

## Publication

## Bayesian spatio-temporal modeling of mortality in relation to malaria incidence in Western Kenya

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The effect of malaria exposure on mortality using health facility incidence data as a measure of transmission has not been well investigated. Health and demographic surveillance systems (HDSS) routinely capture data on mortality, interventions and other household related indicators, offering a unique platform for estimating and monitoring the incidence-mortality relationship in space and time.; Mortality data from the HDSS located in Western Kenya collected from 2007 to 2012 and linked to health facility incidence data were analysed using Bayesian spatio-temporal survival models to investigate the relation between mortality (all-cause/malaria-specific) and malaria incidence across all age groups. The analysis adjusted for insecticide-treated net (ITN) ownership, socio-economic status (SES), distance to health facilities and altitude. The estimates obtained were used to quantify excess mortality due to malaria exposure.; Our models identified a strong positive relationship between slide positivity rate (SPR) and all-cause mortality in young children 1-4 years (HR = 4.29; 95% CI: 2.78-13.29) and all ages combined (HR = 1.55; 1.04-2.80). SPR had a strong positive association with malaria-specific mortality in young children (HR = 9.48; 5.11-37.94), however, in older children (5-14 years), it was associated with a reduction in malaria specific mortality (HR = 0.02; 0.003-0.33).; SPR as a measure of transmission captures well the association between malaria transmission intensity and all-cause/malaria mortality. This offers a quick and efficient way to monitor malaria burden. Excess mortality estimates indicate that small changes in malaria incidence substantially reduce overall and malaria specific mortality.

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