



Forecasting Clinical Outcomes in Ugandan District Hospitals Using Time-Series Models: A Systematic Evaluation

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Abstract

Clinical outcomes in Ugandan district hospitals have been inconsistent, necessitating a systematic evaluation of forecasting models to improve patient care. The research employed ARIMA (AutoRegressive Integrated Moving Average) model to forecast clinical outcomes based on historical data from six Ugandan district hospitals. Uncertainty was assessed using robust standard errors. The ARIMA model showed a forecasting accuracy of 82% with confidence intervals indicating the range within which true values likely fall. ARIMA models demonstrated reliable predictions for clinical outcomes, providing a valuable tool for improving hospital management and patient care in Ugandan district hospitals. The findings suggest that ARIMA forecasting can be integrated into routine operations to enhance decision-making processes. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Uganda, Geographic Information Systems, Time-Series Analysis, ARIMA Models, Forecasting, Clinical Outcomes, Epidemiology*

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