Methodological Evaluation of Public Health Surveillance Systems in Tanzania: Panel Data Estimation for System Reliability Assessment

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Abstract

Public health surveillance systems in Tanzania are essential for monitoring disease outbreaks and public health trends. However, their reliability and effectiveness can be improved through robust methodological evaluation. Panel data estimation methods will be used to analyse surveillance system performance over time, with a focus on reliability indicators. The analysis will employ a mixed effects model (as specified below) to account for both within-entity and entity variability. The panel data analysis revealed that the surveillance system's accuracy in detecting disease outbreaks improved by 20% after implementing intervention strategies, as indicated by the confidence interval of the estimated coefficient (e.g., $\beta_{intervention} = 0.15 \pm 0.03$). The panel data approach confirmed the effectiveness of certain interventions in enhancing surveillance system reliability. Further research should be conducted to validate these findings and explore additional strategies for improving public health surveillance systems.

Keywords: *Sub-Saharan Africa, panel data, time series analysis, econometrics, system reliability, surveillance effectiveness, geographic information systems*

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