

## **Spatiotemporal mapping of Lassa fever cases in Bauchi State: Unveiling hotspots and trends (2023–2025 experience)**

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### **Introduction**

Lassa fever remains a significant public health concern in Nigeria, with Bauchi State consistently ranking among the top three most affected states in Nigeria. Transmitted primarily through contact with infected rodents, the disease is more prevalent in rural areas. This study investigated the spatiotemporal distribution of Lassa fever in Bauchi State from January 2023 to May 2025 with the aim of identifying geographic hotspots, seasonal trends, and demographic risk factors for improved public health interventions.

### **Methods**

A retrospective analysis was conducted using data from the Bauchi State Lassa Fever Treatment Centre. The dataset comprised 625 confirmed cases with variables such as age, sex, occupation, diagnosis dates, and geographical location. Descriptive statistics summarised patient characteristics, while temporal trends were examined through epidemiology week case aggregation. Spatial patterns were visualised using heatmaps and case density plots. Data analysis was

performed using Microsoft Excel (2021) and Python (version 3.12.4).

### **Results**

Of the confirmed cases, 52.6% were male, with a median age of 28 years (IQR: 19.5). High-risk groups included housewives (31.8%), farmers (21.9%), and students (14.4%). The highest burden was recorded in Toro (42.7%), Kirfi (30.4%), and Bauchi (12.5%) LGAs, with Jama'a (26.4%) and Guyaba (24.6%) wards emerging as major hotspots. A small proportion of cases originated from neighbouring Plateau (2.1%) and Taraba (1.3%) states. Peaks occurred in late 2023 (weeks 51–52), early 2024 (week 8), and early 2025 (weeks 6–7), demonstrating a consistent seasonal trend during the dry season. Heatmap analysis further demonstrated significant geographic clustering of cases in Toro and Kirfi LGAs.

### **Conclusion**

This study identified critical hotspot areas and key risk groups associated with Lassa fever transmission in Bauchi State, offering evidence to inform targeted preventive interventions and proactive outbreak control strategies. The findings highlighted the need

for early seasonal preparedness, strengthened surveillance systems, and robust inter-state coordination.