



Methodological Evaluation of Public Health Surveillance Systems in Senegal: A Quasi-Experimental Design for Cost-Effectiveness Assessment

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Abstract

Public health surveillance systems in Senegal are crucial for monitoring diseases and managing outbreaks effectively. A quasi-experimental design was employed to compare pre- and post-intervention data, with statistical analysis using an Ordinary Least Squares (OLS) regression model for estimating costs and benefits. The analysis revealed that the system's cost-effectiveness varied by disease type, with respiratory infections showing a significant positive change in surveillance accuracy ($p < 0.05$). The quasi-experimental design provided insights into system performance but highlighted areas needing further refinement. Further research is recommended to validate these findings and explore potential cost-saving measures. 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, Sampling Theory, Quasi-Experimental Design, Outcome Measurement, Resource Allocation Models, Comparative Analysis*

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