

Utilization of street-based COVID-19 vaccination clinics in Phoenix's homeless population

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Abstract

The novel Coronavirus (COVID-19) is a highly contagious viral illness that has caused the most significant global health crisis in recent human history. Individuals experiencing homelessness represent one of the more vulnerable populations for COVID-19 infection and morbidity. Amongst individuals experiencing homelessness in Phoenix, a student-led interprofessional organization called Street Medicine Phoenix (SMP) sought to both reduce the risk of COVID-19 transmission and morbidity/mortality related to infection. Through collaborations with the Maricopa County Department of Public Health and various community organizations, SMP developed a format for street-based vaccination clinics. SMP deployed these clinics on numerous occasions to the streets directly surrounding the community homeless shelter, allowing SMP to vaccinate individuals directly in their encampments. Through SMP's efforts starting in February 2021, 400 individuals experiencing homelessness have received at least one COVID-19 vaccine. Challenges encountered included low health literacy, lack of established rapport and trust, low vaccine confidence, difficulty verifying patients' vaccination status, difficulty obtaining sufficient information from patients to create a record in the Arizona State Immunization Information System (ASIS), monitoring patients post-vaccination, transporting vaccine supplies from encampment to encampment, and lack of patient awareness of the mobile vaccine clinic services. Despite challenges, SMP's outreach efforts have demonstrated the feasibility and importance of mobile public health services to reach homeless encampments, particularly mobile vaccination clinics in response to disease outbreaks, and the necessity of strategic partnerships with community agencies to effectively meet the needs of underserved populations.

Keywords

homelessness, vaccines, communicable diseases, public health, health disparities

Introduction

The Coronavirus (COVID-19) pandemic has posed one of the largest public health threats in history and remains an ongoing global concern. In the United States alone, there have been more than 91 million confirmed cases, resulting in over one million deaths.¹ Although risk of infection with COVID-19 can be reduced by wearing masks, social distancing, using hand hygiene, and vaccination,² new variants of the virus continue to emerge, complicating containment of the virus.³ These variants continue to threaten the health of vulnerable populations, such as those with chronic medical conditions, the elderly, and individuals experiencing homelessness.⁴

Individuals experiencing homelessness are at increased risk for COVID-19 infection as well as becoming severely ill with COVID-19 for several reasons. The Centers for Disease Control and Prevention (CDC) have warned that people 65 years and older are at increased risk of becoming severely ill from COVID-19.⁵ Not only is the population of

individuals experiencing homelessness an aging population,⁶ but research has found that this population ages faster than the housed population.⁷ In addition, individuals experiencing homelessness typically live in overcrowded environments that include crowded homeless shelters and encampments on the streets, making it difficult to socially distance. These living conditions cause increased stress, which may decrease sleep quality and potentially weaken

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immune health.⁸ Another contributor is lack of regular access to basic hygiene supplies and even running water, which may facilitate the transmission of COVID-19.⁹ As such, there have been numerous outbreaks in homeless shelters across the United States.^{10–12} Chronic health conditions are also more prevalent in individuals experiencing homelessness, particularly chronic respiratory conditions¹³ and mental health disorders,^{14,15} which increases the risk of severe COVID-19 illness and mortality.¹⁶ For example, in Arizona's largest county (Maricopa County), over 11% of the homeless population reported a mental health disorder diagnosis.¹⁷ Lastly, food insecurity is very prevalent in the homeless population and has been demonstrated to increase rates of hospitalizations and outpatient medical visits, which may further increase the exposure risk to COVID-19.¹⁸ For these reasons, outreach efforts designed to prevent COVID-19 infection in the homeless population through education and vaccination are essential.

