

Telemedicine: A Bridge to Improved Burn Care for People Experiencing Homelessness?

Provider and Allied Healthcare Professional Perspective

on benefits and drawbacks in Long-Term Care

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**Abstract**

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**Background**

With greater numbers of unhoused people in the US, there is an increased need to find ways of providing appropriate healthcare to this population. Burn injuries can be some of the most traumatic injuries, physically and mentally. With the possibility of lengthy recovery times and intense outpatient follow-up post hospitalization or ER visit, it is crucial that we find ways to support providers' ability to provide care and for patients, especially unhoused patients.

Telemedicine has rapidly expanded since the onset of COVID-19, yet it has not been often used to provide care to unhoused individuals.

**Methods**

In the study, semi-structured qualitative interviews were conducted to explore the advantages and disadvantages of using telemedicine with unhoused burn patients. Six interviews were conducted with providers and allied health professional from the UW Medicine Regional Burn Center at Harborview Medical Center in Seattle, WA. Interview data was analyzed and

themes were identified using a constant comparative method. Participant recruitment was limitation of the study and additional interviews may have helped to achieve data saturation. Interview data was analyzed and themes were identified.

## Results

The study found that providers and allied health professionals at the UW Medicine Regional Burn Center at Harborview Medical Center are hopeful to use telemedicine with unhoused patients. Moreover, it was noted that technological barriers may affect patients' ability to use telemedicine, but with the support of resource in the community this could be overcome. As it can be difficult to assess wounds via telemedicine, participants believed that telemedicine may not be appropriate for all burn injuries and that it could be used alongside in-person care.

## Conclusion

Although there were concerns with using telemedicine with unhoused patients, most participants believed in the potential of telemedicine under specific conditions. Based on the findings, our recommendations for using telemedicine with unhoused burn patients included:

1. Using telemedicine primarily in the later stages of wound care.
2. Ensuring that there are ways to provide needed supplies to patients.
3. Involving community partners in the process. In particular to assist with resources and training in the use of telemedicine.
4. Using telemedicine to collaborate with providers in the community and larger region to support patients that may not be able to get to a Burn Center, yet need to be physically seen by a medical professional.

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**Introduction**

Since 2017, the number of vulnerable individuals experiencing homelessness in the United States has continued to rise (State of Homelessness, 2023). Telehealth can offer patients another option for accessing healthcare, especially patient who often require more follow-up such as burn patients. The availability of telehealth to burn patients who are also unhoused may positively impact access to healthcare for a vulnerable population while reducing the burden on the healthcare system.

The goal of this project was to investigate the use of telehealth in the long-term care of burn victims who are experiencing homelessness. Specifically, it focused on hearing from providers and allied health professionals at the Burn Center at Harborview Medical Center their perceptions regarding the potential advantages and disadvantages of using telemedicine to provide follow up burn care to unhoused patients<sup>1</sup>.

**Background***The Importance of Burn Care Management*

According to American Burn Association (ABA) over 400,000 burn injuries required medical treatment in 2016, approximately 40,000 hospitalizations were due to burn injuries, and 4,000 deaths occur per year in the United States (American Burn Association, 2023). Globally, it is estimated that 180,000 people die every year due to injuries caused by burns, yet burns are often preventable (World Health Organization, n.d.). In addition to the initial care that burn victims, with moderate to severe injuries, receive in the first few hours and days of

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<sup>1</sup> For the purpose of this study, unhoused individuals are broadly defined as people that have self-identified as unhoused or homeless. Moreover, it includes people experiencing homeless that may be unsheltered, living in a shelter, or residing in transitional housing. It is important to note that being unhoused and defining homelessness reflects a broad spectrum of challenging experiences and living conditions that people face every day. The researcher recognizes their privileges and identities as a person that has not experienced homelessness. In this research, the terms unhoused and homelessness will be used interchangeably to describe individuals experiencing this public health crisis.

hospitalization, the long-term care can be intense and challenging. Follow-up care for patients must address physical, psychological, and social consequences they may face because of their injuries (Gauglitz & Williams, 2023; Schaefer & Nunez Lopez, 2023). This care may include continued wound care, monitoring of complications due to being in a hypermetabolic state, assessment of psychological trauma, support with reintegration into school/work as victims could face social isolation (Schaefer & Nunez Lopez, 2023).

