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

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Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in Uganda. However, their effectiveness and efficiency need further evaluation. Time-series forecasting models were applied to historical data from Uganda's public health surveillance system. The Box-Jenkins ARIMA model was used for analysis with robust standard errors estimated at a 95% confidence interval. The forecasted trends indicated a need for increased reporting of early warning signals, which could reduce the incidence of disease outbreaks by up to 20% within the next year. The study demonstrated the effectiveness of time-series forecasting in evaluating public health surveillance systems and highlighted the importance of timely data input for improved outbreak management. Enhanced training programmes should be implemented to improve reporting accuracy, while investment in infrastructure is recommended to support more frequent data collection. Public Health Surveillance, Time-Series Forecasting, ARIMA Model, Efficiency Gains Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{\rightarrow} p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, surveillance, methodology, forecasting, evaluation, infectious, metrics*

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