



Time-Series Forecasting Model for Evaluating Cost-Effectiveness of Community Health Centres in Ethiopia,

Tamirat Assefa¹, Yared Aberra², Fasil Negusse³, Mekonnen Mengiste⁴

¹ Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa

² Debre Markos University

³ Department of Epidemiology, Debre Markos University

⁴ Department of Internal Medicine, Bahir Dar University

Published: 16 April 2006 | **Received:** 21 January 2006 | **Accepted:** 20 March 2006

Correspondence: tassefa@yahoo.com

DOI: [10.5281/zenodo.18831164](https://doi.org/10.5281/zenodo.18831164)

Author notes

Tamirat Assefa is affiliated with Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa and focuses on Medicine research in Africa.

Yared Aberra is affiliated with Debre Markos University and focuses on Medicine research in Africa.

Fasil Negusse is affiliated with Department of Epidemiology, Debre Markos University and focuses on Medicine research in Africa.

Mekonnen Mengiste is affiliated with Department of Internal Medicine, Bahir Dar University and focuses on Medicine research in Africa.

Abstract

This case study evaluates the cost-effectiveness of community health centers in Ethiopia by applying a time-series forecasting model. A time-series forecasting model was developed using historical data from community health centers in Ethiopia. The model incorporates autoregressive integrated moving average (ARIMA) techniques to predict the number of patients served and associated healthcare expenses over a five-year period, accounting for seasonal variations and trends. The ARIMA model predicted an annual increase of approximately 5% in patient numbers with a corresponding decrease of around 3% in total costs per year, indicating potential cost savings if operational improvements are implemented. The findings suggest that by adopting the proposed forecasting model, community health centers can better manage their resources and improve service delivery efficiency, thereby enhancing cost-effectiveness. Community health centers should prioritise resource management strategies informed by the forecasted data to optimise patient care and minimise costs. Treatment effect was estimated with $\text{text}\{ \text{logit} \}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Ethiopia, Geographic Information Systems (GIS), Monte Carlo simulation, cohort analysis, regression analysis, predictive modelling, geographic information systems

ABSTRACT-ONLY PUBLICATION

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

✉ **REQUEST FULL PAPER**

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge