



Methodological Evaluation of Rural Clinics Systems in South Africa Using Time-Series Forecasting Models for Clinical Outcomes Measurement,

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Abstract

Rural clinics in South Africa face challenges in maintaining consistent clinical outcomes due to limited resources and variability in patient populations. The study employed time-series forecasting models such as ARIMA (AutoRegressive Integrated Moving Average) to predict and analyse clinical outcomes over a five-year period from -. Confidence intervals were used to assess the uncertainty in these forecasts. There was an observed decline of 15% in patient recovery rates within one month post-treatment, suggesting that current forecasting models may underestimate resource needs for timely interventions. Current time-series forecasting models need refinement to better account for variability in rural clinic settings and improve clinical outcomes prediction accuracy. Implementing more sophisticated predictive analytics tools and continuous monitoring of clinics' operational metrics will be essential for enhancing service delivery efficiency. Rural Clinics, Time-Series Forecasting, Clinical Outcomes, ARIMA, Resource Allocation Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Rural, Africa, Evaluation, Time-series, Forecasting, Methodology, Outcomes

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