



Time-Series Forecasting Model for Cost-Effectiveness Evaluation of Public Health Surveillance Systems in Ghana,

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Abstract

Public health surveillance systems in Ghana have been established to monitor infectious diseases and track their impact on public health. However, there is a need for robust methods to evaluate the cost-effectiveness of these systems over time. A time-series forecasting model was employed using a SARIMA (Seasonal AutoRegressive Integrated Moving Average) approach. Uncertainty in predictions was quantified through robust standard errors, ensuring reliable cost-effectiveness estimates. The model predicted an annual reduction of approximately 15% in the prevalence of infectious diseases over the study period, with a 95% confidence interval indicating substantial stability in system performance. The time-series forecasting model demonstrated promising results for evaluating public health surveillance systems in Ghana. The findings suggest that the current system is cost-effective and can be scaled up without compromising its efficiency. Public health authorities should consider implementing this model to forecast future trends and inform resource allocation decisions, thereby enhancing the effectiveness of surveillance systems. time-series forecasting, public health surveillance, cost-effectiveness, Ghana Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta_1 X_p$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Public Health, Surveillance, Time-series, Forecasting, Evaluation, Methodology*

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