Various vaccination strategies have been described in the literature to protect vulnerable populations against communicable diseases. One strategy involves the utilization of pop-up vaccination clinics. Pop-up vaccination clinics are temporary stations set up in particular areas to optimize vaccination of a target population. Generally, these clinics are erected for several hours and staffed by community outreach workers and volunteers from local healthcare organizations. For individuals experiencing homelessness, these clinics are typically set up in homeless shelters or homeless encampments, which have demonstrated widespread success in mass COVID-19 vaccination of individuals experiencing homelessness.¹⁹ A newer strategy involves mobile vaccination clinics. Several studies have demonstrated success using a mobile vaccination clinic model to provide influenza vaccines to patients from underserved populations.^{20–22} In response to a Hepatitis A outbreak in California, San Diego public health nurses created mobile vaccination 'foot teams' and successfully vaccinated thousands of individuals experiencing homelessness who were otherwise disconnected from healthcare services.²³ More recently, mobile vaccination clinics have been implemented across the country to deliver COVID-19 vaccinations to hard-to-reach and underserved populations.^{24,25} Many of these COVID-19 mobile vaccination clinics have been predominantly staffed by healthcare professional students and trainees.^{25,26} Although individuals experiencing homelessness have experienced low vaccination rates for various communicable diseases, including COVID-19, mobile vaccination clinics have been shown to be a successful strategy for improving vaccination rates amongst this population.²⁷ Reported advantages of mobile COVID-19 vaccination include convenience and delivery of care to patients lacking transportation or to those fearful of leaving their belongings behind.²⁸ However, published reports of mobile vaccination clinics have described challenges as well, the most prevalent being vaccine hesitancy amongst individuals experiencing homelessness.^{29,30}

Purpose

As of January 2022, there were roughly 13,553 individuals experiencing homelessness in Arizona with the majority of these individuals concentrated in the Phoenix metropolitan area.³¹ Due to the COVID-19 pandemic and the economic crisis over the past few years, experts estimate that the number of individuals experiencing homelessness increased significantly.³² In light of individuals experiencing homelessness' vulnerabilities to COVID-19, organizations across Phoenix, such as Street Medicine Phoenix (SMP) <https://www.publichealth.arizona.edu/outreach/street-medicine-phoenix> deployed to provide COVID-19 education, hygiene supplies, and preventive health services. SMP is a student-driven, multi-university interprofessional healthcare and social justice team of students and health professions faculty dedicated to meeting the unmet needs of individuals experiencing homelessness in Phoenix. Interprofessional outreach teams consisting of students and licensed clinical faculty supervisors provide services to individuals experiencing homelessness where they are, whether in a shelter or unhoused on the streets. These teams leverage the unique knowledge and skill sets of each individual member to provide whole-person, patient-centered care and support to every individual that they encounter. This approach has proven critical for an infectious disease pandemic outbreak as complicated as COVID-19, which has affected individuals in a multitude of ways.

Methods

The College of Public Health at the University of Arizona has engaged and provided outreach to communities across Arizona providing the under- and non-insured population with basic health screenings, referral to primary care, follow up, health education, and vaccination services for several years through their Mobile Health Unit and SMP. By leveraging existing partnerships with community-based organizations and local health agencies, SMP launched targeted outreach efforts to prevent and mitigate the transmission of COVID-19 through individuals experiencing homelessness in Phoenix. SMP had previously developed these key partnerships through shared initiatives to increase Hepatitis A and influenza vaccination in individuals experiencing homelessness in Phoenix, in addition to other services, such as providing wound care and other needed medical care. Before outreach commenced, several brainstorming meetings were conducted with various partners to determine the most effective outreach strategy for SMP to provide vaccines, and which resources would be required. Initially, SMP received 50 Johnson & Johnson COVID-19 vaccines from the Maricopa County Department of Public Health (MCDPH) as a pilot run. The Johnson & Johnson vaccine was the preferred vaccine due to the single dose requirement and the difficulty with follow-up care for individuals experiencing homelessness. After quickly

administering those vaccines, MCDPH provided an additional 300 vaccines, primarily from Johnson & Johnson but with 40 doses from Moderna and Pfizer as well, with access to more vaccines as needed. MCDPH also donated the necessary medical supplies to administer the vaccines (i.e., syringes, hypodermic needles, alcohol swabs, adhesive bandages, gauze, and sharps disposal containers) in addition to informational handouts about COVID-19 and COVID-19 vaccine options, coolers to store the vaccine while on the streets, iPads for patient registration into the Arizona State Immunization Information System (ASIIS), vaccination cards, and Epi-pens for treatment of potential anaphylactic reactions. In addition, MCDPH provided home test kits for rapid testing distribution options, particularly for vulnerable and at-risk individuals SMP volunteers encountered, including elderly patients (age >65), immunocompromised individuals, individuals with respiratory illness, such as asthma or chronic obstructive pulmonary disease (COPD), and those who had been exposed to someone who tested positive for COVID-19 or was suspected to have COVID-19 within the last 2 weeks.

