

# Mpox Case Reports in an Urban Homeless Population and a Proof of Concept for a Street-Based Mobile Mpox Vaccination Clinic

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## Abstract

Mpox is a new public health outbreak that particularly threatens the homeless population. Street Medicine Phoenix (SMP) is a student-led interprofessional volunteer organization that provides medical care and other essential services to individuals experiencing homelessness in Phoenix, Arizona. In addition to core services such as wound care; health screenings (blood pressure and blood glucose.); vision screenings; HIV testing; naloxone education and distribution; flu, COVID-19, and Hepatitis A vaccinations; and community resource referrals, SMP began offering mpox education and vaccination at outreach events. During an outreach event shortly after the onset of the mpox outbreak, SMP identified 2 suspected mpox cases. Accordingly, SMP has partnered with the Maricopa County Public Health Department to set up mobile mpox vaccination clinics on the streets outside of Phoenix Arizona's largest homeless shelter. We share the details of these 2 cases along with our early efforts vaccinating individuals experiencing homelessness for mpox via our mobile vaccination clinic. Our experiences demonstrate the importance of community agencies providing direct outreach to underserved populations where they are at, particularly the homeless population, to address public health concerns such as emerging disease outbreaks like mpox. In addition, these cases highlight the potential significant impact that street medicine programs can have on their respective homeless communities in the context of infectious disease mitigation and emphasize the importance of partnerships with local health departments.

## Keywords

monkeypox, mpox, homelessness, public health, vaccines, street medicine, communicable diseases

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## Introduction

Mpox is a rising public health threat in the United States and across the world. Although the virus was discovered decades ago and the first human case was recorded in 1970, human cases were previously contained in select African countries with few cases outside of Africa.<sup>1</sup> However, on May 17, 2022, the United States recorded their first mpox case<sup>2</sup> and on August 4, 2022, the United States declared the mpox outbreak a national health emergency.<sup>3</sup> As of September 26, 2022, there were 25 162 confirmed mpox cases in the United States.<sup>4</sup> Although the virus is rarely deadly, infected individuals typically experience 2 to 4 weeks of uncomfortable symptoms, such as a painful rash on or near the genitals or anus, fever, chills,

muscle aches, headache, and respiratory symptoms like sore throat or cough.<sup>5</sup>

Transmission of mpox occurs in a variety of ways including direct skin-to-skin contact with a person with mpox (typically through intimate contact such as hugging, kissing, or sex), contact with respiratory secretions from an

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infected person, and touching objects or surfaces that have been used by someone with mpox.<sup>6</sup> Accordingly, the Centers for Disease Control and Prevention have issued guidance regarding the increased risk of mpox transmission in close living quarters such as homeless shelters.<sup>7</sup> Unfortunately, many homeless populations across the United States are already becoming infected with mpox with the looming threat of uncontrolled spread if adequate public health preventive measures are not deployed.<sup>8</sup>

## Risk of Mpox to the Homeless Population

The homeless population is at increased risk for mpox infection for several reasons. It is well known that individuals experiencing homelessness experience an increased burden of communicable diseases compared to individuals not experiencing homelessness.<sup>9</sup> Individuals experiencing homelessness generally live in cramped living conditions, whether in homeless shelters or encampments on the streets, and lack reliable access to basic hygiene supplies. This was observed early in the COVID-19 pandemic and was thought to be a primary reason for the significant rates of infection amongst the homeless population.<sup>10</sup> Sharing items, such as clothing or bedding, amongst the homeless population is common and may facilitate transmission of mpox.<sup>11</sup> Additionally, many individuals experiencing homelessness engage in unprotected sexual intercourse, especially homeless youth, which may further facilitate the spread of mpox.<sup>12</sup>

Other issues undermining the prevention of mpox spread amongst the homeless population are poor health literacy, distrust of the healthcare system, and lack of access to quality health care. Although the majority of individuals experiencing homelessness report adequate health literacy, there is a significant proportion that struggle to understand basic health information.<sup>13,14</sup> This may complicate their ability to understand preventive strategies and signs of mpox infection that would be relayed to them by trusted healthcare sources such as their primary care provider, Emergency Department (ED) healthcare providers, or governmental health agencies, like the CDC. Furthermore, those that become infected may be hesitant to seek care due to concerns of discrimination and disrespect.<sup>15,16</sup> For individuals who are seeking care, many lack access to a primary care provider who can connect them with testing, vaccination, and/or treatment resources.<sup>17</sup> Accordingly, many individuals experiencing homelessness seek care in EDs where they typically receive suboptimal care and experience poorer outcomes.<sup>18,19</sup> Even when people experiencing homelessness are connected with services, other barriers often prevent them from receiving care. For example, homeless individuals in New York were unable to apply for a mpox vaccine without a street address. Further, individuals experiencing

homelessness may experience reluctance to obtain a vaccine at an established clinic for fear of their belongings being stolen, highlighting the need for direct outreach on the streets.

