



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

Mulu Gebru<sup>1,2</sup>, Yosef Gebreab<sup>1</sup>

<sup>1</sup> Adama Science and Technology University (ASTU)

<sup>2</sup> Jimma University

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**Correspondence:** [mgebru@hotmail.com](mailto:mgebru@hotmail.com)

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## Author notes

*Mulu Gebru is affiliated with Adama Science and Technology University (ASTU) and focuses on Medicine research in Africa.*

*Yosef Gebreab is affiliated with Adama Science and Technology University (ASTU) and focuses on Medicine research in Africa.*

## Abstract

This study addresses a current research gap in Medicine concerning Methodological evaluation of district hospitals systems in Ethiopia: panel-data estimation for measuring system reliability in Ethiopia. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured review of relevant literature was conducted, with thematic synthesis of key findings. 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 Ethiopia: panel-data estimation for measuring system reliability, Ethiopia, Africa, Medicine, meta analysis 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:** *Geography, Africa, Panel, data, Ethiopia, System, reliability, MESR*

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