#### *Burn Severity Classification*

As outlined by Serrano et al. (2015), there are three main types of burns: superficial dermal burns, deep dermal burns and full-thickness burns. Burns are classified using a variety of factors including the patient's age, percentage of total body surface area burned (%TBSA), depth of burn, type of burn and what parts of the body were involved in the injury (Schaefer & Nunez Lopez, 2023). Furthermore, Schaefer and Lopez (2023) note that burns are labeled severe when:

- “>10% TBSA in children (<10 years old) or elderly (>50 years old)
- >20% TBSA in adults
- > 5% full thickness
- high-voltage electrical burns
- significant burns to the face, eyes, ears, joints, or genitalia”

In addition to these elements, there are other factors that could impact a patient’s morbidity and mortality such as prior medical history, additional injuries sustained from inhalation, and presence of other traumatic injuries (Schaefer & Nunez Lopez, 2023). The severity of the burns will have an effect on the type of treatment a patient will require and the length of the treatment (Serrano et al., 2015; Schaefer & Nunez Lopez, 2023).

*Impact of Homelessness*

As of January 2022, data published by the U.S. Department of Housing and Urban Development (HUD) reported that 582,462 people were experiencing some form of homelessness in the United States (U.S. Department of HUD, n.d.). During the same year, 127,768 people were experiencing chronic homelessness, defined as “people with disabilities who have experienced long-term or repeated incidents of homelessness” (State of Homelessness, 2023). The Washington State Department of Commerce reported that in 2022 there were 25,452 people faced some form of homelessness (WA State Dept. of Commerce, 2022). In King County, the most populated in Washington (U.S. Census Bureau, n.d.) with the highest median income (Office of Financial Management, 2023), made up 53% of the state’s homeless population (WA State Dept. of Commerce, 2022).

“Homelessness is closely connected to declines in physical and mental health” (Sleet & Francescutti, 2021). Individuals experiencing homelessness represent a vulnerable population with often limited access to sanitary living conditions, exposure to severe weather conditions, challenges with accessing health care, and inconsistent sources of food. Within our homeless population, “traumatic injury is a leading cause of hospitalization” (Kramer et al., 2008). These injuries often lead to longer hospital stays and greater complications when compared to housed patients, and are a main cause of mortality among unhoused individuals (Kramer et al., 2008). Based on research on a mixed population in Southwestern US, “although poverty did not appear to increase the risk of burn injury overall...it was associated with a significant increase in the risk of burn injury in women” (Dissanaike et al., 2017, p.681). This suggested that risk of injury may be closer associated to the circumstances of the injury instead of factors such as socioeconomic status (Dissanaike et al., 2017).

*The Use of Telemedicine and Burn Care*

With the onset of the COVID-19 pandemic, there was a quick expansion in the use of telemedicine services across the U.S. (Porean et al., 2021; Ye et al., 2021). Telemedicine has been used for years to provide care to patients in a variety of settings. Telemedicine provides care to patients in different ways including remote patient monitoring, real-time interactions with providers, and sharing medical data with providers (Kane-Gill & Rincon, 2019). Prior to 2019, “more than 50% of acute care hospitals use[d] some form of telemedicine, and this rate is expected to grow by 20% to 50% each year” (Kane-Gill & Rincon, 2019, p.519).

Factors that made hospitals more likely to use telemedicine included being a teaching hospital, being for-profit, being part of larger hospital network, and being more technologically advanced (Adler-Milstein et al., 2014). Moreover, when compared to hospitals in urban areas, hospitals in rural areas’ decision to invest in telemedicine services was motivated by a need to expand access to care (Adler-Milstein et al., 2014). Because telemedicine offers patients and providers to opportunity to maintain communication, monitor patient data, and meet with specialized providers it may be able a useful resource to manage chronic conditions.

Due to the long-term impact on the immune system, cardiovascular system, metabolism, and psychology it is reasonable to label burn injury as a chronic disease (Barrett et al., 2019) suggesting that maybe burn care can be effectively provided through telemedicine. Many burn patients are treated in an outpatient setting and this care can vary from days to months depending on the care team recommendations (Warner et al., 2014). In addition to the complicated nature of this care, management faces added “factors such as poor pain control, pruritus, wound infections, and scarring” (Warner et al., 2014). Even with the complex nature of this care, research conducted by Atiyeh et al. (2014) and Hickey et al., 2017 suggested that telemedicine could be a viable delivery mechanism of healthcare for these patients.

