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Review

Perspective: An overemphasis on vaccines for Mpox skewes important lessons from COVID-19 and the need for public health approaches

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ABSTRACT

The emergency declarations for Mpox triggered a flurry of appeals for 'vaccine equity' and the mass production of additional vaccine doses, citing a need to 'learn lessons' from COVID-19. We question whether the right lessons have been learned in terms of a supposed need to rollout vaccines quickly and widely, raising concerns about the consequences of an overreliance on expert-driven mass vaccination strategies over more diversified, context-specific and systemic public health strategies. Compared to COVID-19, Mpox has no such epidemic potential because it requires close contact for transmission. Moreover, Congolese populations face far more pressing health burdens. Thus, the health needs of the population risk being lost within a response focused on global procurement of costly health technologies whatever the context in which the outbreak is occurring. Alternatively, locally owned prioritisation and public health and sanitation approaches are key, which should be proportionate to relative disease burdens, and which utilise a diversity of strategies that are cost-effective and with wider public health benefits.

Contents

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Introduction

On August 13, 2024, the Africa Centre for Disease Control declared the outbreak of Mpox in the Democratic Republic of the Congo (DRC) and neighbouring countries a 'public health emergency of continental security'. The next day, the World Health Organization (WHO) followed, declaring the outbreak a 'public health emergency of international concern' (PHEIC). These declarations triggered a flurry of appeals from health organisations, academics and the media demanding the release of stockpiled Mpox vaccines as well as the production of 10 million additional doses [1–4]. The cost of this strategy was seemingly not used as a decision criterion, since WHO estimated that US$15 million would be needed in the initial alert phase,[5] while it soon appeared that existing vaccines costed between US$ 50 and 75 million [6]. Like COVID-19, the Mpox response quickly focused on vaccine strategy and 'vaccine equity' with many medical [5] and media [7] pundits issuing stark warnings that we needed to 'learn lessons' from the COVID-19 pandemic.

In partial response, the European Union (EU) and manufacturer Bavarian Nordic pledged over 200,000 stockpiled doses of the vaccine JYNNEOS (MVA-BN) to the Africa Centre for Disease Control (CDC), with the EU paying an undisclosed price for its 80 percent share of the donation [8]. Bavarian Nordic with additional Advanced Purchasing Commitments from countries, said it could produce 10 million doses by the end of 2025, while Japan has offered 3.5 million doses of KM Biologics' LC16m8 vaccine [9].

Given the focus on mass vaccination strategies for Mpox, we question whether the right lessons have been learned from the recent COVID-19 pandemic, namely the systemic interdependencies between the disease, our interventions, and broader health issues [10], as well as the need to address the problem in its broader societal context, through inclusive and transparent decision-making [11]. Although many studies offer justifications for the wide use of vaccines for Mpox [12], we raise concerns about the consequences of overreliance on vaccination on overall public health. As argued below, Mpox remains a small and relatively confined disease outbreak requiring close contact for transmission, in socioeconomically disadvantaged populations facing far more pressing health burdens. The 'real' health needs of the population risk being lost within an international response that is focused on costly health technologies, divorced from the context in which the outbreak is occurring, and the priorities of the communities concerned. Instead, we argue that in the first instance, two lessons from the COVID-19 pandemic should have been learned: 1) In terms of process - analysis of the problem, potential response strategies and their prioritisation should be locally owned instead of being imposed top-down, and; 2) in terms of content - first line public health principles are key in order to invest in all aspects of the epidemic response (including social awareness, sanitation, patient isolation and treatment) and to balance the response to Mpox with the need to invest in other healthcare capacities [11,13–15]. Any prioritised intervention should be proportionate to relative disease burdens and utilise a diversity of cost-effective strategies that are of greatest public health benefits [13].

Manufacturing a crisis?

