

# MONKEYPOX OUTBREAK - 2022: A BRIEF REVIEW

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## ABSTRACT

Monkeypox is a zoonotic viral disease caused by Monkeypox virus belonging to Orthopoxvirus. The virus is present in monkeys and small rodents such as squirrels, ant-eaters and others. First human case was reported from Democratic Republic of the Congo in 1970 and had been reported only from central and western African countries before 2022. This year, the first human case of monkeypox was confirmed on May 7, 2022 in UK who travelled to Nigeria. Thereafter, the disease has caused a multi-country outbreak involving all continents outside Africa. As of August 28, 2022, a total of 47,652 monkeypox cases have been reported from 99 countries that have not historically reported monkeypox and in 7 countries that have historically reported monkeypox. Of the total, 47,209 cases have occurred in countries that have not historically reported monkeypox with a highest numbers of cases (17,431) in USA. Keeping in view of an increasing number of cases “monkeypox emergency” has been declared by US government on August 4, 2022. Second highest numbers of cases have been reported from Spain (6,459), Brazil (3,984), France (3,421), Germany (3,405), Britain (3,207) and following by other countries as of August 28, 2022. No cases has been reported from Nepal as of August 28, 2022.

## KEYWORDS

Monkeypox, vesiculopustular rash, zoonotic disease, outbreak-2022

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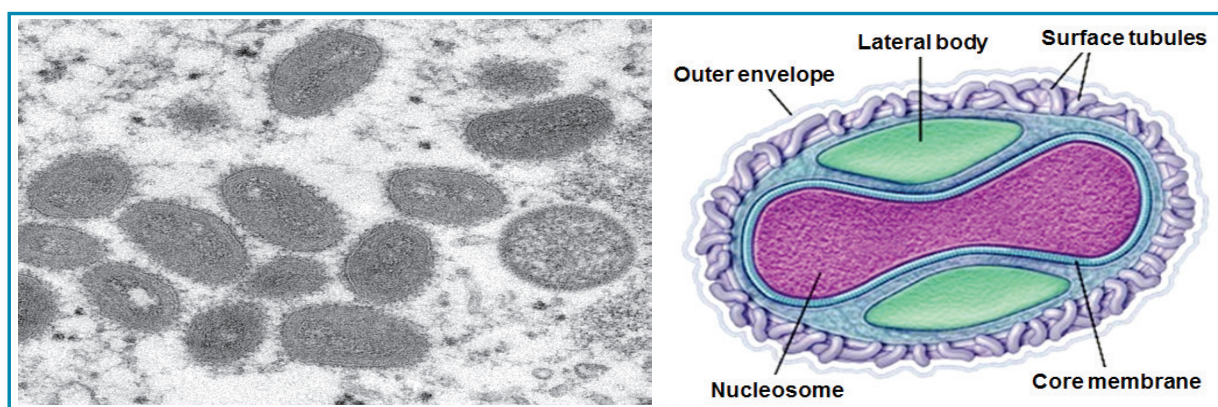
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## MONKEYPOX INTRODUCTION

Monkeypox is a zoonotic viral infection<sup>1,2</sup> caused by the Monkeypox virus - a DNA virus belonging to the Orthopoxvirus genus (Poxviridae family) that include Variola virus (which causes smallpox and has been eradicated in 1980), Vaccinia virus (used as smallpox vaccine) and Cowpox virus (that causes a skin disease in people who comes in direct contact with infected animals). The structure of virus is shown in Fig. 1.<sup>3</sup> It causes the disease 'monkeypox' in both in human as well as other animals such as monkeys, squirrels, ant-eater, hedgehogs (spiny mammals) and shrews (small mole-like mammals).<sup>4</sup>



**Fig. 1:** Structure of Monkeypox virus (a DNA virus)

The disease has been named as “monkeypox” as an outbreak of “pox-like disease” occurred in laboratory monkeys kept for research in Copenhagen, Denmark in 1958. The monkeypox virus was isolated from an ill African rodent (squirrel) in DRC in 1985 and a dead infant mangabey monkey in Cote d’Ivoire in 2012.<sup>5</sup>

The first human case of monkeypox was recorded (in a 9-month-old boy) in 1970 in Democratic Republic of the Congo (DRC)<sup>6</sup> during a period of intensified effort to eliminate smallpox. Since then, monkeypox has been reported in people in several other central-western African countries: Cameroon, Central African Republic, Cote d’Ivoire, Gabon, Liberia, Nigeria and Sierra Leone (Fig. 4). The majority of infections have been reported from DRC. This year, monkeypox virus is causing

a multi-country outbreak in almost all the continents outside Africa (first human case of 2022 was confirmed on May 7, 2022 in UK in an individual with travel history to Nigeria and returned on May 3, 2022 with rashes)<sup>7</sup> and it has been associated with a change in population behavior and increased international travel.<sup>8</sup>