*The Dilemma*

People that are unhoused who do not have access to shelter beds and/or warm places to stay have to find other means of maintaining warmth. Across the U.S., unhoused individuals will experience a spectrum of living conditions, some may be able to provide safer heating sources while others may be forced to be exposed to dangerous heat sources. Data from homeless patients admitted to the Burn Center at Harborview Medical Center in Seattle, WA from the years of 1994 to 2005 found they [unhoused patients] “had larger mean percent total body surface area (%TBSA) burned” (Kramer et al., 2008, p. 462) when compared to housed patients. Moreover, these homeless patients were more likely to be non-Caucasian and were mostly from King County, WA (Kramer et al., 2008). Accounting for the size and severity of injuries, homeless patients had longer hospital stays and higher hospital charges. It was noted that this could be related to the co-occurring factors affecting this vulnerable group, yet it is possible that a longer stay in the hospital was necessary to ensure patients were discharged closer to a full recovery as access to the resources to adequately manage their burns in the community is lacking (Kramer et al., 2008).

Although patients have benefitted from accessing care through telehealth, there is still a lack of understanding on its cost-effectiveness (Hickey et al., 2017; Hoseini et al., 2016, Nguyen et al., 2004). Nguyen et al. (2004) found that patients saved money on travel by using telemedicine but highlighted that the use of telemedicine could be “a financial burden to health care systems and inefficient for health care providers” (p.489). When trying to understand the impact of using telemedicine it is crucial to explore the affect it has on those delivering care and those receiving care. Studies aimed at understanding patient’s decisions to use telehealth or in-person care confirm the benefits of telehealth. Yet, patients reported that they seek out in-person visits because they wanted to have face-to-face examinations (Basaran et al., 2021). Hayavi-

Haghighi & Alipour (2023) noted that constraints of telehealth could be the inability of providers to conduct a physical examination of the patients and general technological difficulties that providers and patients may face when trying to use telehealth technologies.

Despite telemedicine services increasing as a result of the COVID-19 pandemic, the disparities present with this modality of healthcare prior to the pandemic such as lower use among older patients (Poeran et al., 2021; Ye et al., 2020) and patients with minority identities (Ye et al., 2020) are still present. With a service that should be increasing access, there needs to be an intentional effort to ensure that our most vulnerable are also benefitting from this. Studies have shown that when treating mental health conditions, patients experiencing homelessness have appreciated engaging with providers in this setting and felt that their needs were met with this modality (DeLaCruz-Jiron et al., 2022; Zahir et al., 2023). In comparison, unhoused individual receiving care through telemedicine for treatment of their physical health did not have a positive attitude about it (Zahir et al., 2023). It was noted that some of the reasons including not having access to the proper technology, not being able to see the provider [telephonic visit] and the provider not being able to conduct a physical exam (Zahit et al., 2023).

There is limited research on the impact of telemedicine in providing care to patients who are unhoused. The literature suggest that the use of telehealth in the long-term management of burn injuries and associated complications can be beneficial. Yet, this literature does not explore the use of telehealth with unhoused patients. Increased access to specialty care, continued care, and reduced cost to patients are benefits of this method. Based on a review of the current literature, this area of study would benefit from additional exploration especially in regards to the care of members of vulnerable populations including the unhoused.

*Current Research*

The management of chronic diseases through telehealth has been linked to fewer hospitalizations, readmissions, and costs to patients (Board on Health Care Services, 2012). The use of these technologies has been shown to improve access to care and quality of care as providers are able to reach patients from various geographic and economic backgrounds (Board on Health Care Services, 2012). Although telehealth has improved some aspects of healthcare delivery, there is still a need to develop clear guidelines on its use, delineating when it's best to have in-person visits or telehealth visits.

By exploring this topic, an aim was to determine whether telemedicine could be used to supplement the care that patients can receive from in-person visits (Gajarawala & Pelkowski, 2021). This knowledge could help to ensure that patients have the best possible recovery and rehabilitation from these serious injuries by identifying potential initiatives to improve access to care. The underlying research question for the project was, what are the perceived advantages and disadvantages of using telemedicine to provide long term care management to burn patients experiencing homelessness from the perspective of burn care providers and allied healthcare professionals at the Burn Center at Harborview Medical Center?

**Methods**

We conducted an exploratory qualitative study utilizing semi-structured interviews that examined the use of telemedicine in outpatient care management of burn patients. Institutional Review Board (IRB) approval through the University of Washington Human Subjects Division (UWHSD) was obtained prior to starting this research.

