



# Cost-Effectiveness Analysis of District Hospital Systems in Tanzania Using Multilevel Regression Models

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**Published:** 14 February 2006 | **Received:** 12 November 2005 | **Accepted:** 12 January 2006

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**DOI:** [10.5281/zenodo.18823346](https://doi.org/10.5281/zenodo.18823346)

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## Abstract

District hospitals in Tanzania play a crucial role in healthcare delivery, but their efficiency varies significantly across different regions. Multilevel regression models were employed to analyse data from multiple levels (districts and hospitals) in Tanzania, accounting for hierarchical structures inherent in healthcare delivery systems. The analysis revealed significant variations in cost-effectiveness across districts, with a notable proportion of variance explained by hospital-specific factors such as staffing levels and equipment availability. Multilevel regression models provided valuable insights into the operational efficiency of district hospitals, facilitating targeted interventions to enhance service delivery and resource allocation. Investment in human resources training and upgrading infrastructure is recommended to improve cost-effectiveness and patient outcomes in Tanzania's district hospital systems. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^{-1} p X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Tanzania, District Hospitals, Multilevel Models, Cost-Effectiveness, Hierarchical Analysis, Regression, Evaluation, Geographic Medicine*

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