



# Bayesian Hierarchical Model Assessment of District Hospitals Efficiency in Uganda

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## Abstract

District hospitals in Uganda play a critical role in healthcare delivery. However, their efficiency varies significantly across different districts. This study aims to evaluate and enhance these systems through advanced statistical methods. Bayesian hierarchical models were employed to analyse data from district hospitals. These models account for both hospital-specific characteristics and contextual factors affecting their performance. Uncertainty was quantified using robust standard errors. The analysis revealed that certain districts exhibited efficiency levels significantly higher than others, indicating disparities in resource allocation and management practices. Bayesian hierarchical models provide a nuanced understanding of district hospital efficiency in Uganda, highlighting the importance of tailored interventions to optimise performance. Strategic investments should be directed towards underperforming districts to align with best practices identified through this study. Continuous monitoring and feedback loops are essential for sustained improvement. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *District Hospitals, Uganda, Hierarchical Models, Bayesian Statistics, Econometric Methods, Performance Measurement, Quantitative Analysis*

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