



Time-Series Forecasting Model Evaluation of Public Health Surveillance Systems in Rwanda

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Abstract

Public health surveillance systems are crucial for monitoring and responding to infectious diseases in Rwanda. The current system uses a combination of manual reporting and electronic data entry. A time-series forecasting model was developed using an autoregressive integrated moving average (ARIMA) approach. The ARIMA(1,0,1) model was selected based on the lowest Bayesian Information Criterion (BIC). The ARIMA(1,0,1) model showed a mean absolute error of 5.2% in forecasting weekly influenza-like illness case counts. The time-series forecasting model demonstrated moderate accuracy in predicting public health surveillance data. Further research is recommended to explore the scalability and robustness of ARIMA models for different infectious diseases. Public Health Surveillance, Time-Series Forecasting, Autoregressive Integrated Moving Average (ARIMA), Cost-Effectiveness Analysis Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African epidemiology, infectious diseases surveillance, time-series analysis, forecasting models, public health economics, geographic information systems, spatial-temporal modelling*

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