



# Methodological Evaluation of Community Health Centre Systems in Senegal: A Time-Series Forecasting Model for Cost-Effectiveness Assessment

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## Abstract

Community health centers in Senegal face challenges in resource allocation and service delivery efficiency. A systematic literature review was conducted, focusing on existing models of community health centre performance evaluation. A time-series forecasting model with ARIMA (AutoRegressive Integrated Moving Average) methodology was developed for forecasting future costs and benefits. The analysis revealed that a significant proportion (35%) of healthcare resources are underutilized across Senegalese centers, indicating potential inefficiencies in service delivery. Implementing the proposed ARIMA-based forecasting model can help identify optimal resource allocation strategies to enhance cost-effectiveness and improve service efficiency. Senegal should prioritise investment in training healthcare workers and improving infrastructure to optimise centre performance using the forecasted model. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Sub-Saharan, African, Socioeconomic, HealthEconomics, TimeSeriesAnalysis, DataDrivenModels, EmergingInfectiousDiseases*

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