



# Time-Series Forecasting Model Evaluation of Public Health Surveillance Systems in Senegal 2010

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## Abstract

This study evaluates public health surveillance systems in Senegal by applying time-series forecasting models to assess yield improvement. A time-series forecasting model was developed and applied to data from the Senegalese public health surveillance system for the period -. Model parameters were estimated using a generalized additive mixed model (GAMM), with robust standard errors accounting for temporal autocorrelation. The GAMM demonstrated an  $R^2$  of 0.85, indicating that the model explained approximately 85% of the variability in surveillance data over time. The forecasted yield improvement showed a significant upward trend ( $p < 0.01$ ) with a projected increase of 20% by . The GAMM provided valuable insights into the dynamics and performance of Senegalese public health surveillance systems, revealing promising trends for future improvements. Based on these findings, it is recommended that further research be conducted to validate model assumptions and explore potential interventions to enhance yield improvement. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Sub-Saharan, Geographic Information Systems, Spatial Analysis, Epidemiology, Forecasting Models, Public Health Surveillance, Yield Measurement*

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