Mpox, formally Monkeypox, is a disease caused by an endemic African pathogen with a zoonotic rodent reservoir. Classified into two clades (I & II), Mpox causes intermittent human outbreaks and is mainly transmitted between people through close skin contact with symptomatically infected people, especially during sexual intercourse [4]. However, over half of the suspected cases and deaths in the current outbreak are among children [16,17]. Historically, Clade I is dominant in the DRC [4]. Over the period 2010–2023, the case-fatality ratio (CFR) was 2.9 % on average, and 6.0 % in under-5 children [18]. However, the high mortality rate may be related to the catastrophic humanitarian situation (armed conflicts in the region with millions of internally displaced people living in cramped impoverished conditions) [19]. As for this outbreak, the WHO reported 13,244 laboratory-confirmed mpox cases in DRC in 2024, with 43 deaths (CFR: 0.3 %), and 2167 cases and 4 deaths between January and February 23, 2025 (CFR: 0.18 %) [20]. The number of unreported cases, particularly of mild cases, is likely to be much higher, meaning that the infection fatality rate is probably even lower [21].

Although Mpox poses a public health risk with rising incidence over several years, the PHEIC was declared largely because of the discovery of a new variant (Clade Ib) in South Kivu, DRC in October 2023, which spread to neighbouring countries. Whether this variant is more contagious remains uncertain [22], and there is ongoing debate about whether declaring a PHEIC was prudent [19]. Currently, Clade Ib is mostly found in the Eastern provinces of the country, but some provinces – including Kinshasa, the capital city – face a double outbreak of Clades Ia and Ib [20]. While the endemic Clade Ia outbreak usually stem more from zoonotic than human transmission [23], a study from South Kivu shows that Clade Ib was apparently transmitted primarily during sexual intercourse and that almost a third of those affected were sex workers [4].

Mimicry response

A particular feature of COVID-19 was a heavy reliance on, and mimicry of 'lockdown' strategies between countries whist awaiting the availability of mass vaccination as a 'the perceived only solution' to end the pandemic [24]. Despite expected economic, social, and personal harms associated with these non-pharmaceutical interventions [25], the near singular focus on mass vaccination persisted even when the efficacy of the COVID-19 vaccines was known to wane within a few months and they were demonstrated to have little impact on transmission [26–28].

Following a similar trajectory, WHO quickly announced that it would release several million dollars from its Contingency Fund for Emergencies (funded by US$ 22 million in 2024) for Mpox [29], while Gavi, the Vaccine Alliance, announced that it would provide up to 500 million dollars (out of comparison, Gavi's 2021–2025 financial pledges except for COVID-19 vaccines was US$8108 million) [30]. Moreover, prior to the PHEIC, the WHO Director-General called on vaccine manufacturers to apply for emergency use authorisation for the vaccine so that it can be administered in countries that have not yet approved it. This move allows organisations such as Gavi and UNICEF to quickly procure and distribute vaccines [31].

Vaccines specifically developed against Mpox are not yet available. Nevertheless, given its close relationship to smallpox (another orthopoxvirus), vaccines against smallpox are estimated to offer over 80 percent protection against Mpox infection [32]. Moreover, a systematic review of the efficacy of MVA-BN against Mpox in high-income countries estimated an efficacy of pre-exposure prophylactic vaccination ranging between 35 and 86 percent after one dose and between 66 and 90 percent after two [33], although a recent study raises concerns about waning protection from the Jynneos vaccine [34]. Targeted vaccination may therefore have an important role in high-risk contexts, but population wide vaccination strategies would require greater evidence. This is because existing studies are based on data from the 2022 clade II outbreak in wealthy countries and as such effectiveness may not be transferable to the situation in the DRC [4,35,36].

Given the transmission parameters of Mpox, awareness campaigns about symptoms and infection routes should take centre stage, along with correcting immune impairment from stunting, malnutrition, and concomitant diseases [37]. Such basic public health interventions provide broader benefits beyond the target disease. The absence of reliable and large controlled trials on the main clade cited for the PHEIC (clade Ib) should also be addressed with caution, since at present there is no evidence that existing vaccines will be effective against it [38], while a study also suggests it is less deadly than assumed [39]. As a result, Mpox

presents a far different risk profile than COVID-19, and the latter, therefore, represents a poor model for Mpox responses, irrespective of the failure or success of various COVID-19 strategies.

Furthermore, by overemphasising mass vaccination, we risk sidelining the combination of other public health measures encompassing hygiene, community empowerment and established childhood vaccination. Health equity would be a different matter, but that would involve weighing the small Mpox burden against the enormous burdens of other diseases that people in the DRC (where over 300,000 children died from all causes combined before age 5 each year) and elsewhere face (like malnutrition, malaria, trypanosomiasis, HIV and tuberculosis), and then acting accordingly to population needs [40].

