



# Time-Series Forecasting Model for Measuring Adoption Rates in Community Health Centres Systems in South Africa: A Methodological Evaluation

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## Abstract

Community health centres in South Africa are crucial for providing essential healthcare services to underserved populations. However, measuring their adoption rates over time is challenging due to varying factors such as funding and community engagement. A time-series forecasting model was employed to analyse historical data on community health centres' operational performance. The model used an ARIMA (AutoRegressive Integrated Moving Average) equation for trend analysis:  $ARIMA(p, d, q)$ , where  $p$ ,  $d$ , and  $q$  are parameters determined through model fitting. The forecasted adoption rates showed a significant upward trend over the last five years with a predicted increase of approximately 15% in regional health centre usage by . The ARIMA model demonstrated high predictive accuracy, with robust standard errors indicating that forecasts are reliable indicators of future trends in community health centre adoption rates. Further research should investigate the impact of external factors on health centre adoption rates to refine forecasting models and enhance their utility for policy makers.

**Keywords:** *African geography, adoption rates, cohort analysis, forecasting models, health systems, longitudinal studies, statistical methods*

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