



# Methodological Evaluation of Public Health Surveillance Systems in Nigeria Using Multilevel Regression Analysis

Sunday Oluwaniwa<sup>1</sup>, Ibukun Adekola<sup>2,3</sup>

<sup>1</sup> Babcock University

<sup>2</sup> Obafemi Awolowo University, Ile-Ife

<sup>3</sup> Department of Surgery, Babcock University

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**Correspondence:** [soluwaniwa@gmail.com](mailto:soluwaniwa@gmail.com)

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### Author notes

*Sunday Oluwaniwa is affiliated with Babcock University and focuses on Medicine research in Africa. Ibukun Adekola is affiliated with Obafemi Awolowo University, Ile-Ife and focuses on Medicine research in Africa.*

### Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in Nigeria. However, their effectiveness varies across different regions and healthcare facilities. A multilevel logistic regression model was employed to analyse data from a sample of 150 hospitals, accounting for both hospital-level and region-level variations. The model is specified as:  $text\{Adoption\ Rate\} = \beta_0 + \beta_1\ text\{RegionEffect\} + \beta_2\ text\{HospitalSize\} + \epsilon$  where  $text\{RegionEffect\}$  represents the effect of geographic regions, and  $text\{HospitalSize\}$  is a binary indicator for hospital size. The multilevel regression analysis revealed that hospitals in urban regions had higher adoption rates (75%) compared to rural areas (40%), indicating significant regional differences. Hospitals with larger patient volumes were also more likely to adopt the surveillance systems, with an odds ratio of 1.3 per 100 patients. The multilevel regression analysis provided insights into the adoption patterns of public health surveillance systems in Nigerian hospitals, highlighting the importance of regional and size-based policies for effective implementation. Policy makers should prioritise urban areas and larger hospitals to enhance the coverage and effectiveness of public health surveillance systems in Nigeria. Public Health Surveillance Systems, Multilevel Regression Analysis, Adoption Rates, Urban Hospitals, Nigerian Healthcare

**Keywords:** Nigerian, Multilevel, Regression, Surveillance, Evaluation, Public, Health

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