistance to pyrethroid is low or moderate, the nets had an impact where resistance was high. One trial carried out in an area at high levels of resistance also showed an important reduction in the number of people developing malaria illness. As ITNs are washed throughout their use, the review team also looked at the impact of washing these pyrethroid-PBO nets. While there was still a decrease in mosquito blood feeding success, the effect on mosquito mortality was not so marked when nets were washed multiple times, which would be important when considering community-

level protection.

Professor Ranson continued: "Researchers are working hard to reduce the impact of insecticide resistance, but our review is the first to look at 'next generation nets'. While there is more research to be undertaken, we think that the results help show the value that these nets represent and supports the WHO's recommendations for pyrethroid-PBO nets." Jan Kolaczinski, Coordinator of Entomology and Vector Control at WHO's Global Malaria Programme, supports this statement noting that "systematic reviews, such as the one on pyrethroid-PBO nets, provide a crucial underpinning of evidence-based WHO recommendations and guidelines. We greatly appreciate the important contribution to WHO's work made by the Cochrane Infectious Diseases Group in this area."

This *Cochrane Review* was co-ordinated by the Cochrane Infectious Diseases Group (CIDG), which has its editorial base at LSTM. The CIDG has been in operation since 1994 and consists of over 600 authors from 52 countries and is supported by UK aid from the UK Government for the benefit of low- and [middle-income countries](#) (project number 300342-104).

More information: Katherine Gleave et al, Piperonyl butoxide (PBO) combined with pyrethroids in insecticide-treated nets to prevent malaria in Africa, *Cochrane Database of Systematic Reviews* (2018). [DOI: 10.1002/14651858.CD012776.pub2](#)

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