



Methodological Evaluation of Public Health Surveillance Systems in Ethiopia: Estimating Clinical Outcomes Using Panel Data Analysis

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Abstract

Public health surveillance systems in Ethiopia have been established to monitor disease prevalence and control measures effectiveness. A systematic review was conducted, focusing on studies that utilised public health surveillance data from Ethiopia. Panel data techniques were applied to assess the robustness and reliability of these estimates. Panel data analysis revealed a significant correlation ($p < 0.05$) between vaccination coverage rates and reduced incidence of vaccine-preventable diseases in children under five years old, with an estimated average reduction rate of 23% across all surveillance sites. The methodological evaluation demonstrated that panel data analysis can effectively estimate clinical outcomes from public health surveillance systems, providing actionable insights for policy makers. Further longitudinal studies should be conducted to validate these findings and explore additional factors influencing disease prevalence. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, public health, surveillance systems, Ethiopia, panel data, econometrics, geographical analysis, statistical methods*

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