



Methodological Evaluation of Public Health Surveillance Systems in Tanzania Using Multilevel Regression Analysis to Measure Cost-Effectiveness

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Abstract

Public health surveillance systems in Tanzania are crucial for monitoring diseases such as HIV/AIDS, but their effectiveness varies across regions and over time. Multilevel regression analysis will be employed to assess the impact of surveillance systems at both district (level-1) and national (level-2) levels. Robust standard errors and uncertainty intervals will be used for inference. Data revealed significant variations in HIV prevalence rates between districts, with a notable difference in one district where the system was more effective in detecting cases compared to others. The multilevel regression analysis highlights cost-effective strategies that could improve surveillance systems across Tanzania. Policy recommendations will be provided based on the findings to enhance public health surveillance effectiveness 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: *Tanzania, Geographic Variation, Public Health Surveillance, Multilevel Modelling, Regression Analysis, Cost-Effectiveness Studies, Geographic Information Systems*

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