Methodological Evaluation of Community Health Centre Systems in South Africa Using Panel Data for Efficiency Gains Analysis

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Abstract

Community health centres (CHCs) in South Africa play a crucial role in primary healthcare delivery. However, their operational efficiency varies significantly across different regions. A stochastic frontier model was employed to assess efficiency, with robust standard errors accounting for uncertainty in estimates. Data from 20 CHCs over five years were analysed. The analysis revealed that CHC operational efficiency varied by district, with some districts showing significant room for improvement (e.g., 15% reduction in inefficiency). Efforts to enhance resource allocation and training programmes are recommended based on the identified inefficiencies. Investment in technology upgrades and targeted staff development initiatives should be prioritised. Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta}\ p\ X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, health economics, econometrics, panel data analysis, efficiency measurement, service delivery, geographic information systems*

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