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# Methodological Evaluation of Public Health Surveillance Systems in Rwanda

*A Quasi-Experimental Assessment of Clinical Outcome Metrics*

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## ABSTRACT

Public health surveillance systems are critical for monitoring disease burdens and guiding interventions. In Rwanda, the integration of clinical outcome metrics into these systems requires rigorous methodological evaluation to ensure data validity and utility for decision-making. This brief report aims to methodologically evaluate the impact of a revised surveillance protocol on the accuracy and completeness of clinical outcome reporting within the national health system. A quasi-experimental, difference-in-differences design was employed, comparing 20 intervention health facilities with 20 matched control facilities over an observation period. The primary outcome was the proportion of reported clinical outcomes with complete and verified data fields. The analysis used a linear probability model: $Y\{it\} = beta0 + beta1\ text\{Intervention\}i + beta2\ text\{Post\}t + beta3\ (text\{Intervention\}i \times text\{Post\}t) + \varepsilon\{it\}$, with robust standard errors clustered at the facility level. The revised protocol significantly improved data completeness. The intervention was associated with a 22.4 percentage point increase (95% CI: 18.1 to 26.7) in the proportion of clinical outcomes reported with complete verification fields, relative to the control group. The methodological assessment demonstrates that targeted modifications to surveillance protocols can substantially enhance the quality of clinical outcome data captured within routine systems. Implement the revised surveillance protocol nationally and incorporate regular quasi-experimental evaluations into the surveillance strengthening cycle to iteratively improve data quality. surveillance evaluation, health information systems, data quality, difference-in-differences, health metrics This study provides a novel application of a quasi-experimental design for the real-world evaluation of a national health surveillance system intervention, moving beyond descriptive assessment.

**Keywords:** *Public health surveillance, quasi-experimental design, clinical outcomes, health information systems, Sub-Saharan Africa*

### Article Highlights

- Quasi-experimental design compared 20 intervention and 20 control health facilities.
- Intervention associated with a 22.4 pp increase in complete data verification.
- Demonstrates a move beyond descriptive to causal assessment of system changes.
- Supports integrating regular experimental evaluations into surveillance cycles.

### Core Finding

Targeted protocol modifications can substantially enhance the quality of clinical outcome data captured within routine national surveillance systems.

*This brief reports a methodological assessment of a surveillance system intervention.*