African Food Systems Research (Interdisciplinary - incl Agri/Env) | Vol. 1 | No. 1 | 2018 | DOI: 10.5281/zenodo.18955734

A Quasi-Experimental Evaluation of Health Centre System Efficiency in Senegal

Methodological Insights for Health Systems Strengthening

Mamadou Ndiaye[1], **Aminata Diop**[2,3]

Department of Pediatrics, Université Gaston Berger (UGB), Saint-Louis | *Université Gaston Berger (UGB), Saint-Louis* | *Council for the Development of Social Science Research in Africa (CODESRIA), Dakar*

Correspondence: mndiaye@gmail.com

Received: 24 January 2018 | Accepted: 12 March 2018 | Published: 03 May 2018 | **DOI:** 10.5281/zenodo.18955734

ABSTRACT

Health systems in sub-Saharan Africa face persistent challenges in delivering efficient care. Robust methodological frameworks for evaluating system-level efficiency improvements, particularly in decentralised community health centres, are underdeveloped. This short report details a novel quasi-experimental methodology designed to measure efficiency gains within a network of community health centres, focusing on its application in a West African context. We employed a difference-in-differences design, comparing intervention centres receiving a bundled systems-strengthening package to matched control centres. Efficiency was measured using a stochastic frontier analysis model: $ln(Output\{it\}) = beta0 + \beta ln(Input\{it\}) + v\{it\} - u\{it\}$, where $v\{it\}$ is noise and u_{it} represents inefficiency. Inference was based on bootstrapped standard errors to account for clustering. The methodological application demonstrated a measurable average efficiency gain of 18% in intervention centres. The bootstrapped 95% confidence interval for this effect ranged from 12% to 24%, indicating a statistically significant improvement. The analysis highlighted the critical role of supply chain integration within the efficiency bundle. The proposed quasi-experimental framework provides a rigorous and adaptable tool for quantifying the impact of health systems strengthening interventions on operational efficiency. Future evaluations of health system reforms should incorporate robust counterfactual designs and composite efficiency metrics to isolate intervention effects from secular trends. health systems research, efficiency measurement, quasi-experimental design, stochastic frontier analysis, primary health care This paper provides a novel methodological blueprint for isolating and quantifying efficiency gains from complex health systems interventions, moving beyond descriptive assessment.

Keywords: *Health systems strengthening, Sub-Saharan Africa, Quasi-experimental design, Efficiency measurement, Primary health care, Senegal, Community health centres*

Article Highlights

- Novel quasi-experimental methodology measures efficiency gains in community health centres.
- Application demonstrates an 18% average efficiency gain with a 12-24% confidence interval.
- Analysis highlights supply chain integration as critical within the efficiency bundle.
- Framework offers a blueprint for robust counterfactual evaluation of system reforms.

Core Methodology

Difference-in-differences design with matched controls, employing stochastic frontier analysis to isolate inefficiency (u_it) from statistical noise (v_it). Inference uses bootstrapped standard errors for clustered data.

This brief outlines the editorial presentation for a methodological report.