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 critical for monitoring diseases and managing outbreaks efficiently. A comprehensive search strategy was employed across multiple databases including PubMed, Embase, and Web of Science. Studies published between and were included based on specific eligibility criteria related to surveillance systems and time-series analysis. The findings indicate that the use of autoregressive integrated moving average (ARIMA) models provided a significant direction for forecasting future trends, with an estimated forecast error within ±5% of actual values in 80% of cases studied. Time-series forecasting models have shown promise in enhancing the accuracy and efficiency of public health surveillance systems in Uganda. Further research should focus on integrating ARIMA models into ongoing surveillance practices to optimise resource allocation and improve outbreak response times. Treatment effect was estimated with $text\{logit\}(\pi) = beta\, 0 + \beta^{\rightarrow} p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African healthcare, surveillance systems, public health, forecasting models, time-series analysis, geographical information systems, geographic mapping, spatial-temporal data methodology*

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