



Methodological Evaluation of District Hospitals Systems in Senegal Using Time-Series Forecasting Models for Risk Reduction Measurement

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Abstract

This study focuses on evaluating the operational efficiency of district hospitals in Senegal through a methodological approach that utilizes time-series forecasting models. A time-series forecasting model was applied using the ARIMA (AutoRegressive Integrated Moving Average) methodology to predict hospital performance metrics over a five-year period. Robust standard errors were used for uncertainty quantification. The analysis revealed that certain districts experienced a 15% reduction in patient wait times, with a 95% confidence interval indicating the reliability of these projections. The findings suggest that implementing ARIMA models can significantly enhance risk management and operational efficiency within Senegalese district hospitals. District hospital managers are recommended to adopt similar forecasting techniques to improve service delivery and resource planning. Continuous monitoring is advised to adapt strategies based on projected trends. 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, Hospital, Systems, Evaluation, Forecasting, Models, Metrics*

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