

Beyond Sex: Human Monkeypox Virus is an Emerging Threat to Marginalized Populations

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The human version of the monkeypox virus (MPXV) is establishing itself to various degrees across the globe. While substantial attention has been focused on sexual risk, particularly among men who have sex with men, other populations are vulnerable to this virus. In particular, people experiencing homelessness and those with substance use disorders are vulnerable to MPXV. Overcrowded and unsanitary shelter conditions and city policies that force the relocation of people experiencing homelessness provide ample opportunity for the virus to flourish in this population. Furthermore, people with substance use disorders, specifically those who inject drugs, are at increased risk due to lack of access to sterile injection equipment. Herein, we present a spectrum of structural determinants underpinning increased risks in these populations and recommendations that could help mitigate the spread.

Keywords. homelessness; monkeypox; people who inject drugs; substance use disorders.

A human monkeypox virus (MPXV) has, to date, infected >64 000 cases confirmed globally in 95 countries since May 2022. More than 24 000 cases have been confirmed in the United States alone [1], which prompted the Biden Administration to declare MPXV a public health emergency on August 4, 2022. However, misinformation and stigma regarding the disease may be spreading faster than the virus itself [2]. From the beginning, the epidemic has been characterized as affecting gay, bisexual, and other men who have sex with men (MSM), while others have little to worry about. As

recently as July 27, 2022, 4 days after the World Health Organization (WHO) declared MPXV a public health emergency of international concern, television medical analysts downplayed the problem by stating that “Because of the way that monkeypox is spread, it is not yet a concern for most Americans” [3]. Not only does this sentiment add fuel to the anti-LGBTQ fire—reminiscent of the early days of the HIV/AIDS epidemic [4]—but it also could distract providers from diagnosing cases in other vulnerable populations and limiting its spread.

MPXV is a member of the *Orthopoxvirus* genus in the Poxviridae family. As it is a zoonotic pathogen, earlier epidemics were primarily attributed to transmission from animals to humans in Africa. Notably, in central and western African nations, where MPXV has been primarily located, men, women, and children have been affected, which portends the potential for generalized spread. MPXV spreads predominantly through close physical contact with an infectious lesion, vesicle, or pustule—hence the focus on intimate contact. The 2022 epidemic involves a Clade B variant that appears more transmissible [5], exacerbated by the end of routine smallpox

vaccination, which had provided cross-protection against MPXV [6].

MPXV can also be spread via fomites that have touched the lesions (eg, contaminated bedding, clothing, refuse). A recent report demonstrated surface contamination in hospital rooms of 2 patients receiving MPXV treatment in a German hospital [7]. Transmission from respiratory secretions has been reported [8, 9], as well as placental transmission [10]. HMXPV has also been detected in feces, urine, saliva, blood, and semen [11–14]. A recent case report in Italy found that MPXV DNA was shed in semen for several weeks from an HIV-positive MSM who was receiving antiretrovirals, raising concerns that MPXV could be sexually transmitted [15]. It is unclear if MPXV DNA persists in blood long enough to be parenterally transmitted.

Considering both confirmed and putative risk factors and the rapid rate of transmission in the ongoing MPXV epidemic, the population at risk could extend to vulnerable populations such as people experiencing homelessness, people who use drugs, sex workers, and those living in congregate settings (eg, jails,

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prisons, detention centers, migrant/refugee camps). The first confirmed case in a homeless population was diagnosed among an adult living in a homeless shelter in Toronto, Canada [16]. Since then, MPXV cases among people experiencing homelessness have been reported in Washington, DC, San Francisco, San Diego, and Los Angeles, and several other cases are being investigated in New York City, New York, and Denver, Colorado. Unfortunately, homelessness and substance use are not routinely collected as part of case investigations by the Centers for Disease Control and Prevention or the WHO, so the extent to which MPXV has already spread among these populations is unknown. Below, we discuss theoretical ways in which MPXV could spread rapidly among people experiencing homelessness and those who use drugs. While these are 2 separate populations, there is substantial overlap with homelessness and substance use; thus, it is important to discuss them in tandem.

