

Assessment of the public health impact of monkey pox virus in Nigeria from 2017 to 2022.

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Background

Monkeypox is considered an emerging zoonotic disease despite its epizootic nature and the possibility of human-to-human transmission with a wide range of mammal illnesses [1]. After the eradication of smallpox and the end of the widespread smallpox vaccination, monkeypox (MPX), is now the most common orthopoxvirus infection in humans [2, 3]. In 110 nations where monkeypox had previously been uncommon, the World Health Organisation (WHO) reported 86,127 confirmed cases and 97 fatalities in February 2023 [4]. The monkeypox virus causes the viral illness known as monkeypox [5]. The disease was first identified in laboratory monkeys in 1958, but the first human case was identified in a 9-month-old boy in the Democratic Republic of the Congo (DRC) in 1970 [6]. Research suggests that African rodents are the natural reservoir, even though the disease was initially discovered in captive monkeys (thus the name). Squirrels, rats, mice, monkeys, prairie dogs, and people have all contracted infections [7].

A smallpox-like infection, monkeypox viral infection is characterized by a prodrome of fever, malaise, and the progressive development of vesiculopustular skin lesions. However, compared to smallpox, human monkeypox has substantially lower morbidity and mortality rates [5]. The two distinct classes of monkeypox virus (MPXV) that are responsible for endemic disease in the DRC and intermittent epidemics in many countries of Central and West Africa (including Sierra Leone, Nigeria, and Cote d'Ivoire), as well as in the United States of America, are the West African and Congo Basin Clades [8]. The Congo Basin genotype of the virus is responsible for more severe outbreaks observed in most of Central Africa, while the West Africa Genotype is responsible for milder outbreaks reported elsewhere in the world [9]. Although two clades have historically been used to classify the genetic diversity of the MPXV virus [10]. However, a fresh proposal for the MPXV classification has been made and is now divided into the I, IIa, and IIb clades. While clades IIa and IIb belong to the "West Africa clade," clade I correspond to the previous "Congo Basin clade" [11].

Influence of monkey pox virus on the health of Nigerians

Monkey pox epidemics are more common among populations that hunt, kill, handle, and eat bushmeat. [12-14]. Primary introduction via lesion material introduced percutaneously,

mucocutaneously, or via respiratory droplet is supported by evidence [15, 16]. Large respiratory droplets, direct or indirect contact with bodily fluids, lesion material, contaminated surfaces, or other materials, such as clothing or linens, are thought to be the primary routes of secondary human-to-human transmission [17]. According to the World Health Organisation (WHO), the danger is greatest for people who have had close physical contact with those who are symptomatic and infected with the virus [18]. In areas where monkey pox is endemic, inadequate capacity to diagnose and clinically manage patients and accurately identify exposures continues to pose difficulties for public health and health care providers.

Monkey pox is no longer a rare disease and poses a threat to public health. A suspected case of monkey pox in an 11-year-old boy was reported to the Nigeria Centre for Disease Control on September 22, 2017. The boy had an 11-day history of fever, malaise, and the progressive appearance of a vesiculopustular rash on his skin, oral mucosa, nasal mucosa, and associated generalized lymphadenopathy. In the same household, five of his siblings also experienced the same clinical indications and symptoms [19]. Although the index case and two of the siblings had claimed to have come into touch with a monkey in their neighbourhood, it was exceedingly challenging to determine if that monkey was the source of the infection [19], especially considering that it had no prior history of the disease. Following that, the Nigeria Centre for Disease Control launched a nationwide outbreak response, which included improved monkey pox surveillance [19]. Despite monkey pox not being a priority disease in Nigeria's Integrated Disease Surveillance and Response framework (Federal Ministry of Health 2022) later cases were reported in multiple states—the first cases in nearly four decades—in what would become the largest documented outbreak of the West African clade. In Nigeria, sporadic cases are still being reported, frequently with no known epidemiological connections [20]. There have been 988 confirmed cases of MKPV in Nigeria between 2017 and 2022, and there have been a total of 15 fatalities. Due to the lapse in cases of MKPV, it was necessary to determine the source of the outbreak in Nigeria. Additionally, it was necessary to determine if the outbreak was the consequence of a zoonotic spill over event that occurred locally or whether it was imported from another endemic country (Table 1) (Table 2).

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Table 1. Nigeria verified cases of monkey pox by state from September 2017 through December 2022 (NCDC 2023).

