



Methodological Evaluation of Community Health Centre Systems in Rwanda Using Panel Data for System Reliability Measurement

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Abstract

Community health centers in Rwanda have been established to improve access to healthcare services for underserved populations. Panel data from multiple years were used to estimate system reliability using a mixed-effects logistic regression model. Robust standard errors were applied to account for potential heterogeneity in healthcare service delivery across centers. The proportion of completed patient consultations within the expected time frame was found to be 82%, indicating room for improvement in operational efficiency. The mixed-effects logistic regression model successfully quantified system reliability, providing insights into areas needing enhancement. Enhanced training programmes and standardised protocols should be implemented to improve service delivery. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Pan-African, Community Health, Panel Data, System Reliability, Service Delivery, Quantitative Methods, Geographic Information Systems*

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