African Gene Therapy

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

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Abstract

This study evaluates the methodological rigor of clinical outcomes measurement systems in Rwanda's district hospitals. A systematic review and evaluation of existing data from five randomly selected district hospitals were conducted. Time-series forecasting models, specifically ARIMA (AutoRegressive Integrated Moving Average) with robust standard errors, were applied to forecast clinical outcomes over a one-year period. The time-series forecasts showed an average error margin of ±5% in predicting patient recovery rates and hospital readmission rates, indicating moderate accuracy of the models. While ARIMA provided reasonable predictions, further model refinement is needed to enhance forecast precision. Healthcare managers should consider incorporating more variables into their forecasting models to improve outcomes analysis. Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, clinical outcomes, forecasting models, healthcare systems, methodological evaluation, Rwanda, time-series analysis*

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