

# A Methodological Evaluation and Time-Series Forecasting Model for Maternal Care Facility Systems and Clinical Outcomes in Nigeria, 2000–2026

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## ABSTRACT

**Background:** Maternal healthcare systems in Nigeria face significant challenges, yet robust methodological frameworks for evaluating facility systems and forecasting clinical outcomes are lacking. Existing assessments often rely on cross-sectional data, failing to capture temporal dynamics and system-level interactions that influence maternal health indicators.

**Purpose and objectives:** This review critically evaluates methodological approaches for assessing maternal care facility systems and develops a novel time-series forecasting model to project key clinical outcomes. The objective is to provide a validated analytical tool for health systems planning and intervention targeting.

**Keywords:** *Maternal healthcare, Nigeria, Health systems evaluation, Time-series analysis, Clinical outcomes forecasting, Sub-Saharan Africa, Facility-based care*

### Article Highlights

- Methodological review reveals <20% of studies use longitudinal designs suitable for causal inference.
- Forecasting model projects stagnation in facility-based delivery rates (2–4 percentage point increase).
- Emergency obstetric care readiness indices are the most significant exogenous predictors.
- Integrated ARIMA model combines autoregressive components with health system variables.

### Core Forecasting Model

ARIMA framework integrated with exogenous health system variables, estimated via maximum likelihood with robust standard errors.

*This study provides a validated analytical tool for health systems planning and intervention targeting.*

## ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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