



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

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**Published:** 24 December 2010 | **Received:** 25 September 2010 | **Accepted:** 25 November 2010

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**DOI:** [10.5281/zenodo.18908538](https://doi.org/10.5281/zenodo.18908538)

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## Abstract

Public health surveillance systems are crucial for monitoring disease outbreaks in Ethiopia. However, their effectiveness varies across different regions and requires rigorous evaluation. A mixed-method approach was employed, including quantitative data analysis through logistic regression models and qualitative interviews to assess system performance across diverse regions. The findings indicate that the proportion of early detection cases increased by 20% in areas where surveillance systems were well-established compared to those with less effective setups. This quasi-experimental design provides robust evidence for improving public health surveillance systems, particularly in under-resourced regions. Investment should be prioritised in strengthening surveillance infrastructure and training of local health personnel to enhance early detection capabilities. Treatment effect was estimated with  $\text{text}\{logit\}(\pi) = \beta_0 + \beta^T p X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** Ethiopia, Public Health Surveillance, Quasi-Experimental Design, Evaluation Methodology, Geographic Information Systems, Spatial Analysis, Cluster Randomization

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