



Bayesian Hierarchical Model for Measuring Cost-Effectiveness of District Hospitals in Senegal: A Methodological Evaluation

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Abstract

District hospitals in Senegal are critical for providing healthcare services to rural populations. However, their cost-effectiveness is a matter of debate among policymakers and stakeholders. Bayesian hierarchical models were employed to analyse data from multiple district hospitals. The models accounted for variability across different hospitals and regions while estimating costs and outcomes. The analysis revealed that hospital A had significantly higher cost-effectiveness ratios (CER) compared to the national average, indicating potential inefficiencies in resource distribution. While Bayesian hierarchical modelling provided valuable insights into district hospital performance, further research is needed to validate these findings and inform policy decisions. Policymakers should prioritise interventions that address identified inefficiencies in high-performing hospitals A to improve overall healthcare delivery in Senegal. Bayesian Hierarchical Models, District Hospitals, Cost-Effectiveness, Senegal Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *District hospitals, African healthcare systems, Bayesian methods, Hierarchical modelling, Cost-effectiveness analysis, Quantitative health economics, Econometrics*

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