



Methodological Assessment and Panel Data Analysis of Clinical Outcomes in Public Health Surveillance Systems in Uganda

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Abstract

Public health surveillance systems in Uganda are crucial for monitoring disease prevalence and guiding healthcare resource allocation. However, their effectiveness can be enhanced through methodological improvements. Data from two consecutive years of the Ugandan Public Health Surveillance System were analysed. A mixed-effects logistic regression model was employed to account for both fixed effects (e.g., time-varying factors) and random effects (e.g., geographical variation). The analysis revealed significant differences in clinical outcomes between urban and rural settings, with a 20% higher likelihood of positive health indicators in urban areas compared to rural. This study underscores the importance of methodological enhancements for accurate public health surveillance. The mixed-effects logistic regression model provides insights into geographical variations affecting health outcomes. Healthcare policymakers should prioritise improving data collection methods and geographic representation within the surveillance system to ensure more precise monitoring and intervention strategies. Public Health Surveillance, Panel Data Analysis, Mixed-Effects Logistic Regression, Uganda 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: African Geography, Public Health Surveillance, Methodology, Panel Data Analysis, Time Series, Regression Models, Geographic Information Systems

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