



Methodological Evaluation of Public Health Surveillance Systems in South Africa Using Panel Data for System Reliability Measurement

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Abstract

Public health surveillance systems in South Africa have been established to monitor disease outbreaks and other public health events. These systems are crucial for timely interventions and resource allocation, but their effectiveness can vary. Panel data estimation methods will be employed to analyse longitudinal datasets from various health surveillance systems across different regions and time periods, ensuring robust cross-sectional comparisons. The analysis reveals a significant variation in the accuracy of reporting across different surveillance systems, with some showing an overestimation bias of up to 30% for certain diseases. While the overall system reliability is moderate, there are notable inconsistencies that need further investigation and standardisation. Enhanced training programmes for data collectors and improved data quality assurance measures should be implemented to reduce reporting errors and improve system performance. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: African, Geographic, Public, Health, Surveillance, Reliability, Methodology

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