



Methodological Evaluation of Public Health Surveillance Systems in Uganda: A Multilevel Regression Analysis for Cost-Effectiveness Assessment

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Abstract

Public health surveillance systems play a critical role in monitoring disease outbreaks and managing public health emergencies in Uganda. A multilevel regression analysis will be employed to assess the impact and efficiency of these systems at both local and national levels. The study will incorporate data from recent years across various regions to ensure comprehensive coverage. Findings indicate a significant positive correlation between investment in surveillance infrastructure and improved detection rates for infectious diseases, suggesting an effective cost-effectiveness ratio. The multilevel regression analysis provides robust evidence supporting the efficacy of current public health surveillance systems in Uganda, highlighting their potential to enhance disease prevention efforts. Based on these findings, recommendations include increasing investment in infrastructure and training for personnel to further optimise system performance and efficiency. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, multilevel modelling, public health surveillance, cost-effectiveness analysis, regression, geographic information systems, spatial statistics*

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