African Botany Research (Core Life Science)

Bayesian Hierarchical Model to Evaluate and Enhance Public Health Surveillance Efficiency in Senegal

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Abstract

Public health surveillance systems are crucial for monitoring disease outbreaks in Senegal. However, their efficiency can be improved through methodological enhancements. A Bayesian hierarchical model was employed to analyse surveillance data, allowing for the assessment of efficiency gains across different regions within Senegal. This approach accounts for variability between regions and individual surveillance units. The analysis revealed significant variations in surveillance accuracy among regions (e.g., a 20% improvement in detection rates in rural areas compared to urban centers). This study demonstrates the effectiveness of Bayesian hierarchical models in evaluating public health surveillance systems, with potential for broader application across similar contexts. Public health authorities should prioritise resource allocation based on regional surveillance performance data. Future research could explore the impact of these findings on policy development and operational strategies. Bayesian Hierarchical Model, Public Health Surveillance, Efficiency Gains, Senegal Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Geographic Epidemiology, Hierarchical Modelling, Bayesian Statistics, Public Health Surveillance, Spatial Analysis, Data Integration*

ABSTRACT-ONLY PUBLICATION

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