Bayesian Hierarchical Model Assessment in Public Health Surveillance Systems within Kenya: A Methodological Review

Olara Ochieng[1]**, Kiprotich Kiplagat**[2]**, Eunice Chepkech**[3]

[1] African Population and Health Research Center (APHRC)

[2] University of Nairobi

[3] Kenyatta University

Author notes

Olara Ochieng is affiliated with African Population and Health Research Center (APHRC) and focuses on Medicine research in Africa.
Kiprotich Kiplagat is affiliated with University of Nairobi and focuses on Medicine research in Africa.
Eunice Chepkech is affiliated with Kenyatta University and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems in Kenya are crucial for monitoring infectious diseases and other health threats. Bayesian hierarchical models offer a powerful tool to analyse these systems, enabling more accurate predictions and resource allocation. The methodology reviews existing literature on Bayesian hierarchical models applied to public health surveillance data from Kenya. It evaluates model performance and applicability across different scales (e.g., district vs national level). The analysis reveals that Bayesian models enhance predictive accuracy by integrating spatial and temporal variability, leading to more reliable outbreak detection. Bayesian hierarchical models demonstrate significant potential for improving public health surveillance in Kenya, particularly in enhancing the timeliness and precision of disease tracking. Health authorities should prioritise model validation and implementation strategies that incorporate local data sources and expert feedback. Bayesian Hierarchical Models, Public Health Surveillance, Efficiency Gains, Infectious Diseases, Kenya Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{\rightarrow} p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Kenya, Bayesian Hierarchical Models, Methodology, Public Health Surveillance, Model Assessment, Quantile Regression, Spatial Analysis*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge