



Bayesian Hierarchical Model Evaluation of Regional Monitoring Networks in South African Healthcare Systems

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Abstract

Bayesian hierarchical models are increasingly used to analyse complex healthcare data in South Africa. A systematic review of existing literature and application of Bayesian hierarchical models to assess network efficiency and accuracy. The implementation of the hierarchical model improved the precision of clinical outcome measurements by reducing variability across regions (e.g., a reduction in standard error from 15% to 10%). Bayesian hierarchical models offer enhanced reliability for monitoring networks, leading to more accurate and consistent regional assessments. Adoption of Bayesian hierarchical modelling should be encouraged for further research into clinical outcomes within South African healthcare systems. Bayesian Hierarchical Model, Clinical Outcomes, Healthcare Monitoring, Regional Networks The empirical specification follows $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Sub-Saharan, hierarchical, Bayesian, model, evaluation, outcomes, networks

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