



# Bayesian Hierarchical Model for Evaluating Adoption Rates in District Hospitals Systems in Kenya,

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## Abstract

The literature on district hospitals in Kenya is scattered, lacking a comprehensive methodological evaluation of their systems and performance. A Bayesian hierarchical model was employed to analyse data from multiple districts over two years, accounting for variability in hospital systems and regional differences. The analysis revealed an average adoption rate of 58% across the districts, with significant variation between hospitals (range: 40-72%). Bayesian hierarchical modelling provided a nuanced understanding of district hospital performance, highlighting areas for improvement in technology and resource allocation. District health authorities should prioritise training programmes and infrastructure upgrades to enhance adoption rates and service delivery. 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:** *African healthcare, Bayesian statistics, hierarchical modelling, adoption rates, district hospitals, methodological evaluation, quantitative methods*

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