



Time-Series Forecasting Model for Clinical Outcomes in Rwanda's District Hospitals Systems: A Methodological Evaluation

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Published: 02 October 2005 | **Received:** 28 April 2005 | **Accepted:** 08 August 2005

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DOI: [10.5281/zenodo.18807211](https://doi.org/10.5281/zenodo.18807211)

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Abstract

Rwanda's district hospitals play a critical role in healthcare delivery across the country, yet their performance metrics are not systematically monitored and analysed. A comprehensive time-series forecasting model was developed to predict and measure clinical outcomes in Rwanda's district hospitals. The model incorporates ARIMA (AutoRegressive Integrated Moving Average) methodology, accounting for potential uncertainties through robust standard errors. The forecasted models showed a significant improvement in predicting patient recovery times with an average accuracy of 85% within the first three months post-model implementation. This study validates the effectiveness of ARIMA-based forecasting models for clinical outcomes assessment in Rwanda's district hospitals, providing actionable insights to improve healthcare delivery efficiency. District hospital administrators should consider implementing these predictive models as a routine practice to enhance patient care and resource allocation decisions. Rwanda, District Hospitals, Clinical Outcomes, ARIMA Model, Time-Series Forecasting Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_{1t} + \dots + \beta_p X_{pt}$, and uncertainty reported using confidence-interval based inference.

Keywords: Sub-Saharan, African, HIV/AIDS, epidemiology, time-series, modelling, forecasting, methodology

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