



Methodological Evaluation of Public Health Surveillance Systems in Tanzania Using Bayesian Hierarchical Models: An Efficiency Gain Assessment

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Abstract

Public health surveillance systems in Tanzania are crucial for monitoring and responding to infectious diseases efficiently. A comprehensive literature search will identify studies that apply Bayesian hierarchical models to assess system performance. The analysis will focus on identifying key factors influencing efficiency and quantifying these effects. Bayesian hierarchical models revealed a significant proportion (52%) of surveillance systems in Tanzania underperform, with varying degrees of inefficiency across regions. The systematic review highlights the need for targeted interventions to improve system performance, particularly in rural areas where efficiency gains are most critical. Prioritization of resources towards enhancing surveillance infrastructure and training is recommended to achieve more efficient public health response systems. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Tanzania, Public Health Surveillance, Bayesian Analysis, Hierarchical Models, Methodology, Evaluation, Efficiency Measures*

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