



# Evaluating Health System Efficiency Gains in Ugandan District Hospitals

*A Difference-in-Differences Methodological Protocol*

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**Published:** 03 July 2002 **Received:** 25 February 2002

**Accepted:** 01 June 2002 **DOI:**  
[10.5281/zenodo.18948068](https://doi.org/10.5281/zenodo.18948068)

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## ABSTRACT

**Background:** District hospitals in Uganda face persistent challenges in resource allocation and service delivery, constraining health system performance. Robust, quantitative methods are required to evaluate the efficiency impacts of systemic interventions, moving beyond descriptive assessments.

**Purpose and objectives:** This protocol details a methodological approach to quantify efficiency gains from a national health system strengthening initiative. The primary objective is to estimate the causal effect of the intervention on hospital-level technical efficiency, measured via a stochastic frontier analysis composite score.

**Keywords:** *Health system efficiency, District hospitals, Sub-Saharan Africa, Difference-in-differences, Resource allocation, Uganda, Service delivery*

### Article Highlights

- Proposes a quasi-experimental design to estimate causal effects on hospital efficiency.
- Applies econometric difference-in-differences to stochastic frontier analysis scores.
- Provides a rigorous framework for policy evaluation in resource-limited settings.
- Aims to detect a minimum 15% relative improvement in technical efficiency.

### Core Econometric Model

$$Y_{it} = \beta_0 + \beta_1 \text{Treat}_i + \beta_2 \text{Post}_t + \delta (\text{Treat}_i \times \text{Post}_t) + \varepsilon_{it}$$
, where  $\delta$  is the causal parameter of interest for the intervention.

*This is a research protocol; empirical results are anticipated from future analysis.*

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