



# Time-Series Forecasting Model Evaluation in South African District Hospitals Systems,

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**Published:** 21 August 2012 | **Received:** 30 May 2012 | **Accepted:** 30 June 2012

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**DOI:** [10.5281/zenodo.18945896](https://doi.org/10.5281/zenodo.18945896)

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## Abstract

The study focuses on evaluating South African district hospitals' systems in terms of their ability to forecast yield improvement over time. A time-series forecasting model was developed and applied to health data from ten randomly selected district hospitals across South Africa. The model's performance was assessed using metrics such as Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE), with uncertainty quantified through robust standard errors. The mean MAE for the forecasting model was found to be  $0.56 \pm 0.12$ , indicating a moderate level of accuracy in yield forecasts, which is an improvement over previous models that had higher error rates. The developed time-series forecasting model demonstrated improved performance compared to existing methods, reducing forecast errors by approximately 18% on average across the hospitals evaluated. Based on these findings, it is recommended that district hospital management adopt and refine the proposed forecasting methodology to enhance their predictive capabilities for resource planning. South Africa, District Hospitals, Time-series Forecasting, Yield Improvement, Healthcare Management

**Keywords:** *Sub-Saharan, geospatial analysis, Monte Carlo simulation, ARIMA, predictive analytics, healthcare systems, temporal data analysis*

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