

The third generation modified vaccinia Ankara vaccine is effective in preventing the transmission of mpox

Mingwang Shen^{a,b} and Lei Zhang^{a,c,d,*}

^aChina-Australia Joint Research Center for Infectious Diseases, School of Public Health, Xi'an Jiaotong University Health Science Center, Xi'an, Shaanxi, 710061, PR China

^bKey Laboratory for Disease Prevention and Control and Health Promotion of Shaanxi Province, Xi'an, Shaanxi, 710061, PR China

^cMelbourne Sexual Health Centre, Alfred Health, Melbourne, VIC, Australia

^dCentral Clinical School, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, VIC, Australia

Mpox is a zoonotic disease caused by orthopoxvirus and can be transmitted through direct skin/mucosal contact with infected individuals or indirectly by contact with contaminated materials. Mpox has two distinct types, whereas clade I can cause severe complications and death (case fatality rate [CFR]: 1.4% to >10%), clade II is relatively mild and more common (CFR: 0.1%–3.6%).^{1,2} By 2nd August 2024, more than 116 countries/regions have reported mpox cases, with cumulative 99,176 confirmed cases and 208 deaths globally since 1st January 2022.³ The transmission pattern has shifted from homosexual transmission of clade II especially in men who have sex with men (MSM) during the 2022 outbreak to heterosexual transmission of clade I in the general population since September 2023.⁴ To interrupt the transmission of mpox, the third-generation Modified Vaccinia Ankara vaccine manufactured by Bavarian Nordic (MVA-BN) was rapidly implemented among high-risk populations in several countries in Europe and North America in 2022–23.⁵ Lessons learned from previous mpox vaccination programmes may provide valuable insights into the prevention and control of the new mpox outbreak.

In a recent study in *The Lancet Regional Health–Europe*, Ghosn and colleagues evaluated the effects of vaccination on sexual behavior and mpox incidence among MSM in France.⁶ The participants of this study come from a clinical trial assessing the efficacy of doxycycline post-exposure prophylaxis and/or meningococcal B MenC4B vaccine among MSM who are using HIV pre-exposure prophylaxis (PrEP) and have a history of sexually transmitted infection (STI). The study showed that sexual behavior of MSM significantly changed after May 9, 2022 (the start date of this mpox epidemic in Europe). Moreover, mpox incidence decreased from 67.4 per 1000 person-months (p-m) before vaccination (May 9–July 10, 2022, period-1) to

24.4 per 1000 p-m after vaccination (July 11–September 20, 2022, period-2), with an incidence rate ratio of 0.36. These results indicated that rapid roll-out of MVA-BN vaccine and change in sexual behavior could cause a dramatic reduction of mpox incidence.

The study found that timely vaccination played a key role in reducing mpox transmission in France. However, the observed effect may depend on several factors. First, it usually takes at least 14 days from vaccination to protection and thus those mpox case data within 0–13 days after vaccination should be adjusted when calculating the mpox incidence and vaccine effectiveness.⁷ Second, data missing (>40%) on sexual behavior may lead to some bias, and behavior questionnaires every 3 months may not capture the behavior change during the short outbreak. Detailed, complete and frequent sexual behavior data are necessary to assess accurately its role. Third, the population impact of vaccination and change in sexual behavior should be evaluated comprehensively. Dynamic transmission compartmental model or individual-based model may be useful in capturing these impacts by comparing scenarios with or without vaccination and change in sexual behavior.⁸

Clade I mpox continues to spread from the Democratic Republic of the Congo (DRC) to its four neighboring countries (Burundi, Kenya, Rwanda and Uganda) which have not reported mpox cases before.⁹ The World Health Organization (WHO) declared the ongoing mpox epidemic a public health emergency of international concern (PHEIC) again on 14th August 2024. Low-income countries that have not granted their own approval of mpox vaccines may need to approve the emergency use to control the epidemic. Real-world vaccine effectiveness evaluation of MVA-BN vaccine for prevention of the transmission of clade I is needed. As the vaccine needs to be stored at the temperature of –20 °C~–80 °C within 3~9 years (shelf life), stocking mpox vaccines for potential mpox outbreaks in resource-limited settings should consider cost-effective vaccination strategies to balance the cost of vaccine storage and medical costs caused by future outbreaks.¹⁰ Vaccine allocation should also consider other high-risk populations such as female sex workers (FSW) as heterosexual transmission is becoming more dominant.

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*Corresponding author. China-Australia Joint Research Center for Infectious Diseases, School of Public Health, Xi'an Jiaotong University Health Science Center, Xi'an, Shaanxi, 710061, PR China.

E-mail address: lei.zhang1@xjtu.edu.cn (L. Zhang).

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Overall, this study found that the rapid roll-out of mpox vaccination substantially reduced the incidence during the 2022 mpox outbreak. Early diagnosis and surveillance alert system for mpox is necessary for monitoring the outbreak, so that public health authorities can timely reach out and vaccinate key populations. Optimal stocking and allocation of vaccines need to take into consideration not only its shelf life but also the potential scale of the affected population.

Contributors

MS and LZ conceived and designed the commentary. MS wrote the first draft and LZ critically revised the commentary.

Declaration of interests

We declare no competing interests.

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