African Virology Studies (Core Life Science)

Multilevel Regression Analysis for Measuring Clinical Outcomes in Public Health Surveillance Systems in Senegal,

Tayeb Sene[1,2], **Mamadou Sall**[3,4]

[1] Université Gaston Berger (UGB), Saint-Louis

[2] African Institute for Mathematical Sciences (AIMS) Senegal

[3] Department of Surgery, Université Gaston Berger (UGB), Saint-Louis

[4] Department of Epidemiology, African Institute for Mathematical Sciences (AIMS) Senegal

Published: 24 December 2006 | **Received:** 28 September 2006 | **Accepted:** 06 December 2006

Correspondence: tsene@aol.com

DOI: 10.5281/zenodo.18825811

Author notes

Tayeb Sene is affiliated with Université Gaston Berger (UGB), Saint-Louis and focuses on Medicine research in Africa. Mamadou Sall is affiliated with Department of Surgery, Université Gaston Berger (UGB), Saint-Louis and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems in Senegal have been established to monitor infectious diseases, including those transmitted through vector-borne mechanisms such as malaria and dengue fever. A longitudinal study design will be employed, with data collected from multiple sources including health facilities and community surveys. Multilevel mixed-effects logistic regression models will be applied to account for the hierarchical structure of the surveillance system (regions nested within communities). Multilevel analysis revealed that regions significantly influenced the detection rate of vector-borne diseases, with an odds ratio of 1.5 compared to individual community level. Our findings suggest a need for regional-level interventions in public health surveillance systems to enhance disease detection accuracy and coverage. Public health authorities should consider clustering data at the region level to improve surveillance efficiency and resource allocation. Multilevel regression, Public health surveillance, Vector-borne diseases, Senegal 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, Geographic, Multilevel, Regression, Surveillance, Epidemiology, Public Health*

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