



# Bayesian Hierarchical Model for Measuring Adoption Rates in Ghana's Public Health Surveillance Systems

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Published: 07 June 2013 | Received: 17 April 2013 | Accepted: 20 May 2013

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DOI: [10.5281/zenodo.18984094](https://doi.org/10.5281/zenodo.18984094)

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## Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in Ghana. However, their effectiveness can vary significantly across different regions and healthcare facilities. A Bayesian hierarchical model was employed to analyse data collected from multiple healthcare facilities. The model accounts for both regional and facility-level variations, providing insights into factors influencing adoption rates. The analysis revealed that the adoption rate varied by region, with some areas showing adoption rates as high as 85% while others were below 30%. Facility size was found to be a significant predictor of adoption. This study demonstrates the utility of Bayesian hierarchical models in understanding and improving public health surveillance system adoption across diverse settings. Policy makers should consider regional variations when implementing and promoting these systems, with particular emphasis on smaller facilities where adoption rates are lower. Bayesian Hierarchical Model, Public Health Surveillance Systems, Adoption Rates, Ghana Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** African, Bayesian, Hierarchical, Model, Surveillance, Adoption, Evaluation

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