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Research Article

Epidemiology Of Lassa Fever In Nigeria, 2015-2025: A Descriptive Study.

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Abstract

Nigeria is the epicenter of Lassa fever. As of 7 September 2025, the country has recorded 164 deaths out of 884 confirmed cases, and a case fatality ratio (CFR) of 18.6 percent. This portends a significant socio-economic burden and heightened risks of imported cases beyond sub-Saharan Africa. Thus, we describe vital epidemiological variables of Lassa fever in Nigeria between 2015 and 2025. We used primary data from the Nigeria Centre for Disease Prevention and Control (NCDC) database. By deploying descriptive statistics, we found an average case fatality ratio (CFR) of 22 percent between 2015 and 7 September 2025, a case positivity ratio (CPR) of 14 percent, and a total of 249 healthcare workers were infected with Lassa between 2019 and 7 September 2025. This study highlights the contemporary disease burden and diagnostic capacities of Lassa fever in Nigeria. It reinforces the need for improved community engagement and disease surveillance.

Keywords : *Lassa fever, Case fatality ratio, Nigeria, NCDC, Case positivity ratio, Healthcare Workers.*

INTRODUCTION

Lassa virus is an RNA virus that belongs to the family Arenaviridae and causes Lassa fever, predominantly in West Africa (1). It is a zoonotic disease, whose reservoir is multimammate rodent species (Mastomys natalensis), which are abundant in sub-Saharan Africa (2). It was first identified in 1969 in a small town called Lassa in Borno state, Nigeria, when two missionary nurses were infected with the virus (3). Subsequently, it has spread across other West African states with significant outbreaks in Sierra-Leone and Guinea (4). Other adjoining countries such as Benin, Mali, Ghana and Togo are prone to increasing burden of the disease (5). Over the past decades, there have been some cases of Lassa fever in non-endemic areas such as Germany, England and the United States due to human dispersal through heightened human transportation (6).

In West Africa, it affects between 100,000 and 300,000 people with roughly 5000 deaths annually (7). Among other West African states, Nigeria has the highest burden of Lassa fever (8). As of 7 September 2025, the country has reported 164 deaths out of 884 confirmed cases of Lassa spreading across 21 states (9). In Nigeria, among other West African countries, there are recent spirited governments' initiatives to combat Lassa fever (10). However, a more holistic and collaborative effort would be needed to tackle the virus in the region due to its socio-economic and geographical idiosyncrasies. The major drivers of Lassa infections remain pervasive poverty, poor sanitation, ineffective agricultural storage facilities, weak surveillance, increasing deforestation, and limited health infrastructures (11,12). Thus, this virus continues to pose a significant threat to public health in Nigeria, especially in rural and agrarian populations.

Lassa fever has an incubation period of 2-21 days after exposure to the virus. Roughly 80 percent have no clinical features or present with mild symptoms such as malaise, mild fever, and weakness (13). This clinical scenario often contributes to the easy spread of the virus. Roughly one out of five progresses to acute illness after a few days, usually characterized by high-grade fever, headache, muscle pain, weakness, diarrhea, and vomiting. In severe cases, bleeding occurs from the mucosa such as the nose, conjunctiva, gastrointestinal, or superficial skin (petechiae). Other plausible complications include hypotension, facial and neck swelling, and respiratory distress. Neurological symptoms such as tremors, seizures, and altered sensorium may

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develop, and death usually results from multiorgan failure between 10 and14 days of the commencement of symptoms (14). In patients who recover, weakness and neurological symptoms may persist for months. The most common chronic complication is sensorineural deafness, which occurs in approximately 25 percent and may persist for a lifetime (13). Pregnant women have a predilection to having severe disease in the third trimester due to reduced immunity (14).

Regarding its fatalities, the disease has an average CFR of 1 percent, but this can rise up to 15 percent for admitted patients (15). However, such estimates are usually unreliable because disease surveillance and case management vary across West African countries (15). There is no known vaccine against the Lassa virus. Management includes fluid rehydration and management of other associated symptoms. Ribavirin has shown promise and has been recommended against the Lassa virus (16). However, the evidence supporting its efficacy and safety remains weak (17). Lassa fever exhibits seasonal trends, and local populations are more vulnerable during the dry season from November to March (8, 18). Moreover, in West Africa, the prevalence of the virus is intricately linked to climate change. This enhances fluctuations in precipitation with concomitant disruptions in rodents' habitats, leading to increased exposure of humans to rats (19). Hence, the peak incidences of Lassa outbreaks usually occur during the drier months in Nigeria.

