



Methodological Evaluation of Public Health Surveillance Systems in Rwanda: A Randomized Field Trial for Risk Reduction Assessment

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Abstract

Public health surveillance systems play a critical role in early detection of diseases and rapid response to outbreaks in Rwanda. A randomized controlled trial was conducted among 50 healthcare facilities in Rwanda. Surveillance data from these sites were collected over six months to assess system performance and efficiency. The analysis revealed an average reduction of 12% in the detection time for influenza outbreaks compared to baseline conditions, with a 95% confidence interval (CI) indicating statistical significance. The randomized field trial demonstrated that targeted improvements can significantly enhance public health surveillance systems' performance in Rwanda. Investment should be directed towards training staff and upgrading technology in healthcare facilities to further improve outbreak detection times. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African epidemiology, Geographic Information Systems (GIS), Randomized controlled trial, Public health surveillance, Spatial analysis, Health informatics, Community engagement*

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