### Transmission of Monkeypox

Monkeypox infection is transmitted through close and personal contact, often skin-to-skin contact, with respiratory secretion, sexual contact and touching un-disinfected sex toys including kissing, massaging and hugging etc. Vertical transmission (mother to fetus) can

also occur. Infection also occurs from the bite or scratches by infected animals or during preparing or eating undercooked meat of an infected animals.<sup>9</sup> In Peru a “community transmission” has also been reported.<sup>10</sup>

### Sign and Symptoms

The symptoms are similar to that of smallpox but milder and are rarely fatal. The incubation period of monkeypox is usually 7-14 days but can range from 5-21 days. The symptoms include fever, intense headache, lymphadenopathy (swelling of lymph nodes), back pain, myalgia (muscles aches) and intense asthenia (lack of energy)<sup>11</sup> as well as respiratory symptoms (sore throat, nasal congestion or cough).<sup>12</sup> Within 1-3 days (sometimes longer) after the appearance of fever, patient develops a rash in the body.



**Fig. 2:** Developmental stages (left to right) of monkeypox skin lesions



Fig. 3: Skin lesions in the monkeypox in outbreak 2022

Symptoms typically last between 2-4 weeks and are self-limiting. Sometimes, people get rash initially, followed by other symptoms while some experience only rash.

Monkeypox is typically characterized by disseminated vesiculopustular rash. The lesion progresses as macules (a small patch of skin with altered color, but not elevated), papules (an elevated, solid, palpable lesion that may be  $\leq 1$  cm in diameter), vesicle (a thin-walled sac filled with usually a clear fluid), pustules (vesicle filled with pus) and finally scabs (formation of a dry and rough protective crust) (Fig. 2). The lesions can be formed on any part of body including mouth, genitals and eyes (Fig. 3). The illness typically lasts for 2-4 weeks. However, monkeypox may also causes complication such as bacterial superinfection, corneal scarring, bronchopneumonia, septic shock and encephalitis.<sup>2</sup>

### Monkeypox Infection and Death

According to CDC (Center for Disease Control and Prevention), as of August 28, 2022, a total of 47,652 monkeypox cases have been reported in 99 countries that have not historically reported monkeypox and in 7 countries

that have historically reported monkeypox since the disease was first reported in May 6, 2022.<sup>13</sup> Of the total (47,652), 47,209 cases have occurred on in countries that have not historically reported monkeypox. On July 23, WHO has declared monkeypox situation as a “Public Health Emergency of International Concern”.<sup>14</sup> Highest numbers of cases (17,431) have been reported from USA.<sup>13,15</sup> Keeping in view of an increasing number of cases “monkeypox emergency” has been declared by US government on August 4, 2022.<sup>16</sup> Second highest numbers of cases have been reported from Spain (6,459), Brazil (3,984), France (3,421), Germany (3,405), Britain (3,207) and following by other countries as of August 28, 2022.<sup>13</sup> CDC estimates 1.7 million gay and bisexual men faces highest risk from monkeypox.<sup>17</sup>

In contrast to smallpox, the monkeypox is rarely fatal. The Congo Basin (Africa) type of monkeypox has fatality rate is around 10 percent.<sup>2,18</sup> Neighboring country, India reported Asia’s first monkeypox death (22 years old man in southern state of Kerala) on August 1, 2022.<sup>19</sup> However, no monkeypox cases have been detected from Nepal yet.<sup>13</sup>

