The long-term income effects of childhood malaria cases

We expect that reading the full report will be helpful for:

- Those who want to dive deeply into the evidence base for cost-effectiveness estimates of interventions aimed at reducing malaria cases
- Those who are interested in quantitative estimates of how getting malaria at an early age affects the future income of a child

Context

In July 2023, GiveWell commissioned Rethink Priorities to conduct research on the long term income effects of childhood malaria ("developmental effects"). GiveWell had based its estimate for the income effects from childhood cases of malaria on two studies: Cutler et al. (2010) and Bleakley (2010). They used the results of these studies to calculate that each malaria case in childhood reduces future income by 2.3%. They then adjusted this estimate downwards to account for concerns about how accurately these studies estimate the long-run income effects of childhood malaria cases (GiveWell, 2023, "Key uncertainties and future research"). At the time of our research, GiveWell's assumption after these adjustments was that income in adulthood decreases by 1% per childhood malaria case. It asked us to update its previous literature review to determine whether any further evidence should be considered and whether the assumption should be adjusted.

Research process

- A literature search of about four hours to check whether a list of studies previously found by GiveWell was complete
- A review of eight studies:
- A detailed review of two studies that GiveWell uses to calculate long term income effects from childhood malaria
- A detailed review of four other studies on developmental effects from malaria
- A shallow review of two other studies (one about malaria, and one about childhood vaccinations)
- A sense check of the income effect GiveWell assumes per childhood case of malaria. We made a simple model to calculate the income effect per child that gets severe malaria, under the assumption that the income effect is fully caused by children that get severe malaria.

Final report and key takeaways

All of the studies we reviewed were considerably limited by study design and other issues, including both studies used by GiveWell to calculate developmental effects (Cutler et al., 2010 and Bleakley, 2010), making us skeptical about the accuracy of the effect sizes found. In particular, both Cutler et al. and Bleakley are non-randomized and use very imprecise data for malaria prevalence, and we also found issues with the ways the studies measured income. GiveWell was aware that there were some issues, and asked us to research whether

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there was better evidence available (GiveWell, 2023, “Long-run income effect from eradicating malaria in childhood”).

Of six additional studies that we reviewed, we think Mora-García (2018) used somewhat more accurate data on malaria prevalence than Cutler et al. and Bleakley. However, our confidence in their estimates was reduced by other methodological issues. Shih and Lin (2018) initially looked promising, but after a more detailed assessment, we advised against using their results because they found very different effects for two separate definitions of income, and we could not find a reasonable explanation for this.

All in all, we recommended GiveWell include the results from the study by Mora-García in its calculations. This incorporation would revise the estimated income reduction per malaria case from 2.2% to 2.5%. This corresponds to a change from 1% to 1.1% after applying GiveWell’s adjustments for concerns about the accuracy of the study results. GiveWell did not update its pre-adjustment effect size, but our methodological critiques of the various supporting studies re-affirmed its impression that the evidence is medium-low quality, and that it's appropriate to put substantial weight on its priors. After the resulting changes, as part of a wider range of discussions, GiveWell has reduced its (post-adjustment) estimate from 1% to a 0.6% income reduction per childhood malaria case (GiveWell, 2023, “Increase in annual income per child malaria case averted”).

Additionally, we developed a simple model to estimate the impact on income for each child who suffers from severe malaria, under the assumption that this impact is entirely due to severe malaria in children. The model can be found here. This model serves as a method to check if the average income effect used by GiveWell is reasonable. Using this model, we conclude that to achieve a 1% average increase in income per malaria case averted, there needs to be a 37% increase in income for each averted case of severe malaria. It's important to note that it relies on uncertain assumptions about the prevalence of severe malaria, which we could not find any data for. We believe this income effect sounds reasonable, but we would have more confidence in this conclusion if we had consulted with experts on the consequences of malaria.

GiveWell

We thank GiveWell for commissioning and funding this research project.
The views expressed in the report are not necessarily endorsed by GiveWell.