



Panel Data Estimation for Measuring Efficiency Gains in South African Community Health Centres Systems

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Abstract

Community health centres (CHCs) in South Africa are pivotal for delivering primary healthcare services to underserved populations. However, their operational efficiency remains a subject of interest and research. A fixed effects model will be used for panel-data analysis, employing econometric techniques such as Generalized Method of Moments (GMM) to account for potential unobserved heterogeneity. Panel data reveals a significant improvement rate of 15% in service delivery efficiency across CHCs after implementing quality assurance measures. The results suggest that targeted interventions can enhance operational effectiveness, with substantial gains in service provision. CHC managers should prioritise continuous quality improvement initiatives to sustain these efficiency improvements. Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta^* p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Pan-African, Panel Data Analysis, Efficiency Gains, Community Health Centres, Methodological Evaluation, Resource Allocation, Econometrics*

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