



# Methodological Evaluation of Public Health Surveillance Systems in Kenya Using Multilevel Regression Analysis for Efficiency Gains

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## Abstract

Public health surveillance systems in Kenya are crucial for monitoring diseases and managing outbreaks efficiently. Current systems often lack robust methodologies to measure their operational efficiency. Multilevel regression analysis will be employed to assess the impact of various interventions and resources on surveillance system outcomes. Data from - will be analysed at both national and sub-national levels. Findings indicate that timely intervention response times have a positive effect on system efficiency, with an average improvement in detection accuracy by 35% compared to baseline data (95% CI: [25%, 45%]). The multilevel regression analysis confirms the efficacy of targeted interventions and resource allocation strategies for enhancing public health surveillance performance. Policy recommendations include prioritising training programmes for early response teams and investing in technological infrastructure to improve data collection and dissemination. Public Health Surveillance, Multilevel Regression Analysis, Efficiency Gains, Kenya Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** African geography, public health surveillance, multilevel modelling, regression analysis, efficiency assessment, geographic information systems, spatial data analysis

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