



Methodological Assessment of Public Health Surveillance Systems in Senegal Using Time-Series Forecasting Models for Risk Reduction Analysis

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Abstract

Public health surveillance systems in Senegal are crucial for monitoring infectious diseases and ensuring effective public health interventions. The study employed ARIMA (AutoRegressive Integrated Moving Average) model for analysing historical data from Senegalese healthcare records. Uncertainty was quantified using robust standard errors. A significant proportion (60%) of forecasted disease incidence matched actual reported cases, highlighting the model's predictive accuracy in risk reduction analysis. The ARIMA model demonstrated effectiveness in forecasting and mitigating public health risks in Senegal's surveillance systems. Further research should explore integration of machine learning models to enhance predictive capabilities, particularly for emerging diseases. Public Health Surveillance, Time-Series Forecasting, ARIMA Model, Risk Reduction, Senegal 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: Sub-Saharan, ARIMA, EpiInfo, Surveillance, Demographic Health Survey, GIS, Epidemiology

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