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POLICY BRIEF · TANZANIA

Malaria Eradication Boosts Learning Outcomes in Tanzania

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Key messages

- **Malaria eradication significantly improves education:** Tanzania's 2004 national malaria eradication program increased test scores by **5.8%** and added **2.4 years of schooling** for children born post-intervention.
- **Greater gains in arts/business subjects:** Performance scores rose by **7.4%** in arts/business subjects vs. **5.8%** in science subjects (STEM), suggesting malaria reduction disproportionately benefits language/memory-based learning.
- **Early exposure matters:** School-aged children during the intervention gained **0.58 additional years** of education, but those born afterward benefited most, highlighting the importance of early-life health.
- **Policy synergy:** Integrated health and education interventions can amplify human capital development, especially in high-malaria regions.

Malaria and Human Capital Development

The interdependence between health and education is increasingly acknowledged as critical to human capital development. Despite significant education reforms—most notably the elimination of school fees for primary and secondary education—Tanzania continues to face persistently low learning outcomes. One likely reason could be the overlooked role of disease burden, particularly malaria, in limiting the effectiveness of educational investments. Notably, poor child health has been shown to reduce school attendance, cognitive function, and educational achievement.

Malaria, especially when contracted in early childhood, has long-term adverse effects on cognitive development, including memory, attention, and language skills. Studies from Uganda and elsewhere highlight that severe malaria episodes significantly lower educational outcomes, while even uncomplicated malaria indirectly affects schooling through increased absenteeism. Although malaria control has shown some success in improving educational attainment in countries like Uganda, Mozambique, and Taiwan, results across different contexts remain inconsistent, suggesting contextual factors such as school quality and labor markets also shape outcomes.

This brief evaluates the unintended educational benefits of Tanzania's 2004 Malaria Eradication Program, using nationally representative data to demonstrate how targeted health interventions can complement education policy. The findings underscore the need for cross-sectoral approaches that address malaria as a structural barrier to learning and long-term human capital development.

The Study: Methodology

This study assesses the educational impact of Tanzania's 2004 malaria eradication program using a Difference-in-Differences (DiD) approach. It leverages administrative data from the National Examinations Council of Tanzania (NECTA, 2003–2010) and the Demographic and Health Surveys (DHS, 2004 and 2022) to compare academic outcomes in high-malaria (low-altitude) and low-malaria (high-altitude) regions before and after the intervention. In addition to academic performance, the study evaluates educational attainment by distinguishing between two cohorts: children who were of preschool or primary school age during the intervention, and those born after 2004 who experienced reduced malaria exposure in utero and throughout early childhood.

The main outcome measure is academic performance, calculated by summing weighted grades across the seven best subjects (maximum score = 35; minimum = 7). Years of schooling is used as a secondary outcome. This methodology allows for a robust assessment of whether reduced

malaria exposure—due to the intervention—translated into improved educational attainment and performance across regions with different disease burdens.

Key Findings

Academic Performance

The malaria eradication program in Tanzania led to significant improvements in lower secondary academic performance, with an overall gain of 5.8% (≈ 0.14 Standard Deviations (SD)). Female students saw slightly greater benefits 6.6% (≈ 0.16 SD) than male students 5.4% (≈ 0.13 SD), suggesting a modest gender differential in program impact. Subject-wise analysis revealed that students improved more in arts and business subjects (7.4% ≈ 0.18 SD) than in STEM subjects (5.8% ≈ 0.14 SD), indicating that reduced malaria exposure may particularly enhance learning in areas more dependent on language and memory skills.

Educational Attainment

The results shows that Tanzania's malaria eradication program significantly increased educational attainment, with stronger effects observed among children with lower exposure to malaria. Individuals born after the intervention in 2004 gained approximately 2.4 additional years of education, while those who were preschool or primary school (school-aged) at the time—thus exposed to malaria during critical developmental periods—gained 0.58 additional years (Figure 12). These findings underscore the importance of early-life health interventions, as malaria exposure in utero and early childhood appears to have lasting adverse effects on educational trajectories due to compromised immunity and repeated infections during key learning phases.