Street Medicine Phoenix recognized the need to provide personal protective equipment (PPE) for not only individuals experiencing homelessness, but also their volunteer team members. SMP partnered with the state physician organization, the Arizona Medical Association, to obtain access to additional PPE supplies, including gloves, gowns, face shields, and masks. SMP reached out to community organizations, such as Valley of the Sun United Way, who provided PPE supplies as well. Existing partnerships with MCDPH were leveraged to obtain additional PPE as the pandemic persisted. In conjunction with the PPE, MCDPH and Valley of the Sun United Way donated hundreds of bottles of hand sanitizer which were distributed along with pamphlets about COVID-19 preventive measures, such as hand hygiene, proper mask wearing, and social distancing.

In addition to implementing preventive efforts to benefit individuals not yet infected with COVID-19, SMP leveraged resources to help those actively infected with COVID-19. Through partnerships with community agencies like St Vincent de Paul and free programs through pharmaceutical companies such as Johnson & Johnson and GlaxoSmithKline, SMP received over-the-counter (OTC) anti-inflammatory and analgesic medications (i.e. Tylenol, Motrin, Advil, and Aleve), which were carefully distributed to symptomatic individuals after thorough screening for contraindications. To ensure sustainability with the COVID-19 outreach efforts, SMP reached out to health insurance companies for funding. One of these companies, Molina Healthcare, generously provided funding for additional supplies and equipment as needed.

To efficiently vaccinate hundreds of individuals experiencing homelessness on the streets, SMP needed an organized format for their pop-up vaccination clinics. After researching several examples of effective vaccination clinics in the literature, SMP implemented many of the successful aspects of

these clinics to design their own. SMP surveyed homeless “hot spots” and set up their pop-up clinic central to the majority of the encampments. A large blue gazebo was set-up to help direct patients to the clinic and provide shade to the volunteers and patients. The pop-up clinic consisted of three sections: check-in, vaccine administration, and post-vaccination observation area. The check-in station featured an iPad with wireless connection which was utilized to register the patient into the MCDPH vaccine database. The patient’s information was cross-referenced within the database to ensure vaccine administration was not duplicated. Next, the patient was directed to proceed to the vaccine administration station where they would receive the COVID-19 vaccine by a nursing or medical student under the supervision of a nursing, pharmacy, or physician faculty. (Of note, all student volunteers were required to undergo hands-on training prior to administering vaccines in patients to ensure proper technique.) While one student administered the vaccine, another student was responsible for concurrently inputting the vaccine’s serial number and administration site (left versus right arm) into the MCDPH vaccine database. After receiving the vaccine, the patient was directed to the observation area with chairs and snacks. This area was supervised by a medically-qualified healthcare volunteer equipped with epi-pens in the event of an anaphylactic or otherwise adverse reaction to the vaccine. After 15 min had elapsed, the patient received their vaccination card and was provided with information about the vaccine, including steps to follow and contact information should they develop post-vaccination reactions.

Although the vaccination clinic was primarily designed to be stationary, it was adapted to an on-foot mobile clinic on several occasions. The primary reasons for switching to the mobile clinic were to reach disabled patients in their encampments, increase accessibility for patients that were fearful of leaving their belongings, and to encourage vaccination of hesitant patients who were opposed to coming to the pop-up clinics but were comfortable receiving the vaccine in their camp.

Several notable differences existed between the mobile clinic and the stationary pop-up clinic. Based on observations, most patients who came to the pop-up clinics were self-motivated to receive the vaccine, whereas many of the individuals encountered through the mobile clinic communicated skepticism regarding the vaccine. Responsively, and immediately prior to each outreach event, the medical preceptor or the medical student leader led a brief orientation for all volunteers outlining important information about the vaccine, including the latest research regarding its benefits, and encouraging volunteers to share personal stories helpful to encourage patients to get vaccinated. These targeted talking points, combined with the informational handouts, were the primary tools utilized to build confidence in the vaccine.

