



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

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Abstract

Public health surveillance systems in Ghana are essential for monitoring disease prevalence and coordinating responses to outbreaks. A mixed-effects logistic regression model was employed to analyse panel data from three regions in Ghana. The model accounts for temporal and spatial dependencies among surveillance sites. The estimated coefficient of the fixed effect for region-specific intercepts indicates significant variation in system performance across different regions, with a proportion exceeding 20%. Public health surveillance systems in Ghana exhibit substantial regional variations in reliability, requiring tailored interventions to address disparities. Policy makers should prioritise investments and training programmes targeting the lowest-performing regions identified through this study. Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, African, Surveillance, Systems, Epidemiology, Reliability, PanelData*

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