

## Estimating the number of malaria cases in Africa and their age distribution

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In most of sub-Saharan Africa, estimates of the burden of disease due to malaria are unreliable as many people with fever do not reach public health facilities, and there are also imperfect health reporting systems in many of the countries with the largest burden. However, many general population studies exist recording the proportion of people with detectable malaria parasites. Researchers at the Malaria Atlas Project (MAP) have collated these datasets and fitted geo-spatial models to them, providing an estimate of parasite prevalence at any location along with the uncertainty in that estimate (1).

We previously formulated a malaria transmission model that captures the gradual acquisition of partial immunity in response to repeated infections (2). The model includes the main interventions used against malaria transmission. In the present study, we have fitted the model to datasets from across Africa which recorded the number of episodes of clinical malaria in different age groups, and to data on parasite prevalence and the number of infectious mosquito bites that people receive (3). We then combined this model with the MAP estimates of parasite prevalence so that we can estimate the incidence of clinical malaria in any age group, and at any location in Africa.

We estimate that in 2010 there were 252 million cases of clinical malaria in sub-Saharan Africa. Even in cohort studies where anyone with malaria symptoms is encouraged to go to a health facility, we estimate that passive case detection (i.e. counting cases at the health facility) only detects one third of the cases that daily active case

detection would pick up. Passive case detection on a larger scale may detect an even lower proportion.

The age pattern of disease varies greatly with transmission intensity: cases are concentrated in the first few years of life at high transmission, whereas elsewhere they occur throughout childhood, and also in adults at very low transmission. Transmission has been falling in many places in recent years, mainly due to insecticide-treated net distribution and artemisinin combination therapies, which are more effective than previous drugs. Some interventions such as seasonal chemoprophylaxis are targeted at young children – these strategies may need to be modified to take account of an increasing proportion of cases occurring in older age groups.

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### References:

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