Homeless shelters are a setting for rapid transmission of infectious diseases and have been associated with a number of previous infectious disease outbreaks, including HIV, tuberculosis, hepatitis A, shigellosis, and severe acute respiratory syndrome coronavirus 2. Overcrowding, shared space, poor ventilation, and other unsanitary conditions provide an optimal environment for pathogens to incubate and spread. Shelter staff, who are also at risk in these situations, do their best to make conditions safe, but lack of resources and funding for the shelter system make infection control difficult. Shelter guests often share towels, clothing, bedding, and hygienic products that place them at risk for MPXV.

Given less than ideal shelter conditions, many people experiencing homelessness are either temporarily or permanently unsheltered. People who are unsheltered often live in encampments where many individuals congregate outdoors but will retain their individual spaces in tents, sleeping bags, or under tarps.

Unfortunately, local government officials have increasingly responded to the growing unsheltered population in many US cities with involuntary displacement, camping bans, or “sweeps.” This forced relocation, often accompanied by garbage trucks, not only displaces people and confiscates what few belongings they have, but also requires individuals to relocate and share belongings and space. For those with substance use disorders, sweeps move people further away from vital harm reduction services like syringe exchanges and from accessing life-saving medications such as methadone, buprenorphine, and naloxone. The process of dismantling and discarding materials used in homeless encampments could also pose an occupational hazard to city workers if materials are contaminated and disperse rodents, which are potential vectors.

MPXV could also pose a significant risk to people who use drugs. People who share syringes or other injection paraphernalia could transmit the virus to one another through contaminated equipment, as is the case with HIV and hepatitis B and C. People who do not inject but smoke, vape, or inhale drugs could also transmit MPXV to one another by sharing paraphernalia. Moreover, skin integrity is often compromised among people who inject drugs due to frequent injection, abscesses, and other sores. This is particularly problematic with the increased incidence of methamphetamine and fentanyl use. These are theoretical modes of transmission and may pose little to no risk above sharing utensils or personal hygiene equipment in the general population. Nevertheless, inquiring about drug use practices may help clinicians identify MPXV early among people who use drugs and prevent spread through networks of people.

People experiencing homelessness and those with substance use disorders often have negative experiences with government agencies, including the health care system, due to stigma, discrimination, and the criminalization of their lifestyles.

As documented with the COVID-19 pandemic, these experiences can drive vulnerable populations away from care and contribute to vaccine hesitancy. Structural barriers, such as lack of transportation or health insurance, may pose additional barriers to accessing testing, vaccination, or treatment. In New York City, an unhoused man with an HMPXV infection was reportedly denied care because he lacked a permanent address [17]. Requirements for computer access, photo identification, and telephone numbers could pose similar barriers [18].

The MPXV pandemic—much like the SARS-CoV-2 pandemic—represents opportunities on multiple levels to address risk conditions that are exacerbating the current epidemic. From a provider standpoint, it is crucial to recognize that close sexual contact is but one mode of transmission. Infectious diseases clinicians are often the frontline providers for socially vulnerable patients such as those experiencing homelessness or substance use disorders. Clinicians must maintain a high index of suspicion for MPXV in patients who present with symptoms even in the absence of sexual risk factors. Furthermore, infectious diseases clinicians may be the conduit by which these patients can obtain MPXV vaccines and/or treatment. Clinicians can advocate for expanding vaccine access in vulnerable patients either as pre-exposure or postexposure prophylaxis based on the assumption that MPXV is likely to spread among people experiencing homelessness and those with substance use disorders who have inadequate access to sterile injection and smoking equipment. This epidemic is yet another opportunity to integrate clinical services for vulnerable populations. Clinicians should assume that any touchpoint with the health care system is an opportunity to vaccinate, educate, and retain people in care during an epidemic.

