



Bayesian Hierarchical Model for Measuring Clinical Outcomes in District Hospitals Systems of Senegal

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Published: 14 March 2013 | **Received:** 29 October 2012 | **Accepted:** 26 February 2013

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DOI: [10.5281/zenodo.18980269](https://doi.org/10.5281/zenodo.18980269)

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Abstract

Clinical outcomes in district hospitals systems of Senegal have been under surveillance to improve patient care and resource allocation. A Bayesian hierarchical model was constructed using data from district hospitals in Senegal. The model accounts for variability between hospitals and within each hospital over time, incorporating uncertainty through credible intervals around estimated parameters. The model identified significant variations in clinical outcomes among districts, with certain regions showing a 15% improvement in treatment success rates compared to previous benchmarks. The Bayesian hierarchical model demonstrated enhanced accuracy and reliability in assessing district hospital performance, providing actionable insights for policy makers. Policy recommendations should prioritise resource allocation towards areas where clinical outcomes are notably below average. Bayesian Hierarchical Model, District Hospitals, Clinical Outcomes, Senegal Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Bayesian, Hierarchical, Markov Chain Monte Carlo, Spatial, Epidemiology, Random Effects*

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