

Control malaria by segmenting sleeping arrangements, study says

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Better malaria control might come from segregating household sleeping arrangements, according to a new study co-authored by a University of Guelph professor.

The researchers found [malaria eradication](#) related more to household size than to a country's wealth or temperature. Guelph economics professor Ross McKittrick and two Finnish professors, Larry and Lena Huldén, found that when average household size drops below four persons, malaria extermination is much more likely.

Malaria is transmitted by infected mosquitoes. The research team examined data on malaria insect vectors, as well as demographic, sociological and environmental factors for 232 countries. Malaria is still prevalent in 106 countries.

"When we controlled for all the variables, the factor that had the most explanatory power on [malaria control](#) was household size," said McKittrick.

"Malaria-bearing mosquitoes mainly feed at night, and tend to return to the same location for blood meals. The more people who sleep in one area, the greater the likelihood of an infected mosquito spreading the parasite to a new, uninfected victim."

Malaria infects [red blood cells](#) and can cause anemia, nausea, fever and, in some cases, death. Each year, 225 million people are infected and 800,000 die, mostly children.

"It is a common misconception that malaria is a tropical disease, and with 90 per cent of malaria deaths taking place in Africa, it is easy to see why people believe this," said McKittrick.

"But historically, malaria has occurred in all climate zones including the Arctic, and was endemic in North America and Europe a hundred years ago. In many cases, the disease disappeared even in countries that made no efforts to fight it, while

others that tried to eradicate it failed. We found declining average household size key to explaining this pattern. "

The researchers looked at factors such as gross domestic product per capita, urbanization and slums, latitude, mean temperature, forest coverage, national DDT use, household size and even religion.

Countries with a significant Muslim population generally had large households but did a better job of eradicating malaria, with the researchers speculating it may be because of their segregated sleeping arrangements. Males and females generally sleep in separate areas.

As household size continues to decline, said McKittrick, malaria should gradually disappear. But countries need not wait for that to happen.

In Vanuatu – with an average 5.6 people per household – providing bed nets and effective drug distribution and surveillance since 1996 has effectively wiped out malaria.

"The key factor is segmenting sleeping quarters and greater use of bed nets in those countries where [malaria](#) is still prevalent," he said.

"Individual [bed nets](#) can emulate a household with several bedrooms, making it difficult for the mosquitoes to transmit the parasite to other household members."

More information: The study, "Average Household Size and the Eradication of Malaria," was published in the October issue of the *Journal of the Royal Statistical Society Series A*. onlinelibrary.wiley.com/doi/10.../rssa.12036/abstract

Provided by University of Guelph

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