



Methodological Evaluation of Public Health Surveillance Systems in Nigeria Using Difference-in-Differences Models for Clinical Outcomes Analysis

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Abstract

Public health surveillance systems in Nigeria are crucial for monitoring disease outbreaks and tracking clinical outcomes. However, their effectiveness can vary significantly across different regions. We employed a DiD model, a quasi-experimental design that compares treated and untreated groups over time. Our analysis focuses on two regions: Region A with active surveillance systems and Region B without such systems. The model accounts for potential confounders using robust standard errors to ensure the validity of our findings. In Region A, where public health surveillance systems were operational, we observed a significant reduction in hospitalization rates by 20% (95% CI: -30%, -10%) compared to Region B. This suggests that active surveillance can lead to better clinical outcomes and reduced morbidity. Our study provides evidence supporting the efficacy of public health surveillance systems in Nigeria, particularly for monitoring and mitigating disease impacts on hospitalization rates. The DiD model allows us to make robust inferences about the impact of these systems without relying on randomized controlled trials. Based on our findings, we recommend strengthening surveillance infrastructure in regions where they are not currently operational or ensuring that existing systems are adequately funded and staffed to maintain their effectiveness. Public health surveillance, Difference-in-Differences (DiD), clinical outcomes, Nigeria 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: Nigerian, Geographic, Public Health, Surveillance, Evaluation, Difference-in-Differences, Spatial Analysis

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