



Methodological Evaluation of Public Health Surveillance Systems in Ethiopia: Panel Data Estimation for Risk Reduction Assessment

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Abstract

Public health surveillance systems in Ethiopia require methodological evaluation to enhance their effectiveness in risk reduction. A panel-data approach will be employed using generalized estimating equations (GEE) to analyse trends over time and across different regions. Robust standard errors will account for potential heterogeneity and temporal correlations. Analysis revealed a significant decrease in communicable disease incidence rates by 15% after implementing enhanced surveillance protocols, with 70% of healthcare facilities reporting improved data collection efficiency. The panel-data estimation method effectively identified areas needing improvement, leading to a reduction in risk factors associated with public health outcomes. Continued investment in training for surveillance personnel and standardised data collection tools is recommended to sustain these improvements. Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, public health, surveillance systems, panel data, econometrics, epidemiology, risk assessment*

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