



# Methodological Evaluation of Public Health Surveillance Systems in Rwanda Using a Difference-in-Differences Model for Cost-Effectiveness Analysis

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## Abstract

This study addresses a current research gap in Medicine concerning Methodological evaluation of public health surveillance systems systems in Rwanda: difference-in-differences model for measuring cost-effectiveness in Rwanda. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Methodological evaluation of public health surveillance systems systems in Rwanda: difference-in-differences model for measuring cost-effectiveness, Rwanda, Africa, Medicine, protocol This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Rwanda, Public Health Surveillance, Methodological Evaluation, Cost-Effectiveness Analysis, Difference-in-Differences, Geographic Information Systems, Spatial Epidemiology*

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