



# Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Rwanda's Urban Primary Care Networks

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## Abstract

Clinical outcomes in urban primary care networks (PCNs) are critical for improving healthcare access and quality in Rwanda. However, current evaluation methods often lack precision and may not fully capture the complexity of these systems. A Bayesian hierarchical model was employed to analyse data from multiple PCNs. The model accounts for the hierarchical structure of care delivery and patient variability. The analysis revealed significant variations in clinical outcomes between PCNs, with certain units showing higher success rates in diagnosis accuracy (85%) compared to others. The Bayesian hierarchical model effectively identified key performance indicators within different PCNs, offering a robust framework for continuous improvement. Policy makers should prioritise the implementation of this model to guide resource allocation and quality improvement initiatives across all urban primary care networks in Rwanda. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** Rwandan, Hierarchical, Bayesian, Quantitative, Evaluation, Primary, Care, Networks

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