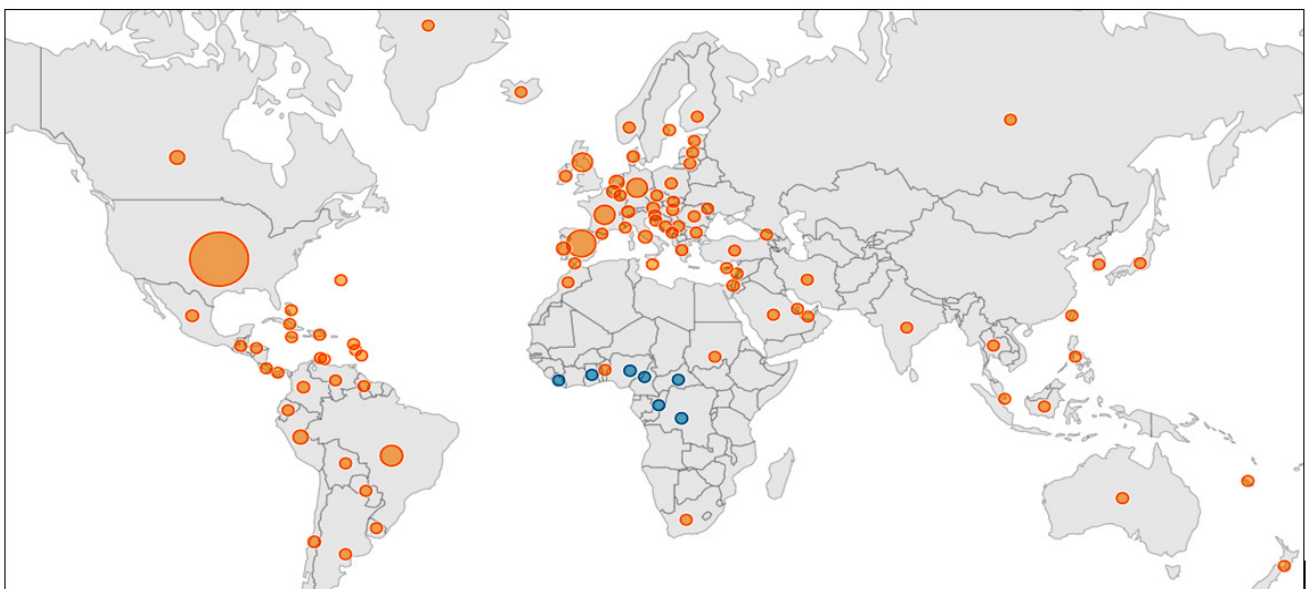
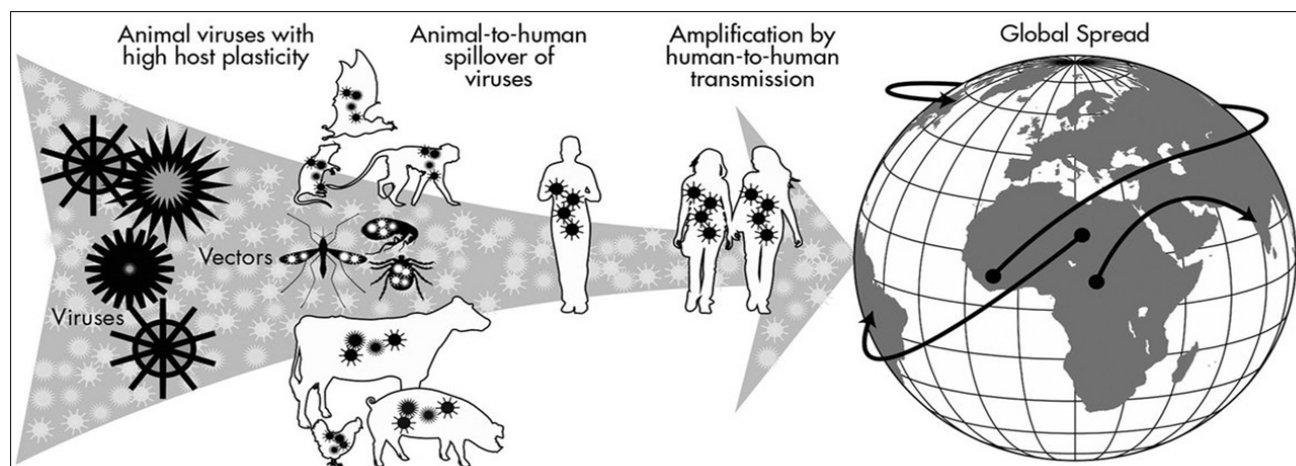


Fig. 4: World map showing monkeypox virus infection



**Fig. 5:** Spillover of Corona viruses from bat to animals and then to human as pandemic  
(Source: Johnson et al, 2015)

### Monkeypox Spillover

Monkeypox virus has been circulating among wild animals such as monkeys, squirrels, anteater, hedgehogs (spiny mammals) and shrews (small mole-like mammals) in tropical Africa. The first outbreak in the US was occurred in 2003 affecting 70 peoples was thought that the virus was brought in infected prairie dogs.<sup>20</sup> Other cases have occurred usually in people who had recently travelled to African countries.

In May 2022, an outbreak of monkeypox was reported in UK, US, Australia, Europe and Canada. This virus, that once remained in primates and rodents, must have entered in human population as ‘spillover’ and human to human transmission must have occurred as has been seen in the case of Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-COV-2) (Fig. 5)<sup>21</sup> though not as fast as SARS-COV-2 virus. In a 2013 monkeypox outbreak in the DRC, high rates of intra-household transmission were reported (median secondary attack rate 50%), with 104 possible cases across 16 households.<sup>22</sup> Currently, it is thought that the virus might have been circulating undetected in human populations in number of countries outside of Africa. In Peru ‘community transmission’ of the monkeypox virus with 203 cases, all aged between 32 and 37 years, has been reported.<sup>16</sup> However, all of them are in stable condition.

### Preventive Measures<sup>23</sup>

To prevent the monkeypox infections, one should do followings: (1) avoid close, skin-to-skin contact with people who have a rash that looks like monkeypox (no touching the rash or scabs of a person with monkeypox, no kissing, hugging or no having sex with someone with monkeypox and no sharing of eating utensils or cups with a person with monkeypox); (2)

do not handle or touch the bedding, towels, or clothing of a person with monkeypox; (3) wash your hands often with soap and water or use an alcohol-based hand sanitizer and (4) in Central and West Africa, avoid contact with animals that can spread monkeypox virus, usually primates and rodents. Also, avoid touching sick or dead animals.

If monkeypox is suspected, then it is prudent to: (1) consult health workers/doctors; (2) stay in a separate room or area away from people or pets, when possible, in case of active rash or other symptoms. Vaccination (with JYNNEOS or ACAM2000 vaccines) is recommended for people who have been diagnosed with or exposed to monkeypox and people who are at higher risk of being exposed to monkeypox.

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