



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

Kayimana Rwipetereko¹

¹ Department of Public Health, University of Rwanda

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Correspondence: krwipetereko@yahoo.com

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Author notes

Kayimana Rwipetereko is affiliated with Department of Public Health, University of Rwanda and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems are crucial for monitoring diseases and managing public health crises in Rwanda. A meta-analysis will be conducted using data from multiple observational studies. The analysis will employ mixed-effects regression models to estimate cost-effectiveness ratios (CER), accounting for potential confounders and heterogeneity across studies. The findings suggest that the current surveillance systems are moderately effective in detecting outbreaks but have room for improvement, particularly in terms of resource allocation efficiency. This study contributes to the methodological development in cost-effectiveness analysis within public health by integrating quasi-experimental designs with mixed-effects regression models. Future research should prioritise refining surveillance strategies and assessing their impact on real-world outbreak detection rates. Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta^{-1} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geographical distribution, causal inference, meta-analysis, observational studies, quasi-experimental design, surveillance systems, systematic review*

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