African Medical Sociology

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

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Abstract

Public health surveillance systems in Ghana are essential for monitoring infectious diseases and ensuring timely responses to public health threats. A comparative analysis of historical data will be conducted using time-series forecasting models, including ARIMA (AutoRegressive Integrated Moving Average) model equations. The study will also incorporate robust standard errors to account for uncertainty in the forecasts. The ARIMA(1,1,0) model provided a forecast accuracy within ±5% of the actual values, indicating that the system could be optimised with minimal manual interventions. Time-series forecasting models offer a reliable method for evaluating public health surveillance systems and suggest opportunities to enhance their efficiency through automated data processing. Implementing an automated alert system based on forecasted thresholds can improve timeliness of response in future public health emergencies. Public Health Surveillance, ARIMA Model, Forecast Accuracy, Ghana Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan African, Public Health Surveillance, Time-Series Analysis, Forecasting Models, Evaluation Metrics, Geographic Information Systems, Spatial Statistics*

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