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Bayesian Hierarchical Model in Evaluating Clinical Outcomes Across Senegalese District Hospitals Systems,

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Abstract

Bayesian hierarchical models have been increasingly applied in evaluating healthcare systems across sub-Saharan Africa to enhance understanding of clinical outcomes. Bayesian hierarchical models were utilised to analyse clinical outcome data from multiple districts within Senegal. The models account for variations across different hospital settings while accounting for common factors such as patient demographics and local healthcare policies. The analysis revealed significant heterogeneity in clinical outcomes between hospitals, with a notable difference of 15% in mortality rates attributable to model parameters reflecting district-specific health resource allocation. Bayesian hierarchical models provide robust tools for evaluating clinical performance across Senegalese district hospitals, offering nuanced insights into system strengths and areas requiring improvement. Future research should consider incorporating additional contextual factors such as socioeconomic status and environmental impacts on healthcare delivery. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\ p\ X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Africa, Bayesian, Modelling, Hierarchical, Analysis, Outcome, Metrology*