

A Methodological Evaluation and Difference-in-Differences Analysis of Public Health Surveillance System Adoption in Rwanda, 2000–2024

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ABSTRACT

Background: The methodological rigour of evaluating national public health surveillance systems in low-resource settings remains underdeveloped, limiting the ability to attribute health outcomes to specific system implementations.

Purpose and objectives: This study aimed to conduct a methodological evaluation of surveillance system assessments and to quantify the causal impact of a major integrated disease surveillance and response (IDSR) adoption on reporting completeness.

Keywords: *public health surveillance, Rwanda, low-resource settings, difference-in-differences, methodological evaluation, health systems strengthening, Sub-Saharan Africa*

Article Highlights

- Critique reveals a predominant reliance on cross-sectional designs lacking counterfactual reasoning in surveillance evaluation.
- Difference-in-differences analysis estimates a 23.4 percentage point increase in reporting completeness following system adoption.
- Effect was statistically significant ($p < 0.001$) and robust to multiple sensitivity checks.
- Advocates for integrating quasi-experimental designs into routine surveillance system assessments.

Core Analytical Model

The study employed a difference-in-differences design: $Y_{it} = \beta_0 + \beta_1(\text{Treat}_i \times \text{Post}_t) + \gamma_i + \delta_t + \varepsilon_{it}$, with district and time fixed effects and cluster-robust standard errors.

This study provides a methodological framework for attributing health system improvements to specific interventions.

ABSTRACT-ONLY PUBLICATION

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