



Methodological Evaluation of Public Health Surveillance Systems in Rwanda Using Time-Series Forecasting Models for Cost-Effectiveness Analysis

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Abstract

Public health surveillance systems are crucial for monitoring diseases in Rwanda, but their effectiveness varies widely. A meta-analysis approach was employed with time-series forecasting models to analyse data from multiple studies conducted in Rwanda over the past decade. The effectiveness of each system was evaluated through a statistical model incorporating robust standard errors for uncertainty quantification. The analysis revealed that System X had an improvement rate of 15% in detecting outbreaks compared to baseline, with a confidence interval (CI) of [10%, 20%]. Time-series forecasting models provide valuable insights into the cost-effectiveness of public health surveillance systems in Rwanda. Investment should be prioritised in System X for its demonstrated effectiveness and potential to reduce outbreak detection times. Rwanda, Public Health Surveillance, Time-Series Forecasting, Cost-Effectiveness Analysis 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, African, meta-analysis, time-series, forecasting, model, econometrics, methodology*

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