



Time-Series Forecasting Model for Evaluating Clinical Outcomes in Public Health Surveillance Systems in Rwanda: A Methodological Assessment

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Abstract

Public health surveillance systems are crucial for monitoring and managing clinical outcomes in Rwanda. However, their effectiveness can be improved through advanced analytical tools. A time-series forecasting model was developed based on the ARIMA (AutoRegressive Integrated Moving Average) method. The model's accuracy and robustness were assessed through cross-validation techniques, ensuring reliable predictions of future clinical outcomes. The ARIMA model demonstrated a significant $ARIMA(p, d, q)$ where $p=2$, $d=1$, and $q=3$ to forecast trends in clinical data with an uncertainty interval of $\pm 5\%$ for the predicted values. The time-series forecasting model showed promise in accurately predicting future clinical outcomes, offering a valuable tool for public health surveillance systems in Rwanda. Public health officials should consider implementing this model to enhance their surveillance capabilities and improve resource allocation based on forecasted needs. public health surveillance, ARIMA method, time-series forecasting, clinical outcome prediction

Keywords: *Rwanda, Geographic Information Systems (GIS), Spatial Analysis, Time-Series Analysis, Epidemiology, Predictive Modelling, Public Health Surveillance*

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