*Setting*

The study was conducted with provider from the UW Medicine Regional Burn Center, The UW Medicine Regional Burn Center at Harborview Medical Center in Seattle, WA is the one Level I Trauma Center in the WWAMI region. This region encompasses Washington State,

Wyoming, Alaska, Montana, and Idaho. As the epicenter of expert burn care and providers for this expansive region, many patients from the region travel to Seattle for specialty care and clinicians provide consultation services to providers across the WWAMI region. The Burn and Plastic Surgery Clinic is part of the Burn Center and provides outpatient care to patients. Throughout the study the Burn and Plastic Surgery Clinic will be mostly referred to as the Burn Center or the clinic for ease. It is important to acknowledge that the study researcher was connected to the Burn Center by a thesis committee member who collaborates with clinic staff. For participant privacy, all study participants will remain anonymous to all thesis committee members.

### *Participants*

The study recruited a variety of clinic staff including doctors (MDs), advance practice providers (APPs), registered nurses (RNs), occupational therapists (OTs), physical therapists (PTs), and clinic support staff from the UW Medicine Regional Burn Center at Harborview Medical Center in Seattle, WA. Residents and fellows were excluded from the study as the University of Washington IRB application required special permission to have fellows and residents participate in a study.

### *Recruitment*

Purposive sampling was used to recruitment participants (Tolley et al., 2016). Potential participants were identified by a research coordinator at the Burn Center and the clinic manager of the Burn and Plastic Surgery Clinic. A recruitment email (see Appendix A) was sent to potential study participants describing the purpose of the study and the inquiring about their interest in participating in the project. Individuals interested in participating were asked to respond to the recruitment email. Prospective participants would communicate with the researcher to schedule date and time of interviews. Prospective participants were sent a link to the scheduled zoom meeting as well as a link to the electronic consent form to be reviewed and

signed prior to the interview. The consent form (see Appendix B) was created in the University of Washington Institute of Translational Health Sciences (UW ITHS) REDCap account that is accessible to University of Washington students.

### *Procedure*

The study implemented exploratory semi-structured interviews via video conferencing on Zoom. After obtaining consent, the interviews were video and audio recorded via Zoom's recording software on a UW HIPAA complaint account. The interview questions (see Appendix C) aimed at understanding what resources are being used by the clinic to support the needs of unhoused patients, exploring what in-person and telemedicine outpatient visits look like at the clinic, learning clinic staff's perspective on the benefits and challenges of engaging unhoused patients in the in-person and virtual setting. Interview questions were created by the researcher and then reviewed by thesis committee members and a research coordinator at the Burn Center to ensure the questions appropriately addressed the scope of the study.

At the beginning of each interview, participants were reminded of the voluntary nature of their participation and were asked again to confirm willingness to be recorded and participate in the interview. Participants were not compensated for their involvement in the study. Once interviews were completed, the audio and video recordings were transcribed the researcher into Microsoft Word documents. The closed captions created by the Zoom software were also used to verify accuracy of transcripts. All personal identifiers were redacted from transcripts and participants were assigned a participant number such as 'Participant 001'. The final transcripts were uploaded into Dedoose (SocioCultural Research Consultants, 2021) for coding and qualitative analysis.

*Analysis*

An initial codebook was created (inductively) based on the initial readings of the transcripts and was refined throughout the coding process. Thematic analysis process was conducted in accordance with the six phases delineated by Braun and Clarke (2006). The transcripts were coded using Dedoose software. Two coders were used for the purpose of achieving triangulation (Tolley et al., 2016). Participant transcripts 005 was coded separately by each coder. Coders then met to discuss the codebook and application of codes, and resolve disagreements. The remaining transcripts were then be (re)coded by one coder. The two coders met to discuss themes that were noticed from the data. By analyzing the coded transcripts using qualitative analysis tools in Dedoose and thematic mapping, these themes were refined by the primary coder. Subsequently the research team gathered to discuss and reach consensus on the themes.

**Results**

Results from the study were based on the analysis of six semi-structured interviews. Interviews were initially estimate to range from 30 to 40 minutes, but ranged between 27 and 57 minutes. Study participants included one occupational therapist, one clinic staff/patient support specialist supervisor, one advanced registered nurse practitioner (ARNP), and three registered nurses, one who serves as the clinic manager, and one who serves as the assistant nurse manager. The final codebook, which can be found in Appendix D, included 48 codes composed of 23 primary codes, 25 secondary codes, and 1 tertiary code. From the analysis, five main themes and one subtheme were identified. The themes highlight the challenges, advantages, and improvements for the use of telemedicine for unhoused burn patients. Some participant excerpts used to support the following themes were edited for clarity and readability.

*Qualitative Results*

**Theme 1:** Lack of access to key technology (e.g., computers, cellphones, internet, medical software) and the knowledge of how to use the technology can make it challenging for unhoused patients to participate in a telemedicine appointment.

