



Methodological Evaluation of Public Health Surveillance Systems in Ghana Using Multilevel Regression Analysis for Cost-Effectiveness Measurement

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Published: 03 April 2001 | **Received:** 17 October 2000 | **Accepted:** 10 February 2001

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DOI: [10.5281/zenodo.18728247](https://doi.org/10.5281/zenodo.18728247)

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Abstract

Public health surveillance systems in Ghana play a critical role in monitoring infectious diseases and other public health issues. However, their effectiveness varies across different regions and contexts. A comprehensive search strategy was employed to identify relevant studies from English-language publications. Studies were assessed for their methodology and findings related to the cost-effectiveness of public health surveillance systems. Multilevel regression analyses were used to evaluate these studies, accounting for potential sources of heterogeneity such as geographical location and healthcare system characteristics. A notable finding was that multilevel regression models provided robust estimates of cost-effectiveness, with varying proportions of variance explained between different regions (e.g., urban vs rural areas). The use of multilevel regression analysis in evaluating public health surveillance systems offers a nuanced understanding of their effectiveness and resource allocation. Future research should consider incorporating additional layers of complexity, such as socioeconomic factors influencing disease prevalence, to enhance the accuracy of cost-effectiveness assessments. Public Health Surveillance, Ghana, Multilevel Regression Analysis, Cost-Effectiveness Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Ghanaian, Public Health, Surveillance, Multilevel, Regression, Cost-Effectiveness, Evaluation*

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