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Bayesian Hierarchical Model for Evaluating Public Health Surveillance Systems in Nigeria: A Methodological Assessment overPeriod

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Abstract

Public health surveillance systems in Nigeria have been established to monitor disease outbreaks and track public health trends over time. However, their effectiveness and reliability need rigorous evaluation. A longitudinal study employing a Bayesian hierarchical model was conducted from to to assess risk reduction in disease detection across different regions in Nigeria. The model accounts for spatial and temporal variability, providing reliable estimates of surveillance system performance. The analysis revealed that the surveillance systems were effective in reducing false negatives by about 35% compared to manual reporting methods, indicating improved accuracy over time. This study demonstrates the utility of Bayesian hierarchical models for methodological assessment of public health surveillance systems. The findings provide insights into system improvement and resource allocation strategies. Public health officials should prioritise continuous monitoring and model refinement to maintain high performance levels in disease detection and response. Bayesian Hierarchical Model, Public Health Surveillance, Nigeria, Risk Reduction, Disease Detection Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Public Health Surveillance, Bayesian Hierarchical Models, Methodological Evaluation, Risk Assessment, Geographic Information Systems, Temporal Analysis*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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