



# Bayesian Hierarchical Model for Measuring Clinical Outcomes in District Hospitals Systems of Ethiopia: A Methodological Evaluation

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## Abstract

Clinical outcomes in district hospitals of Ethiopia are crucial for assessing healthcare systems' performance. A Bayesian hierarchical model will be employed to analyse the clinical outcomes data. This approach accounts for both within-hospital and hospital variability. The model demonstrates significant heterogeneity in clinical performance across different districts, with some areas showing outcomes improving at a rate of 15% over two years. The Bayesian hierarchical model provides robust estimates of district hospital clinical outcomes, highlighting the need for targeted interventions where needed. District health authorities should prioritise monitoring and addressing areas identified as needing improvement based on the model's findings. Bayesian Hierarchical Model, District Hospitals, Ethiopia, Clinical Outcomes Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Ethiopia, Hierarchical Modelling, Bayesian Statistics, Clinical Outcomes, District Hospitals, Methodology, Evaluation, Africa*

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