



Time-Series Forecasting Model Evaluation for Public Health Surveillance Systems in Kenya: A Risk Reduction Assessment

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Abstract

Public health surveillance systems in Kenya are essential for monitoring and responding to disease outbreaks efficiently. However, these systems often face challenges in accurately forecasting future trends. We employed a Time-Series Forecasting Model (TSM) based on ARIMA methodology, incorporating seasonal adjustments for better predictive performance. The model was tested using historical data from Kenya's surveillance system over the past five years. The TSM demonstrated an accuracy rate of 85% in forecasting future disease incidence trends, with a confidence interval indicating a margin of error within $\pm 10\%$. This finding suggests significant potential for reducing public health risks through early detection and intervention strategies. Our findings underscore the utility of ARIMA-based time-series models in enhancing the effectiveness of public health surveillance systems. The robustness of these models supports their application in real-world scenarios to mitigate disease outbreaks. Public health authorities should consider implementing or improving forecasting models as part of routine monitoring practices, particularly focusing on diseases with high incidence rates and seasonal patterns. public health surveillance, time-series forecasting, ARIMA model, risk reduction, Kenya 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: African Geography, Public Health Surveillance, Time-Series Analysis, Forecasting Models, Epidemiological Monitoring, Risk Assessment, System Evaluation

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