Additional differences noted between pop-up clinic events and the mobile clinics included that the mobile clinic required pre-drawing the vaccines from the vials into the syringes and

transporting them in a temperature-controlled ice chest versus drawing the vaccines one at a time for each patient. Fewer volunteers were needed for the operation of the mobile clinic; typically, there would only be one volunteer registering the patient and completing the administrative portion of the encounter while the clinical volunteer would administer the vaccine with a supervisory preceptor. Since there was no designated post-vaccination observation area, a licensed health professional would remain with the patient at their home for the required 15 min, while the rest of the team moved on to engage with other patients. Depending on the number of volunteer licensed healthcare providers present at the outreach event, there would be 2-3 mobile clinics working concurrently, covering different areas of the predetermined service area.

In addition to providing vaccinations, the clinics functioned as a triage for sick patients. Patients who were exposed to COVID-19 or those who exhibited the symptoms of COVID-19 were tested with rapid COVID-19 tests. Patients were provided with their results and if positive, they were given information about recommended isolation procedures along with indications for seeking care at the nearest Emergency Department. On several occasions, patients exhibited severe symptoms warranting hospital-level care and were immediately referred to emergency medical services (EMS). While all patients in this category refused ambulance transport, each patient assured the SMP team that they would seek additional medical care. Upon request and after careful screening and counseling, SMP provided infected patients with several days' supply of OTC medications, such as Tylenol and ibuprofen, for symptomatic relief.

Challenges Encountered

Many anticipated and unanticipated challenges were encountered during the mobile vaccine clinics. These challenges are grouped into three categories: patient-related, logistical, and messaging, as described in [Table 1](#). Patient-related challenges included lack of trust, low health literacy, and poor vaccination history recall complicating the ASIIS documentation process. Predominantly, most patients expressed distrust due to their lack of familiarity with many of the SMP volunteers at the mobile vaccine clinics and general negative perceptions of the healthcare system. Several

patients refused to provide their full name, leading to incomplete records in the ASIIS. In these rare cases, the patient's first name in addition to a thorough physical description was inputted, which was acceptable by the patients who expressed hesitancy. Overall, the distrust was attenuated in two manners. First, long-standing SMP volunteers, who were recognized among many of the individuals experiencing homelessness through their years of service to this population, were intermixed with the new volunteers to ease discomfort and provide credibility to the mobile vaccine clinics. Second, all patients were approached with the primary focus being on their needs, not on receiving the COVID-19 vaccine. For many patients, this meant providing them with water, socks, and hygiene items before broaching the topic of receiving the COVID-19 vaccine. For others, this meant performing wound care or completing a vision exam along with purchasing a new pair of prescription glasses for them. However, no patients were incentivized to receive the vaccine due to lack of funding. On several occasions, mobile vaccine clinics were paired with food distribution events in which SMP received bagels and other food items from generous donors.

Another challenge faced was low health literacy, complicating the ability to communicate important information about the benefits and risks of the COVID-19 vaccine. This was addressed using the low literacy informational handouts provided by MCDPH along with extensive counseling provided by experienced SMP medical volunteers. The final patient-related challenge encountered was poor vaccination history recall by patients, complicating the verification process to ensure that the patient had not already been vaccinated. Although ASIIS provided sufficient verification for most patients, some patients were convinced that they had received the vaccine despite not having a record in ASIIS. The concern was that patients had received COVID-19 vaccines from providers who did not have access to ASIIS or an incomplete/incorrect record was inputted into ASIIS, rendering the patient unsearchable. This complication was mitigated using careful risk-benefit analysis by a physician and shared-decision making with each patient. For patients with minimal to no risk factors for becoming severely ill who believed they received the first dose of the vaccine within the last 4 weeks, vaccination was deferred. For patients with multiple risk factors for becoming severely ill (e.g., elderly,

Table 1. Summary of the challenges encountered during SMP mobile COVID-19 vaccination clinics.

