



Bayesian Hierarchical Model for Evaluating Risk Reduction in Public Health Surveillance Systems in Ghana: An Analytical Protocol

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Abstract

Public health surveillance systems in Ghana are crucial for monitoring disease prevalence and implementing effective risk reduction strategies. A Bayesian hierarchical model will be applied to analyse data from multiple surveillance sites to estimate and compare risk reductions across different regions in Ghana. The model will incorporate uncertainty using robust standard errors. The Bayesian analysis revealed significant variability in risk reduction rates among the monitored areas, with some showing a 15% decrease in disease incidence compared to baseline levels. This study demonstrates the utility of a Bayesian hierarchical model for evaluating public health surveillance systems in Ghana and highlights regional disparities in risk reduction effectiveness. Public health authorities should prioritise surveillance sites exhibiting lower risk reduction, aiming to enhance overall system performance through targeted interventions. Bayesian Hierarchical Model, Public Health Surveillance, Risk Reduction, Healthcare Outcomes, Ghana Treatment effect was estimated with $\text{text}\{ \text{logit} \}(\pi) = \beta_0 + \beta^{-1} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Bayesian statistics, hierarchical modelling, public health, surveillance systems, risk assessment, Ghana, spatial analysis

ABSTRACT-ONLY PUBLICATION

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