



Forecasting Risk Reduction in Ghanaian Community Health Centres Using Time-Series Models: A Methodological Evaluation

Logah Owusu¹

¹ Department of Clinical Research, University of Ghana, Legon

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Correspondence: lowusu@gmail.com

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Author notes

Logah Owusu is affiliated with Department of Clinical Research, University of Ghana, Legon and focuses on Medicine research in Africa.

Abstract

Community health centres in Ghana are pivotal for addressing healthcare needs at the grassroots level. However, their efficiency and effectiveness can be influenced by various socio-economic factors. A comprehensive analysis was conducted using ARIMA (AutoRegressive Integrated Moving Average) model for forecasting trends in healthcare outcomes across selected Ghanaian health facilities. Uncertainty around predictions was quantified through robust standard errors. The time-series models demonstrated a significant reduction in predicted risk levels by approximately 15% over the forecast period, indicating potential improvements in service quality and patient outcomes. This study provides empirical evidence supporting the use of ARIMA for forecasting healthcare risks at community health centres. The findings offer actionable insights to policymakers aiming to enhance public health services. Policymakers should consider integrating these predictive models into strategic planning processes, particularly in resource-limited settings where data collection and analysis can be challenging. 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: Sub-Saharan, African, Networks, Time-Series, Analysis, Modelling, HealthSystemResilience

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