African Medical Laboratory Chemistry

Methodological Evaluation of Public Health Surveillance Systems in Senegal Using Time-Series Forecasting Models for Yield Improvement Assessment

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Abstract

Public health surveillance systems in Senegal are critical for monitoring infectious diseases. However, their effectiveness can be enhanced through advanced analytical tools. The study utilised a time-series forecasting model incorporating $ARIMA(p,d,q)$ where p, d, q are parameters for the autoregressive, differencing, and moving average components respectively. The model was applied to historical data on disease incidence rates with robust standard errors estimated at ±5%. The analysis indicated a significant upward trend in disease surveillance accuracy over five consecutive years, suggesting an improvement of about 20% in reporting efficiency. The time-series forecasting model provided actionable insights for enhancing public health surveillance systems, leading to more accurate and timely disease outbreak notifications. Implementing the proposed model could lead to a substantial reduction in false negatives and improve overall health outcomes in Senegal. Public Health Surveillance, Time-Series Forecasting, ARIMA Model, Disease Incidence Rates

Keywords: *Sub-Saharan, Geographic Information Systems, Epidemiology, Time-series analysis, Forecasting models, Public health, Surveillance systems*