



# Forecasting Yield Improvement in Public Health Surveillance Systems Using Time-Series Models in Uganda: A Methodological Evaluation

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## Abstract

Public health surveillance systems in Uganda are crucial for monitoring disease prevalence, but their efficiency can be improved through data-driven methods. The study utilised ARIMA (AutoRegressive Integrated Moving Average) models for forecasting yield improvements, with real-time surveillance data from Uganda's National Health Information System as the primary input. Robust standard errors were employed to account for prediction uncertainties. An initial forecast model showed a positive direction of improvement in disease surveillance metrics but exhibited moderate uncertainty (95% confidence interval: -0.12% to +0.45%). The ARIMA models demonstrated potential as an analytical tool for enhancing public health surveillance systems, warranting further empirical validation. Further research should include a wider range of diseases and incorporate additional variables such as socio-economic factors to improve model accuracy. Public Health Surveillance, Time-Series Forecasting, ARIMA Models, Uganda Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** Uganda, Public Health Surveillance, Time-Series Analysis, ARIMA Models, Forecasting, Epidemiology, Methodology

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