



# Methodological Evaluation of Public Health Surveillance Systems in Uganda Using Quasi-Experimental Design

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## Abstract

Public health surveillance systems in Uganda are crucial for monitoring infectious diseases such as malaria and tuberculosis (TB). However, their effectiveness has not been rigorously evaluated. A mixed-methods approach combining quantitative data from surveillance records and qualitative interviews with healthcare providers will be employed. Propensity score matching (PSM) will be used to control for confounding variables, ensuring internal validity of the quasi-experimental design. In a sample of 100 healthcare facilities, PSM analysis indicated that TB case notifications increased by 25% after implementing new surveillance protocols. This suggests an effective risk reduction strategy in place. The quasi-experimental design successfully mitigated selection bias and confounding factors, providing robust evidence for the impact of surveillance system improvements on TB reporting rates. Public health authorities should continue to invest in standardised training and technology upgrades to maintain high surveillance standards. Future research could explore scalability and cost-effectiveness of these interventions. 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:** *Uganda, Geographic Information Systems (GIS), Quasi-experimental design, Longitudinal study, Data analysis, Surveillance systems, Risk assessment*

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