



# Methodological Assessment and Cost-Efficiency Evaluation of Public Health Surveillance Systems in Ghana: An Econometric Approach Using Panel Data

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## Abstract

Public health surveillance systems (PHSSs) play a crucial role in monitoring infectious diseases, particularly in resource-limited settings such as Ghana. A mixed-method approach incorporating econometric analysis with a focus on time-series and cross-sectional data from multiple years. The study employs a fixed effects model to analyse the data, accounting for potential confounders such as socio-economic indicators. The econometric panel data estimation revealed that certain surveillance systems were significantly more cost-effective in detecting outbreaks compared to others, with an average reduction of 15% in operational costs per detected case. This study underscores the importance of methodological rigor and cost-effectiveness evaluation in PHSS design and implementation for effective disease control. Public health policymakers should prioritise the adoption of surveillance systems that not only minimise detection time but also optimise resource allocation based on cost-efficiency metrics. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Sub-Saharan, econometric, panel data, cost-effectiveness, surveillance systems, public health, resource-limited*

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