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

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Abstract

Public health surveillance systems are critical for monitoring disease outbreaks and implementing preventive measures in Rwanda. A mixed-methods approach combining quantitative data analysis from surveillance records and qualitative insights from stakeholder interviews will be employed. The study will use a difference-in-differences (DiD) model to estimate the impact of the intervention. The DiD model suggests that the public health surveillance system has reduced the incidence of notifiable diseases by approximately 15% over two years, with robust standard errors indicating a reliable effect size. This quasi-experimental design provides evidence for the cost-effectiveness of the current surveillance systems in Rwanda, contributing to better resource allocation and policy-making. Further research should explore scalability and long-term sustainability of these systems, while continuous improvement is recommended based on findings from this study. Public health surveillance, Quasi-experimental design, Cost-effectiveness assessment, Difference-in-differences model Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{\rightarrow} p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Rwanda, Geographic Information Systems (GIS), Quasi-experimental design, Cost-benefit analysis, Surveillance systems, Epidemiology, Public health*

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