

Assessing Lassa virus surveillance disparities in West Africa using climatic zone and geographic proximity indicators

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Introduction

Lassa fever remains a persistent public health concern in West Africa, with Nigeria as its epicenter. While climatic and ecological conditions are known to influence rodent-borne transmission, neighboring countries with similar risk profiles often lack genomic surveillance data. This study presents a preliminary analysis of Lassa virus surveillance disparities across the region, exploring the role of climate zones, geographic proximity, and infrastructural gaps.

Methods

Metadata on Lassa virus genomic sequences were retrieved from the National Centre for Biotechnology Information (NCBI) Nucleotide database. Surveillance distribution across 16 West African countries was assessed against 2024 regional temperature variation data from Berkeley Earth. Countries were categorized based on shared climatic zones (Sahara, Sahel, Sudano-Sahelian, Guinea Coast) and proximity to known endemic areas.

Results

Preliminary findings show that only 5 of 16 countries (31.3%) which are; Nigeria, Guinea, Sierra Leone, Liberia, and Côte d'Ivoire, have submitted Lassa virus genomic data. Nine countries (56.3%) sharing border with endemic zones have no sequence submissions. Uniform regional temperature trends (mean variation = 1.5°C) were observed across all countries.

Conclusion

Countries with physical proximity to endemic zones but lacking genomic submissions may represent silent hotspots of Lassa virus. Surveillance disparities are not due to ecological unsuitability but likely inadequate facilities to conduct Lassa virus genomics surveillance. A novel idea of “WAVES Policy (West Africa Viral Early Surveillance Policy)” was proposed, which calls for regional genomic capacity strengthening, mandatory cross-border sequence virtual sharing for research purposes, and the deployment of mobile genomic units guided by climate and geography-informed risk models. Collaboration shall go a long way toward enabling West Africa put up a resilient fight against Lassa fever.