



# Methodological Evaluation and Risk Reduction Measurement in Nigeria's Public Health Surveillance

*A Randomised Field Trial*

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## ABSTRACT

**Background:** Public health surveillance systems in Nigeria face significant methodological challenges, including inconsistent data quality and delayed outbreak detection, which undermine effective risk reduction. There is a critical need for robust, field-tested interventions to improve system performance and measure their impact on public health risk.

**Purpose and objectives:** This study aimed to evaluate a novel, technology-enhanced surveillance protocol and quantitatively measure its efficacy in reducing notifiable disease risk compared to the standard national system.

**Keywords:** *Public health surveillance, Sub-Saharan Africa, Randomised controlled trial, Risk reduction, Methodological evaluation, Outbreak detection, Nigeria*

### Article Highlights

- Stratified cluster-randomised trial across 120 Nigerian local government areas.
- Intervention reduced composite surveillance risk score by 32.1 percentage points.
- Achieved median 4.2-day reduction in time from case confirmation to national alert.
- Provides causal evidence for protocol-driven surveillance

### Primary Outcome

Analysis via mixed-effects linear model showed a significant reduction in the composite risk score for disease-specific surveillance failures ( $\beta_1 = -32.1$  pp, 95% CI: -39.4, -24.8;  $p < 0.001$ ).


*This trial provides experimental evidence for strengthening surveillance systems.*

enhancement.	
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