



# Time-Series Forecasting Model for Evaluating Cost-Effectiveness in Nigerian Community Health Centres Systems: A Methodological Appraisal

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## Abstract

The Nigerian healthcare system faces significant challenges in providing equitable access to quality health services, particularly in underserved communities where community health centres (CHCs) play a crucial role. A mixed-methods approach combining quantitative time-series analysis with qualitative assessments was employed. The time-series model used was an autoregressive integrated moving average (ARIMA), with robust standard errors accounting for the uncertainty in parameter estimates. The ARIMA model indicated a significant positive trend in CHC utilisation over five years, with a coefficient of determination ( $R^2$ ) value of 0.75, suggesting that 56% of the variability in usage can be explained by time-series factors. This study provides evidence supporting the use of ARIMA models for forecasting CHC utilisation and cost-effectiveness, offering a robust methodological framework for future research. Further studies should explore the impact of external factors on CHC performance and consider integrating additional data sources to enhance model accuracy.

**Keywords:** *African geography, Community health centres, Economic evaluation, Forecasting models, Health systems analysis, Methodology, Time-series analysis*

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