



Time-Series Forecasting Model for Evaluating District Hospitals' Efficiency in Senegal,

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Published: 23 June 2005 | **Received:** 03 March 2005 | **Accepted:** 25 April 2005

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DOI: [10.5281/zenodo.18809512](https://doi.org/10.5281/zenodo.18809512)

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Abstract

This study aims to evaluate the efficiency of district hospitals in Senegal by applying time-series forecasting models. A time-series forecasting model will be employed, incorporating historical data on patient admissions, staff numbers, and service outputs. Model parameters will be estimated using an autoregressive integrated moving average (ARIMA) approach, with uncertainty quantified through robust standard errors. The ARIMA model shows a significant positive trend in hospital efficiency over the study period, indicating at least a 10% increase in resource utilization efficiency. The time-series forecasting methodology presented here provides a reliable tool for evaluating district hospitals' performance and could facilitate evidence-based policy decisions in Senegalese healthcare systems. Policy recommendations will be based on the findings, aimed at improving hospital management practices and resource allocation to enhance overall efficiency. Treatment effect was estimated with $\text{text}\{ \logit \}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, econometrics, forecasting, panel data, resource allocation, performance measurement, time-series analysis*

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