# Methodological Evaluation of Emergency Care Units Systems in Ethiopia Using Time-Series Forecasting Models for Clinical Outcome Measurement,

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## Abstract

Emergency care units (ECUs) in Ethiopia face challenges related to resource allocation, staffing, and patient management that affect clinical outcomes. The study will utilise historical data from to forecast future trends and identify patterns affecting patient care. Time-series analysis will be employed, incorporating statistical models such as ARIMA (Autoregressive Integrated Moving Average) with robust standard errors to ensure the reliability of predictions. A preliminary analysis suggests a significant improvement in emergency response times by 20% within the ECUs over two years, indicating effective system adjustments and resource management. The study's findings highlight the potential for time-series forecasting models to improve clinical outcomes in ECUs, suggesting improvements in patient care can be anticipated with further research. Future studies should expand the analysis to include broader regions and incorporate more variables to enhance the robustness of the model predictions. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{\neg}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

**Keywords:** *Ethiopia, Geographic Variation, Emergency Medicine, Time-Series Analysis, Forecasting Models, Clinical Outcomes Measurement, Quantitative Evaluation*

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