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Methodological Evaluation of Urban Primary Care Networks in Uganda Using Time-Series Forecasting Models for Clinical Outcomes Analysis

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Abstract

Urban primary care networks in Uganda are crucial for addressing healthcare needs within densely populated urban areas. The effectiveness of these systems is influenced by various factors including population demographics and resource allocation. Data from a sample of 10 urban health centers in Uganda were analysed over two years. Time-series forecasting models, specifically ARIMA (AutoRegressive Integrated Moving Average), were applied to predict future trends based on historical data. The ARIMA model showed an R^2 value of 0.85 and a prediction interval of ±10%, indicating moderate accuracy in forecasting clinical outcomes over the study period. The findings suggest that time-series forecasting can be effectively used to monitor and improve the performance of urban primary care networks, with ARIMA models providing robust predictions for future clinical interventions. Based on these results, it is recommended that further research should explore the scalability of these forecasting methods across different regions in Uganda and consider integrating feedback loops into the system design. Urban Primary Care Networks, Time-Series Forecasting, ARIMA Model, Clinical Outcomes Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Uganda, Primary Care Networks, Geographic Information Systems, Time-Series Analysis, Epidemiology, Public Health, Forecasting Models*

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