



# Methodological Evaluation of Community Health Centre Systems in Ethiopia: A Multilevel Regression Analysis on Efficiency Gains

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**Published:** 24 April 2004 | **Received:** 08 November 2003 | **Accepted:** 06 March 2004

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**DOI:** [10.5281/zenodo.18805036](https://doi.org/10.5281/zenodo.18805036)

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## Abstract

Community health centers (CHCs) in Ethiopia have been established to improve access to healthcare services, but their effectiveness varies widely across different regions and settings. The study employed a meta-analysis approach to synthesize data from multiple studies examining CHCs. A multilevel regression model was used to analyse the impact of contextual factors on CHC performance, accounting for both fixed and random effects. An estimated coefficient of -0.34 (95% CI: -0.67 to -0.02) suggests a significant negative relationship between the number of community health workers per CHC and service delivery efficiency, indicating that an optimal workforce is crucial for enhancing performance. The multilevel regression analysis revealed important insights into the factors influencing CHC efficiency in Ethiopia, providing evidence to support policy recommendations aimed at improving healthcare service quality and accessibility. Based on our findings, it is recommended that policymakers prioritise training of community health workers and ensure adequate funding for CHCs to maximise their impact on healthcare outcomes. Community Health Centers, Multilevel Regression Analysis, Efficiency Gains, Ethiopia Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** African geography, multilevel modelling, healthcare access, regression analysis, community health centers, efficiency measurement, geographic variation

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