Given the catastrophic social and economic impact of the COVID-19 pandemic, the World Health Organization (WHO) marshalled an action plan in 2022. This is to curtail the escalation of various RNA-based viruses, including Lassa virus, which could trigger the next pandemic (20). Their main rationale is to enhance global vaccine research, improve funding, and mitigate the escalation of epidemics. Furthermore, it would encourage more groundbreaking studies on pathogenic and extremely virulent RNA viruses, including the Lassa virus. Besides, due to its high pathogenicity and virulence, there exists a potential for its deployment as a biological weapon among other high-risk pathogens (4). In this regard, this study aims to highlight the current epidemiological trends and characteristics of Lassa, specifically in Nigeria. There is no dearth of studies regarding the epidemiology of Lassa in West Africa, including Nigeria. Some scholarships have focused on the viral properties and clinical manifestations of the virus (1,14). While others emphasize the risk factors and socio-economic implications of the disease in the sub-Saharan climate (11,19). However, concerning the theme of this article, there is a paucity of research highlighting the epidemiological variables of Lassa over a prolonged period. Other recent studies have derived epidemiological data for Lassa on a weekly basis or over a shorter time span (18, 21-23). However, this research contrasts with previous epidemiological research on Lassa. We estimate epidemiological variables of Lassa over an extended period, 2015 to 2025. This often facilitates more effective planning, implementation, and evaluation of epidemic campaigns as well as surveillance programs.

This study also examines the trends and scale of Lassa infection among healthcare workers from 2019 to 2025. Earlier research has focused on Lassa infections in healthcare workers at the regional or outbreak level. In 2018, a study in Ondo state reported 16 infected healthcare workers at a tertiary hospital, with 10 likely infected by patient contact (24). Another study found 16 nosocomial cases among healthcare workers between January and April 2019 in Nigeria (25). This article, by contrast, establishes the trend and extent of hospital-acquired Lassa cases among healthcare workers nationally over a longer period. This helps create a clearer picture of disease burden and case trends over time. In this way, our study highlights key epidemiological factors of Lassa to support better community awareness, surveillance, IPC protocols, and preparedness against the virus.

MATERIALS AND METHOD

This study highlighted the current epidemiological trends of Lassa fever in Nigeria. We used retrospective primary data about the cases and mortalities of Lassa between 2015 and 7 September 2025. We also extracted data of healthcare workers affected with Lassa fever between 2019 and 7 September 2025. The primary data were sourced from the Nigeria Centre for Disease Prevention and Control (NCDC). The raw data obtained were collated using Excel spreadsheets and analyzed using basic statistics like percentages, cross-tabulation, and graphical charts. We deployed descriptive statistics, such as frequency and tables, to highlight the current epidemiological variables of Lassa infections in Nigeria. Such variables are average case fatality ratio (CFR) and case positivity ratio (CPR) of Lassa infections within the designated time frame. Also, we expose the trend and the magnitude of nosocomial Lassa infections among HCWs across the country from 2019 to 7 September 2025.

RESULTS

Nigeria witnessed a total number of 1735 deaths out of 7972 Lassa cases between 2015 and 7 September 2025 (**table 1**). **Figure 1** displays the trend of suspected and confirmed cases of Lassa fever. It highlights a sharp rise in confirmed and suspected cases from 2019 to 2020. They dipped appreciably in 2021 but witnessed a steady upsurge, peaking in 2024, before dipping again in 2025. The highest deaths accrued to the hemorrhagic disease occurred in 2020, when 244 Nigerians died from Lassa fever, while the lowest number of deaths, 40, was recorded in 2015 (**Table 1**). As of 7 September 2025, the end of epidemiological week 36, the country has

reported a total number of 164 deaths due to Lassa fever with a cumulative confirmed cases of 884 and a CFR of 18.6(**Table 1**). From **Table (1)**, the average estimate of CFR is 21.8. During this period, the range of CFR is from 9.3 to 30.2. The highest, 30.2 percent, occurred in 2018 while the lowest, 9.3 percent, occurred in 2015 (**Figure 2**). Regarding the case positivity rate (CPR) in this study, **Table 2** shows an average value of 14 from 2019 to 7 September 2025. Within this period, **Figure 3** displays a CPR range of 11.1 to 17.5 percent. This study also illustrates the magnitude of healthcare workers who contracted Lassa fever within the period. Between 2019 and 7 September 2025, 249 healthcare workers (HCWs) were infected with Lassa (**table 3**). **Figure 4** describes the trend of infection among HCWs. It displays the fluctuating trend of nosocomial infections from 2019, before it peaked in 2022. However, from 2022, the frequency of Lassa infections among HCWs has progressively plummeted until 7 September 2025. Regarding the geographical distribution of disease incidences, Ondo, Edo, Ebonyi, Bauchi, and Taraba states constitute at least 70 percent of the most affected states with Lassa fever in Nigeria between 2015 and 7 September 2025(**table 1**).

