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Methodological Evaluation of Public Health Surveillance Systems in Rwanda Using Multilevel Regression Analysis for Cost-Effectiveness Assessment

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Abstract

Public health surveillance systems are crucial for monitoring diseases in Rwanda. However, their effectiveness and cost-effectiveness have not been systematically evaluated. Multilevel regression analysis will be employed to analyse data collected from various levels of the public health system. Uncertainty in estimates will be reported using confidence intervals. The analysis revealed significant differences in surveillance effectiveness across different geographic regions, with a proportion exceeding 50% showing improved detection rates. This study provides evidence for targeted improvements in surveillance systems to enhance their efficiency and cost-effectiveness. Investment in infrastructure and training should be prioritised in areas where surveillance performance is notably lower. Public health, surveillance systems, multilevel regression analysis, cost-effectiveness, Rwanda Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\, p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Rwandan, Geographic Information Systems, Spatial Analysis, Multilevel Modelling, Cost-Benefit Analysis, Public Health, Surveillance Systems*

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