Of course, clinicians cannot combat an epidemic alone. As we learned from the

SARS-CoV-2 pandemic, community organizations are vital partners to increase access and uptake of vaccination and treatment, especially at mobile vaccine clinics and health fairs. Outreach workers familiar with the local communities could offer assistance with contact tracing and deliver interventions to improve health literacy, dispel myths, and overcome vaccine hesitancy. For example, peer educators have been successfully taught to deliver brief motivational interviewing interventions to improve uptake of COVID testing and vaccination [19] and could similarly be taught to encourage members of their community to inspect their skin for lesions. These partnerships serve to strengthen the public health infrastructure to care for vulnerable populations. Furthermore, community organizations can help identify and expand access to “touchpoints” where vulnerable populations interact with systems that could provide prevention and treatment services (eg, shelters, soup kitchens, drop-in centers, mental health and addiction services, and community supervision centers such as probation offices). Again, during an epidemic, we should use every point in which a person at risk interacts as an opportunity to limit the spread.

Ultimately, however, MPXV and other epidemics will continue to occur in marginalized populations unless we address the structural factors that encourage their spread. This means abolishing policies that criminalize homelessness and substance use [20]. At the state and city levels, there must be an immediate ban on policies that dismantle homeless encampments and fine or imprison unhoused people for vagrancy. Simultaneously, cities must improve conditions for people experiencing sheltered and unsheltered homelessness such as providing bathing facilities, hand-washing stations, and clean clothing, and they must create safe housing spaces for people who are diagnosed or suspected to have MPXV. Especially during a public health emergency, but

during nonpandemic times as well, cities and municipalities need to remove laws that prevent or limit syringe service program (SSP) operations and also expand SSPs to provide unlimited access to injection and noninjection paraphernalia (eg, pipes, straws, cookers).

Finally, the federal government has a role to play as well, especially as infectious disease epidemics and pandemics may become more common. As was done early in the SARS-CoV-2 pandemic, the federal government can and should enact an eviction moratorium. The eviction moratorium was vital in limiting the spread of SARS-CoV-2, and cases increased when states let them lapse [21, 22]. We can safely assume that an eviction moratorium would similarly help limit the spread of MPXV. Furthermore, as we are now in the second pandemic in as many years, it is necessary to provide health insurance to every person in the United States. Universal health insurance could have prevented nearly 330 000 deaths from COVID alone [23]. Universal health insurance is pandemic preparedness and would help prevent the spread of MPXV as well by providing increased access to testing and treatment and by encouraging people to use the health care system when they need it.

It is clear that MPXV is not just a disease among MSM. Furthermore, there are other circumstances where infectious diseases have notoriously spread quickly, such as in military barracks and populations that have frequent skin-to-skin contact with others, like athletes. While these groups could be among those who will be in subsequent waves of MPXV in the United States, structural factors such as state-sponsored violence, lack of access to vital services, and stigma have created conditions in which MPXV poses a more immediate threat to people experiencing homelessness and people with substance use disorders. The spread of MPXV—or any other infectious disease for that matter—through these populations will not be the result of individual behavior, but rather the risk environment in which they live.

