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What We Know About Monkeypox and What We Need to Do to Protect Ourselves!

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The monkeypox (MPX) outbreak that started in the middle of May 2022 has spread to more than 30 countries, with around 8000 laboratory-confirmed cases as of July 8, 2022. It is expected to continue to spread throughout the world. Human MPX is a zoonotic disease caused by the monkeypox virus (MPXV), a member of the genus *Orthopoxvirus* in the *Poxviridae* family. MPX is endemic among monkeys in Africa. Although it is not certain, rodents, especially squirrels, are suspected to be the reservoir of this zoonotic disease. Since the 1970s, the disease has been observed in humans sporadically, mostly in the rainforests of Central and Western Africa, where zoonotic transmission is associated with the handling and consuming of infected animals (1). Person-to-person spread occurs by direct contact with body fluids or virus-contaminated objects—such as bedding or clothing—or by large respiratory droplets during direct and prolonged face-to-face contact.

However, the current outbreak is different than the outbreaks in Africa because it appears to be concentrated in gay and bisexual men aged 20-50 years old with no known travel to Africa. Although MPX is not known as a sexually transmitted disease, it is possible that genital transmission happens during intimate contact or from the bedding. The leading theory under investigation is that the origin of the outbreak can be traced to exposure to infected individuals at two separate rave events held in Spain and Belgium. Generally, the MPX incubation period is 5 to 21 days, and the disease duration is 2 to 5 weeks or until all lesions resolve. Early signs of infection are very nonspecific and include fever, chills, lethargy, myalgia, and eventually lymphadenopathy and rash. Although observed, the perianal and genital lesions seen in this outbreak were not commonly reported with MPX disease previously. Normally lesions are distributed centrifugally. They start mainly on the face and then spread through the trunk, extremities, and the palms and soles of the feet. The progressive stages of the rash are classified as macules, papules, vesicles, pustules, and eventually crust and scabs (2).

In general, the clinical picture of MPX is very similar to chickenpox and smallpox. The disease presentation in the current global outbreak is similar to herpes and, possibly,

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syphilis. Therefore, a rapid and definitive diagnosis is key to identifying the extent and controlling the spread of the outbreak. Laboratory diagnostic assays for MPX include virus isolation and polymerase chain reaction (PCR). Additional tests could be performed using IgM and IgG ELISA, immunofluorescent antibody assays, sequencing, histopathology, and electron microscopy (2). The genome sequence of an MPX virus obtained from a skin lesion of a male patient showed that the virus circulating during this outbreak belongs to the West African clade, which causes milder disease than the Congo Basin clade (3).

Among unvaccinated populations, and especially immunocompromised individuals, the case fatality rate is 1 to 10%. Vaccination with smallpox vaccine is highly protective (≥85%) against infection with MPX virus. However, routine smallpox vaccination was ended between the mid-1970s and 1980, depending on the country, after the eradication of the disease. This may be a factor in why this current outbreak is primarily affecting a younger population who were not vaccinated against smallpox as children. Currently, there are two FDA-licensed smallpox vaccines. Jynneos® (Bavarian Nordic A/S, Hellerup, Denmark) is a replication-incompetent, third-generation live modified vaccinia Ankara (MVA) vaccine that is approved for both smallpox and MPX virus and can be safely used for immunocompromised people (4). Studies showed that a two-dose vaccination with Jynneos® protected at least 85% of recipients against MPX disease. A ring vaccination campaign targeting exposed people and their contacts in the early phase of the outbreak would be one strategy to end transmission. ACAM2000 (Sanofi Pasteur Biologics Co., Lyon, France) is a replication-competent, second-generation live vaccinia virus vaccine that also has been shown to protect against MPX (5). The Centers for Disease Control and Prevention (CDC) advises that vaccines can be given within four days from the date of exposure to prevent or attenuate the onset of the disease but could be offered up to 14 days post-exposure. Both vaccines are maintained in the U.S. Strategic National Stockpile (SNS).

For patients with the clinically evident disease, the antiviral drug TPOXX® (tecovirimat) (SIGA Technologies Inc., Corvallis, USA) was approved by FDA in 2018 and can be used in the treatment of smallpox (6). Studies in animals also showed that TPOXX® is highly effective against MPX disease. TPOXX® is available in the SNS. Tembexa® (Chimerix Inc., Durham, USA), approved by FDA in 2021, is another antiviral; it can be used in infants and patients with difficulty swallowing (7). These medications would most likely be reserved for the treatment of severe cases.

Unlike in the early days of the COVID 19 pandemic, licensed vaccines and therapeutics, along with proven control strategies such as ring vaccination, are available to combat the global MPX outbreak. Also important to stopping the spread of the disease quickly is the rapid provision of disease prevention guidance to the LGBTQ+ (lesbian, gay, bisexual, transgender, queer) community, particularly to gay and bisexual men. Patients with the disease should be isolated until their lesions heal, and masks should be worn by patients and those who live with them. Contact tracing should be done as soon as possible to prevent the spread of the disease. Furthermore, health care workers (HCW) should be on the lookout for and testing patients with nonspecific symptoms or lesions suggestive of MPX infection, even in the absence of travel or specific risk factors and regardless of sexual orientation. HCW should take all precautions and wear personal protective equipment (PPE) when examining these patients. Early diagnosis is critical and supportive treatment, such as treatment of fever, skin lesions, dehydration, secondary infection of lesions, etc., is suggested for non-critical patients.

The opinions, interpretations, conclusions, and recommendations contained herein are those of the author and are not necessarily endorsed by the US Army.

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