

A Randomised Field Trial to Assess the Reliability of Public Health Surveillance Systems in Rwanda

A Methodological Evaluation

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ABSTRACT

Background: Public health surveillance systems are critical for disease control, yet their operational reliability in low-resource settings is often assumed rather than rigorously measured. Methodological evaluations of these systems, particularly using experimental designs, are scarce.

Purpose and objectives: This study aimed to methodologically evaluate the reliability of Rwanda's integrated disease surveillance system by quantifying its sensitivity and positive predictive value (PPV) for detecting priority reportable conditions through a randomised field trial.

Keywords: *Public health surveillance, Randomised controlled trial, Methodological evaluation, Sub-Saharan Africa, Health information systems, Data quality, Rwanda*

Article Highlights

- Sensitivity varied significantly by disease: 92% for measles vs. 65% for acute watery diarrhoea.
- Positive predictive value of system-generated signals was 86% (95% CI: 81 to 91).
- The randomised scenario method proved feasible for rigorous, operational evaluation in a low-resource setting.
- Findings indicate a critical vulnerability in gastrointestinal disease reporting within the surveillance system.

Methodological Note

Study employed a parallel-group, cluster-randomised field trial across 60 health facilities, introducing standardised case scenarios into surveillance workflows to quantify sensitivity and PPV.

This evaluation provides empirical metrics for a critical public health infrastructure.

ABSTRACT-ONLY PUBLICATION

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