African Occupational Medicine

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 malaria and tuberculosis. However, their effectiveness can be improved through methodological evaluation. A mixed-method approach combining quantitative data analysis with qualitative insights was used. Time-series forecasting models were applied to historical health data from Ugandan surveillance systems, considering robust standard errors for uncertainty assessment. The time-series forecasts demonstrated a moderate level of accuracy in predicting disease trends, particularly in malaria outbreaks ($R^2 = 0.75$). The application of time-series forecasting models enhanced the understanding of surveillance system performance and highlighted potential areas for intervention. Public health officials should prioritise training on data interpretation and model validation to improve the accuracy of disease trend predictions. Uganda, Public Health Surveillance, Time-Series Forecasting, Disease Prediction Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta}\ p\,X_i$, and uncertainty reported using confidence-interval based inference.

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

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