

Methodological Evaluation and Yield Optimisation of Public Health Surveillance Systems in Tanzania

A Multilevel Regression Analysis

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ABSTRACT

Background: Public health surveillance systems in sub-Saharan Africa are critical for disease control, yet their methodological rigour and yield—the proportion of true cases detected—are often suboptimal. Systematic evaluations quantifying the impact of specific interventions on surveillance yield are lacking.

Purpose and objectives: This study aimed to methodologically evaluate an enhanced surveillance intervention and quantify its effect on case detection yield within the Tanzanian Integrated Disease Surveillance and Response system. The primary objective was to measure yield improvement across sentinel facilities.

Keywords: *public health surveillance, yield optimisation, multilevel regression, sub-Saharan Africa, methodological evaluation, health systems strengthening*

Article Highlights

- Multilevel regression quantifies a significant 17.2pp yield increase from enhanced surveillance protocols.
- Intervention combined targeted training, streamlined reporting, and integrated data feedback loops.
- Analysis reveals significant residual variance attributable to district-level contextual factors.
- Findings advocate for structured feedback mechanisms as a core component of system strengthening.

Methodological Insight

The study employed a two-level hierarchical model to isolate the intervention effect while accounting for district-level random effects, providing a robust framework for surveillance evaluation in heterogeneous health systems.

This analysis offers a quantitative framework for optimising public health surveillance in resource-constrained settings.

ABSTRACT-ONLY PUBLICATION

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