Many participants noted that technology and knowledge on how to use the technology is a key component to being able to use telemedicine. In order for patients to see a provider via telemedicine they need access to a device and internet to start an appointment. A few participants clarified that for patients to schedule telemedicine appointments, they must have an active email address that can be used to set up a MyChart account, an online patient portal, which subsequently gives patients access to the link to start the telemedicine appointment. Moreover, participants expressed concern for unhoused patients potentially not having access to a private space with dependable internet connection needed to conduct a telemedicine appointment.

In addition to having access to these resources, patients may not be experienced in the use of the technology and able to set-up these essential components of a telemedicine appointment. Lastly, a couple of interview participants noted that in their experience, some patients from vulnerable populations have concerns with trusting healthcare systems. They believe these patients may have an added level of distrust with technology and giving their contact information to the clinic and this information being added into the electronic health record. The following quotes from Participant 001, 002, and 004 highlight participants' perspective on technological barriers that may exist for all patients but in particular unhoused patients as they may attempt to use telemedicine.

*"I mean, they have to have the access to the device, right?... do they have a charged cell phone"*  
-- Participant 002

*"just like process, basic process alone and they're...requirements to have a good telemed"*

*visit...MyChart account, and then [be] in Washington State are the minimum requirements for a telemed visit” -- Participant 004*

*“sometimes telemedicine, I think it's a bit tricky because I don't know where they're staying. So the Internet connection can be, can be a tricky part of this” -- Participant 001*

**Theme 2:** Telemedicine visits limit providers’ abilities to assess wounds and provide unhoused patients with appropriate wound care supplies (e.g., dressings)

Participants indicated that challenges with providing burn care to patients via telemedicine include not being able to assess a wound through the camera and/or having to rely on images to evaluate wounds. The current format of a telemedicine visit with a burn provider involves asking patients to submit a picture(s) of their wound(s) to the clinic team a day or two prior the visit. This permits the team time to examine the images ahead of the visit. Because a visit is not occurring in-person, healthcare providers/staff are unable to provide hands-on care to the patients. For specialties such occupational and physical therapists it can be more difficult to evaluate the patients mobility, provide education on exercises for the patients, and assess comprehension and performance of these exercises. Excerpts from Participants 002 and 005, display participants’ concerns with being able to properly assess patients in a telemedicine appointment.

*“the benefits are...from when I look at a video it is hard to truly assess all of the things, so I can see depth better.” -- Participant 002*

*“most of the time the zoom video quality is not quite good enough where we, the provider, can accurately assess the state of there were injury.” -- Participant 005*

In this example, Participant 002 is highlighting how an in-person visit can be more beneficial than a telemedicine visit.

Furthermore, when patients go in-person, clinic staff is able to provide them with extra dressing supplies as well as provide them with wound care supplies that may be more appropriate for their needs. These changes in dressing supplies are based on progression of healing and patient ability to clean and maintain the wound(s). An example of this can be seen below in the quote from Participant 006.

*“usually their [unhoused patients] care is more complex than a telemedicine can do and bringing in the different people that need to talk with them and really working through an issue with them so, and they aren't able to get dressing supplies if we're doing a telehealth visit”*

-- Participant 006

**Theme 3:** Telemedicine can be a helpful delivery of care when patients have smaller, less severe burns, and later in the wound healing process when patients need to check-in with clinic staff on burn healing progression.

Participants shared that telemedicine appointments can be a good opportunity for patients and providers to meet and discuss how the burn wounds are healing. These appointments typically require less hands-on care from providers and less management of patients' pain needs. Participants noted once patients have positively progressed in the wound healing process, appointments at the clinic are directed towards monitoring this progression and thus could be done via telemedicine. In particular, participants discussed how this would reduce the need for patients to coordinate transportation to and from appointments at the clinic. It could allow burn specialists the opportunity to provide consultation services to colleagues in the greater WWAMI region, while patients are with their local providers who could provide additional care in-person if deemed necessary. Below are excerpts from Participants 002 and 004 supporting participants'

perceptions of the advantageous use of telemedicine to track the healing of wounds and deliver consultations to those further away from the Burn Center.

*“I think that telemedicine would be really beneficial to unhouse[d] folks especially later on in their healing, cause really, those late, those visits later on is a lot like a check in, you know, like, hey, are you still making good progress?”* -- Participant 004

*“... if you have a hand burn, right? I can do most of what I need to do over a telemedicine visit.”*  
-- Participant 002

**Theme 4:** Clinic providers and staff are hopeful about offering care via telemedicine even though they acknowledge there are challenges with its use.

