



Multilevel Regression Analysis for Evaluating Efficiency Gains in Public Health Surveillance Systems in Kenya: A Methodological Assessment

Kikwati Mwangi^{1,2}, Mukuu Ndege³

¹ Department of Pediatrics, University of Nairobi

² Department of Internal Medicine, Kenya Medical Research Institute (KEMRI)

³ University of Nairobi

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Correspondence: kmwangi@aol.com

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Author notes

Kikwati Mwangi is affiliated with Department of Pediatrics, University of Nairobi and focuses on Medicine research in Africa.

Mukuu Ndege is affiliated with University of Nairobi and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems are crucial for monitoring diseases in Kenya. However, their efficiency can vary significantly across different regions and levels of government. A multilevel regression model was employed to analyse data collected from various regions. The model accounts for hierarchical structures, such as regional differences within the national context. The multilevel regression analysis revealed a significant improvement ($p < 0.05$) in surveillance efficiency when considering both regional and national factors. This study provides empirical evidence on how to enhance public health surveillance systems, particularly in terms of their effectiveness across different levels of governance. Public health managers should prioritise cross-regional collaboration and resource allocation based on the findings from this analysis. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Kenya, Multilevel Regression, Public Health Surveillance, Efficiency Analysis, Hierarchical Modelling, Spatial Statistics, Epidemiological Methodology

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