



Bayesian Hierarchical Model for Measuring Adoption Rates in Public Health Surveillance Systems in Nigeria

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Abstract

Public health surveillance systems in Nigeria have been established to monitor diseases and track their spread efficiently. The methodology involves developing a Bayesian hierarchical model to analyse adoption data from in Nigeria. The model accounts for spatial and temporal variations using random effects. Adoption rates varied significantly across different regions, with an estimated mean rate of 65% (95% credible interval: 61-70%) over the study period. The Bayesian hierarchical model provided a nuanced understanding of adoption trends and regional disparities in Nigeria's public health surveillance systems. Policy recommendations include targeted interventions to increase adoption rates, particularly in areas with lower adoption levels. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Public Health Surveillance, Bayesian Hierarchical Model, Adoption Rates, Africa, Methodology, Epidemiology*

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