



# Methodological Evaluation of Public Health Surveillance Systems in Rwanda Using Time-Series Forecasting Models

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## Abstract

Public health surveillance systems in Rwanda are crucial for monitoring infectious diseases such as influenza and measles. However, their effectiveness can be improved through rigorous methodological evaluation. A systematic literature review was conducted to assess existing surveillance data and identify gaps. Time-series forecasting models were applied to forecast future trends based on historical data. The analysis revealed a positive correlation between early detection rates and system performance, indicating that timely interventions can be more effective in reducing disease prevalence. The time-series forecasting models demonstrated robustness in measuring the reliability of public health surveillance systems in Rwanda. Recommendations for enhancing these systems are proposed based on findings. Implementing early warning signals and continuous training for surveillance staff will improve system performance and reduce false negatives. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Sub-Saharan, Rwanda, surveillance, methodology, forecasting, reliability, infectious diseases*

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