Table 1. Recorded Cases and Mortalities of Lassa Fever, 2015-2025

Year	Suspected Cases	Confirmed Cases	Deaths Deaths	Case Fatality Ratio %)	Most Affected states
2015	430	25	40	9.3	15
2016	921	109	119	12.9	29
2017	733	143	71	9.7	29 (70% from Edo, Ondo and Taraba)
2018	3498	633	191	30.17	23(80% from 23 (Ondo, Edo and Ebonyi)
2019	5057	833	174	20.9	23 (87% from Edo, Ondo and Ebonyi)
2020	6791	1189	244	20.5	27(83.2% from Ondo, Edo and Ebonyi)
2021	4654	510	102	20	17(84% from Ondo, Edo and Bauchi)
2022	8207	1067	189	17.7	27(from Ondo , Edo and Bauchi)
2023	9155	1270	227	17.87	28 (76% from Ondo , Edo and Bauchi)
2024	10098	1309	214	16.34	28(72% from Ondo, Edo and Bauchi)
2025	7523	884	164	18.6	21(90% from Ondo, Edo, Bauchi and Taraba)
Total		7972	1735	21.8	

N.B- From 2015 -2017, NCDC calculated CFR by dividing death rates by the total suspected cases. The 2025 data correspond to cumulative values from week 1 – 36, as of 7 September 2025.

Case Definitions

Suspected Case: (a)Any individuals presenting with one or more of the following symptoms. Malaise, fever, headache, sorethroat, cough, nausea, vomiting, diarrhea, myalgia, chest pain or hearing loss. (b) History of contact with probable or confirmed Lassa fever case within a period of 21 days of onset of symptoms. (c) Any person with inexplicable bleeding/hemorrhage.
Confirmed Case: any suspected case with laboratory confirmation (positive IgM antibody, PCR or virus isolation).

Table 2. Recorded Cases of Lassa and Case Positivity Ratio in Nigeria, 2019-2025

Year	Suspected Cases	Confirmed Cases	Case Positivity Ratio (%)
2019	5057	833	16.5
2020	6791	1189	17.5
2021	4654	511	11.1
2022	8202	1067	13.1
2023	9155	1270	13.9
2024	10098	1309	13
2025	7523	884	11.8
Total	54615	7629	14

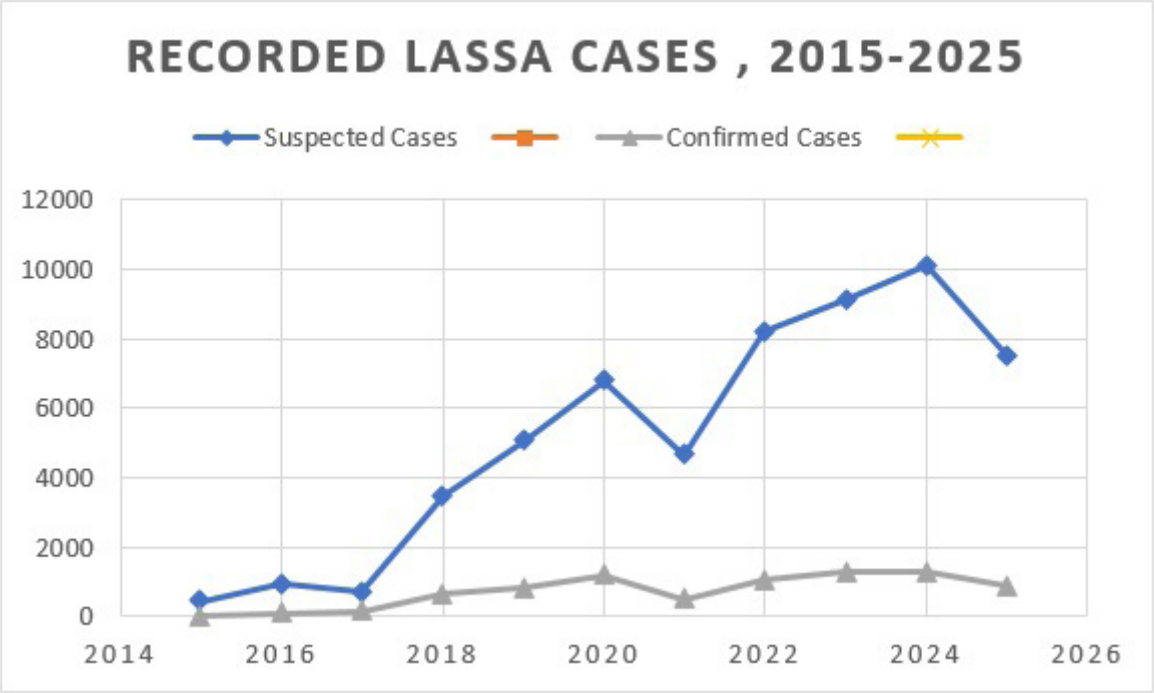
N.B – The 2025 data correspond to cumulative values from week 1 – 36, as of 7 September 2025

