

## **From Covid-19 to monkeypox, variation on the theme of zoonose**

Press release of the French National Academy of Medicine

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In less than three years, two epidemic viral infections have been classified as public health emergencies of international scope, Covid-19 on January 30, 2020, and monkeypox on July 23, 2022. In both cases, the rapid spread of an emerging, contagious, potentially fatal disease, affecting many countries on several continents, justified the triggering of the highest level of alert by the World Health Organization.

Aside from the inevitable infodemic drifts caused by the chronological proximity of these two epidemics, only one common point is to remember: like Covid-19, the new epidemio-clinical form of monkeypox has a zoonotic origin. Crossing the species barrier has allowed the monkeypox virus (MPXV) in Africa, like SARS-CoV-2 in China, to adapt to humans, and then to be transmitted from person to person.

Otherwise, everything opposes monkeypox to Covid-19; MPXV is a DNA virus of the genus Orthopoxvirus, close to smallpox and vaccinia viruses, while SARS-CoV-2 is an RNA Betacoronavirus genus virus. The epidemiology, clinical signs and severity of these two infections are totally distinct, with transmission occurring above all by air for SARS-CoV-2 and mainly during sexual contact for MPXV. As for the lethality rate of monkeypox, it is much lower than the rates reported in endemic African areas and is 10 times lower than that of Covid-19.

In both cases, it is necessary to detect and isolate infected subjects, prevent transmission and induce protective immunity through vaccination. However, measures aimed at containing monkeypox do not apply to the whole population, but specifically target those at risk, i.e. homo- or bisexual men with multiple partners, which account for more than 95% of reported cases. As monkeypox has evolved as a sexually transmitted infection (STI) since its emergence in May 2022 [1], it is possible to avoid its transmission by respecting a strict personal hygiene and the principles of "safe sex" including self-screening for skin and mucous membranes rashes, using condoms (recommended for 8 weeks after symptoms have resolved) [2], reducing the number of partners or temporarily avoiding any sexual contact.

Unlike the prevention of Covid-19, for which vaccination became available after a long year of pandemic, the prevention of monkeypox could, from the start of the epidemic, have benefited from the smallpox vaccination which confers a cross-immunity of around 85%. It uses a 3rd generation vaccine (Imvanex®), developed from a non-replicating strain of the Ankara vaccinia virus [3], which received a European marketing authorization "under exceptional circumstances" in 2013 for immunization of adults against smallpox. This vaccine was approved on July 25 by the European Medicines Agency for vaccination against monkeypox. Although the data available on the immunogenicity and tolerance of this vaccine, as well as the experimental results in animals, are very encouraging [4], its clinical efficacy is still poorly documented.

In its opinion of July 8, faced with the rapid increase in the number of new cases of monkeypox, the French National Authority for Health (HAS) modified its vaccination model from a reactive post-exposure strategy to a pre-exposure vaccination of people at high risk of contamination [5]. An initial drawdown of 30,000 doses of vaccine from the strategic reserves, constituted in the event of the reappearance of smallpox, was intended to ensure the immunization of 15,000

people by respecting the recommended vaccination schedule (2 doses of 0.5 ml at 28 days intervals), i.e. a small proportion of the target population estimated at 250,000 people in France [5]. Without a rapid resupply for wider vaccination, it is likely that the national campaign will fail to stem the current epidemic progression of monkeypox.

To avoid a shortage of doses, it is proposed to prioritize post-exposure vaccination and to delay the administration of the second dose by several weeks if needed [5]. This option favors the prevention of severe forms of the disease but cannot interrupt the virus circulation.

Until the supply of Imvanex® vaccine is sufficient to immunize all people at high risk of contamination, the French National Academy of Medicine recommends:

- to reserve the vaccination schedule in 2 doses spaced 28 days apart for people at risk of serious forms of the disease, in particular immunodeficient patients and people living with HIV (PLHIV);
- to temporarily limit the pre- or post-exposure vaccination protocol to the first dose of vaccine;
- to postpone vaccination in persons previously vaccinated against smallpox, except in immunodeficient patients and PLHIV;
- to remember that vaccination is not a guarantee of safe sex;
- to support free information, screening and diagnosis centers (CeGIDD), as well as associations working to prevent infectious diseases in gay communities, in order to strengthen the fight against STIs and promote non-vaccine prophylactic measures for monkeypox.

1. Press release of the French National Academy of Medicine “Monkey pox: a zoonosis and sexually transmitted infection (STI)”, July 8, 2022.

2. High Council for Public Health “Preventive measures against Monkeypox virus infection”, July 8, 2022.

3. European Medicines Agency. Imvanex.  
<https://www.ema.europa.eu/en/medicines/human/EPAR/imvanex>

4. Stittelaar KJ et al. Modified Vaccinia Virus Ankara Protects Macaques against Respiratory Challenge with Monkeypox Virus. *J Virol.* 2005; 79(12):7845-51.

5. HAS. Opinion n°2022.0039/AC/SESPEV of July 7, 2022 of the college of the Haute Autorité de santé relating to vaccination against the Monkeypox virus in pre-exposure of people at high risk of exposure.