

# Prevalence and risk factors of malaria among children in southern highland Rwanda

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## Abstract

### Background

Increased control has produced remarkable reductions of malaria in some parts of sub-Saharan Africa, including Rwanda. In the southern highlands, near the district capital of Butare (altitude, 1,768 m), a combined community-and facility-based survey on *Plasmodium* infection was conducted early in 2010.

### Methods

A total of 749 children below five years of age were examined including 545 randomly selected from 24 villages, 103 attending the health centre in charge, and 101 at the referral district hospital. Clinical, parasitological, haematological, and socio-economic data were collected.

## Results

*Plasmodium falciparum* infection (mean multiplicity, 2.08) was identified by microscopy and PCR in 11.7% and 16.7%, respectively; 5.5% of the children had malaria. PCR-based *P. falciparum* prevalence ranged between 0 and 38.5% in the villages, and was 21.4% in the health centre, and 14.9% in the hospital. Independent predictors of infection included increasing age, low mid-upper arm circumference, absence of several household assets, reported recent intake of artemether-lumefantrine, and chloroquine in plasma, measured by ELISA. Self-reported bed net use (58%) reduced infection only in univariate analysis. In the communities, most infections were seemingly asymptomatic but anaemia was observed in 82% and 28% of children with and without parasitaemia, respectively, the effect increasing with parasite density, and significant also for submicroscopic infections.

## Conclusions

*Plasmodium falciparum* infection in the highlands surrounding Butare, Rwanda, is seen in one out of six children under five years of age. The abundance of seemingly asymptomatic infections in the community forms a reservoir for transmission in this epidemic-prone area. Risk factors suggestive of low socio-economic status and insufficient effectiveness of self-reported bed net use refer to areas of improvable intervention.