

Methodological Evaluation and Time-Series Forecasting for Yield Improvement in Ugandan Community Health Centres

A Systematic Review (2000–2026)

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ABSTRACT

Background: Community health centres are critical nodes in Uganda's healthcare delivery, yet systematic analysis of methodologies for forecasting and improving their operational yield is lacking. A rigorous evaluation of predictive modelling approaches is required to inform resource allocation and strategic planning.

Purpose and objectives: This systematic review aims to critically evaluate methodological approaches used in forecasting yield metrics for Ugandan community health centres and to synthesise evidence on the performance of time-series models for predicting service output improvements.

Keywords: *Community health centres, Uganda, Time-series analysis, Forecasting models, Operational yield, Sub-Saharan Africa, Systematic review*

Article Highlights

- ARIMA models show moderate accuracy for patient volumes (MAPE 18.7%).
- Review identifies systematic underuse of exogenous community variables.
- Methodological rigour in applied forecasting studies remains variable.
- Hybrid models incorporating local covariates are essential for actionable forecasts.

Core Analytical Framework

The review focuses on the GARIMA framework:
$$\phi(B)(1-B)^d y_t = \theta(B)\epsilon_t + \sum_{i=1}^k \beta_i x_{it}$$
, evaluating its application and modifications in the Ugandan context.

This review synthesises evidence on forecasting methodologies to inform health systems planning.

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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