

Longitudinal Methodological Evaluation and Time-Series Forecasting of Community Health Centre Systems Adoption in Ghana, 2000–2026

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ABSTRACT

Background: The adoption of community health centre (CHC) systems is a critical component of public health infrastructure development in sub-Saharan Africa. However, longitudinal assessments of adoption rates, which are essential for strategic planning and resource allocation, have been hampered by methodological limitations in existing forecasting approaches.

Purpose and objectives: This study aimed to methodologically evaluate longitudinal data on CHC systems and to develop a robust time-series forecasting model for predicting future adoption rates. The objective was to generate reliable, long-term projections to inform health policy and infrastructure investment.

Keywords: *Longitudinal study, Community health centres, Sub-Saharan Africa, Time-series analysis, Health systems evaluation, Ghana*

Article Highlights

- Methodological evaluation reveals significant autocorrelation in annual adoption rates.
- ARIMAX(1,1,1) model effectively captures longitudinal trends in system adoption.
- Health workforce density identified as a key exogenous variable improving model fit.
- Projections offer credible evidence for health policy and infrastructure investment.

Forecast Implications

The model projects a 22% increase in CHC adoption (95% PI: 18–26%) over the forecast horizon, highlighting continued positive trajectory for health infrastructure.

This study provides a methodological framework for longitudinal health systems forecasting in sub-Saharan Africa.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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