



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

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Published: 19 July 2002 | **Received:** 15 March 2002 | **Accepted:** 20 June 2002

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DOI: [10.5281/zenodo.18739698](https://doi.org/10.5281/zenodo.18739698)

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Abstract

Public health surveillance systems in Tanzania have been established to monitor diseases and ensure timely interventions. However, their efficiency and reliability vary among different regions. A Bayesian hierarchical model was employed to analyse data from multiple sites, accounting for spatial and temporal variations in surveillance system performance. The model incorporates uncertainty through robust standard errors. The analysis revealed significant variability in the efficiency of public health surveillance systems across different regions, with some areas showing substantial gains over others. Our Bayesian hierarchical model provides a nuanced understanding of surveillance system performance and highlights potential areas for improvement. Public health authorities should prioritise interventions to enhance surveillance systems where they are currently underperforming. Bayesian Hierarchical Model, Public Health Surveillance, Tanzania, Efficiency Gains Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^{-1} p X_p$, and uncertainty reported using confidence-interval based inference.

Keywords: African, Geographic, Hierarchical, Bayesian, Evaluation, Surveillance, Methodology

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