African Cardiovascular Surgery

Bayesian Hierarchical Model for Evaluating Cost-Effectiveness of Public Health Surveillance Systems in Kenya: A Methodological Assessment

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Abstract

Public health surveillance systems are critical for monitoring infectious diseases in resource-limited settings like Kenya. However, their cost-effectiveness is often underappreciated. A Bayesian hierarchical model was employed to assess the cost-effectiveness of different surveillance strategies. This approach allows for the incorporation of uncertainty and heterogeneity across multiple surveillance sites. The analysis revealed that certain surveillance systems were more cost-effective than others by a margin of at least 20% in terms of per-case reduction costs, with significant variability observed between regions. This study validates the use of Bayesian hierarchical models for evaluating public health surveillance systems and highlights disparities in their effectiveness across Kenya. Future research should consider integrating these findings into policy decisions to optimise resource allocation for disease control efforts. Bayesian Hierarchical Model, Public Health Surveillance, Cost-Effectiveness, Infectious Diseases, Resource-Limited Settings Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Public Health Surveillance, Cost-Effectiveness, Bayesian Statistics, Hierarchical Modelling, Resource-Limited Settings, Methodological Evaluation*

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