African Trauma and Mental Health (Psychology)

Bayesian Hierarchical Model for Evaluating Cost-Effectiveness of Public Health Surveillance Systems in South Africa,

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Abstract

Public health surveillance systems are crucial for monitoring and controlling infectious diseases in South Africa. However, their cost-effectiveness remains a subject of debate. A Bayesian hierarchical model was employed to assess the financial and operational aspects of surveillance systems. This approach allowed for the integration of data from multiple sources, providing insights into system performance and cost distribution across different regions. The analysis revealed a significant proportion (35%) of surveillance costs were attributed to underutilized resources in rural areas, suggesting opportunities for more efficient resource allocation. The findings underscore the importance of targeted interventions aimed at optimising resource use within public health surveillance systems. Public health authorities should prioritise investments in surveillance infrastructure and personnel training programmes designed to enhance system efficiency and reduce costs. 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 inference, Hierarchical modelling, Cost-effectiveness analysis, Public health surveillance, Epidemiology, Statistical methods*

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