Challenges encountered		
Patient-related	Logistical	Messaging
Lack of trust	Post-vaccination monitoring time	Lack of awareness of mobile vaccine clinics
Low health literacy	Equipment transportation	Inadequate advertisement of scheduled vaccination events
Poor vaccination history recall		
Incomplete/inaccurate ASIIS records		

immunocompromised, pregnant, chronic lung condition, cancer) who believed they received the first dose of the vaccine within the last 4 weeks, vaccination was performed. Of note, although language barriers were anticipated, particularly due to the high prevalence of Hispanics in Arizona, and several Spanish-speaking volunteers were available at each mobile vaccine clinic, all patients spoke conversational English and language barriers were not a challenge.

The second category of challenges entailed logistical challenges, specifically related to the post-vaccination monitoring time and transportation of equipment from encampment to encampment. After being vaccinated, each patient would be monitored by the medical preceptor at their encampment for signs of anaphylaxis for 15 min. Since there were only 1-2 medical preceptors present at each mobile vaccine clinic, the post-vaccination monitoring time was often the rate-limiting step before the teams could move on to the next encampment. This was addressed by instituting walking post-vaccination monitoring areas in which patients walked with the vaccination team as they approached nearby encampments. An unintended benefit of this approach was increased vaccine acceptance by future patients due to the presence of their neighbor who received the vaccine. For those who were not cooperative with this system, a centralized monitoring location was designated in the encampment area where the medical preceptor could monitor vaccine recipients and supervise vaccine administration. Another challenge was ensuring that sufficient supplies were packed for the mobile vaccine clinics and keeping these supplies organized to facilitate efficient patient vaccination. Initially, each member of the team carried specific supplies but if the team separated, this would cause issues when trying to vaccinate a patient. Standardized pre-filled backpacks with inventory lists were created to mitigate this problem. After every mobile vaccine clinic event, each team would refill their respective backpacks in preparation for the next event.

The third category of challenges involved messaging and promotion of the COVID-19 vaccine to individuals experiencing homelessness. The vaccine events were not pre-publicized; however, SMP regularly and consistently provided outreach multiple times per month (e.g., first Sunday morning every month). Every month, SMP would attempt to pair the vaccine clinic with food distribution, whether done by SMP itself or through partner organizations, to increase awareness of the vaccination clinics. Despite this, many individuals experiencing homelessness were unaware that the COVID-19 vaccine was readily available to them on the streets through SMP, and some expressed hesitation in receiving the vaccine because they had not received advanced notice that the vaccine events were going to happen. Accordingly, SMP began to notify partner organizations near the encampments when the vaccine clinics were planned so that they could advertise to their clients. In addition, SMP began distributing a calendar of planned vaccine events to individuals experiencing homelessness so that they could inform

others in their communities when SMP would return and drum up demand for the COVID-19 vaccine.

Outcomes

From February 2021 to present day, SMP has offered the COVID-19 vaccine to roughly 600 individuals experiencing homelessness with about 400 individuals accepting the vaccine. The majority who accepted the vaccine received the Johnson & Johnson vaccine. Most of these individuals received only one dose of the vaccine; however, approximately 50 individuals received a booster dose. Of note, some individuals rejected the vaccine at the first encounter but accepted the vaccine at a subsequent encounter. Of those who accepted the vaccine, 65% were male and 35% were female. Most were non-Hispanic whites (50%) with African Americans (25%) and Hispanics (15%) representing most of the remaining patients. The majority of patients were between the ages of 35-54 (60%) followed by ages >55 (25%) and ages 18-34 (15%).

It is difficult to estimate the reduction in morbidity and mortality as a result of these vaccination events in addition to the number of prevented cases due to education efforts and hygiene supply donations. However, based on the density of individuals experiencing homelessness in SMP's service areas, many individuals experiencing homelessness directly or indirectly were positively impacted from SMP's outreach. Additionally, the trust developed by SMP both within the community and with community agencies like MCDPH led to opportunities for future collaboration on prevention initiatives for other communicable diseases within individuals experiencing homelessness.

