



Methodological Evaluation of Community Health Centre Systems in Rwanda Using Time-Series Forecasting Models for Efficiency Analysis

Kizito Bizimana¹

¹ Department of Clinical Research, Rwanda Environment Management Authority (REMA)

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Correspondence: kbizimana@yahoo.com

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Author notes

Kizito Bizimana is affiliated with Department of Clinical Research, Rwanda Environment Management Authority (REMA) and focuses on Medicine research in Africa.

Abstract

Community health centers in Rwanda have been pivotal in addressing healthcare needs across diverse geographical regions. However, their operational efficiency has not always met expected standards. The study employed a combination of descriptive statistics and time-series analysis with autoregressive integrated moving average (ARIMA) model predictions, incorporating data from to . Robust standard errors were used to account for the uncertainty in forecasting models. A notable trend indicated that while some centers showed steady growth, others experienced fluctuations and challenges in service delivery over the analysed period. The ARIMA model forecasts highlighted significant variability in operational efficiency across different health centers. These findings underscore the need for targeted interventions to enhance overall system performance. Strategic investments should be directed towards improving infrastructure, training staff, and implementing sustainable funding mechanisms to stabilise and improve service delivery. Community Health Centers, Time-Series Forecasting, Efficiency Analysis, ARIMA Model, Rwanda Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, community health centers, econometrics, forecasting models, time-series analysis, healthcare efficiency, analytical methods*

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