



# Bayesian Hierarchical Model for Evaluating Adoption Rates in Ethiopian Community Health Centres Systems,

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## Abstract

Community health centers (CHCs) in Ethiopia have been established to improve access to healthcare services. However, their effectiveness varies across different regions and communities. A Bayesian hierarchical model was employed to analyse data from Ethiopian community health centers over two years. The model incorporates spatial heterogeneity to account for variations in adoption rates across different regions. Bayesian hierarchical modelling revealed distinct patterns of CHC adoption, with significant differences observed between urban and rural areas ( $p < 0.05$ ). The Bayesian approach provided nuanced insights into the factors influencing CHC adoption and highlighted disparities in service uptake across geographical regions. Strategic planning should be tailored to address specific challenges identified within each region, particularly focusing on rural areas with lower adoption rates. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta^T X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Ethiopia, Bayesian Hierarchical Model, Adoption Rates, Community Health Centres, Methodology, Evaluation, Spatial Analysis*

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