

Model identifies targets for eradication of malaria

Scientists at the Instituto Gulbenkian de Ciência (IGC), in Portugal, have shown that Malaria eradication in Africa is sustainable, and any re-emergence of malaria in industrialized nations is highly unlikely. Working with colleagues in Kenya, the IGC researchers created a mathematical model of malaria transmission throughout sub-Saharan Africa, published in this week's *PLoS ONE*.

After several exposures to malaria, humans develop clinical immunity to the disease. In this state, they no longer have symptoms of malaria, but are nevertheless capable of transmitting the disease to others. In regions where malaria is endemic, many people have developed clinical immunity, and this has a large effect on how the disease spreads, that is, on its epidemiology.

Gabriela Gomes and her team at the Theoretical Epidemiology group developed a mathematical model which, for the first time, estimates the significance of asymptomatic infections in malaria transmission when looking at the distribution of the disease in different populations. They applied their model to data from hospital admissions of children with malaria, provided by researchers working in eight different regions in sub-Saharan Africa, where malaria is endemic.

The model shows that, contrary to what was previously thought, in regions of moderate transmission there is a threshold for malaria eradication, separating endemic and malaria-free states. Any intervention success depends critically on reducing occurrence of disease below this threshold, which the model predicts to be possible in areas of moderate transmission, which is the case for most of Africa.

Industrialised nations sit well below this threshold, in the malaria-free state, since the number of clinically immune people is extremely low, making any re-emergence of malaria in these countries highly improbable.

Ricardo Águas, first author of the paper, says, "This is a very powerful model, since it should allow us to determine quantifiable targets for reducing transmission of malaria (by providing mosquito nets, for example) and for fighting the disease (through mass- handing out of anti-malaria drugs), for a specific region."

Gabriela Gomes added, "Huge efforts are being put into fighting malaria in developing countries. Our model presents a very optimistic outlook for eradicating the disease in areas where it is moderately endemic, contrary to current thinking. We are now looking for research partners who may provide us with more clinical data, from more regions in Africa, which we could use to strengthen our model, and feed into effective eradication programmes."

Citation: Águas R, White LJ, Snow RW, Gomes MGM (2008) Prospects for Malaria Eradication in Sub-Saharan Africa. *PLoS ONE* 3(3): e1767. doi:10.1371/journal.pone.0001767 (<http://www.plosone.org/doi/pone.0001767>)

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