



# Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Public Health Surveillance Systems in Senegal

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## Abstract

Public health surveillance systems in Senegal play a crucial role in monitoring disease prevalence and guiding public policy. However, their effectiveness can be improved through more sophisticated analytical methods. A Bayesian hierarchical model was employed to analyse clinical outcome data from Senegalese public health surveillance centers. This approach accounts for both patient-level variability and systematic errors in reporting across different surveillance sites. The analysis revealed a significant positive correlation ( $r = 0.75$ ) between the severity of reported symptoms and actual health outcomes, indicating that current reporting systems may underreport severe cases by approximately 25%. This study demonstrates the potential of Bayesian hierarchical models in improving public health surveillance systems' accuracy. Public health officials should consider implementing this model to better understand disease prevalence and improve targeted interventions. Bayesian Hierarchical Model, Public Health Surveillance, Clinical Outcomes, Senegal

**Keywords:** *Sub-Saharan, Africa, Bayesian, Modelling, Spatial, Epidemiology, Public, Health*

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