African Pharmacoepidemiology

Bayesian Hierarchical Model Assessment of Public Health Surveillance Systems in Tanzania,

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Published: 22 July 2008 | **Received:** 15 May 2008 | **Accepted:** 18 June 2008

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DOI: 10.5281/zenodo.18866511

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Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in Tanzania, a country with diverse epidemiological patterns. A Bayesian hierarchical model was utilised to analyse surveillance data from to , incorporating uncertainty quantification through credible intervals. The model accounts for variability across different regions and temporal dynamics. The analysis revealed significant regional variations in system reliability, with a notable difference of 15% between the highest and lowest performing regions regarding detection rates of infectious diseases. This study provides evidence on the effectiveness of public health surveillance systems in Tanzania and highlights the need for targeted interventions to improve performance in underperforming areas. Public health authorities should prioritise strengthening surveillance infrastructure, particularly in underserved regions identified as having lower system reliability. Bayesian hierarchical model, Public health surveillance, Reliability assessment, Infectious diseases, Tanzania Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Tanzania, Bayesian hierarchical model, surveillance systems, public health, methodological evaluation, reliability assessment, infectious diseases, epidemiology*

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