

Methodological Evaluation and Efficiency Gains in Rwandan District Hospital Systems

A Multilevel Regression Analysis

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ABSTRACT

Background: District hospitals are critical nodes in Rwanda's healthcare system, yet systematic evaluations of their operational efficiency remain limited. Existing analyses often fail to account for the hierarchical structure of health service data, potentially leading to biased estimates of performance drivers.

Purpose and objectives: This review critically evaluates the application of multilevel regression modelling for assessing efficiency in Rwandan district hospitals. It aims to synthesise methodological approaches, identify key determinants of efficiency, and propose a robust analytical framework for future health systems research.

Keywords: *District hospitals, Sub-Saharan Africa, Health systems evaluation, Multilevel modelling, Operational efficiency, Resource allocation, Developing countries*

Article Highlights

- Multilevel regression reveals significant hospital-level variation in operational efficiency.
- Bed occupancy rate emerges as a consistently positive driver of efficiency.
- Single-level analyses produce biased estimates by ignoring clustered data structure.
- Robust hierarchical data collection is essential for reliable policy evidence.

Core Analytical Framework

Proposed model: A three-level random intercepts structure accounting for province, hospital, and observation-level effects, with robust standard errors for inference.

This review synthesises methodological approaches for evaluating health system efficiency in Rwanda.

ABSTRACT-ONLY PUBLICATION

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