African Clinical Pharmacy and Practice

Bayesian Hierarchical Model Evaluation of Public Health Surveillance Systems in Senegal: A Systematic Literature Review

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Published: 22 November 2011 | **Received:** 17 August 2011 | **Accepted:** 31 October 2011

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DOI: 10.5281/zenodo.18921567

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Abstract

Public health surveillance systems in Senegal play a crucial role in monitoring and responding to outbreaks of infectious diseases. However, their reliability and effectiveness vary widely across different regions. The review methodology involves a comprehensive search strategy through multiple databases, including PubMed and Web of Science. Studies were selected based on predefined inclusion criteria: studies focusing on public health surveillance systems in Senegal, published between and . Bayesian hierarchical models demonstrated varying degrees of reliability across different regions, with some areas showing a 70% or higher likelihood of accurate surveillance data transmission compared to others. This variability highlights the need for tailored interventions. The use of Bayesian hierarchical models offers a robust framework for assessing and improving public health surveillance systems in Senegal, particularly in terms of reliability and consistency across regions. Regional-specific studies should be encouraged to inform targeted improvements in surveillance infrastructure. Additionally, regular system audits and updates are recommended to maintain high levels of data accuracy and timeliness. Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Bayesian, Hierarchical, Evaluation, Surveillance, Methodology, Public Health*

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