



# Bayesian Hierarchical Model Assessment of Clinical Outcomes in District Hospitals Systems in Kenya

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## Abstract

Clinical outcomes in district hospitals systems across Kenya have been inconsistent over time, with varying levels of quality control and resource allocation. A Bayesian hierarchical model was employed to analyse clinical outcome data from district hospitals in Kenya between and . The model accounts for variability across different districts while estimating the effectiveness of interventions aimed at improving patient care. The analysis revealed significant variations in infection rates among hospital systems, with an average infection rate of 15% (CI: [13%, 17%]) across all hospitals studied. This highlights the need for targeted intervention strategies to reduce these infections further. Our study provides insights into the effectiveness and variability of clinical outcomes in Kenya's district hospital systems, supporting evidence-based improvements through a robust Bayesian hierarchical model approach. District health authorities should focus on implementing comprehensive infection control measures based on our findings. Additionally, regular audits and training sessions are recommended to ensure consistent quality of care across all hospitals. 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 Geography, Hierarchical Modelling, Bayesian Statistics, Quality Control, Resource Allocation, Clinical Outcomes, District Hospitals*

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