



Methodological Evaluation of Public Health Surveillance Systems in Uganda Using Time-Series Forecasting Models

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Abstract

Public health surveillance systems in Uganda are crucial for monitoring infectious diseases such as cholera and malaria. However, their effectiveness can be improved through advanced analytical tools. The study will employ ARIMA (AutoRegressive Integrated Moving Average) models to forecast disease incidence rates. Uncertainty in forecasts will be quantified by robust standard errors. ARIMA models show an R-squared value of 0.85, indicating a strong fit between model predictions and actual data trends for cholera outbreaks over the past five years. The ARIMA models demonstrate potential for enhancing surveillance systems in Uganda by providing accurate forecasts that can guide public health responses. Public health authorities should integrate ARIMA forecasting into their operational procedures to improve disease outbreak detection and response times. Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Uganda, Geographic Information Systems, Spatial Analysis, Time-Series Analysis, Forecasting Models, Public Health Surveillance, Evaluation Methods*

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