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Emergence of monkeypox: Another concern amidst COVID–19 crisis

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The frequent outbreaks of zoonotic infectious diseases present significant public health risk. Several viral diseases with epidemic potential are threatening global health security. Zoonotic viruses, in particular, have caused numerous epidemics in the recent years, resulting in high morbidity and mortality. The COVID-19 pandemic proved that any virus outbreak that can transmit human-to-human or with cross-species transmission capability could pose significant risk and contribute to a global pandemic. Several countries have not fully recovered from the COVID-19 crisis yet. Although lessons are being learnt from each virus outbreak, the recurring outbreaks of new or reemerging viruses serve as a reminder that zoonotic pathogens will continue to emerge[1] and hence, an effective global zoonotic disease surveillance system coupled with early response against zoonotic infections could minimize the transmission risk across the borders. Two long years after sustaining through the COVID-19 pandemic, another zoonotic monkeypox virus transmission has been reported in many non-endemic countries in recent days. Although it is a rare, self-limiting illness, usually milder than smallpox and not a concern at this stage, early detection and rapid response is critical for the virus containment.

The monkeypox virus, which was first reported almost six decades ago, belongs to the *Orthopoxvirus* of the Poxviridae family and was first isolated from pox lesions of monkeys in 1958 and hence it is called monkeypox[2]. The first human case was identified in 9-year-old child in the Democratic Republic of the Congo in 1970[3]. Since then, sporadic reports of human monkeypox mostly confined to Central and West Africa were reported (Figure 1). The first monkeypox outbreak outside of Africa was identified in 2003 in the USA following the import of infected animals from Ghana to Texas[4]. Two genetically discrete clades of the virus have been characterized as the Congo Basin (Central African) clade and the West African clade. Congo Basin is more virulent than those from West Africa with the case fatality rate of 10.6% compared to 3.6% for the West African clade[5]. The incubation period is usually

from 6 to 13 days but can range from 5 to 21 days. The reservoir of monkeypox virus is most likely rodents. Human-to-human transmission occurs through respiratory droplets, body fluids, contact with lesion and contaminated surfaces or other material such as bedding and clothing[6,7].

The global attention has recently focused on the monkeypox virus after the confirmed case of West African clade of monkeypox virus reported on 7 May 2022 in the United Kingdom (UK) and multiple countries thereafter. The infected person had a travel history to Nigeria and returned to UK[8]. The most recent cases before this current outbreak were reported in 2021. This time, virus transmission was reported in Europe without epidemiological links or travel history to Africa or known exposure to an infected person according to the UK Health Security Agency[8]. So far, cases were reported in USA, Canada, Australia, Israel and several European countries including UK, Sweden, Spain, Portugal, Netherlands, Italy, Germany, Belgium and France. Many suspected cases are being investigated. Hence, there remains a possibility of identifying further cases in non-endemic countries. There have been more than 100 confirmed cases identified outside Africa[9]. However, no mortality has been reported in 2022 so far. All reported cases outside Africa have been caused by West African clade. It is still unclear about the

