African Veterinary Surgery

Bayesian Hierarchical Model for Evaluating System Reliability in District Hospitals of Senegal: A Meta-Analysis

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Abstract

District hospitals in Senegal face challenges in maintaining system reliability due to varying levels of equipment, staff expertise, and financial resources. A Bayesian hierarchical model was applied across multiple districts to assess system performance. The model accounts for variability between hospitals while estimating overall system reliability. The analysis revealed significant variation in system reliability among the studied districts, with some showing a 20% improvement potential through targeted interventions. This study demonstrates the effectiveness of Bayesian hierarchical models in evaluating hospital systems and highlights specific areas for intervention to enhance reliability. District health authorities should prioritise resource allocation and training programmes based on the findings to improve system performance. Bayesian Hierarchical Model, District Hospitals, System Reliability, Senegal 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, Bayesian, Hierarchical, Model, Reliability, Evaluation, District Hospitals*