



Bayesian Hierarchical Model for Evaluating Cost-Effectiveness in Public Health Surveillance Systems in Tanzania: A Systematic Literature Review

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Abstract

Public health surveillance systems in Tanzania play a crucial role in monitoring diseases such as malaria and tuberculosis. However, their cost-effectiveness is not well understood, leading to potential inefficiencies. A comprehensive search strategy was employed to identify relevant studies. Data from these studies were analysed using a Bayesian hierarchical model, which accounts for variability across different regions and conditions. The analysis revealed significant heterogeneity in cost-effectiveness measures across different surveillance systems in Tanzania, with some regions showing substantial cost savings compared to others. Bayesian hierarchical models provide valuable insights into the cost-effectiveness of public health surveillance systems, highlighting areas where improvements can be made. Policy makers should consider implementing targeted interventions based on the findings from this review to optimise resource allocation in Tanzania's surveillance systems. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta^T X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: African geography, Bayesian statistics, Hierarchical modelling, Public health surveillance, Cost-effectiveness analysis, Systematic review, Methodological evaluation

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