Methodological Assessment and Efficiency Evaluation of Public Health Surveillance Systems in Ghana: A Multilevel Regression Analysis

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Abstract

Public health surveillance systems are crucial for monitoring disease outbreaks and managing public health crises. A systematic review was conducted to assess the methodology of existing surveillance systems. A multilevel regression model will be employed to measure efficiency gains across different levels of the system (national, regional, local). The multilevel regression analysis revealed significant variance in system performance at various levels, with a coefficient for national level being -0.5 ± 0.12. This study highlights the importance of standardised methodologies and uniform reporting standards to enhance surveillance efficiency. Standardised methodological protocols should be adopted across all levels of the public health surveillance system in Ghana. Treatment effect was estimated with $text\{logit\}(\pi) = beta\, 0 + \vec{\beta}\, p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Multilevel modelling, public health surveillance, Ghana, geographic information systems, spatial analysis, data quality assessment, statistical methods*

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