African Veterinary Surgery

Methodological Evaluation of Public Health Surveillance Systems in Kenya Using Bayesian Hierarchical Models for Reliability Assessment

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Abstract

Public health surveillance systems in Kenya are critical for monitoring infectious diseases such as cholera and typhoid fever. However, their reliability and performance vary across different regions. The study employed Bayesian hierarchical models to analyse surveillance data from multiple sites within Kenya, aiming to estimate system reliability with robust uncertainty estimates. In one region, it was found that the surveillance system had an accuracy rate of 85% in detecting outbreaks compared to traditional methods. The Bayesian hierarchical model provided a nuanced understanding of system performance across different regions and could inform improvements in public health surveillance practices. Adopting this methodological approach can enhance the reliability and effectiveness of future public health surveillance systems in Kenya. Treatment effect was estimated with $text\{logit\}(\pi)=beta 0+\vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Bayesian, Hierarchical, Evaluation, Reliability, Surveillance, Public Health*

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