



Methodological Assessment and Yield Optimization in Nigerian Public Health Surveillance Systems Using Bayesian Hierarchical Models

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Abstract

Public health surveillance systems are critical for monitoring diseases and managing public health crises in Nigeria. However, these systems often face challenges such as data quality and variability across different regions. The review will employ a comprehensive search strategy using databases relevant to public health, epidemiology, and Bayesian statistics. Studies published between and will be included if they utilised Bayesian hierarchical models for surveillance system performance assessment in Nigeria. Bayesian hierarchical models have shown promise in improving the accuracy of disease prevalence estimates by accounting for regional variability within a national context. The review concludes that integrating Bayesian hierarchical modelling into public health surveillance systems can enhance their efficiency and effectiveness, particularly in addressing data heterogeneity across Nigeria's diverse regions. Public health officials should consider implementing or refining existing surveillance models to incorporate Bayesian hierarchical frameworks for more accurate and region-specific disease monitoring. Bayesian Hierarchical Models, Public Health Surveillance, Nigeria, Epidemiology Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Public health, surveillance systems, Nigeria, Bayesian models, hierarchical analysis, data quality, yield assessment*

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