African Medical Laboratory Microbiology

Time-Series Forecasting Model for Evaluating Emergency Care Units in Ghana: A Methodological Assessment

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Abstract

Emergency care units (ECUs) in Ghana face challenges related to patient throughput and clinical outcomes. A time-series forecasting model was developed using historical data from ECUs. The model incorporates autoregressive integrated moving average (ARIMA) methodology, accounting for potential autocorrelation in the residuals to ensure robustness. The ARIMA model showed a significant improvement in predicting hospital stay lengths with an R^2 value of 0.85 and standard errors that were within ±10% confidence intervals. The time-series forecasting model demonstrated reliability in estimating clinical outcomes, particularly for hospital stays, providing valuable insights for improving ECUs in Ghana. ECU managers should use the forecasted data to optimise resource allocation and improve patient care processes. Emergency Care Units, Time-Series Forecasting, ARIMA Model, Clinical Outcomes, Ghana Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Sub-Saharan, Methodology, Time-series, Forecasting, Evaluation, Systems*

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