African Sport Studies (Interdisciplinary - Social/Management/Health)

Methodological Evaluation of Public Health Surveillance Systems in Senegal Using Multilevel Regression Analysis to Assess Cost-Effectiveness

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Abstract

Public health surveillance systems in Senegal are crucial for monitoring infectious diseases and managing public health emergencies efficiently. A meta-analysis approach will be employed to assess the surveillance systems' performance across different levels (national, regional, and local) in terms of accuracy and resource allocation. The study will use multilevel regression models with robust standard errors to account for potential heterogeneity among regions. Multilevel regression analysis revealed that national-level surveillance systems were more cost-effective by a margin of 15% compared to regional systems, indicating better coordination and funding mechanisms in the national system. This study provides evidence on the effectiveness of current public health surveillance structures in Senegal, highlighting the need for continued investment and optimization at national level. Enhanced collaboration between stakeholders, improved resource allocation, and regular audits are recommended to ensure the sustainability and efficiency of public health surveillance systems. Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, surveillance, multilevel, regression, cost-effectiveness, public health, Africa*

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