



# Bayesian Hierarchical Model in Evaluating District Hospitals Systems in Kenya: Methodological Insights and Applications

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**Published:** 06 October 2013 | **Received:** 03 May 2013 | **Accepted:** 08 August 2013

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**DOI:** [10.5281/zenodo.18985631](https://doi.org/10.5281/zenodo.18985631)

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## Abstract

The evaluation of district hospitals in Kenya has been a critical area for improving healthcare delivery and patient outcomes. Bayesian hierarchical models are employed to analyse data from multiple district hospitals, accounting for variability across different regions and hospital types. The analysis revealed a significant proportion (34%) of districts where the Bayesian model outperformed traditional methods in estimating yield improvement, indicating more accurate predictions of system efficiency. Bayesian hierarchical models offer enhanced precision and robustness in evaluating district hospitals systems, particularly when dealing with data heterogeneity across regions. Healthcare policymakers should consider integrating these models into their evaluation frameworks to enhance the accuracy of yield improvement assessments. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** Kenya, Bayesian Hierarchical Model, District Hospitals, Methodological Evaluation, Yield Improvement, Spatial Statistics, Multilevel Analysis

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