African Food Systems Research (Interdisciplinary - incl Agri/Env)

Time-Series Forecasting Model for Clinical Outcomes in Tanzania's Public Health Surveillance Systems: A Methodological Evaluation Over

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Abstract

Public health surveillance systems in Tanzania are crucial for monitoring clinical outcomes over time. However, the effectiveness of these systems can be improved through advanced analytical tools such as time-series forecasting models. A longitudinal study was conducted using data from the National Health Information System. A Vector Autoregression (VAR) model was employed to forecast trends in hospital-acquired infections, with uncertainty quantified through standard errors and confidence intervals. The VAR model demonstrated a significant predictive power for hospital-acquired infections, forecasting an increase of approximately 10% over the next year based on historical data. The study validates the efficacy of time-series forecasting models in enhancing public health surveillance systems. This novel method provides actionable insights to policymakers and healthcare providers. Policymakers should implement these forecasting tools to anticipate future clinical outcomes, enabling timely interventions and resource allocation. Vector Autoregression (VAR), Time-series Forecasting, Public Health Surveillance, Tanzania Treatment effect was estimated with $text{ logit }(\pi)=beta 0+\vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Tanzania, Geographic Information Systems (GIS), Spatial Analysis, Time-Series Analysis, Forecasting Models, Public Health Surveillance, Epidemiology, Data Quality Assurance*

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