African Animal Nutrition (Agri/Animal Science)

Bayesian Hierarchical Model for Measuring Adoption Rates in Public Health Surveillance Systems in Uganda: A Systematic Literature Review

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Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in Uganda. However, their effectiveness can be influenced by factors such as adoption rates and implementation challenges. The review employed systematic search strategies using databases like PubMed and Scopus. Studies were assessed for relevance, methodology, and data quality using predefined inclusion criteria. Bayesian hierarchical models with Markov Chain Monte Carlo (MCMC) methods were used to analyse adoption rates across different surveillance systems in Uganda. Bayesian hierarchical models provided a nuanced understanding of adoption rates in public health surveillance systems, revealing significant variation between districts. Adoption was notably higher in urban areas compared to rural settings, with proportions ranging from 50% to 70%. The use of Bayesian hierarchical models offers improved accuracy and robustness in estimating adoption rates across diverse contexts. Further research should explore potential barriers to adoption and the impact of these on surveillance effectiveness. Policy recommendations could include targeted interventions based on findings from this review. Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta}\, p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian statistics, Hierarchical modelling, Methodological evaluation, Public health surveillance, Quantitative methods, Surveillance systems*

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