Table 3. Recorded Cases of Lassa Infections among Health Care Workers, from 2019-2025

Year	Health Care Worker Infected
2019	20
2020	48
2021	10
2022	63
2023	56
2024	40
2025	12
Total	249

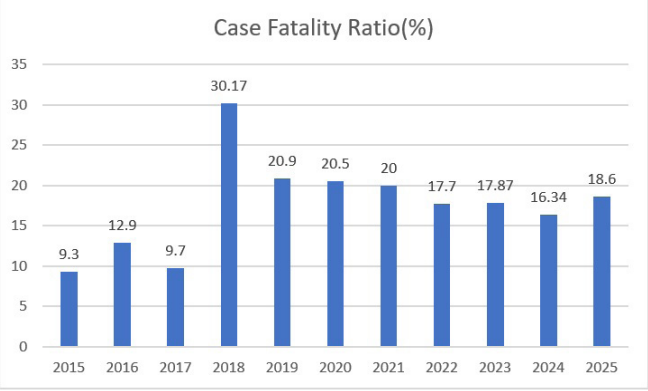
N.B – The 2025 data correspond to cumulative values from week 1 – 36, as of 7 September 2025

Figure 1. Recorded Suspected and Confirmed Cases of Lassa Fever in Nigeria, 2015-2025



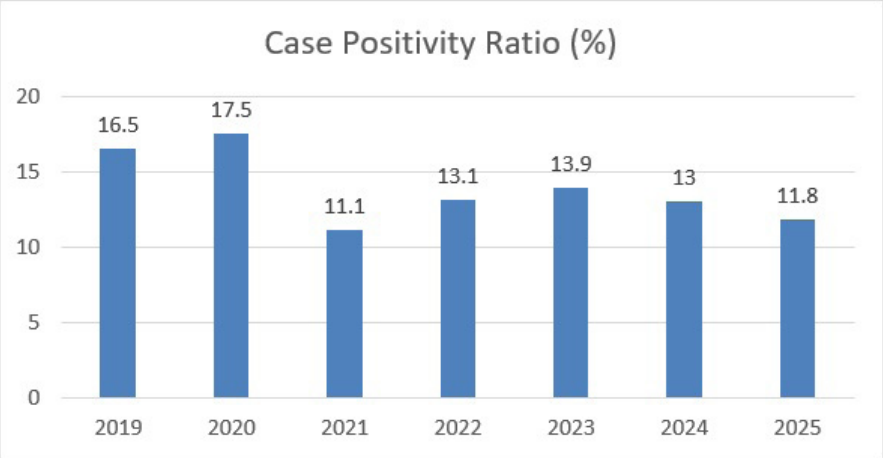
N.B – The 2025 data correspond to cumulative values from week 1 – 36, as of 7 September 2025

