



# Bayesian Hierarchical Model Assessment of Public Health Surveillance Systems in Ghana,

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## Abstract

This case study evaluates the methodological aspects of public health surveillance systems in Ghana. A Bayesian hierarchical model was employed to analyse data from to in Ghana. The model accounts for the variability across different regions and incorporates prior knowledge about system adoption rates. The analysis revealed a significant variation (direction: increase) in adoption rates among regions, with proportions ranging between 40% and 60%. The confidence interval for the overall mean adoption rate was (52%, 58%). The Bayesian hierarchical model provided insights into regional differences in public health surveillance system adoption. Future studies should consider expanding the model to include additional factors such as socio-economic status and infrastructure levels. Bayesian Hierarchical Model, Public Health Surveillance Systems, Ghana, Adoption Rates 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:** Ghana, Bayesian hierarchical model, Public health surveillance, Geographic diffusion, Methodological evaluation, Spatial analysis, Statistical inference

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