



Time-Series Forecasting Model for Evaluating Cost-Effectiveness of Community Health Centre Systems in Kenya

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Abstract

This study aims to evaluate the cost-effectiveness of community health centre systems in Kenya by utilising time-series forecasting models. Data from 2008 to 2010 was analysed using an ARIMA (AutoRegressive Integrated Moving Average) model with robust standard errors estimated at the 95% confidence level. This approach allows for accurate forecasting of healthcare costs and resource allocation decisions. The ARIMA model forecasts a steady increase in healthcare expenditure by 4.2% annually, suggesting that current system capacities may not be sufficient to meet future demands without significant investment upgrades. Our findings indicate the need for proactive planning and financial adjustments to ensure sustainable community health centre operations within Kenya's healthcare landscape. Health authorities are recommended to implement preventive care strategies and invest in infrastructure to mitigate projected resource shortages identified by the forecasting model. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_{it}$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, community health systems, cost-effectiveness analysis, forecasting models, time-series analysis, econometrics, epidemiology*

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