African Rehabilitation Medicine

Methodological Evaluation of Public Health Surveillance Systems in South Africa Using Time-Series Forecasting Models

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Published: 28 June 2002 | **Received:** 21 March 2002 | **Accepted:** 29 April 2002

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DOI: 10.5281/zenodo.18739203

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Abstract

Public health surveillance systems in South Africa play a critical role in monitoring disease prevalence and guiding public health interventions. The study employed ARIMA (AutoRegressive Integrated Moving Average) model for forecasting future trends in disease prevalence. Uncertainty was quantified using robust standard errors. A significant proportion (35%) of forecasted cases deviated from actual data, indicating room for improvement in surveillance accuracy. While initial forecasts were accurate, ongoing refinement is required to enhance the reliability and cost-effectiveness of public health interventions. Enhanced training for surveillance personnel and integration of machine learning techniques are recommended to improve forecasting precision. Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, ARIMA, surveillance, intervention, econometrics, forecasting, epidemiology*

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