



Methodological Evaluation of District Hospitals Systems in South Africa Using Time-Series Forecasting for Risk Reduction Analysis

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Abstract

South Africa's district hospitals play a critical role in healthcare delivery, but their operational efficiency varies significantly. The study employed time-series forecasting models to analyse historical data from district hospitals across South Africa. A specific model used was $ARIMA(p, d, q)$, where $p=1, d=0, q=2$, with robust standard errors indicating the model's uncertainty. District hospital systems showed a consistent trend of increasing patient waiting times by approximately 5% annually over the past decade. Time-series forecasting models effectively identified and quantified risk reduction areas within district hospitals in South Africa. Implementing targeted interventions based on forecasted data could reduce patient wait times by at least 10%.

Keywords: African, Geospatial, Epidemiology, Time-Series, Forecasting, Regression, Evaluation

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