African Biology Research (Core Life Science)

Methodological Evaluation of Public Health Surveillance Systems in Senegal: A Time-Series Forecasting Model for Cost-Effectiveness Analysis

Ibrahima Ndoye[1,2], **Amadou Touré**[2,3], **Seydou Diop**[1,2]

[1] African Institute for Mathematical Sciences (AIMS) Senegal

[2] Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

[3] Institut Sénégalais de Recherches Agricoles (ISRA)

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Correspondence: indoye@aol.com

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Author notes

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

Amadou Touré is affiliated with Institut Sénégalais de Recherches Agricoles (ISRA) and focuses on Medicine research in Africa.

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

Abstract

Public health surveillance systems are crucial for monitoring disease outbreaks in Senegal. However, their effectiveness varies widely across different regions and time periods. A systematic literature review was conducted to identify studies on public health surveillance systems, focusing on their implementation and outcomes. A time-series forecasting model was applied to assess the cost-effectiveness of these systems. The time-series forecasting model indicated that while some systems showed a positive return on investment (ROI) in terms of early detection and resource allocation, others had significant operational costs without substantial benefits. This study provides insights into optimising public health surveillance systems by highlighting the cost-effectiveness trade-offs. Public health officials should prioritise system upgrades that balance efficacy with efficiency to ensure sustainable and effective disease control measures in Senegal. Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, surveillance, metrics, econometrics, evaluation, forecasting, geographic*

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