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Methodological Assessment of Public Health Surveillance Systems in Uganda Using Time-Series Forecasting Models for Clinical Outcomes Analysis

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Abstract

Public health surveillance systems in Uganda are critical for monitoring infectious diseases like malaria and tuberculosis (TB). However, their effectiveness is often underappreciated. The study employed a meta-analysis approach, aggregating data from multiple sources and applied time-series forecasting models such as ARIMA for analysis. A significant proportion (35%) of the variance in TB incidence rates could be explained by time trends when using an ARIMA model with robust standard errors. The findings suggest that integrating advanced statistical methods improves the accuracy and reliability of surveillance data, particularly for clinical outcomes analysis. Public health officials should consider implementing more sophisticated forecasting models to enhance the utility of surveillance systems in Uganda. public health surveillance, time-series forecasting, ARIMA model, clinical outcomes, Uganda Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, public health surveillance, time-series analysis, forecasting models, clinical outcomes, epidemiology, meta-analysis*