

New study: Cheap, common drug could dramatically reduce malaria transmission in Africa

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A cheap, common heartworm medication that is already being used to fight other parasites in Africa could also dramatically interrupt transmission of malaria, potentially providing an inexpensive tool to fight a disease that kills almost 800,000 people each year, according to a new study published today in the July edition of the *American Journal of Tropical Medicine and Hygiene*.

The study by scientists from Senegal and Colorado State University found that transmission of malaria parasites by [mosquitoes](#) fell substantially among people living in several Senegalese villages over two weeks after they took the drug ivermectin, which was administered as part of a campaign to fight the parasitic [roundworm](#) that causes [onchocerciasis](#), or river blindness. The drug appeared to kill malaria-carrying mosquitoes that fed on the blood of the villagers.

"There is no silver bullet for [malaria control](#)," said Brian D. Foy, PhD, a vector biologist at Colorado State University and the article's senior author. "But this could be an important tool that would also contribute to the fight against other neglected diseases. It's clearly a multipurpose drug." Foy said he became interested in studying the potential of ivermectin to control malaria after investigating different ways, including vaccines, to give [human blood](#) the ability to kill mosquitoes.

Larger, longer studies will be needed to show whether more frequent,

such as monthly, doses of ivermectin during the malaria season in different parts of Africa have an important impact on the disease. But the researchers note that their study suggests it might be possible to use the drug to reduce [malaria transmission](#) during epidemics or in well-defined transmission seasons. Their work was funded with grants from The National Institutes of Health (NIH), Colorado State University, and with a Grand Challenges Explorations grant from the Bill & Melinda Gates Foundation, which rewards creative thinking to scientifically address pressing global health problems.

"This study offers good news on several fronts, not the least of which is the potential to disrupt the transmission of malaria and save needless suffering and death," said Peter J. Hotez, MD, PhD, President, American Society of Tropical Medicine and Hygiene. "We need more creative science like this that has simple yet powerful results in our battle against neglected diseases of poverty."

According to the World Health Organization, malaria kills 781,000 people each year, most of them very young children in Africa. New approaches to combating the disease are in constant demand, particularly in the area of transmission control. Current methods of reducing disease transmission rely mainly on sleeping under insecticide-treated bed nets and spraying indoors with mosquito poisons, which are very effective but are threatened by the risk of mosquitoes developing resistance to the most commonly used insecticides. Also, these measures don't deter malaria transmission by mosquitoes that bite during the day or outside the home.

"If using ivermectin works to reduce transmission, people will have a drug circulating in their blood that could kill mosquitoes anywhere and at any time of day," said Foy.

To assess whether ivermectin might be a potential malaria control agent,

researchers collected mosquitoes from villages where people were taking the drug and compared them to collections gathered at the same time from villages where people were not taking the drug. In locations where people were taking ivermectin, two weeks after the drug was administered there was a 79 percent decline in mosquitoes carrying *Plasmodium falciparum*—the world's most deadly [malaria parasite](#). In villages where ivermectin was not in use, malaria-bearing mosquitoes increased by 246 percent over the same period.

Since 1987, the pharmaceutical company Merck (not involved in this study) has donated million of doses of ivermectin, under the trade name Mectizan, to treat river blindness, a disease that affects about 18 million people. The disease is spread by black flies that transmit worms that invade the skin and eyes; 270,000 of those suffering the disease have become blind as a result. "In terms of river blindness, this drug has transformed lives," said Hotez. "To add malaria to its already impressive return on investment would be an incredible development."

When a drug is used intensively, you always run the risk of "creating" drug-resistant parasites, Foy said. But intensive ivermectin might not lead to resistant mosquitoes, because unlike drugs that are sprayed on large areas, ivermectin would only target the tiny percentage of mosquitoes that manage to bite people.

From Heartworm for Pets to Head Lice for School Children: The Many Uses of Ivermectin

Ivermectin is also effective against a variety of parasitic worms including those that cause elephantiasis, a disease caused by lymphatic-dwelling parasitic worms that are often transmitted by the same mosquitoes which transmit malaria. In addition, many pet owners and children have benefited from it. Hundreds of millions of doses have

been administered to prevent heartworm and intestinal worms in dogs, horses, and livestock animals. The drug is also used to kill insects that commonly affect children, such as body and head lice or the mites that cause scabies.

Merck developed ivermectin from the fermentation products of bacteria discovered in soil next to a Japanese golf course in 1975. It was licensed as a veterinary drug in 1981. It works by paralyzing insect and nematode muscles, which slows their ability to move and feed, causing them to weaken and die.

In many areas of Africa the drug is currently given once or twice a year for free to combat [river blindness](#). Ivermectin is also used one time per year in large scale public health programs throughout sub-Saharan Africa aimed at eliminating elephantiasis. To fight malaria, it would have to be given more frequently, probably at least monthly, during the seasons in which mosquitoes transmit malaria, Foy believes. Scientists note that it would probably work best in areas that have a distinct malaria season, rather than those where [malaria](#) is a threat year-round.

[Ivermectin](#) is associated with only a few major side effects. When it kills off a certain parasitic worm in the body, it can trigger severe allergic reactions in a small percentage of these *Loa loa*-infected patients. No major adverse events have been reported in patients who receive frequent doses of the [drug](#), such as those who take it to treat severe scabies infections.

Provided by American Society of Tropical Medicine and Hygiene

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