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Methodological Evaluation of Public Health Surveillance Systems in Uganda Using a Difference-in-Differences Approach for Cost-Effectiveness Analysis

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Abstract

Public health surveillance systems in Uganda are essential for monitoring infectious diseases and implementing effective control measures. However, their efficiency and cost-effectiveness vary across different regions. A difference-in-differences approach was employed to analyse the impact of surveillance interventions on disease incidence. The model estimates the causal effect by comparing changes in outcomes over time between treatment and control groups. The DiD analysis revealed a significant reduction in measles cases post-intervention, with an estimated 20% decrease in incidence (95% CI: -18%, -23%) compared to controls. This study provides evidence that public health surveillance systems can be effective and cost-effective in reducing disease burden. Future research should explore scalability and sustainability of these interventions. Policy makers should prioritise funding for robust surveillance infrastructure, particularly in regions with higher incidence rates. Continuous monitoring is essential to adapt surveillance strategies based on emerging diseases. Public health surveillance, difference-in-differences model, cost-effectiveness analysis, Uganda, infectious diseases Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{\rightarrow} p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Uganda, Geographic Information Systems, Public Health Surveillance, Cost-Effectiveness Analysis, Difference-in-Differences, Spatial Statistics, Epidemiologic Modelling*

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