



# Bayesian Hierarchical Model for Evaluating Public Health Surveillance Systems in Ghana,

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## Abstract

Public health surveillance systems are essential for monitoring infectious diseases in developing countries like Ghana. Bayesian hierarchical models were applied to analyse surveillance data from -, accounting for spatial and temporal variations. The model identified regions with underreporting rates of up to 35% in disease incidence, necessitating targeted interventions. Bayesian hierarchical models provide a robust framework for assessing surveillance systems' performance and cost-effectiveness. Targeted interventions should be prioritised in areas with high underreporting rates identified by the model. Public health surveillance, Bayesian hierarchical models, Ghana, 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:** *Ghana, Public Health Surveillance, Bayesian Hierarchical Model, Markov Chain Monte Carlo, Cost-Effectiveness Analysis, Epidemiology, Geographic Information Systems*

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