

A Bayesian Hierarchical Modelling Framework for Evaluating Public Health Surveillance System Adoption in Uganda

A Research Protocol

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ABSTRACT

Background: Public health surveillance systems are critical for disease control, yet their adoption across diverse health facilities in low-resource settings remains poorly quantified. Current evaluations often rely on binary metrics that fail to capture the complex, multi-level determinants of implementation success, limiting the utility of data for decision-making.

Purpose and objectives: This protocol outlines a methodological framework to evaluate the adoption of integrated disease surveillance and response (IDSR) systems in Uganda. The primary objective is to develop and validate a Bayesian hierarchical model to estimate facility-level adoption rates and identify key predictors of successful implementation.

Keywords: Bayesian hierarchical modelling, public health surveillance, health systems evaluation, sub-Saharan Africa, Uganda, adoption rates, health informatics

Article Highlights

- Develops a Bayesian hierarchical model to estimate facility-level adoption rates of IDSR systems.
- Identifies key predictors of successful implementation across diverse health facilities in Uganda.
- Generates district-level posterior estimates, anticipating significant heterogeneity in adoption.
- Provides actionable, probabilistic inference to guide health system strengthening efforts.

Core Methodology

Cross-sectional survey of stratified random sample. Bayesian hierarchical logistic regression with district-level random effects, estimated via MCMC sampling.

This article presents a study protocol; empirical findings are anticipated.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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