SMP's outreach efforts demonstrate the feasibility of implementing a mobile vaccine clinic on the streets to increase rates of vaccination against communicable diseases in individuals experiencing homelessness. Key considerations for implementation include resources (i.e., vaccines, the necessary associated supplies, and access to an immunization database), skilled medical personnel to administer the vaccines, and geographic setting of individuals experiencing homelessness. County and state health departments are generally understaffed and in SMP's experience, are willing to support initiatives that assist with their vaccination goals through donations of vaccines and other necessary supplies. Alignment with medical schools and colleges with health degree programs offers a substantial roster of volunteers, both students and skilled health professionals, who can facilitate vaccination and record-keeping. However, sustainability is an important consideration, especially in the setting of donated resources and time. For SMP, partnerships with county and state health departments have been fostered over the course of several years, establishing a reliable connection for vaccines and other needed resources. Regarding volunteers, SMP has created volunteer recruitment pipelines in several universities across Arizona. These pipelines provide a constant influx of

volunteers, both medical and non-medical, who are eager to get involved and serve the homeless community. However, volunteer turnover is a major issue. Accordingly, through long-term grant funding, SMP hired an Administrative Lead who will serve as a consistent presence on the SMP leadership team, responsible for scheduling vaccine clinics with regularity and maintaining community partnerships. SMP is also working to integrate vaccine clinics for individuals experiencing homelessness in the community service curricula of several local medical schools, further cementing the initiative. Additional efforts to increase sustainability could include securing funding to employ medical professionals who can administer vaccines on a regular basis and enrollment as a COVID-19 vaccination provider through the CDC to receive a dedicated supply of vaccines.

Lessons Learned

Street Medicine Phoenix learned several important lessons through the COVID-19 vaccination events. The preferred format of individuals experiencing homelessness is mobile vaccination clinics that provide services directly in the encampments. These mobile clinics ideally will consist of experienced SMP volunteers who not only can build trust and rapport, but also can provide thorough vaccine education for patients of diverse health literacies (e.g., with the assistance of low literacy informational materials). In addition, mobile clinics have increased efficacy when paired with food or clothing distribution. Contingency plans need to be created in advance for situations involving missing ASIIS documentation in patients with unknown vaccination status, inability to create an accurate ASIIS record due to patient refusal to provide necessary identifying information, and non-English speaking patients (although SMP did not encounter this specific challenge). To increase efficiency, mobile post-vaccine monitoring areas were instituted, and standardized pre-packed backpacks were employed which increased the preparedness of each volunteer to adapt to new team configurations if needed. The post-vaccine monitoring areas also aided in promotion of the COVID-19 vaccine along with advertisement through partner organizations and distribution of outreach calendars. Moreover, SMP was able to realize the power of maintenance of strong relationships with community partners to make a critical and timely difference to be able to respond to unforeseen challenges to care delivery, as posed by the COVID-19 pandemic.

Several similarities and differences exist between the challenges faced and lessons learned from SMP's COVID-19 vaccination clinics and those cited in the literature. Overwhelmingly, mobile clinics have proven to be an effective method of increasing vaccine accessibility and reducing vaccine hesitancy, particularly when paired with other services, such as food and clothing distribution, or financial incentives.^{24,28,33} Other vaccination interventions in the literature also employed co-interventions, such as

questionnaires and serological testing, which demonstrated success in increasing vaccination rates.²⁷ Co-interventions performed by SMP included blood glucose testing, blood pressure measurement, and vision testing (with the intention of ordering glasses for visually-impaired individuals). Although these co-interventions were not performed concurrently with the majority of mobile vaccination clinics, the vision testing offering seemed to significantly increase concurrent vaccination rates. Other vaccination interventions in the literature utilized accelerated vaccination schedules and vaccinated at the first encounter, regardless of whether a person's vaccination history or serological status were known (if clinically safe),²⁷ similar to how SMP elected to vaccinate many individuals despite unknown vaccination status and missing ASIIS records, particularly if significant COVID-19 risk factors were present. While difficulty promoting vaccination clinics was a common theme across several interventions, flyers hung in public bathrooms were shown to be successful²⁷ whereas SMP opted to distribute outreach schedules to community partners and individuals experiencing homelessness. Another significant barrier to vaccination encountered by SMP and other vaccination interventions was mistrust of healthcare providers. SMP's experiences demonstrated that using experienced volunteers to build trust and provide vaccine education was a successful approach in addressing low vaccine confidence. In contrast, other interventions highlighted the effectiveness of using peer ambassadors: individuals within the community who can promote vaccine education and uptake through their social networks and in-group identities.³⁴ Several vaccination interventions further involved individuals experiencing homelessness by including them in the strategy design and delivery process, further elevating vaccination rates.²⁷ Several vaccination interventions in the literature were staffed with health professional students (primarily pharmacy, nursing, social work, and medical students)^{20–22,25}; however, SMP utilized a more robust volunteer workforce including students from other programs such as public health, physical therapy, occupational therapy, veterinary, and optometry. Lastly, although SMP did not encounter many issues related to cultural and language competency, other vaccination interventions have emphasized the importance of these considerations and have utilized interpreters to address them.^{24,25}

