



# Methodological Evaluation of Public Health Surveillance Systems in Tanzania Using Difference-in-Differences Models for Cost-Effectiveness Analysis

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### Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in developing countries such as Tanzania. However, their effectiveness can vary significantly and require rigorous evaluation. This study employs a difference-in-differences (DiD) model, a statistical technique used to measure causal effects by comparing changes over time between a treatment group and a comparison group. The DiD model is estimated using maximum likelihood estimation with robust standard errors to account for potential confounders. The findings suggest that the public health surveillance system in Tanzania has led to an increase of approximately 20% in the detection rate of infectious diseases, but this effect size comes with a cost-effectiveness ratio of 150 per detected case, indicating some room for improvement in efficiency. In conclusion, while the DiD model demonstrates that  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** African geography, public health surveillance, cost-effectiveness analysis, difference-in-differences, econometric models, sentinel sites, statistical methods

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