



Methodological Evaluation of District Hospitals Systems in Uganda Using Panel Data for System Reliability Measurement

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Abstract

Ugandan district hospitals play a critical role in healthcare delivery, yet their operational efficiency is often suboptimal. Panel data from Ugandan district hospitals were analysed using fixed effects models to estimate system reliability. Robust standard errors account for within-hospital variability. The analysis revealed that patient wait times in some districts exceeded the national average by up to 30%, suggesting systemic inefficiencies. Panel data estimation highlighted critical areas needing attention, particularly in improving resource allocation and service delivery efficiency. Immediate interventions are recommended to reduce patient wait times and enhance overall system reliability. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^* p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African healthcare, panel data analysis, system reliability, fixed effects model, econometrics, hospital efficiency, geographic information systems*

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