



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

Oginga Mutua Ndege¹, Mwai Kibaki Nyaga², Otieno Muturi Gitau^{2,3}

¹ Pwani University

² Maseno University

³ Strathmore University

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Correspondence: ondege@yahoo.com

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Author notes

Oginga Mutua Ndege is affiliated with Pwani University and focuses on Medicine research in Africa.

Mwai Kibaki Nyaga is affiliated with Maseno University and focuses on Medicine research in Africa.

Otieno Muturi Gitau is affiliated with Strathmore University and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems in Kenya are crucial for monitoring infectious diseases such as cholera and malaria. However, their effectiveness varies widely across different regions. A meta-analysis was conducted on existing data from multiple regions within Kenya, employing ARIMA (AutoRegressive Integrated Moving Average) model for trend analysis. Uncertainty in forecasts was quantified with 95% confidence intervals. The average forecast error across all models was found to be within $\pm 10\%$, indicating a reliable predictive capability of the ARIMA model. This study provides robust evidence on the reliability and effectiveness of time-series forecasting in evaluating public health surveillance systems in Kenya, offering a standardised method for future research. Public health officials should consider adopting these models to improve the timeliness and accuracy of disease outbreak predictions. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, African, Spatial, temporal, Biostatistics, Meta-analysis, Infectious-disease surveillance*

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