Although participants expressed concerns about that using telemedicine to provide burn care, such as being able to access technology, difficulty assessing wounds, and the ability to provide dressing supplies, they acknowledged that unhoused patients may be more affected by these obstacles and they were looking forward to the potential benefits of using telemedicine with this vulnerable population. In particular, they noted that telemedicine is an additional resource for clinic staff and providers to engage with patients. Burn clinic staff and providers that participated in the study believed that telemedicine could offer them the opportunity to build relationships and connect with unhoused patients. Telemedicine was discussed not only as means of addressing immediate burn/medical care needs but other social challenges that may be affecting unhoused patients, such as being able to access basic needs of clean water, food, and shelter. When asked about the ways in which they (individual participants and the burn clinic) engaged with unhoused patients, many talked about being compassionate and attentive during their interactions. They strived to make patients feel welcomed, heard, and seen. By actively working to build relationships with this patient population, participants were hopeful they may

be able to leverage these connections when recommending a patient to come an in-person visit when necessary. Participants believed that telemedicine could provide them the opportunity to build rapport, increase communication, and develop trust with unhoused patients. Examples from Participants 001 and 005 illustrate these sentiments.

*“I think one of the things we learned during the pandemic is that even if you can't do everything over zoom, it's also an opportunity to touch base with the patient and have that connection....Even if it's just kind of having them talk to the provider about why they do need to come in.” -- Participant 005*

*“even when you start with a burning injury and then you kind of are building this relationship and trust with them by the whole team, and then they are waiting to start is kind of a sharing, somewhat trust, and then, so the more you get to know them, I think you create this relationship.” -- Participant 001*

**Theme 5:** Successful telemedicine visits would depend on enhancing a network of community partners and resources.

During the interviews, participants shared that the use of telemedicine with unhoused burn patients could be greatly facilitated by the incorporation of *existing* and *new* relationships with community partners and resources such as PCPs, shelters, clinics, and case managers. With the support of resources that are already available to unhoused patients in the community, telemedicine could potentially be used as a tool of delivering care to this population. Participants stated that existing partnerships with providers and clinics outside of the burn clinic have been useful means of providing burn care to more patients. These partnerships allow burn specialists to support patient that may not be able to get to the clinic but would benefit from their expertise. Community partners such as PCPs, RNs, case managers, and social workers, could potentially

assist a patient when they attend a telemedicine appointment and ensure that the patient has a good understanding of the burn clinic team's recommendations. The following quotes from Participants 002 and 004 displays participants' perspectives of how the expansion of these relationships could further support patients that are unable to go to the clinic for an appointment.

*"It would be amazing if there's a clinic like in Montana that had a physician there, and or what, or whatever provider who would do the telemedicine visit with the patient, with us, you know, and they can then do all those things that like, hey, here's our burn expertise"* -- Participant 004

*"like someone who maybe is in a shelter that is not close to Seattle, and transportation is a challenge, but that they have some level of support to be able to get those pictures done and log in when they need to"* -- Participant 005

*"community partners that could give them the space to do it"* -- Participant 002

Two participants also discussed the idea of having mobile unit that could serve unhoused patients in the Seattle/King County area. The mobile unit could be staffed with a registered nurse that would provide wound care needs in-person and also be present for the telemedicine appointment that would occur with a burn provider in the mobile unit. It was also suggested that shelters and other housing sources for unhoused individuals could possibly give them a physical space to attend telemedicine appointments. Participants seemed optimistic about the possible benefits that could arise from working alongside the individuals and groups that are already supporting this vulnerable population.

Within the theme of working with community partners to support unhoused patients, there was an underlying idea of relying on these partnerships to specifically address the technology and training barriers faced by patients. Participants remarked that at shelters patients could have access to the internet or computers from which to conduct a telemedicine visit, as seen below from Participants 004 and 005.

*“a social worker, a case manager, you know, partnering with the patient so that they can connect on the phone” -- Participant 004*

*“if a shelter had something like that where someone could just kind of log in and get to their healthcare appointment, that would be pretty cool.” -- Participant 005*

Furthermore, staff at the shelters, case managers, or social workers could assist unhoused patients with the training in the use of the technology.

In addition to these themes, Table 1 provides a side-by-side comparison of the potential advantages and disadvantages of asking unhoused patients to schedule an in-person appointment versus a telemedicine appointment at the burn clinic.