Figure 2. Estimated Case Fatality Ratio (%) of Lassa fever in Nigeria, 2015-2025



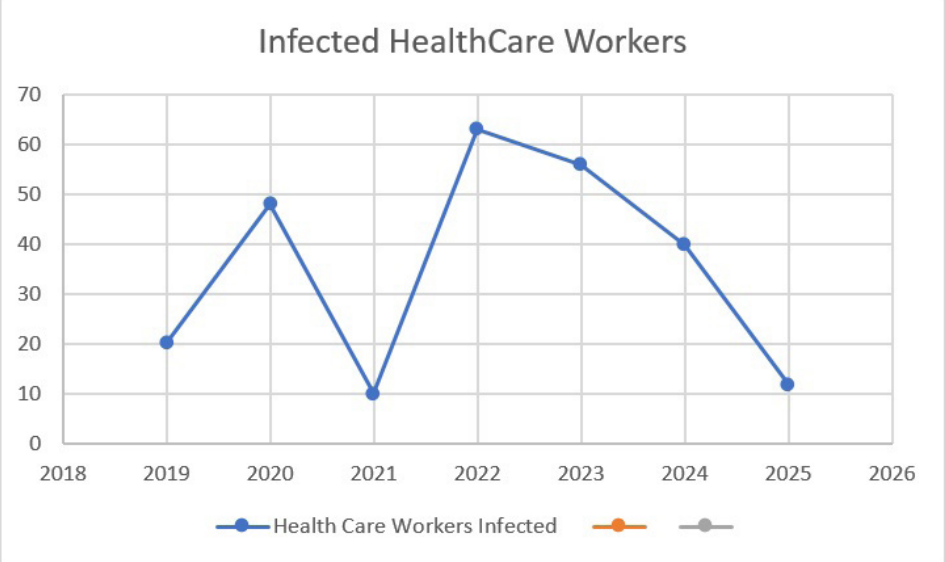
N.B – The 2025 data correspond to cumulative values from week 1 – 36, as of 7 September 2025

Figure 3. Estimated Case Positivity Ratio of Lassa fever in Nigeria, 2019-2025



N.B – The 2025 data correspond to cumulative values from week 1 – 36, as of 7 September 2025

Figure 4. Numbers of Lassa Infections in Healthcare Workers in Nigeria, 2019-2025.



DISCUSSIONS

Nigeria witnessed comparatively higher cases of Lassa between 2021 and 2024. In recent times, the recent spike in Lassa fever is attributable to governments' focus on community awareness and improved surveillance programs in high-risk areas. Our study found a case positivity ratio (CPR) of 11.1 to 17.5 percent between 2015 and 7 September 2025. During the COVID-19 pandemic, the WHO recommended a CPR of less than 5 percent for relaxation of restrictions (26). Although there is no universal CPR for specific pathogens. There is an acceptable implication of a high CPR in epidemiology. A significantly high value indicates a high level of virus transmission with many undetected infections, inadequate testing, and underscores the need for heightened contact tracing and surveillance (27). Thus, there have been increased cases of unreported or undetected Lassa infections over a longer period, and it is not a recent event. The recent upsurge was apparently spurred by current government initiatives to mitigate Lassa infections in prone areas in Nigeria. Hence, the true burden of Lassa is far higher than recorded in most instances. There are other plausible reasons for the high incidence of Lassa in Nigeria. The level of community engagement and education, especially in rural areas, is comparatively lower than that of their urban counterparts. Hence, a low level of awareness could trigger a higher Lassa fever burden than the reported cases during the earlier period (28). Many confuse the earlier stage of Lassa with common tropical infections; hence, many cases remain grossly underreported. This results from the overlap of prodromal

symptoms of common tropical infections such as malaria, typhoid, gastroenteritis, and COVID-19 with Lassa fever (29). We found that the steep rise in Lassa fever deaths in 2020 might be due to the effects of COVID-19 campaigns from late 2019 to 2020. Lockdowns and movement restrictions disrupted health promotion, surveillance, early detection, and management of other diseases, including Lassa fever, especially in sub-Saharan Africa (30). After COVID-19 campaigns, cases of some endemic diseases and related deaths escalated. However, from 2022 to 2025, the significant rise in Lassa cases is most likely due to heightened disease awareness, driven by widespread community engagements.

Regarding the geographical distribution of Lassa fever, the sub-national burden is linked to large rural populations and forest ecosystems in states such as Ondo, Edo, Ebonyi, and Bauchi. Most local people farm or hunt, which raises their risk of Lassa fever (31). Another reason for the skewed disease burden is how farm products are stored. Many local farmers process and store farm produce in open places or unprotected houses. Thus, they are vulnerable to rodent infestations and contaminations that heighten Lassa fever risk (18,32).

