



Bayesian Hierarchical Model for Measuring Adoption Rates in Ghanaian District Hospitals Systems,

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Abstract

The adoption rates of new medical interventions in Ghanaian district hospitals are critical for improving patient outcomes and resource utilization. A Bayesian hierarchical model will be employed to analyse data on medical interventions' adoption rates within district hospitals. The model accounts for hospital-level heterogeneity and provides robust standard errors for uncertainty quantification. The analysis revealed that the adoption rate varied significantly between different hospitals, with a notable proportion of interventions adopted in fewer than half of the districts studied. The Bayesian hierarchical model successfully captured variation at multiple levels and provided more precise estimates compared to traditional models. Future studies should validate these findings across additional datasets to ensure generalizability and reliability. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta^T X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographical, Bayesian, Hierarchical, Model, Adoption, Interventions, Ghana*

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