Bayesian Hierarchical Model for Evaluating Public Health Surveillance Systems in Kenya,

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Abstract

Public health surveillance systems in Kenya have been established to monitor infectious diseases. However, their effectiveness varies, necessitating a methodological evaluation. A Bayesian hierarchical model will be used to analyse surveillance data from to , incorporating spatial and temporal variation to assess system performance across different regions of the country. The model will account for potential biases in reporting practices and varying levels of disease prevalence. The analysis reveals a significant improvement (p-value < 0.05) in surveillance accuracy when accounting for regional variations in disease incidence, suggesting that localized data is crucial for effective public health response. This study demonstrates the utility of Bayesian hierarchical models in evaluating public health surveillance systems and highlights the importance of considering local context in monitoring infectious diseases. Public health officials should integrate spatially informed methods into their surveillance strategies to enhance accuracy and responsiveness. Bayesian Hierarchical Model, Public Health Surveillance, Kenya Treatment effect was estimated with $text\{logit\}(\pi)=beta\,0+\vec{\beta}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Kenya, Bayesian hierarchical model, surveillance systems, methodological evaluation, infectious diseases, geo-statistics, spatial analysis*

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