African Nursing Education

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

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Abstract

Public health surveillance systems are crucial for monitoring disease prevalence and guiding interventions in developing countries like Tanzania. A comprehensive analysis was conducted using ARIMA (AutoRegressive Integrated Moving Average) model to forecast disease incidence rates over a five-year period. Robust standard errors were calculated to assess the uncertainty of these forecasts. The ARIMA models showed a significant improvement in forecasting accuracy, with an $ARIMA(p,d,q)$ where $p=1$, $d=0$, and $q=1$ for measles incidence data. Time-series forecasting models provided valuable insights into the efficiency of public health surveillance systems and identified opportunities for enhancing disease monitoring. Investment in training and technology upgrades to improve surveillance system accuracy is recommended, particularly for diseases like measles where improvements were most notable.

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

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