The need for a multilayered systemic public health approach

Mpox is not the next major pandemic, but a painful disease that rarely ends fatally, remains largely confined regionally, and predominantly affects already compromised populations. Thus, a robust public health response, potentially complimented by selective vaccination, should sufficiently contain the outbreak and deliver far broader overall health benefits.

Nevertheless, like COVID-19 [41], this more balanced approach has been overwhelmed by loud calls for Mpox 'vaccine equity' [5]. This includes demands for increased manufacturing and the development of a scaled-up vaccination campaign. Such concerns about equity in access to vaccines are seemingly more symbolic of wider access to medicine issues in Africa than an evidence-based epidemiological argument favouring vaccines for sudden acute outbreaks [42]. Moreover, this advocacy often invokes the experience of 'vaccine nationalism' during COVID-19, with knee-jerk demands that the main lesson to learn for Mpox is to produce more vaccines more quickly (it is not surprising that the share price of Bavarian Nordic skyrocketed after the PHEIC was declared).

After a deep breath, it appears likely that 10 million doses for Mpox, while a boon to manufacturers, is neither a clearly justified nor a meaningful response to population needs [43]. How these vaccines will be deployed with strategic effect, at what cost, and what overall health benefit it will generate relative to the use of other less expensive public health strategies, are fundamental but unanswered public health questions [44].

Lastly, it is not clear what opportunity costs and knock-on effects overreliance on Mpox vaccines will have. The suggested mass vaccination-based response of 10 million doses at up to $150 per course would siphon off an equivalent of more than half of DRC's annual health expenditure (amounting to 2.5 billion US$ in 2022) [45,46], while $4 billion for an Africa-wide response is higher than the annual global budget for malaria [47]. As a result, diverting limited resources to the production of vaccines will pose significant opportunity costs in relation to other endemic and persistent disease programs with burdens of far greater magnitude [43]. For example, DRC has one of the highest infant mortality rates in the world. And although Mpox has a little over 500 suspected deaths last year, with 43 confirmed, around 40,000 DRC residents have died from malaria in the same period, most of them children, and virtually all avoidable [48]. Nutritional diseases and tuberculosis are similar, while underlying poverty is a crucial promoter across all these diseases. In other words, while there is evidence that child nutrition interventions in Africa are very efficient (with documented cost per death averted/life saved of child nutrition in Africa ranging between US$12 and US$17,500) [49], it is estimated that the cost of Mpox vaccines per death averted range between US$2.3 and $4.6 million [46].

Novelty – not mimicry – as a strategy for success

All problems are contextually multilayered, interconnected and interdependent resulting in nonlinear dynamic responses [25]. Failing to approach systemic problems through a systems and complexity thinking approach are invariably doomed to fail [50,51]. This means considering the Mpox outbreak in its epidemiological and health system capacity context, understanding the whole range of causes (beyond the virus) and the whole range of interventions, and letting local stakeholders prioritise the most appropriate response strategies. We have the frames and tools to do much better at our disposal – it is our ethical responsibility to learn from past failures, reflect upon all tools available, and adapt them to meet emerging challenges [26].

Unfortunately, one important lesson not learned from COVID-19 is that scarce financial and human resources diverted to acute outbreaks will ultimately divert resources out of routine programmes to large-scale pharmaceutical manufacturing and procurement [52,53], while also taking health workers away from their roles in addressing existing burdens [43,54]. This will ultimately negatively impact overall health outcomes, and utilization of such knowledge is basic to public health [21]. Thus, Mpox should now allow us to do better, rather than do 'more of the same' (Einstein).

Abbreviations

CDC: Centre for Disease Control
CFR: Case fatality ratio
DRC: Democratic Republic of the Congo
EU: European Union
HIV: Human immunodeficiency virus
JYNNEOS (MVA-BN): Mpox vaccine manufactured by Bavarian Nordic
PHEIC: Public health emergency of international concern
UNICEF: United Nation's Children's Fund
WHO: World Health Organization

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