African Veterinary Pharmacology

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

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Abstract

Public health surveillance systems in South Africa are crucial for monitoring infectious diseases to mitigate their impact on public well-being and resource allocation. A systematic review approach was employed, utilising keywords such as 'public health', 'surveillance', and 'forecasting' to identify relevant studies published between and . Studies were assessed for methodological rigor using predefined criteria. The analysis revealed that a majority of surveillance systems in South Africa employed ARIMA models, with some utilising machine learning techniques. The proportion of studies reporting robust standard errors was noted at approximately 70%. Time-series forecasting models have been widely adopted in South African public health surveillance systems but exhibit variability in methodological rigor and statistical support. Strengthening the adoption of transparent reporting practices and increasing investment in model validation could enhance the reliability and effectiveness of these systems. Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, surveillance, forecasting, methodology, infectious diseases, systematic review, public health*