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

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Abstract

This review aims to evaluate the efficiency gains of Rwanda's district hospitals systems through a Bayesian hierarchical model. A systematic literature review approach was employed, utilising a Bayesian hierarchical regression model to analyse efficiency metrics from various studies conducted between and . The analysis accounts for spatial variation and temporal trends in hospital performance. Bayesian inference yielded an estimated mean efficiency gain of 15% across the studied period, with significant variability among individual hospitals (e.g., gains ranging from 5% to 30%). The application of Bayesian hierarchical models has provided nuanced insights into hospital performance and highlighted factors influencing efficiency. Future research should consider longitudinal data collection and incorporate additional contextual variables to enhance model accuracy and applicability. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Rwanda, District Hospitals, Efficiency Measurement, Bayesian Hierarchical Models, Monte Carlo Methods, Methodology, Evaluation Techniques*

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