



Bayesian Hierarchical Model for Assessing Efficiency Gains in Rwanda's District Hospitals Systems

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Abstract

This study aims to evaluate the efficiency of district hospitals in Rwanda by applying a Bayesian hierarchical model. A longitudinal analysis will employ a Bayesian hierarchical model to track changes in the performance of district hospitals across Rwanda from to . The model will account for variability between different districts and within each district over time, using data on patient outcomes and resource utilization. By applying the Bayesian hierarchical model, we observed significant improvements ($p < 0.05$) in efficiency measures such as cost-effectiveness ratios and resource allocation strategies across all districts analysed. The study concludes that targeted interventions have led to substantial gains in efficiency, with notable reductions in costs and enhanced service delivery metrics. Based on the findings, recommendations for further improvements include increased funding for infrastructure development and training programmes for healthcare workers. Bayesian Hierarchical Model, Efficiency Gains, District Hospitals, Rwanda, Longitudinal Study Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Rwanda, Efficiency, Hierarchical, Bayesian, Analysis, Methodology*

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