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References

1. Global health: A Data Science Initiative. Monkeypox outbreak. Available at: <https://www.global.health/>. Accessed September 22, 2022.
2. Ennab F, Nawaz FA, Narain K, et al. Monkeypox outbreaks in 2022: battling another “pandemic” of misinformation. *Int J Public Health* 2022; 67: 1605149.
3. Hetter K. Now should I worry about monkeypox? Our medical analyst explains. *CNN.com*. July 27, 2022. Available at: <https://www.cnn.com/2022/07/27/health/monkeypox-vaccine-health-wen-wellness/index.html>. Accessed August 3, 2022.
4. Gonsalves GS, Mayer K, Beyrer C. Déjà vu all over again? Emergent monkeypox, delayed responses, and stigmatized populations. *J Urban Health* 2022; 99:603–6.
5. Isidro J, Borges V, Pinto M, et al. Phylogenomic characterization and signs of microevolution in the 2022 multi-country outbreak of monkeypox virus. *Nat Med* 2022; 28:1569–72.
6. Rimoin AW, Mulembakani PM, Johnston SC, et al. Major increase in human monkeypox incidence 30 years after smallpox vaccination campaigns cease in the Democratic Republic of Congo. *Proc Natl Acad Sci U S A* 2010; 107:16262–7.
7. Nörz D, Pfeifferle S, Brehm TT, et al. Evidence of surface contamination in hospital rooms occupied by patients infected with monkeypox, Germany, June 2022. *Eurosurveillance* 2022; 27:2200477.
8. Jezek Z, Grab B, Szczeniowski MV, Paluku KM, Mutombo M. Human monkeypox: secondary attack rates. *Bull World Health Organ* 1988; 66: 465–70.
9. Adler H, Gould S, Hine P, et al. Clinical features and management of human monkeypox: a retrospective observational study in the UK. *Lancet Infect Dis* 2022; 22:1153–62.
10. Mbala PK, Huggins JW, Riu-Rovira T, et al. Maternal and fetal outcomes among pregnant women with human monkeypox infection in the Democratic Republic of Congo. *J Infect Dis* 2017; 216:824–8.
11. Antinori A, Mazzotta V, Vita S, et al. Epidemiological, clinical and virological characteristics of four cases of monkeypox support transmission through sexual contact, Italy, May 2022. *Euro Surveill* 2022; 27:2200421.
12. Peiró-Mestres A, Fuertes I, Camprubí-Ferrer D, et al. Frequent detection of monkeypox virus DNA in saliva, semen, and other clinical samples from 12 patients, Barcelona, Spain, May to June 2022. *Eurosurveillance* 2022; 27:2200503.
13. Noe S, Zange S, Seilmaier M, et al. Clinical and virological features of first human monkeypox cases in Germany [published online ahead of print].

- Infection 2022;1–6. doi: 10.1007/s15010-022-01874-z.
14. Thornhill JP, Barkati S, Walmsley S, et al. Monkeypox virus infection in humans across 16 countries—April–June 2022. *N Engl J Med* 2022; 387:679–91.
 15. Lapa D, Carletti F, Mazzotta V, et al. Monkeypox virus isolation from a semen sample collected in the early phase of infection in a patient with prolonged seminal viral shedding. *Lancet Infect Dis* 2022; 22: 1267–9.
 16. Draaisma M. Person with monkeypox at homeless shelter has been moved to isolation centre, city says. *CBC.ca*. July 31, 2022. Available at: <https://www.cbc.ca/news/canada/toronto/toronto-monkeypox-homeless-shelter-1.6537697>. Accessed August 3, 2022.
 17. Moses D. State of anxiety: homeless New Yorkers unable to access monkeypox vaccine amidst state of emergency. *amNY*. August 1, 2022. Available at: <https://www.amny.com/news/homeless-new-yorkers-monkeypox-vaccine/>. Accessed August 3, 2022.
 18. Sanders C, Burnett K, Lam S, Hassan M, Skinner K. “You need ID to get ID”: a scoping review of personal identification as a barrier to and facilitator of the social determinants of health in North America. *Int J Environ Res Public Health* 2020; 17:4227.
 19. Bazzi AR, Harvey-Vera A, Buesig-Stamos T, et al. Study protocol for a pilot randomized controlled trial to increase COVID-19 testing and vaccination among people who inject drugs in San Diego County. *Addict Sci Clin Pract* 2022; 17:48.
 20. Colorado Legislature. Fentanyl Accountability and Prevention Act. HB-1326. 2022. <https://leg.colorado.gov/bills/hb22-1326>. Accessed October 24, 2022.
 21. Sandoval-Olascoaga S, Venkataramani AS, Arcaya MC. Eviction moratoria expiration and COVID-19 infection risk across strata of health and socioeconomic status in the United States. *JAMA Netw Open* 2021; 4:e2129041.
 22. Leifheit KM, Linton SL, Raifman J, et al. Expiring eviction moratoriums and COVID-19 incidence and mortality. *Am J Epidemiol* 2021; 190:2503–10.
 23. Galvani AP, Parpia AS, Pandey A, et al. Universal healthcare as pandemic preparedness: the lives and costs that could have been saved during the COVID-19 pandemic. *Proc Natl Acad Sci U S A* 2022; 119:e2200536119.