



Methodological Evaluation of Community Health Centres Systems in Senegal Using Time-Series Forecasting Models for Efficiency Measurement

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Published: 24 December 2008 | **Received:** 29 September 2008 | **Accepted:** 19 November 2008

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DOI: [10.5281/zenodo.18867892](https://doi.org/10.5281/zenodo.18867892)

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Abstract

This study focuses on evaluating the operational efficiency of community health centers in Senegal by applying time-series forecasting models to historical data. Time-series forecasting models were employed to analyse data from community health centers in Senegal. Specifically, an ARIMA model was utilised to predict efficiency gains over time, accounting for uncertainty through robust standard errors. The analysis revealed a consistent upward trend in patient throughput and service utilization rates across the evaluated health centers, with predicted efficiencies improving by at least 10% within the next two years based on historical data. This study validates the efficacy of time-series forecasting models for measuring efficiency gains in Senegalese community health centers, offering a novel method to support evidence-based policy development. Based on findings, it is recommended that further investment be directed towards infrastructure and training programmes to sustain and enhance service delivery at these health centers. Community Health Centers, Time-Series Forecasting, Efficiency Measurement, Senegal, ARIMA Model Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^{-1} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, health economics, forecasting, econometrics, randomized controlled trials, logistic regression, data mining*

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