



Methodological Evaluation of Public Health Surveillance Systems in South Africa Using Panel Data for Cost-Effectiveness Analysis

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Abstract

Public health surveillance systems in South Africa are critical for monitoring diseases such as malaria and tuberculosis. However, their effectiveness varies significantly across different regions. A fixed-effects regression model was applied to analyse panel data from multiple years. The study employed robust standard errors to account for potential unobserved heterogeneity and temporal correlation. The analysis revealed that the cost-effectiveness of malaria surveillance systems in KwaZulu-Natal improved by 20% when adjusted for regional variations, indicating a need for tailored strategies. While initial results suggest improvements, further research is required to validate these findings across broader geographical scales and disease categories. Public health authorities should prioritise investments in surveillance systems that have demonstrated cost-effectiveness in KwaZulu-Natal. Tailored interventions are recommended based on regional epidemiological data. Treatment effect was estimated with $\text{text}\{ \text{logit} \}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, African, panel, data, methodology, econometrics, surveillance, evaluation*

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