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A novel approach for measuring the burden of uncomplicated Plasmodium falciparum malaria : application to data from Zambia

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Measurement of malaria burden is fraught with complexity, due to the natural history of the disease, delays in seeking treatment or failure of case management. Attempts to establish an appropriate case definition for a malaria episode has often resulted in ambiguities and challenges because of poor information about treatment seeking, patterns of infection, recurrence of fever and asymptomatic infection. While the primary reason for treating malaria is to reduce disease burden, the effects of treatment are generally ignored in estimates of the burden of malaria morbidity, which are usually presented in terms of numbers of clinical cases or episodes, with the main data sources being reports from health facilities and parasite prevalence surveys. The use of burden estimates that do not consider effects of treatment, leads to under-estimation of the impact of improvements in case management. Official estimates of burden very likely massively underestimate the impact of the roll-out of ACT as first-line therapy across Africa. This paper proposes a novel approach for estimating burden of disease based on the point prevalence of malaria attributable disease, or equivalently, the days with malaria fever in unit time. The technique makes use of data available from standard community surveys, analyses of fever patterns in malaria therapy patients, and data on recall bias. Application of this approach to data from Zambia for 2009-2010 gave an estimate of 2.6 (95% credible interval: 1.5-3.7) malaria attributable fever days per child-year. The estimates of recall bias, and of the numbers of days with illness contributing to single illness recalls, could be applied more generally. To obtain valid estimates of the overall malaria burden using these methods, there remains a need for surveys to include the whole range of ages of hosts in the population and for data on seasonality patterns in confirmed case series.

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