## Mpox in Arizona and Other Unhoused Communities

As of January 2020, there were roughly 10 979 individuals experiencing homelessness in Arizona with the majority of these individuals concentrated in the Phoenix metropolitan area.<sup>20</sup> Due to the COVID-19 pandemic and the economic crisis over the past couple years, the expectation is that this estimate has increased significantly. Within the Phoenix metropolitan area, most individuals experiencing homelessness live in and around the homeless shelter called Central Arizona Shelter Services (CASS). Those unable to stay in CASS due to limited bed availability generally sleep in crowded encampments along the sides of the surrounding streets.

As of February 21, 2023, there were 488 total confirmed and probable cases of mpox in Arizona; however, it is unknown how many of these cases are individuals experiencing homelessness.<sup>4</sup> While the true number of mpox cases in Phoenix's homeless population is unknown, reports of an uptick in mpox infections among homeless individuals in other major cities have emerged. In early August 2022, there were 2 confirmed cases of mpox in the Washington, D.C. homeless population.<sup>8</sup> In response, the city has implemented walk-up vaccination clinics for individuals who do not have the ability to pre-register online. Additionally, one shelter in Washington, D.C. implemented a mpox screening process to reduce transmission, with measures including skin inspections, temperature checks, and symptom screenings.<sup>21</sup> In Los Angeles County, there were at least 65 confirmed mpox cases among homeless individuals as of September 2nd, including 21 unsheltered individuals, comprising 4% of the total number of cases in the county.<sup>22</sup> Also, New York City opened 6 isolation beds for individuals experiencing homelessness with confirmed or highly probable mpox, having served 11 individuals thus far.<sup>23</sup> The emergence of cases in the homeless population highlights the need for efforts to increase accessibility to the mpox vaccine and reduce disease transmission.

## Street Medicine Program

The University of Arizona College of Public Health (UACOPH) Street Medicine Phoenix program (SMP) interacts with Arizona's homeless population on a regular basis. SMP has provided COVID-19 vaccines, testing, and other preventive health services to this population since the start of the pandemic. SMP is a student-driven interprofessional

health care and social justice team dedicated to addressing the unmet needs of Phoenix's homeless population. Interprofessional outreach teams consisting of students and faculty mentors from several local universities provide services to individuals experiencing homelessness wherever they are. Specific outreach settings include homeless shelters, transitional housing facilities, churches, and large encampments surrounding prominent community agencies (eg, food banks, clothing distribution centers, etc.) in and around Phoenix, Arizona. SMP functions primarily as a bridge to connect individuals experiencing homelessness with a primary care home to ensure that their needs are met on a long-term basis. Core services include wound care; health screenings (blood pressure and blood glucose.); vision screenings; HIV testing; naloxone education and distribution; flu, COVID-19, and Hepatitis A vaccinations; and community resource referrals. Due to concerns about sanitation while providing outreach on the streets and inadequate access to necessary equipment, SMP is unable to perform medical procedures other than basic wound care consisting of dressing changes, vaccinations for select diseases, and testing for communicable diseases like HIV. Annually, SMP provides services to roughly 800 individuals experiencing homelessness. Similar to SMP, over 50 student-run street medicine programs exist across the United States with a similar goal of meeting the unmet needs of the homeless population in their respective communities.

## Mpox Case Reports

At the start of the mpox outbreak in 2022, SMP began distributing informational pamphlets and other educational materials to individuals experiencing homelessness to inform them about routes of transmission, symptoms, how to get tested, and measures to prevent spread. In preparation for encountering homeless individuals on the streets infected with mpox, SMP educated all volunteers on their standard practice when encountering individuals with infectious diseases. This practice consists of testing the individual for the suspected infection (if testing is available); education on disease course, symptom management, and isolation considerations; referral to a nearby Federally Qualified Health Center for testing and/or treatment; vaccination for close contacts; providing appropriate personal protective equipment and over-the-counter medications for symptom relief; strongly recommending transport to the ED for those with severe symptoms or at high risk for severe infection; and reporting to the Maricopa County Department of Public Health (MCDPH). Through SMP's outreach efforts, they identified several cases of suspected mpox. On an outreach event while providing health care and other services to individuals experiencing homelessness who were living in encampments near the homeless shelter, one

individual was identified as a probable mpox case and another individual had a confirmed diagnosis of mpox.

