

## Epidemiology of Lassa fever in Bauchi State, Nigeria, 2021-2024: Temporal trends and forecast

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**Citation:** Nasir Omar Ahmed et al., Epidemiology of Lassa fever in Bauchi State, Nigeria, 2021-2024: Temporal trends and forecast. Journal of Interventional Epidemiology and Public Health. 2025;8(ConfProc5):00084.

**DOI:** <https://doi.org/10.37432/jieph-confpro5-00084>

**LINK:** <https://afenet-journal.org/epidemiology-of-lassa-fever-in-bauchi-state-nigeria-2021-2024-temporal-trends-and-forecast/>

**Received:** 13 Apr 2025, **Accepted:** 09 Jul 2025, **Published:** 11 Aug 2025

**Keywords:** Lassa fever, modelling, surveillance, time series analysis, seasonality, Bauchi State

This is part of the proceedings of the ECOWAS 2nd Lassa fever International Conference in Abidjan, September 8 – 11, 2025

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### Introduction

Lassa fever (LF) is an acute viral haemorrhagic illness caused by the Lassa virus, maintained in nature by multimammate rats. Nigeria is endemic to LF, and cases are reported throughout the year. Bauchi State in the northeast has emerged as an epicentre for LF outbreaks. Despite year-round case reporting, limited trend and seasonality analysis exist to inform timely interventions. This study applied time series modelling to describe LF trends in Bauchi from 2021 to 2024.

### Methods

We conducted a retrospective analysis using 4-year LF surveillance data extracted from the Bauchi State surveillance database (2021–2024). Using Microsoft Excel, the classical multiplicative decomposition model was used to separate the time series into trend ( $T_t$ ), seasonal ( $SV$ ), and irregular ( $I_t$ ) components:  $Y_t = T_t \times SV \times I_t$ . A centred moving average was used to estimate the trend, seasonal subseries averaging to derive seasonal indices, and irregularities were calculated accordingly. A one-year forecast was generated based on the trend and seasonality components.

### Results

From 2021 to 2024, 2,969 suspected LF cases were reported, of which 549 (18%) were confirmed. Confirmed cases increased annually: 51

(2021), 132 (2022), 163 (2023), and 203 (2024). Using the classical multiplicative decomposition method to forecast confirmed cases, a 4% increase is projected in 2025. Case distribution by sex was at a ratio of 1:1. The age-group 20-39 years accounted for 55% of the confirmed cases, while the 0-9 years had the lowest (9%). Three LGAs, Toro (36%), Bauchi (25%), and Kirfi (23%), accounted for over 80% of confirmed cases.

### Conclusion

Findings showcased the need to integrate analytical modelling into Nigeria's routine disease surveillance and response frameworks. The projected increase in LF cases for 2025 underscores the need for continuous implementation of risk communication, community engagement, environmental sanitation, and strengthened surveillance, especially in high-burden LGAs in the State.