



A Bayesian Hierarchical Model for Evaluating Risk Reduction in Senegal's Community Health Centre Systems

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Author notes

Mamadou Diop is affiliated with Université Gaston Berger (UGB), Saint-Louis and focuses on Medicine research in Africa.

ABSTRACT

Background: Community health centres are critical for primary care delivery in many African nations, yet robust methodological frameworks for evaluating their systemic impact on population health risks are lacking. Existing evaluations often rely on aggregate statistics that mask heterogeneity and uncertainty.

Purpose and objectives: This study aimed to develop and apply a novel Bayesian hierarchical model to quantify the reduction in key health risks attributable to the community health centre system, using a national-scale dataset from Senegal.

Keywords: Bayesian hierarchical modelling, risk reduction, community health centres, primary healthcare, sub-Saharan Africa, Senegal, health systems evaluation

Article Highlights

- Bayesian model reveals significant geographical heterogeneity in system effectiveness.
- Substantial reduction in risk of unattended births linked to centre utilisation.
- Provides a statistically robust framework for performance evaluation and resource allocation.
- Highlights need to address geographical inequities in primary healthcare delivery.

Methodological Contribution

Introduces a novel application of Bayesian hierarchical modelling for health systems evaluation in low-resource settings, moving beyond aggregate statistics to quantify uncertainty and heterogeneity.

This study offers a replicable framework for evaluating primary healthcare systems across sub-Saharan Africa.

ABSTRACT-ONLY PUBLICATION

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

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