About four in five people infected with Lassa fever have mild or no symptoms. Only 20 percent develop multisystemic organ damage that could be fatal (13,33). The average case fatality rate is 1 percent, but it can rise to 15 percent or higher in hospitalized patients (13). This study found a CFR range of 9.3 to 30.17 percent and an average of 22 percent, which is higher than the WHO threshold. The reasons relate to the unique challenges of developing and resource-mismanaged regions like Nigeria. The main drivers are poverty, limited community awareness, and poor healthcare infrastructure. These issues are common in most sub-Saharan countries, especially in rural areas. In Sierra Leone, with comparable socio-geographical context, a study discovered a CFR range of 15 to 50 percent in hospitalized Lassa patients (33). In other West African countries, average CFRs are higher and match our results. For example, another research deploying seven countries in West Africa found a case fatality rate of 15.6 to 25.6 between 2012 and 2022 (34). In a similar vein, some scholars calculated a CFR of 24 to 61 percent in Lassa-endemic West African zones (35). In 2025, a systematic review across West Africa reported a pooled CFR of 27 percent for Nigeria, the Ivory Coast, Sierra Leone, Liberia, and Guinea between 1969 and 2025(36). Our findings also align with the average Lassa CFR across sub-Saharan Africa. In 2020, a previous systematic review recorded an average CFR of 30 percent across sub-Saharan Africa (37). These results highlight that many Lassa cases go unreported and that the disease causes unreported deaths. Lassa fever remains a serious public health threat in West African countries, including Nigeria.

Regarding nosocomial infections due to Lassa among HCWs, we found a total number of 249 HCWs infected with the disease from 2019 to 7 September 2025. In 2022, the number of infected HCWs peaked. 63 HCWs were infected with Lassa fever. Subsequently, there has been a progressive decrease in the frequency of nosocomial Lassa cases among HCWs. As of 7 September 2025, 12 HCWs have contracted Lassa from healthcare settings. This might be connected to the recent widespread sensitization of health workers about the need for appropriate IPC for all suspected infectious diseases, including Lassa virus. The recent One Health initiatives have specifically championed this course in vulnerable states, with some improvements in Lassa fever outcomes. Prior to 2022, some studies have shown limited availability of personal protective equipment (PPE), inappropriate knowledge, and use of IPC (Infection Prevention Control) protocols among health workers (24,25,38). This phenomenon predisposes them to Lassa infections. Hence, there has been an appreciable decline in the Lassa-infected HCWs since 2022. It is attributable to enhanced knowledge of Lassa in recent times. More significantly, some advances in the practices of IPC protocols in handling suspected infectious diseases, including Lassa fever, could be responsible for the decline in recent Lassa-infected HCWs.

CONCLUSION

In conclusion, this study calculates a high average CFR of 22 percent between 2015 and 7 September 2025. Furthermore, from 2019 to 7 September 2025, we calculate an average case positivity ratio of 14. Moreover, 249 healthcare workers contracted Lassa fever during the period. These epidemiological values indicate a high incidence of unreported cases and a high rate of viral transmission. They equally signify inadequate testing as well as a high rate of nosocomial infections due to Lassa fever. Thus, we demonstrate the unmet burden of Lassa fever among other common viral infections ravaging Nigeria. We appreciate the recent One Health initiatives targeting high-risk communities. They have developed and implemented a programme geared towards improving vector control, surveillance, contact tracing, and prompt case management. Indeed, this governments 'initiatives have increased local awareness, and enhanced surveillance and case management of the disease.

Based on the epidemiological data in this study, the following main recommendations are provided to mitigate Lassa infections in Nigeria: 1) Intensify community education on Lassa transmission in high-risk areas, especially during the dry seasons; 2) Prioritize the provision and use of modern, rodent-resistant storage facilities for rural farmers; 3) Ensure strict adherence to IPC protocols by HCWs and improve provision of PPE and laboratory resources, particularly in rural health facilities; 4) Strengthen laboratory capacities for Lassa testing nationwide; 5) Make Ribavirin readily available year-round

in high-risk regions and at major health facilities, especially during the dry season; and 6) Focus intensification of these interventions in highly affected states such as Edo, Ondo, Bauchi, Ebonyi, Bauchi , and Taraba. This study demonstrates Nigeria's ongoing challenges in controlling both sporadic and endemic Lassa cases. The findings reinforce the need for heightened surveillance, case management, and laboratory diagnostic capacity for Lassa fever nationwide. Nevertheless, this work has limitations. It mainly concerns the government health data used and associated variations in data collection, recording, and computation, which may impact analysis and interpretation. To make more robust predictions about future Lassa trends, an inferential analytic approach should be considered in subsequent research

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