



# Methodological Evaluation of Public Health Surveillance Systems in Kenya Using Multilevel Regression Analysis for Clinical Outcomes Assessment

Mwihaki Kinyua<sup>1,2</sup>, Kiplagat Gitonga<sup>3</sup>, Ngugi Otieno<sup>4,5</sup>

<sup>1</sup> Kenya Medical Research Institute (KEMRI)

<sup>2</sup> Department of Surgery, African Population and Health Research Center (APHRC)

<sup>3</sup> Department of Epidemiology, African Population and Health Research Center (APHRC)

<sup>4</sup> Maseno University

<sup>5</sup> African Population and Health Research Center (APHRC)

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**Correspondence:** [mkinyua@aol.com](mailto:mkinyua@aol.com)

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## Author notes

*Mwihaki Kinyua is affiliated with Kenya Medical Research Institute (KEMRI) and focuses on Medicine research in Africa.*

*Kiplagat Gitonga is affiliated with Department of Epidemiology, African Population and Health Research Center (APHRC) and focuses on Medicine research in Africa.*

*Ngugi Otieno is affiliated with Maseno University and focuses on Medicine research in Africa.*

## Abstract

Public health surveillance systems in Kenya are essential for monitoring infectious diseases such as malaria and tuberculosis (TB). However, their effectiveness varies across different regions and levels of administration. A multilevel regression model will be employed to analyse data collected from various healthcare facilities in Kenya. The model will account for both fixed effects (e.g., facility-level characteristics) and random effects (e.g., regional variations). The analysis revealed that facility-level infrastructure significantly influenced clinical outcomes, with a moderate effect size. Our multilevel regression approach provides valuable insights into the performance of surveillance systems in Kenya, offering a refined method for future evaluations. Future studies should consider incorporating additional variables to enhance model accuracy and address potential biases. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** Kenya, Public Health Surveillance, Multilevel Analysis, Regression Modelling, Epidemiology, Geographic Information Systems, Spatial Statistics

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