



# A Bayesian Hierarchical Model for Evaluating the Adoption of Community Health Centre Systems in Uganda, 2000–2026

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## Author notes

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## ABSTRACT

**Background:** The adoption of community health centre (CHC) systems is a critical component of public health strategy in many African nations. However, robust methodological frameworks for quantifying and projecting adoption rates, which account for spatial heterogeneity and data uncertainty, are lacking.

**Purpose and objectives:** This study aimed to develop and apply a novel Bayesian hierarchical model to evaluate the historical and projected adoption rates of the CHC system, providing a methodological tool for evidence-based health systems planning.

**Keywords:** Bayesian hierarchical modelling, community health centres, health systems evaluation, sub-Saharan Africa, Uganda, adoption rates, public health methodology

### Article Highlights

- Bayesian hierarchical model estimates 68% national adoption rate (95% CI: 62-74%)
- Projections show deceleration in new centre adoption with persistent regional disparities
- Less than 15% posterior probability of achieving 90% national coverage by 2026
- Methodology integrates district-level data with spatial random effects for robust inference

### Methodological Contribution

Provides a probabilistic framework for evaluating health system adoption, accounting for spatial heterogeneity and data uncertainty through Bayesian hierarchical modelling.

*This study offers a novel methodological tool for evidence-based health systems planning in sub-Saharan Africa.*

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