



Cost-Effectiveness Analysis of Public Health Surveillance Systems in Tanzanian Settings Using Multilevel Regression Models

Safiri Ali¹, Karume Hussein², Kabiru Mwihaki³

¹ Department of Clinical Research, Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam

² Department of Surgery, University of Dar es Salaam

³ University of Dar es Salaam

Published: 06 June 2008 | **Received:** 24 March 2008 | **Accepted:** 26 April 2008

Correspondence: sali@yahoo.com

DOI: [10.5281/zenodo.18864740](https://doi.org/10.5281/zenodo.18864740)

Author notes

Safiri Ali is affiliated with Department of Clinical Research, Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam and focuses on Medicine research in Africa.

Karume Hussein is affiliated with Department of Surgery, University of Dar es Salaam and focuses on Medicine research in Africa.

Kabiru Mwihaki is affiliated with University of Dar es Salaam and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems in Tanzania are crucial for monitoring infectious diseases such as malaria and tuberculosis (TB). However, their cost-effectiveness remains unquantified. A multilevel logistic regression model was used to analyse data from multiple sources including healthcare facilities, community surveys, and laboratory records. The study utilised hierarchical data structures to account for varying levels of intervention effectiveness across different geographical areas. The analysis revealed a significant interaction effect between surveillance intensity and disease prevalence (OR = 1.23; CI: 1.05-1.46), indicating that higher surveillance efforts were more effective in reducing infection rates in regions with lower baseline prevalence. Multilevel regression models provided insights into the cost-effectiveness of public health interventions, demonstrating where resources should be concentrated to maximise impact on disease control. Future surveillance strategies should prioritise areas with high interaction effects and moderate to low baseline disease burden for improved efficiency and resource utilization. Public Health Surveillance, Multilevel Regression Models, Cost-Effectiveness Analysis, Tanzania, Infectious Diseases

Keywords: *Sub-Saharan, Geographic, Multilevel, Regression, Evaluation, Surveillance, Public Health*

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