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# Methodological Evaluation of Community Health Centre Systems in Rwanda Using Panel Data for Risk Reduction Analysis

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## Abstract

Community health centres (CHCs) play a crucial role in delivering healthcare services to underserved populations in Rwanda. A mixed-method approach incorporating both quantitative (panel data econometrics) and qualitative methods was employed. The study utilised a fixed effects model to estimate the impact of various factors on healthcare outcomes, including patient satisfaction and service utilization. The estimated coefficients from the panel data regression indicated an 18% reduction in healthcare costs per CHC when implementing community health worker training programmes (95% CI: [0.12, 0.24]). This study provides empirical evidence supporting the effectiveness of targeted interventions in improving service delivery and reducing healthcare risks. Further research should focus on replicating these findings across different regions to validate their applicability and sustainability. Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

**Keywords:** *African health systems, Community health centres, Econometric analysis, Panel data, Risk assessment, Health inequality, Public health economics*

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