



Bayesian Hierarchical Model for Evaluating Cost-Effectiveness of Community Health Centres in Rwanda

Kabatuka Mukasoga¹

¹ Department of Pediatrics, African Leadership University (ALU), Kigali

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Correspondence: kmukasoga@aol.com

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Author notes

Kabatuka Mukasoga is affiliated with Department of Pediatrics, African Leadership University (ALU), Kigali and focuses on Medicine research in Africa.

Abstract

Community health centers in Rwanda have been established to improve access to healthcare services, particularly in underserved rural areas. Despite their establishment, evaluations of these facilities' cost-effectiveness are limited by methodological challenges. The study employs a Bayesian hierarchical regression model to analyse data from community health centers across Rwanda. This approach accounts for variability at multiple levels (individual patient outcomes, clinic-level resources, regional differences) in assessing cost-effectiveness metrics such as the incremental cost-effectiveness ratio (ICER). Bayesian estimates indicate that the ICER for preventive healthcare services provided by community health centers is 150 per QALY gained, with a 95% credible interval of (130, \$170), suggesting moderate cost-effectiveness relative to standard care. The Bayesian hierarchical model provides robust estimates of cost-effectiveness for community health centers in Rwanda, offering insights into resource allocation and policy recommendations. Based on the findings, policymakers are encouraged to allocate additional resources towards preventive healthcare services at community health centers to maximise benefits while managing costs effectively.

Keywords: *Geographic, Sub-Saharan, Hierarchical, Bayesian, Evaluation, Quantitative, Intervention*

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