



# Methodological Evaluation of Regional Monitoring Networks in Kenya for Time-Series Forecasting Models of Clinical Outcomes

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### Abstract

Regional monitoring networks in Kenya have been established to track clinical outcomes over time. These systems aim to provide timely insights into disease prevalence and treatment efficacy. A comprehensive search strategy was employed across multiple databases including PubMed, Web of Science, and Google Scholar. Studies were included if they reported on the performance metrics of forecasting models used in Kenyan regional monitoring networks for clinical outcomes. The analysis identified a significant variation in the accuracy of time-series forecasts among different regions, with some networks achieving forecast accuracies within  $\pm 5\%$  confidence intervals. This review highlights the need for standardised methodology and validation processes to ensure reliable forecasting of clinical outcomes across Kenya’s regional monitoring networks. It is recommended that future studies in this field should focus on developing robust, validated time-series models and incorporating feedback mechanisms to improve model accuracy. Model estimation used  $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \sum_{i=1}^n (y_i - f_{\theta}(\xi_i))^2 + \lambda \|\theta\|_2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** Pan-African, Geographic Information Systems (GIS), Spatial Analysis, Data Quality Assessment, Time Series Analysis, Regional Mapping, Geospatial Technology

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