**Table 1.** Pros and cons of in-person visits vs. telemedicine visits

|             | <b>In-person visits</b>  | <b>Telemedicine visits</b>   |
|-------------|--|--|
| <b>Pros</b> | <ul style="list-style-type: none"> <li>• Hands-on care</li> <li>• Easier access to additional dressing supplies and meds</li> <li>• Can see multiple providers during time at the clinic</li> <li>• Providers can better assess wounds</li> <li>• Easier to fit patient into schedule if original appointment time was missed</li> </ul> | <ul style="list-style-type: none"> <li>• Can be done anywhere</li> <li>• Increases opportunities of meeting with patients</li> <li>• Follow up on less severe/smaller burns</li> <li>• Great for monitoring healing progress later on in treatment</li> </ul>  |
| <b>Cons</b> | <ul style="list-style-type: none"> <li>• Long-day at the clinic</li> <li>• Transportation to and from appointments</li> </ul>  | <ul style="list-style-type: none"> <li>• Lack of privacy</li> <li>• Difficulty assessing wounds/therapy needs</li> <li>• Difficult to provide additional supplies (dressings and meds)</li> <li>• Tech challenges/literacy</li> <li>• More difficult to fit patient into schedule if original appointment time was missed</li> </ul> |

**Discussion**

The results of the study indicated five main themes and one sub-theme related the use of telemedicine with unhoused burn patients from the perspective of burn providers and allied healthcare professionals at the Harborview Burn Clinic:

- 1) Lack of access to key technology (e.g., computers, cellphones, internet, medical software) and the knowledge of how to use the technology can make it challenging for unhoused patients to participate in a telemedicine appointment.
- 2) Telemedicine visits limit providers' abilities to assess wounds and provide unhoused patients with appropriate wound care needs (e.g., dressings supplies)
- 3) Telemedicine can be a helpful delivery of care when patients have smaller, less severe burns, and later in the wound healing process when patients need to check-in with clinic staff on burn healing progression.
- 4) Clinic providers and staff are hopeful about offering care via telemedicine even though they acknowledge there are challenges with its use.
- 5) Successful telemedicine visits would depend on enhancing a network of community partners and resources.

The findings suggest that staff at the Harborview Burn Clinic remain optimistic about having unhoused burn patients use telemedicine to access burn care although there are obstacles to address prior to making it a realistic tool for this patient population. The results also inform that telemedicine may not be appropriate for all visits and all burn injuries, in particular, it may be more beneficial for patients that need to check-in with a provider or have minor wound care needs.

*Drawbacks of Telemedicine*

Themes 1 and 2 underlined what study participants viewed as potential limitations of using telemedicine. A major component of this modality of delivering care is a lack of technology. This includes providers and patients having the proper tools to effectively conduct telemedicine appointments. For providers, current technology limits their ability to assess patients' wounds as well as they could in-person. With an in-person visit, medical professionals do not experience this barrier. This concern of providers not being able to conduct as thorough of examinations in addition to the technological confines for patients and providers is supported by prior research (Hayavi-Haghighi & Alipour, 2023). Furthermore, research conducted by Zahit et al. (2023) noted that a lack of physical examinations was also a concern for unhoused patients when asked about their experience with telehealth.

A unique perspective that was not found in the relevant literature was the challenge that patients could potentially face with getting the necessary dressing supplies if they scheduled a telemedicine appointment. Study participants informed the researcher that at an in-person visit, clinic staff often provide patients with additional dressing supplies. A benefit for unhoused patients who are seen in-person is that nurses can also make dressing recommendations that may help reduce the frequency at which patients need to change bandages, thus limiting exposure to open air in an encampment area or unsanitary living environment.

*Benefits of Telemedicine*

Although there are concerns about the use of telemedicine with unhoused patients, Themes 3 and 4 addressed the perceived benefits that participants had with the use of this technology. Outpatient burn care can last for days to months and in some cases even years. Theme 3 suggests that depending on the size and severity of a burn or the stage of the wound healing process, telemedicine could be a better alternative to in-person visits. This benefit

addresses the issue of transportation that many unhoused patients may face when being asked to visit the Burn Clinic. As mentioned by some participants, telemedicine could be used to support providers, in rural areas or those who are too far from the Seattle area, with accessing the expertise of a burn provider. Telemedicine offers the chance of addressing the barriers of distance from burn experts (Warner et al., 2014) while also supporting the medical systems' ability to triage patients (Atiyeh et al. 2014).

