



Time-Series Forecasting Model to Evaluate System Reliability of Community Health Centres in Kenya: A Methodological Protocol

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Abstract

Community health centres (CHCs) in Kenya play a crucial role in healthcare delivery, but their reliability and efficiency need evaluation. A time-series analysis will be applied to historical data from CHCs using an ARIMA (AutoRegressive Integrated Moving Average) model. Uncertainty will be quantified with robust standard errors. The forecast accuracy suggests a 95% confidence interval for future reliability projections, indicating moderate precision in the model's predictions. The ARIMA model demonstrates promise for evaluating CHC system reliability but further validation is needed. Further empirical testing and refinement of the model are recommended to enhance its applicability. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Kenya, Geographic Information Systems (GIS), Time-series Analysis, System Dynamics, Reliability Engineering, Data Mining, Predictive Analytics

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