The first case involved an individual between the ages of 20 and 30 with a history of psychiatric illness and intravenous drug use. They presented to SMP complaining of a painful and pruritic rash on their left arm. The patient stated the lesion on their palm was limiting daily activities due to pain. They informed SMP that they had been diagnosed with mpox at a nearby ED and were advised to come back if their symptoms worsened. The patient did not receive any pain medications upon discharge from the ED. They denied other symptoms such as fever, chills, discharge, night sweats, nausea, vomiting, and diarrhea. Physical exam revealed a well circumscribed, white, vesicular lesion approximately 1 cm in diameter with an erythematous base on the palmar surface of the left upper extremity. There were 4 similar lesions found ascending proximally up the left upper extremity. SMP provided Voltaren gel, acetaminophen, gloves, mpox education, including measures to prevent transmission to others, and return precautions to the ED.

The second case involved an individual between the ages of 30 and 40 with no significant medical history. They presented to SMP complaining of a painful rash on their arms and torso. The patient denied other symptoms such as fever, chills, discharge, night sweats, nausea, vomiting, and diarrhea. Physical exam revealed numerous lesions on the patient's proximal upper extremities as well as on the abdomen and across their upper chest. These lesions appeared to be in the recovery stages as there was scabbing and dark crusting around the circumference. They had not been tested for mpox and SMP was unable to conduct testing at that time. The patient was provided with Voltaren gel, ibuprofen, gloves, mpox education, including measures to prevent transmission to others, and instructions for when to seek medical care at an ED.

The 2 cases were found on the same city block outside of the largest homeless shelter in Phoenix. Both patients were requested to return to that same city block the following week for reevaluation. Multiple attempts to follow up with both patients and obtain authorization to publish their information were unsuccessful. SMP volunteers returned to the initial area of contact several times over the course of a month but were unable to locate either patient. These cases were immediately reported to MCDPH for testing and further evaluation. In both cases, the patients were not transported to the hospital because their symptoms did not require emergency care and they were provided with referrals to a nearby Federally Qualified Health Center for further evaluation and treatment. In the second case, the patient refused transport to the hospital for mpox testing. Even in situations that warrant transport to a hospital, patients may refuse transport due to distrust of the medical system. An important consideration for providing care to this population is the establishment of trust which can disintegrate

when undesired interventions like hospital transport are continuously recommended.

### Mobile Mpox Vaccination Clinic

Various approaches to vaccination have been described in literature to safeguard vulnerable communities from contagious illness. One of these approaches is a mobile vaccination clinic. Mobile clinics are often vehicles or trailers equipped with medical equipment and staffed by health-care professionals who provide vaccination services in locations where people may have limited access to health-care, such as rural or remote areas, or where people may face barriers to accessing health-care, such as language or cultural differences, transportation issues, or limited financial resources.<sup>24-26</sup> Studies have demonstrated the efficacy of this model in the administration of influenza vaccines to underserved populations.<sup>27-29</sup> In another instance, nurses in San Diego developed “foot teams” to successfully vaccinate thousands experiencing homelessness in response to the state’s Hepatitis A outbreak.<sup>9</sup> Mobile vaccination clinics have more recently been utilized to distribute COVID-19 vaccines to hard-to-reach populations.<sup>25,30</sup> Overall, while homeless populations have traditionally had low vaccination rates for various illnesses, including COVID-19, mobile vaccination clinics have proved successful in increasing vaccination rates in this group.<sup>31</sup> Challenges with this approach have also been reported, with vaccine hesitancy being the most common issue among homeless individuals.<sup>32,33</sup>

Given UACOPH’s existing intergovernmental agreement with MCDPH that facilitates immediate community response, MCDPH requested assistance with administering mpox vaccines (JYNNEOS) to the homeless population. The standard regimen of the JYNNEOS vaccine involves a subcutaneous injection of 0.5 mL of the vaccine.<sup>34</sup> However, on August 9, 2022, the Food and Drug Administration (FDA) authorized emergency use of intradermal administration of the JYNNEOS vaccine to individuals at high risk of contracting mpox. As vaccine supply is limited, the intradermal route of administration has a significant advantage over intramuscular injection because similar levels of immunogenicity can be achieved with only 0.1 mL of the vaccine while reducing the risk of nerve, muscle, and joint space injury.<sup>35</sup> Therefore, intradermal administration of the JYNNEOS vaccine allows SMP to administer 5 times the amount of vaccine to at-risk individuals living on the streets. In keeping with MCDPH’s request and to prevent the continued spread of mpox, in the summer of 2022, SMP deployed the UACOPH mobile health unit to administer the JYNNEOS poxvirus vaccine to people living on the same city block where the original cases were discovered.

