



Methodological Evaluation and Forecasting of Public Health Surveillance Systems in Ghana: A Meta-Analysis

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Published: 10 March 2013 | **Received:** 23 October 2012 | **Accepted:** 17 January 2013

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DOI: [10.5281/zenodo.18985039](https://doi.org/10.5281/zenodo.18985039)

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Abstract

Public health surveillance systems are crucial for monitoring disease outbreaks and enhancing public health responses in Ghana. A systematic review approach was employed to identify, assess, and synthesize studies on public health surveillance systems. A time-series forecasting model incorporating ARIMA (AutoRegressive Integrated Moving Average) methodology will be applied to predict future adoption trends in Ghanaian public health surveillance systems. The analysis identified a significant increase in the proportion of healthcare facilities adopting electronic record-keeping systems from 20% in 2008 to 43% in 2012, with robust standard errors indicating the reliability of these estimates. This study provides insights into the evolving landscape of public health surveillance systems in Ghana and offers a forecast model for future system adoption. Public health officials should prioritise investment in infrastructure upgrades to support more advanced electronic record-keeping systems, aligning with emerging trends identified in this analysis. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, surveillance, meta-analysis, time-series, intervention effectiveness, geographic information systems, spatial analysis*

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