Bayesian Hierarchical Model for Evaluating Efficiency in Public Health Surveillance Systems in Uganda,

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Abstract

Public health surveillance systems in Uganda have been established to monitor diseases and track their spread efficiently. However, evaluating these systems' performance remains challenging due to varying operational contexts. A Bayesian Hierarchical Model was employed to analyse data from surveillance systems across different regions. This approach allowed for the estimation of parameters within varying levels of geographical organisation, accommodating both local and regional variability. The BHM revealed that socioeconomic factors significantly influenced system efficiency, with a moderate positive correlation ($r = 0.52$) between income inequality and surveillance effectiveness. This study highlights the importance of considering contextual variables in evaluating public health surveillance systems. The Bayesian hierarchical model offers a robust framework for understanding and improving such systems. Based on the findings, targeted interventions focusing on reducing socioeconomic disparities are recommended to enhance surveillance efficiency.

Keywords: *Sub-Saharan, Bayesian, Hierarchical, Model, Evaluation, Efficiency, Surveillance*

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