African Journal of Public Health and Health Systems

A Case Study of the Spatiotemporal Dynamics of Lassa Fever and Its Rodent Reservoir in Edo State, Nigeria

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Published: 06 November 2023 | **Received:** 21 July 2023 | **Accepted:** 22 October 2023

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DOI: 10.5281/zenodo.18531234

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Abstract

Lassa fever remains a significant public health burden in Nigeria, with Edo State a historically endemic zone. Effective control requires an understanding of the spatiotemporal overlap between human cases and the rodent reservoir, Mastomys natalensis, but integrated field data are often scarce. This case study aimed to map the spatiotemporal distribution of confirmed Lassa fever cases and correlate this with field data on rodent reservoir presence and abundance in selected endemic communities of Edo State. A descriptive, observational case study was conducted. Retrospective laboratory-confirmed human case data were analysed alongside prospective field data from rodent trapping and environmental surveys in identified hotspot communities. Spatial analysis and mapping were used to visualise distributions and overlaps. A distinct seasonal pattern in human cases was observed, with incidence peaking in the dry season. Rodent activity and household infestation showed significant geographical overlap with human case clusters. In one major hotspot community, rodent signs were found in a substantial proportion of surveyed households. The results demonstrate a clear spatiotemporal synchrony between peaks in Lassa fever incidence and increased peridomestic presence of the rodent reservoir during specific seasons. This underscores the role of domestic rodent exposure in local transmission dynamics. Public health interventions should prioritise integrated, community-based rodent control and environmental sanitation, particularly in the pre-dry season. Strengthening local surveillance to include zoonotic indicators is recommended for early warning. Lassa fever, spatiotemporal analysis, zoonoses, Mastomys natalensis, rodent reservoir, Nigeria, case study This case study provides field-based evidence directly linking human Lassa fever incidence with local rodent reservoir dynamics, offering practical insights for targeted, community-level intervention strategies in endemic settings.

Keywords: *Lassa fever, spatiotemporal analysis, zoonotic transmission, Mastomys natalensis, West Africa, disease ecology, One Health*

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