



# Methodological Evaluation of Public Health Surveillance Systems in Rwanda: A Quasi-Experimental Design for System Reliability Assessment

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## Abstract

Public health surveillance systems are crucial for monitoring diseases and managing public health interventions in Rwanda. A mixed-methods approach combining quantitative analysis with qualitative interviews was employed to assess system reliability. Data from ten years of surveillance records were analysed for trends and patterns, supplemented by expert opinions. The analysis revealed a consistent upward trend in disease incidence over the past decade, indicating an effective reporting system but also suggesting areas needing improvement such as underreporting of certain diseases. The quasi-experimental design successfully highlighted key strengths and weaknesses in Rwanda's public health surveillance systems. Recommendations include enhancing data collection methods for underreported conditions. Rwanda should prioritise improving the reporting mechanisms for rare or emerging diseases to ensure comprehensive coverage. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** Rwanda, Geographic Information Systems, Public Health Surveillance, Quasi-Experimental Design, System Reliability, Data Quality Assessment, Spatial Analysis

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