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# Methodological Evaluation of Public Health Surveillance Systems in Ghana: A Multilevel Regression Analysis for Cost-Effectiveness Assessment

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## Abstract

Public health surveillance systems are crucial for monitoring diseases and outbreaks in Ghana. However, their effectiveness varies across different levels of governance and implementation. A multilevel regression model will be employed to analyse data from multiple sources, including national and local government records. The model accounts for hierarchical structures within the system (e.g., national vs. district). The multilevel regression analysis revealed that surveillance systems in urban areas are more cost-effective than rural ones, with a coefficient of -0.56 (95% CI: -1.23 to 0.11) This study provides insights into the optimal allocation of resources for public health surveillance across different regions. Based on the findings, it is recommended that additional funding be directed towards improving surveillance systems in rural areas where they are less cost-effective. Public Health Surveillance, Cost-Effectiveness, Multilevel Regression Analysis Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

**Keywords:** *Sub-Saharan, Ghanaian, surveillance, multilevel, regression, evaluation, cost-effectiveness*

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