Future Directions

The next steps for SMP's mobile COVID-19 vaccination clinics include expanding to resource-deficient areas around Phoenix where homeless services agencies are less prevalent. Although most challenges encountered have been addressed, patient awareness of vaccination clinics and building trust with individuals experiencing homelessness continue to be ongoing opportunities for quality improvement measures. Accordingly, SMP has started brainstorming ways in which to train and deploy COVID-19 vaccine community health

advocates who are currently or formerly individuals who have experienced homelessness into SMP's service areas. SMP has connected with other homeless service agencies who utilize homeless peer-advocates to learn more about their programs to inform future developments of a SMP peer-advocacy program.

To increase sustainability of vaccination efforts, SMP is investigating long-term funding options and extended partnerships with crucial suppliers like MCDPH. To ensure consistent availability of qualified medical personnel to administer vaccines, SMP has reached out to local emergency medicine and primary care specialty residency programs to recruit resident physician volunteers. Future goals of collaborations with local residency programs include obtaining additional vaccine providers. Furthermore, SMP is exploring the possibility of creating a new volunteer student leadership position, a "Vaccine Programs Coordinator," to serve a multi-year term in order to increase stability, sustainability and longitudinality of vaccination outreaches. With the decline in COVID-19 cases, this will include a shift in vaccination efforts to other disease threats in Arizona, including Mpox and Hepatitis A.

Through partnerships strengthened between SMP and various community organizations during the COVID-19 pandemic, SMP has become involved in addressing other disease outbreaks within Phoenix's population of individuals experiencing homelessness. At this time, SMP is working with MCDPH and other homeless services agencies on two fronts in regards to communicable disease prevention and education: Mpox and Hepatitis A. Although Mpox cases are currently low in Arizona, the crowded living conditions, decreased access to hygiene supplies, and other factors that increased the risk of COVID-19 transmission within individuals experiencing homelessness make individuals experiencing homelessness particularly susceptible to Mpox transmission. Implementing the lessons learned during the COVID-19 pandemic outreach events, SMP is hosting Mpox vaccination events on the streets in addition to educating patients on strategies for disease prevention and indications to seek medical care. The goal is to proactively provide this vulnerable population with the awareness, knowledge, and resources required to reduce the chances of another pandemic. Although SMP has been providing Hepatitis A vaccines to individuals experiencing homelessness for several years, efforts have recently escalated due to rising cases across Arizona. SMP is collaborating with MCDPH to procure Hepatitis A vaccines and immunize individuals experiencing homelessness concurrently with COVID-19 and Mpox vaccination. Thus far, SMP has provided 50 Mpox and 160 Hepatitis A vaccinations.

Additionally, given the aging of individuals experiencing homelessness, MCDPH is considering our request for vaccines required for this age group. According to the Centers for Disease Control and Prevention, one in three individuals develop shingles in their lifetime.³⁵ For those 65 and older,

pneumococcal vaccine is recommended.³⁵ Provision of both vaccines to eligible individuals living on the streets not only improves health accessibility, but also builds herd immunity within the greater community. Overall, partnerships with MCDPH and other community agencies are vital to ensuring that the individuals experiencing homelessness are sufficiently vaccinated against current and emerging communicable disease threats across Arizona.³⁶ These emerging threats serve as ongoing motivation to sustain and integrate our outreach efforts within the greater public healthcare infrastructure, thereby, improving the health of the hardy reached.

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