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

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Abstract

Public health surveillance systems in Uganda are essential for monitoring infectious diseases such as malaria and tuberculosis (TB). However, their efficiency varies over time, necessitating methodological evaluations. The study employs a Vector Autoregression (VAR) model to forecast trends in surveillance data, with robust standard errors accounting for uncertainty in the forecasts. A significant proportion (35%) of forecasting accuracy was achieved, indicating room for efficiency improvement. Variability across different time-series suggests targeted interventions are needed to optimise system performance. The VAR model demonstrated its potential as a tool for evaluating surveillance systems' effectiveness in Uganda, with specific recommendations for enhancing data collection and analysis strategies. Integrate real-time feedback loops into the surveillance process to improve timeliness and accuracy. Conduct targeted training sessions for surveillance staff to address identified knowledge gaps. Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta}\ p\ X_i$, and uncertainty reported using confidence-interval based inference.

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