



Methodological Evaluation and Panel-Data Estimation of Public Health Surveillance Systems for Clinical Outcomes in Kenya

A Meta-Analysis, 2000–2026

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ABSTRACT

Background: Public health surveillance systems are critical for monitoring clinical outcomes and informing policy in sub-Saharan Africa. In Kenya, numerous surveillance initiatives have been implemented, yet a comprehensive methodological evaluation of their designs and the statistical robustness of their panel-data estimations is lacking.

Purpose and objectives: This meta-analysis aims to methodologically evaluate surveillance systems used for clinical outcomes in Kenya and to assess the statistical properties and consistency of panel-data estimation techniques employed within these studies.

Keywords: *Meta-analysis, Public health surveillance, Kenya, Panel data, Clinical outcomes, Sub-Saharan Africa, Methodological evaluation*

Article Highlights

- 42% of evaluated systems lacked documented data validation protocols.
- Integrated system design showed positive association with

Core Analytical Model

The study evaluated the panel-data model: $Y_{it} = \beta_0 + \beta_1 X_{it} + \alpha_i + \varepsilon_{it}$, where α_i represents entity-specific fixed effects, with inference based on 95% CIs and robust standard

<p>improved outcome measurement (std. coeff: 0.31).</p> <ul style="list-style-type: none">• Significant study variance ($I^2 = 67\%$) indicates substantial methodological heterogeneity.• Fixed-effects models with robust error estimation are recommended to control for unobserved heterogeneity.	<p>errors.</p> <p><i>This meta-analysis synthesises methodological designs across Kenyan surveillance systems from 2000–2026.</i></p>
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ABSTRACT-ONLY PUBLICATION

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