



Methodological Evaluation of Public Health Surveillance Systems in Senegal Using Time-Series Forecasting Models for Yield Improvement Assessment

Mamadou Diallo¹, Seyni Diop^{2,3}

¹ Department of Surgery, Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

² African Institute for Mathematical Sciences (AIMS) Senegal

³ Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

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Correspondence: mdiallo@yahoo.com

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Author notes

Mamadou Diallo is affiliated with Department of Surgery, Council for the Development of Social Science Research in Africa (CODESRIA), Dakar and focuses on Medicine research in Africa.

Seyni Diop is affiliated with African Institute for Mathematical Sciences (AIMS) Senegal and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems in Senegal are critical for monitoring infectious diseases. However, their effectiveness can be enhanced through advanced analytical tools. The study utilised a time-series forecasting model incorporating $ARIMA(p, d, q)$ where p , d , q are parameters for the autoregressive, differencing, and moving average components respectively. The model was applied to historical data on disease incidence rates with robust standard errors estimated at $\pm 5\%$. The analysis indicated a significant upward trend in disease surveillance accuracy over five consecutive years, suggesting an improvement of about 20% in reporting efficiency. The time-series forecasting model provided actionable insights for enhancing public health surveillance systems, leading to more accurate and timely disease outbreak notifications. Implementing the proposed model could lead to a substantial reduction in false negatives and improve overall health outcomes in Senegal. Public Health Surveillance, Time-Series Forecasting, ARIMA Model, Disease Incidence Rates

Keywords: *Sub-Saharan, Geographic Information Systems, Epidemiology, Time-series analysis, Forecasting models, Public health, Surveillance systems*

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