African Performing Arts Research

# Bayesian Hierarchical Model for Assessing Adoption Rates in Public Health Surveillance Systems in Uganda

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## Abstract

Public health surveillance systems in Uganda are crucial for monitoring diseases and implementing timely interventions. However, their effectiveness often depends on the adoption rates of these systems by healthcare providers. A Bayesian hierarchical model was developed to analyse data from multiple districts. The model accounts for variability between districts while estimating overall adoption rates with uncertainty quantification provided by credible intervals. The analysis revealed a significant variation in adoption rates across districts, with some areas showing higher adoption than others, suggesting the need for targeted interventions to increase coverage. This study highlights the importance of adopting a Bayesian hierarchical modelling approach for assessing public health surveillance system adoption. The model provides nuanced insights into factors affecting adoption and can guide policy decisions. Policy makers should consider district-specific strategies based on the findings, such as educational programmes tailored to specific areas with lower adoption rates. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\, p\, X_i$, and uncertainty reported using confidence-interval based inference.

**Keywords:** *African geography, Bayesian statistics, hierarchical modelling, public health, surveillance systems, adoption rates, spatial analysis*

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