



# Methodological Evaluation of Public Health Surveillance Systems in Senegal Using Difference-in-Differences for Risk Reduction Measurement

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## Abstract

Public health surveillance systems are crucial for monitoring diseases and guiding interventions in Senegal and other countries. However, their effectiveness can vary over time due to changes in healthcare policies or resource allocation. We employed a Difference-in-Differences approach to analyse the impact of policy changes on disease surveillance metrics. Data from two consecutive years were used to construct synthetic control groups, ensuring comparability between regions within Senegal and across countries for robust DID estimation. The analysis revealed that after implementing new policies, there was a statistically significant reduction in reported cases of malaria ( $p < 0.05$ ) compared to baseline levels, indicating the effectiveness of these measures in reducing disease incidence. This study provides evidence supporting the efficacy of recent policy interventions aimed at improving public health surveillance systems in Senegal. The findings suggest that timely and targeted policy changes can lead to measurable reductions in reported disease cases. Based on our results, it is recommended that ongoing monitoring should continue for these policies and further research should be conducted to explore other potential areas where similar improvements could be achieved. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Sub-Saharan, surveillance, evaluation, model, intervention, geographical, analytical*

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