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Methodological Evaluation of Public Health Surveillance Systems in Ghana Using Multilevel Regression Analysis

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Abstract

Public health surveillance systems in Ghana are crucial for monitoring disease prevalence and implementing targeted interventions. However, their effectiveness can vary across different regions. A meta-analysis approach was employed to synthesize data from multiple studies conducted within Ghana. Multilevel regression models were utilised to account for both individual and regional variability in surveillance effectiveness. The analysis revealed that multilevel regression models could effectively capture the heterogeneity of surveillance systems across regions, with some areas showing significant risk reduction ($p < 0.05$). This study demonstrates the utility of multilevel regression analysis in evaluating public health surveillance systems and highlights its potential for improving intervention strategies. Future research should consider expanding the scope to include more regions and additional outcome measures, such as socioeconomic factors affecting surveillance outcomes. Public Health Surveillance, Ghana, Multilevel Regression Analysis, Risk Reduction Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, multilevel, regression, validity, surveillance, evaluation, Africa*

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