

A Bayesian Hierarchical Modelling Approach to Cost-Effectiveness in Ugandan District Hospital Systems

A Methodological Evaluation

David Kato Mubiru¹|Aisha Nalwoga²|Julius Ochieng Okello¹

Makerere University Business School (MUBS) • Mbarara University of Science and Technology

Correspondence: dmubiru@hotmail.com

Received: 07 July 2018 | Accepted: 13 September 2018 | Published: 12 October 2018 | DOI:

[10.5281/zenodo.18955404](https://doi.org/10.5281/zenodo.18955404)

ABSTRACT

Background: District hospital systems in low-resource settings require robust, context-sensitive methods for evaluating cost-effectiveness to inform resource allocation. Traditional frequentist approaches often struggle with sparse, hierarchical data and fail to quantify uncertainty fully.

Purpose and objectives: This study aimed to methodologically evaluate a Bayesian hierarchical modelling framework for measuring cost-effectiveness in a low-resource healthcare system, using district hospitals as a case study.

Keywords: *Bayesian hierarchical modelling, cost-effectiveness analysis, district hospital systems, sub-Saharan Africa, health economics, low-resource settings, Uganda*

Article Highlights

- Bayesian hierarchical modelling quantifies greater uncertainty in cost-effectiveness estimates.
- Substantial heterogeneity found between district hospitals ($\tau^2 = 0.42$).
- Framework designed for sparse, hierarchical data in low-resource settings.
- Superior to frequentist approaches for multi-level uncertainty in decentralised systems.

Methodological Core

A Bayesian hierarchical model estimating cost per DALY averted, with hospital-level random effects (u_j) to capture site heterogeneity using Hamiltonian Monte Carlo inference.

This paper presents a methodological framework, not new clinical or economic outcome data.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

REQUEST FULL PAPER

 **Email:** info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

 **Submit at:** app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge