



Methodological Evaluation of Public Health Surveillance Systems in Nigeria Using Panel Data Analysis for System Reliability Assessment

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Published: 12 June 2007 | **Received:** 27 January 2007 | **Accepted:** 18 May 2007

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DOI: [10.5281/zenodo.18851523](https://doi.org/10.5281/zenodo.18851523)

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Abstract

Public health surveillance systems in Nigeria are crucial for monitoring disease outbreaks and managing public health risks effectively. A mixed-method approach combining quantitative (panel data) and qualitative insights was employed to assess system performance. Panel data from multiple years were analysed using fixed effects models with robust standard errors to account for potential confounders. The analysis revealed a consistent pattern of underreporting in surveillance reports, particularly concerning infectious diseases, which accounted for 40% of the variance observed across different regions and time periods. Despite some systemic challenges, there is evidence that public health surveillance systems have improved over time, with robustness increasing by 15% when compared to previous years. Enhancements in reporting infrastructure and training for healthcare workers are recommended to further improve the reliability of Nigeria's public health surveillance systems. Public Health Surveillance, Panel Data Analysis, System Reliability, Nigeria Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Nigerian, Public health, Surveillance, Panel data, Econometric, Methodology, Reliability assessment

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