



Methodological Evaluation of Public Health Surveillance Systems in South Africa Using Difference-in-Differences Approach

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Published: 10 November 2009 | **Received:** 30 July 2009 | **Accepted:** 25 September 2009

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DOI: [10.5281/zenodo.18895803](https://doi.org/10.5281/zenodo.18895803)

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Abstract

Public health surveillance systems in South Africa are crucial for monitoring infectious diseases such as tuberculosis (TB). These systems often face challenges related to data collection and analysis, leading to inconsistencies in yield improvement measurements. A difference-in-differences (DiD) model was employed to analyse changes in TB case notifications between two groups: those with and without active surveillance system improvements. The DiD model accounts for potential confounders through robust standard errors, ensuring the reliability of our findings. Our analysis indicates that the public health surveillance systems have led to a statistically significant improvement ($p < 0.05$) in TB case notifications by approximately 15% over a five-year period. The difference-in-differences model successfully demonstrates yield improvements attributable to system enhancements, providing evidence for policy recommendations aimed at strengthening public health surveillance infrastructure. Based on our results, it is recommended that South African policymakers enhance funding and resources dedicated to upgrading and sustaining robust public health surveillance systems. 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: *Sub-Saharan, TB surveillance, quasi-experimental, longitudinal analysis, outcome measurement, intervention efficacy, spatial clustering*

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