

Methodological Evaluation and Time-Series Forecasting for Clinical Outcomes in Rural South African Primary Healthcare Systems

A Systematic Review

Thandiwe Nkosi¹, Kagiso Mokoena^{2,3}, Pieter van der Merwe⁴

Department of Internal Medicine, Rhodes University | Department of Public Health, University of Cape Town |

Rhodes University | Department of Surgery, University of Cape Town

Correspondence: tnkosi@outlook.com

Received: 29 September 2010 | Accepted: 03 January 2011 | Published: 25 February 2011 | DOI:

[10.5281/zenodo.18948236](https://doi.org/10.5281/zenodo.18948236)

ABSTRACT

Background: Rural primary healthcare systems in South Africa face significant challenges in resource allocation and demand planning. Accurate forecasting of clinical outcomes is critical for improving service delivery, yet the methodological rigour of existing predictive models in this specific context remains unevaluated.

Purpose and objectives: This systematic review aims to critically evaluate the methodological approaches used in time-series forecasting models for clinical outcomes within rural primary healthcare clinics in South Africa, and to synthesise evidence on their predictive performance and applicability.

Methodology: A systematic search of multiple electronic databases was conducted following PRISMA guidelines. Studies employing time-series or longitudinal forecasting models for clinical outcomes (e.g., patient volumes, disease incidence) in rural primary care settings were included. Data were extracted on model specifications, validation techniques, and performance metrics. Study quality was appraised using a modified checklist for prognostic model research.

Keywords: *rural health services, primary health care, South Africa, time-series analysis, forecasting, clinical outcomes, systematic review*

Article Highlights

- Review finds predominant reliance on ARIMA models for clinical outcome forecasting.
- Fewer than 30% of studies incorporated exogenous community-level variables.
- Model performance frequently reported without confidence intervals, limiting uncertainty inference.
- Methodological narrowness constrains utility for strategic planning in complex systems.

Core Limitation

The methodological focus remains on temporal autocorrelation, with inadequate integration of socio-environmental determinants critical to rural health systems.

This review calls for methodological expansion and robust uncertainty reporting in health forecasting research.

ABSTRACT-ONLY PUBLICATION

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

REQUEST FULL PAPER

 **Email:** info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We
welcome your submissions!**

Join our community of African scholars and share
your groundbreaking work.

 **Submit at:** app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global
Knowledge