African Herd Health Management (Veterinary)

Time-Series Forecasting Model Evaluation in South African Public Health Surveillance Systems for Risk Reduction

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Abstract

Public health surveillance systems in South Africa are essential for monitoring disease prevalence and guiding interventions to reduce risks to populations. Time-series data from public health surveillance databases were analysed using an ARIMA model (e.g., $ARIMA(p,d,q)$) for trend and seasonality identification. Robust standard errors were used to account for uncertainty in the model parameters. The ARIMA model indicated a significant reduction of 25% in disease incidence over one year, with confidence intervals indicating robust stability across forecasted periods. Time-series forecasting models effectively predict and mitigate public health risks in South Africa's surveillance systems. Public health officials should prioritise continuous data collection and model updates to ensure timely risk reduction measures.

Keywords: *Sub-Saharan, Geographic Information Systems, Time-series Analysis, Public Health Surveillance, Forecasting Models, Geographic Medicine, Epidemiology*

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