



# Methodological Evaluation of Maternal Care Facilities Systems in South Africa Using Time-Series Forecasting Models for Clinical Outcomes Measurement

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## Abstract

Maternal care facilities in South Africa play a critical role in ensuring optimal health outcomes for mothers and infants. However, there is a need to evaluate the effectiveness of these systems over time. This study employs advanced statistical techniques, specifically autoregressive integrated moving average (ARIMA) models, to forecast and analyse trends in maternal health indicators within South African healthcare systems. The analysis reveals a significant upward trend in neonatal mortality rates over the past decade, suggesting that current interventions may not be sufficiently effective if not adjusted for future challenges. ARIMA modelling provides a robust framework for understanding temporal patterns and predicting future clinical outcomes. Recommendations include refining intervention strategies based on forecasted data. Health policymakers should prioritise resource allocation towards areas identified as high-risk by the ARIMA forecasts to improve maternal health outcomes in South Africa. maternal care, forecasting models, time-series analysis, neonatal mortality, South Africa Treatment effect was estimated with  $\text{text}\{logit\}(\pi) = \beta_0 + \beta_1 X_p$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** Sub-Saharan, Neonatology, Epidemiology, Maternal Health, Forecasting, Regression Analysis, Spatial Statistics

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