

# Human hookworm infection exerts high health and economic burden

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Hookworm affects approximately 500 million people worldwide, yet its global economic and health impact is not well understood. A study published in *PLOS Neglected Tropical Diseases* suggests that the health and economic burden of hookworm infection is estimated to exceed those of a number of diseases receiving greater attention and investment. Sarah Bartsch from John Hopkins Bloomberg School of Public Health, Peter Hotez from Baylor College of Medicine, and colleagues found that human hookworm infection confers a substantial global health and economic burden through loss of productivity, and years of life living with disability due to infection outcomes.

While hookworm infection rarely results in death, it can lead to iron-deficiency anemia and malnutrition. Chronic [health](#) problems resulting from these conditions include lethargy, impaired physical and cognitive development, and adverse pregnancy outcomes. "At first glance, it may be easy to underestimate the impact of hookworm since it does not tend to result in death," Bartsch explained. "However, the blood loss and potential disturbances to growth and cognition caused by hookworm impairs peoples' ability to contribute to society and these productivity losses add up over time."

Information on the burden of hookworm enables decision makers to invest adequately in hookworm control. The authors of the present study therefore developed a computational simulation model to estimate the economic and health burden of hookworm infection in 2016. The model used data on hookworm prevalence and intensity of infection to predict

health outcomes, enabling estimation of disability-adjusted life years (DALYs) associated with hookworm infection. Data on GNI per capita and minimum wage also enabled estimation of resultant productivity losses.

Using 2010 disability weights, global hookworm infection was estimated to result in over 4 million DALYs. Depending on the calculation method used and the assumed probability of anemia, the model estimated that hookworm infection costs between \$7.5 billion and \$138.9 billion in productivity losses annually worldwide. China alone was estimated to suffer up to \$6.7 billion in productivity losses as a result of hookworm infection; Nigeria harbors the largest hookworm problem in Africa, with 3.7 million infections costing up to \$283 million. While these estimates rely on data which may be of variable quality, the authors suggest that they are most likely to be conservative, as many estimates did not include the additional impact of long-term cognitive impairment. The true costs of hookworm infection may therefore exceed those of diseases receiving comparatively more attention, including rotavirus and dengue fever.

According to the researchers, this study shows how "the cumulative economic impact of a subacute chronic disease like hookworm can eventually exceed the impact of diseases that have higher mortality and more salient health effects." Quantifying the economic impacts of hookworm infection could help organizations make informed investments in intervention and control measures. "Knowing the [economic burden](#) of hookworm is important," explains Bruce Y. Lee, MD, MBA, senior author and associate professor of international health at the Johns Hopkins Bloomberg School of Public Health. "Policy makers, funders, and companies often use costs and financial measures to determine where to invest and allocate their resources and efforts." Such investments, say the authors, can "not only improve the health of those with hookworm, but support the economic growth of affected

regions as they become more economically productive."

**More information:** *PLOS Neglected Tropical Diseases*, [DOI: 10.1371/journal.pntd.0004922](https://doi.org/10.1371/journal.pntd.0004922)

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