



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 crucial for monitoring disease outbreaks and managing food safety risks. However, their effectiveness can vary over time. The methodology involves collecting data from various sources including hospitals, laboratories, and food safety inspection records. Time-series forecasting models such as ARIMA (AutoRegressive Integrated Moving Average) will be used to analyse the stability and predictability of surveillance systems across different time periods. Our analysis revealed a consistent upward trend in reported cases over the study period, indicating potential underreporting or changes in reporting practices. The forecast model suggests that if current trends continue, system reliability might decrease by 10% within the next two years. The findings highlight the need for continuous improvement and robust data collection strategies to ensure reliable public health surveillance systems in Ghana. Enhanced training programmes for healthcare workers and improved infrastructure at food safety inspection sites are recommended to improve system reliability. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^{-1} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Public health, Surveillance systems, Time-series analysis, Forecasting models, Reliability assessment, Methodology*

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