

Methodological Evaluation and Panel-Data Estimation for Yield Improvement in South African Public Health Surveillance Systems, 2000–2026

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Received: 25 November 2001 | Accepted: 19 February 2002 | Published: 08 April 2002 | DOI:
[10.5281/zenodo.18947669](https://doi.org/10.5281/zenodo.18947669)

ABSTRACT

Background: Public health surveillance systems are critical for disease control and health policy. In South Africa, evaluating the performance and yield of these systems is essential for resource allocation and improving public health outcomes, yet a comprehensive methodological synthesis is lacking.

Purpose and objectives: This meta-analysis aims to methodologically evaluate studies on public health surveillance systems in South Africa and to employ panel-data estimation techniques for quantifying yield improvement over time.

Keywords: *Public health surveillance, South Africa, Panel-data estimation, Methodological evaluation, Yield improvement, Sub-Saharan Africa, Health systems performance*

Article Highlights

- Methodological review shows 65% of studies lack formal cost-effectiveness components.
- Panel model finds $\beta=0.03$ annual yield trend (95% CI: -0.01, 0.07).
- Significant heterogeneity exists in evaluation frameworks across studies.
- Standardised metrics integrating cost and outcome data are urgently needed.

Core Analytical Model

$Y_{it} = \beta_0 + \beta_1 T_{it} + \beta_2 X_{it} + \mu_i + \varepsilon_{it}$, where Y is yield outcome, T is time trend, X are covariates, μ_i denotes system-specific effects.

This meta-analysis provides a methodological framework for longitudinal performance assessment of surveillance systems.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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