Policy Recommendations

To improve educational outcomes in malaria-endemic regions, policy should prioritize integrated health-education strategies. Malaria prevention—through widespread use of bed nets, prenatal care, and targeted spraying—should be embedded within school-improvement plans, especially in areas with high disease burden. Interventions must align with critical developmental periods, particularly from pregnancy to age five, when health shocks have the greatest impact on cognitive development. Reviving and scaling the School Net Programme nationwide, with consistent annual distribution of long-lasting insecticidal nets (LLINs) to students, is a key step toward achieving this goal.

To ensure sustainable impact, resource allocation should be coordinated across sectors. Education-specific interventions, such as teacher training and curriculum support, should be paired with health campaigns to reinforce classroom effectiveness. Joint funding mechanisms between the Ministries of Health and Education can facilitate the implementation of integrated programs, leveraging the high returns such investments yield in both learning and health outcomes.

Conclusion

Reducing malaria exposure delivers clear, measurable improvements in both academic performance and years of schooling. Tanzania's success demonstrates that malaria control is not just a health policy—it's an education strategy. By aligning health and education strategies—particularly sustaining school-based malaria controls—Tanzania can accelerate human capital development, enhance equity, and advance toward its Vision 2025 goals. Investing in health is investing in learning.

About this brief

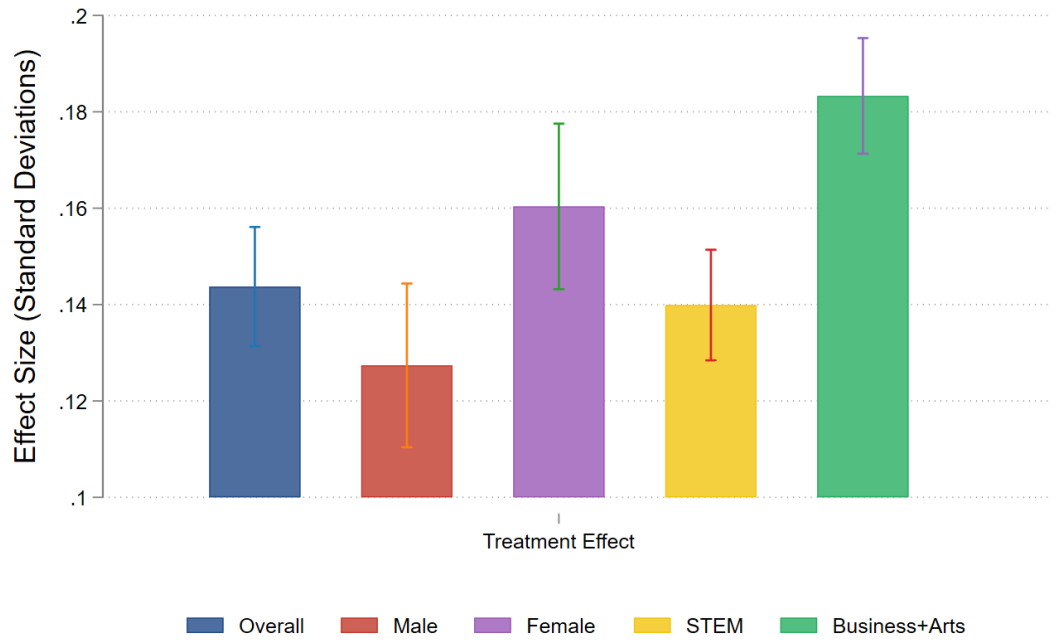
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Figure 1: The Impact of Malaria Eradication Intervention Program on Performance Score



Note: Error bars represent 95% confidence intervals.

Figure 2: The Impact of Malaria Eradication Intervention Program on Years of Schooling

