



Methodological Evaluation of Public Health Surveillance Systems in Senegal Using Bayesian Hierarchical Models for Clinical Outcomes Assessment

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Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in Senegal, but their effectiveness varies widely. Bayesian hierarchical models were employed to analyse data from multiple surveillance sites across the country, providing a nuanced understanding of disease prevalence and treatment efficacy. The analysis revealed significant variation in infection rates among different regions, with some areas experiencing up to 20% higher incidence compared to others. Bayesian hierarchical models offer a robust framework for evaluating public health surveillance systems and improving clinical outcomes in Senegal. Continued use of Bayesian hierarchical models alongside targeted interventions can enhance disease management strategies. public health, surveillance, Bayesian hierarchical model, clinical outcomes, Senegal Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^{-1} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Bayesian, Hierarchical, Markov Chain Monte Carlo, Surveillance, Epidemiology, Clinical Trials*

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