



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 are crucial for monitoring diseases and managing public health interventions in South Africa. A systematic literature review will be conducted, employing mixed methods including qualitative and quantitative analyses. Panel data from multiple years will be used for robust measurement of system reliability. Panel analysis revealed a significant improvement ($p < 0.05$) in the reporting accuracy of surveillance systems over three consecutive years. The panel-data method demonstrated enhanced reliability compared to previous single-year evaluations, validating its use as a standard for future assessments. Public health authorities should prioritise regular data updates and training programmes to maintain high system reliability. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta^T X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Public health, surveillance systems, South Africa, panel data, reliability measurement, geographical information systems, spatial analysis*

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