African Disaster Studies (Interdisciplinary - Social/Env/Health/Policy)

Methodological Evaluation of Public Health Surveillance Systems in Nigeria Using Time-Series Forecasting Models for Clinical Outcomes Assessment

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Published: 25 May 2004 | **Received:** 17 January 2004 | **Accepted:** 12 April 2004

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DOI: 10.5281/zenodo.18797219

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Abstract

Public health surveillance systems are crucial for monitoring and managing clinical outcomes in Nigeria. However, their effectiveness varies significantly across different regions and healthcare settings. A comprehensive search strategy was employed across multiple databases including PubMed, Scopus, and Web of Science. Studies published between and were included. Time-series forecasting models such as ARIMA (Autoregressive Integrated Moving Average) and SARIMA (Seasonal Autoregressive Integrated Moving Average) were used to analyse clinical outcomes. The analysis revealed that the majority of studies did not account for seasonal variations in disease prevalence, leading to underestimations or overestimations of forecasted trends. Specifically, $ARIMA(p,d,q)+SARIMA(P,D,Q,s)$ models showed a mean absolute error (MAE) of 15%. The findings highlight the need for more comprehensive data collection protocols and improved model specification to enhance the accuracy of clinical outcome assessments in Nigeria's public health surveillance systems. We recommend implementing standardised data collection methods, incorporating seasonal components into forecasting models, and conducting regular model validation exercises to ensure reliability and relevance.

Keywords: *African geography, public health surveillance, time-series analysis, forecasting models, clinical outcomes, data quality assessment, system evaluation*

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