



# Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Urban Primary Care Networks in Senegal: A Methodological Study

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**Published:** 22 March 2013 | **Received:** 27 October 2012 | **Accepted:** 20 February 2013

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**DOI:** [10.5281/zenodo.18989081](https://doi.org/10.5281/zenodo.18989081)

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## Abstract

Urban primary care networks (PNCs) in Senegal have been established to improve access to healthcare and outcomes for underserved populations. However, their effectiveness varies across different settings. A Bayesian hierarchical model was applied to analyse data from urban PNCs in Senegal. The model accounts for variability between different healthcare facilities and patient characteristics. The analysis revealed significant variation in clinical outcomes across the network, with certain facilities showing higher success rates in treatment adherence and patient satisfaction compared to others. This study highlights the importance of tailored interventions within urban PNCs based on their performance metrics. Urban health authorities should prioritise support for PNCs with lower clinical outcomes, focusing on areas such as staff training and resource allocation. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^{-1} p X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Urban Primary Care Networks, Bayesian Hierarchical Models, Senegal, Methodology, Geographic Variation, Clinical Outcomes Measurement, Quantitative Research Methods*

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