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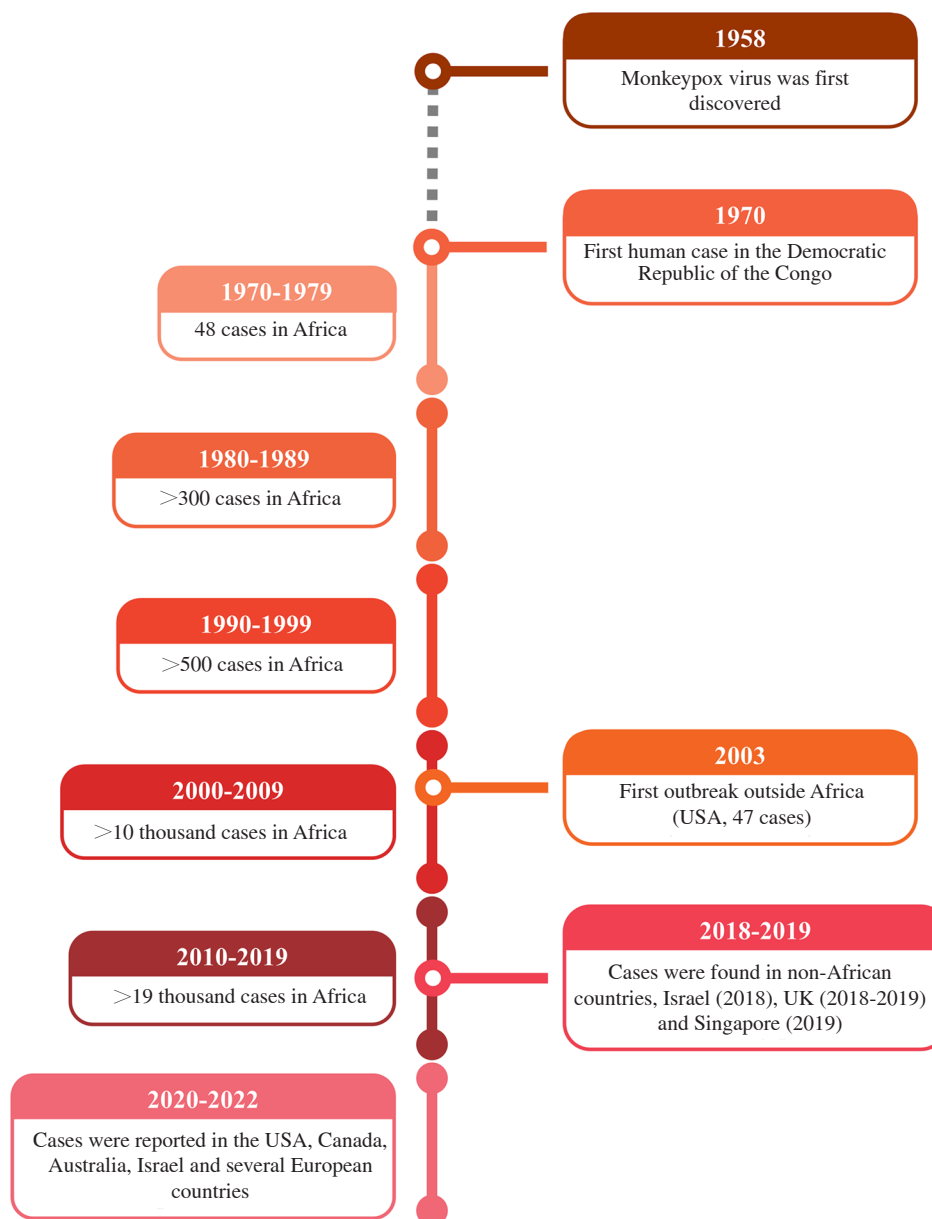


Figure 1. Timeline of monkeypox virus infection. The number of confirmed, probable, and/or possible number of monkeypox cases by decade is presented[5].

natural history, animal origin, reservoir host for virus circulation. Extensive surveillance of monkeypox virus in the endemic places will help us to better understand the zoonotic origin of the virus.

The clinical presentation of monkeypox is usually milder with a rash, lymph node enlargement, fever and mostly affected individuals recover within a few weeks. Proper isolation with supportive care and quarantine measures should be in place to quickly respond upon identification of suspected or confirmed new case. The termination of smallpox vaccination in 1980 and waning immunity among population in due course and increasing number of unvaccinated individuals led to the increased incidence of monkeypox[10]. The vaccination against smallpox has been demonstrated to be protective against monkeypox. Furthermore, Bavarian Nordic's live virus vaccine platform technology, MVA-BN (JYNNEOS in US,

IMVAMUNE in Canada and IMVANEX in Europe) is the only licensed vaccine for the prevention of monkeypox and Tecovirimat SIGA (Tpoxx) is a medicine approved for the treatment. Despite being discovered in 1958, these countermeasures are not yet widely available[7].

Although it is still relatively a rare infection, the increasing number of monkeypox cases in non-endemic countries and across Europe is triggering alarm worldwide. Epidemiological investigations, transmission dynamics and ecology of the disease are not completely understood and demands greater attention. Awareness campaigns, promoting precautionary measures, educating health care workers, advancing public health preparedness with proactive continuous extensive surveillance, rapid risk assessments, response activities, early detection and contact tracing should be critical to deal with

emerging or reemerging viral threats in a sustainable way. The COVID-19 pandemic highlights the importance to strengthen the national healthcare systems and the need to create global policies, regulatory frameworks to respond quickly to potential threats[11]. World Health Organization and other government organizations are gathering information, identifying knowledge gaps and priority research questions for monkeypox research in order to provide an action plan that can be readily deployed to control the outbreaks. All in all, the outbreak needs to be monitored carefully, keep exploring the possible treatment options, control measures and encourage the public to adhere to the safety protocols issued by national and international health authorities.

Conflict of interest statement

The authors declare there is no conflict of interest. Waranyoo Phoolcharoen from Chulalongkorn University is a co-founder/shareholder of Baiya Phytopharm Co., Ltd. Thailand.

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Authors' contributions

B.S. and W.P. conceived the study. B.S. participated in the literature search and drafted the manuscript. N.K. helped to produce the figure. All authors revised the manuscript and approved the final manuscript for submission.

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