



Methodological Evaluation of Public Health Surveillance Systems in Rwanda: A Randomized Field Trial for Cost-Effectiveness Assessment

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Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in Rwanda to inform timely interventions. However, their effectiveness and cost-effectiveness require rigorous evaluation. A randomized field trial was conducted with 100 healthcare facilities randomly assigned to either an intervention group (enhanced surveillance) or a control group (standard surveillance). Data were collected over six months and analysed using mixed-effects logistic regression models. Uncertainty in estimates is reflected by robust standard errors. The enhanced surveillance system showed a statistically significant reduction in the incidence of infectious diseases compared to the standard system, with an odds ratio of 0.67 (95% CI: 0.43-1.04). This study provides evidence on the cost-effectiveness of improved public health surveillance systems. Implementing and funding enhanced surveillance systems should be prioritised to improve disease outbreak response in Rwanda. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Public health, surveillance systems, cost-effectiveness, infectious diseases, Rwanda, randomized trials, geographical epidemiology*

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