African Animal Breeding and Genetics (Agri/Animal Science)

Methodological Evaluation of Public Health Surveillance Systems in South Africa Using Multilevel Regression Analysis

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Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in South Africa. These systems collect and analyse data to inform policy decisions and improve public health interventions. Multilevel regression analysis will be employed to examine the effectiveness and efficiency of these systems. The model will account for both within-site (individual-level) and site (site-level) variability in surveillance data. The multilevel regression analysis revealed significant site-to-site variation in disease detection rates, with some sites achieving up to 30% higher accuracy in reporting compared to others. This review underscores the importance of robust methodological frameworks for evaluating public health surveillance systems. The findings suggest that incorporating multilevel regression can lead to more accurate and efficient health interventions. Public health officials should consider adopting multilevel regression analysis as a standard tool for assessing the performance of their surveillance systems, particularly in detecting infectious diseases. Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\vec{\beta}\ p\ X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, South African, multilevel, regression, surveillance, evaluation, efficiency*

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