



# Methodological Evaluation of District Hospitals Systems in Senegal Using Panel Data to Measure Efficiency Gains

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## Abstract

This study addresses a current research gap in Medicine concerning Methodological evaluation of district hospitals systems in Senegal: panel-data estimation for measuring efficiency gains in Senegal. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A mixed-methods design was used, combining survey and interview data collected over the study period. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Methodological evaluation of district hospitals systems in Senegal: panel-data estimation for measuring efficiency gains, Senegal, Africa, Medicine, original research This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. Treatment effect was estimated with  $\text{text}\{logit\}(\pi) = \beta_0 + \beta^T p X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Sub-Saharan, African, Hospital, Systems, Evaluation, Panel, Data, Metrics*

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