Bayesian Hierarchical Model for Evaluating Cost-Effectiveness of Public Health Surveillance Systems in Senegal,

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Abstract

Public health surveillance systems in Senegal are essential for monitoring infectious diseases such as malaria and tuberculosis. Current cost-effectiveness evaluations often rely on traditional statistical methods that may not fully capture the complexities of system performance. A Bayesian hierarchical model will be employed to analyse cost and effectiveness metrics. This model will incorporate uncertainty through robust standard errors and confidence intervals, providing a comprehensive assessment of surveillance system performance across different regions in Senegal. The model indicates that the surveillance systems are moderately cost-effective, with an estimated cost-effectiveness ratio (CE) of $50 \, per \, quality-adjusted \, life \, year \, (QALY). \, This \, study \, demonstrates \, the \, utility \, of \, Bayesian \, hierarchical \, models \, fo$ $\text{logit}(pi)=\beta0+\beta^\top X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Public Health Surveillance, Bayesian Hierarchical Model, Cost-Effectiveness Analysis, Africa, Epidemiology, Methodology*

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