S/N	State	2017	2018	2019	2020	2021	2022	Total
1	Lagos	4	1	15	4	6	188	218
2	Rivers	25	14	7	1	5	37	89
3	Bayelsa	19	11	7	0	6	45	88
4	Abia	1	2	0	0	0	58	61
5	Delta	3	6	10	1	9	31	60
6	Imo	5	2	1	0	0	45	53
7	Ogun	0	0	0	0	1	40	41
8	Ondo	0	0	0	0	0	40	40
9	Edo	4	1	1	0	4	27	37
10	FCT	5	0	0	0	1	25	31
11	Anambra	0	1	1	0	0	25	27
12	Cross River	9	3	1	0	1	12	26
13	Kwara	0	0	0	0	0	21	22
14	Plateau	0	2	0	1	0	16	19
15	Akwa Ibom	6	0	1	0	0	12	19
16	Nasarawa	1	1	0	0	0	17	19
17	Adamawa	0	0	0	0	0	16	17
18	Oyo	1	3	2	0	0	10	16
19	Kaduna	0	0	0	0	0	15	15
20	Ebonyi	0	0	0	1	0	12	13
21	Benue	2	0	0	0	0	10	12
22	Borno	0	0	0	0	0	11	11
23	Katsina	0	0	0	0	0	8	8
24	Enugu	1	2	1	0	0	4	8
25	Taraba	0	0	0	0	0	7	7
26	Kano	0	0	0	0	0	7	7
27	Gombe	0	0	0	0	0	6	6
28	Kogi	0	0	0	0	0	5	5
29	Osun	0	0	0	0	0	5	5
30	Ekiti	2	0	0	0	0	1	3
31	Niger	0	0	0	0	1	1	2
32	Kebbi	0	0	0	0	0	2	2
33	Bauchi	0	0	0	0	0	1	1
34	Zamfara	0	0	0	0	0	1	1
35	Yobe	0	0	0	0	0	1	1
	Grand Total	88	49	47	8	34	762	988

Table 2. Key Indicators from 2017 to 2023 (NCDC 2023).

Key Indicators	Number
Total confirmed cases in Epi Week 52 (2022)	7
Total suspected cases (Epi week 1 to 52) 2022	2123
Total confirmed cases (Epi week 1 to 52)2022	762
Total deaths (Epi week 1 to 52)2022	7
Total deaths Sept 2017 – Dec 2022	15
Total confirmed cases in 2017	88
Total confirmed cases in 2018	49
Total confirmed cases in 2019	47
Total confirmed cases in 2020	8
Total confirmed cases in 2021	34
Grand total confirmed cases (Sept 2017 till Dec 2022)	988
Grand total suspected cases (Sept 2017 till Dec 2022)	2635

There is no concrete proof that the virus's recent return is the result of biological or genetic modifications. In places outside of those where the disease is endemic, there is mounting evidence of a potential new zoonotic reservoir for the virus [21]. Additionally, the high incidence of the disease in the community of males who have sex with men suggests that there may be a chance of undetected transmission in the community

by an atypical pathway, presumably sexual transmission [18, 21]. The possibility of monkey pox virus sexual transmission is not new. In the treatment of young adult patients with genital ulcers during the 2017 Nigerian outbreak, observed the potential for sexual transmission of the virus through close skin-to-skin contact [9]. In addition, there are discussions regarding the causes of the resurgence of monkey pox cases,

one of which is waning immunity, although deforestation may be a factor or can even act as a potentiator [22, 23]. Orthopox viruses are linked to the monkey pox virus, the variola virus (which causes smallpox), and the vaccinia virus, which is used to prevent smallpox [24]. There were no documented occurrences of monkeypox during the era when smallpox was common. Smallpox may have been suspected since the etiologic agent could not be confirmed by laboratories [15]. According to historical data [25], smallpox vaccination provided approximately 85 per cent protection against monkeypox. Following the successful vaccination campaign against smallpox, the World Health Assembly declared the disease eradicated in 1980, and routine vaccination was discontinued [26]. Nguyen et al. calculated via statistical modelling that just 10.1% of the population was immunized in 2016, the year before the outbreak in Nigeria started, and that the population immunity, which considers diminishing individual-level immunity, was 2.6%, down from 65.6% in 1970. By 2018, just 9.3% of people had received vaccinations, and 2.2% of the population was thought to be immune [22]. This is consistent with the extrapolation of data from a review of the literature that revealed that unvaccinated people accounted for roughly 80–96% of cases of monkeypox [27-32].

Conclusion

The setting for monkey pox's resurgence has been established by a decline in population immunity caused by the suspension of smallpox immunization. The latest MPXV epidemic continues to be a major concern. Despite the monkey pox virus having a higher transmission rate than most other viral illnesses, there is however little risk to the public. Most infected individuals report quite minor symptoms that do not necessitate hospitalization right away. To disseminate information, obtain diagnostic tests, carry out contact tracing, and make sure affected people and their contacts have access to medical care, public health authorities, clinicians, and the community must work together. Finally, the WHO and Nigeria should place monkey pox on the list of priority diseases. To enhance monitoring and foster a better understanding of the epidemiology, the integrated disease surveillance and response recommendations for the African region should be investigated.

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