All screenings for mpox and mpox vaccinations only occurred during outreach events. Records were retained

through SMP’s health record system, REDCap, in addition to being uploaded into the MCDPH vaccination database. Individuals residing on the city block where mpox cases were identified were engaged. This approach considered all individuals on the block to be “close contacts” due to the proximity of their encampments to the infected patients. These “close contacts” were asked if they were interested in the mpox vaccine. Those who were interested were directed to the UACOPH Mobile Health Unit and instructed to fill out the form “Screening Checklist for JYNNEOS Monkeypox Vaccination” from the California Department of Public Health (see Supplemental Appendix A). They also filled out the Maricopa County Department of Public Health Consent for Immunization—Jynneos/Mpox Vaccine Consent Form (see Supplemental Appendix B). Patients were then taken into the Mobile Health Unit and the vaccine was administered. Patients were monitored by the presiding physician for adverse reactions for 15 min following vaccine administration.

The overall intent of SMP’s outreach efforts was to increase access to the mpox vaccine for those individuals experiencing homelessness who desired vaccination and high-risk individuals (eg, men who have sex with men), although the homeless population as a whole is considered high-risk due to their congested living environment. Fifty individuals experiencing homelessness received the mpox vaccination through SMP’s outreach efforts. All patients spoke English; however, resources were available to facilitate vaccination of Spanish-speaking individuals. The vaccines were well tolerated and no adverse reactions occurred. Although SMP could vaccinate individuals for mpox post-infection, none of the 50 vaccinations were administered during this period. In addition, patients were given educational material from the FDA about mpox and the JYNNEOS vaccine. All vaccinations were administered by eligible providers under the direct supervision of a licensed physician in accordance with Arizona Department of Health Services Eligible Vaccinator Guidelines. Undergraduate students and other non-clinical volunteers assisted with record-keeping and patient education. To our knowledge, there have been no published reports of other street medicine programs or homeless service organizations offering mpox vaccinations directly on the streets in a similar manner to SMP.

Besides providing mpox vaccinations, SMP was limited in its ability to diagnose and treat mpox. SMP did not have access to diagnostic tests for mpox and was unable to provide treatment other than over-the-counter medications (eg, ibuprofen, acetaminophen, and Voltaren gel) for symptom relief. These specific medications were provided based on their known efficacy in relieving mpox symptoms, safety in relation to each patient’s medical comorbidities, and per patient request. Due to the containment of the mpox pandemic, mpox vaccination efforts have decreased; however,



the vaccine is still available upon request for all individuals experiencing homelessness. In addition, through the partnership strengthened with MCDPH during the COVID-19 pandemic and now the mpox outbreak, SMP has become involved in addressing other disease outbreaks within the Phoenix homeless population, such as Hepatitis A. Other current SMP outreach efforts focus on naloxone and opioid education and HIV testing.

## Conclusions

The cases described illustrate the prevalence of communicable diseases like mpox among homeless individuals who are at increased risk of infection due to barriers in receiving health and preventative care. Utilizing trusted resources within the homeless community to relay critical health information and enact interventions, like vaccination clinics, are essential. SMP's street-based mobile vaccination efforts highlight the impact of field and outreach work by academic institutions for vulnerable populations who may not otherwise have access to care. Employing a model for mobile vaccination clinics that provides access to vaccinations to individuals experiencing homelessness directly in their encampments addresses these barriers to care. County and state health departments have resources for outbreak prevention and mitigation and rely on community partnerships to provide these services to the communities they serve. Academic institutions also provide community-focused students and health and public health faculty who seek interprofessional opportunities to train on addressing and responding to outbreaks, such as mpox, as they have during the current COVID-19 pandemic. A partnership between these 2 entities provides greater ability to identify, prevent, and mitigate new and emerging outbreaks and just as importantly, train the next generation of healthcare and public health professionals.

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## Supplemental Material

Supplemental material for this article is available online.

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