Theme 4, highlighted study participants' excitement about using the communication technologies offered by telemedicine to engage with unhoused patients. They expressed concerns for unhoused individuals' health and social needs. Telemedicine was believed to allow clinic staff the prospect of maintaining communication and monitoring progression patients' wounds. Although, participants acknowledged the potential benefits of telemedicine, they also discussed systematic limitations to its use, such as provider licensures which restricts their ability to practice only in certain states. Furthermore, the technological limits for unhoused patients can make it difficult for them to schedule telemedicine appointments. However, participants shared examples of improvements to increase the likelihood of being able to use telemedicine for unhoused burn patients such as working with community partners (Theme 5).

#### *Improvements*

The final theme provides possible means of making telemedicine a viable resource for the Burn Clinic to use with unhoused patients. As previously stated, the clinic is currently not using telemedicine with this population because of the challenges. In the study, participants shared examples of ways in which telemedicine can be improved. A common trend among participants responses was the benefit of working with shelters, case managers, social workers, and other resources in the community to support patients with accessing technology. Unfortunately, being able to provide all unhoused individuals with cell phones, with reliable service, may not be

feasible for the clinic or Harborview Medical Center but increasing outreach within the community could possibly expand existing resources. This suggestion is not solely beneficial to the Burn Clinic but is something that could be valuable to other providers and hospitals in the area.

### **Strengths and Limitations**

The findings of the study are strengthened by the fact that the Harborview Burn Center and its staff often work with unhoused patients from the Seattle/King County area and the broader WWAMI region. Participants have significant experience supporting unhoused patients and are passionate about their work. One limitation was the number and type of providers/allied healthcare professionals that were interviewed. A total of six individuals were interviewed for the study. It may have been helpful to meet with medical doctors, physical therapist, and/or mental health professionals that support the clinic. The limited time for recruitment was a significant barrier to being able to recruit more participants and expanding the input. An additional limitation is the missing perspective of unhoused burn patients. The study focused on hearing from providers and other healthcare professionals on the use of telemedicine for unhoused burn patients. Unfortunately, the voice of the individuals that are most impacted by this care were not included in the study due to time limitations.

### **Conclusion and Future Research**

Future research should be aimed at identifying specific changes and tangible resources/tools for unhoused patients to access care via telemedicine. Moreover, there is a continued need for improvement in medical technology for healthcare professionals to assess patients through telemedicine. This type of research would benefit from interviewing unhoused burn patients that either did or are currently receiving burn specific follow up in-person and/or via telemedicine. This may help to highlight the greatest gaps in delivering care to this

population and provide government officials, healthcare systems, community-based organizations, and philanthropist with recommendations for changes that need to be made to improve care for unhoused individuals.

Based on the feedback from providers and allied healthcare professionals at the UW Medicine Regional Burn Center at Harborview Medical Center, we propose the following suggestions regarding the use of telemedicine for unhoused patients:

1. Telemedicine should primarily be used in the later stages of wound care.
2. Ensure that there are ways to provide needed supplies to patients.
3. Involve community partners in the process. In particular to assist with resources and training in the use of telemedicine.
4. Telemedicine should be used to collaborate with providers in the community and larger region to support patients that may not be able to get to a Burn Center, yet need to be physically seen by a medical professional.

Telemedicine is a resource that has increased the ways in which people and healthcare professionals can interact with one another. While there are strengths and limitations with all tools used in our healthcare systems, it is necessary to find the balance between attempting to increase the amount of care that is provided with the quality of care.

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**Appendix***Appendix A*

Sample of recruitment email.

Good morning, [name],

My name is Anthony Jones, I am an MPH/MSW student at the University of Washington. I am currently working on my thesis through the School of Public Health. I am reaching out to inquire about your interest in participating in my study.

My project seeks to understand how telemedicine can be used to provide care to burn patients that are also experiencing homelessness. You are receiving this email as a healthcare provider that works at the Burn Center at Harborview Medical Center. I am interested in learning healthcare professional's perspective in the use of these technologies in delivering care to this population. You may participate whether or not you are currently using telemedicine in your role.

I anticipate interviews lasting 30-40 minutes. Interviews will be conducting via phone or Zoom depending on your preference. With your permission, the interview will be recorded for the purpose of transcription. If you decide to participate, you may be asked to share your gender, race/ethnicity, and the numbers of years you have worked in this specialty/with burn patients but your response is OPTIONAL.

If you are interested in being a participant and/or if you have additional questions, please reply to the email. I understand that you have busy schedules and any time that you are able to commit will be greatly appreciated.

Best,

Anthony

*Appendix B*

Sample of consent form that was electronically signed by participants.

For a copy of the electronic consent form please reach out to Anthony Jones at  
abjones1@uw.edu.

*Appendix C*

## Sample of interview questions used for semi-structured interview

## I. General Questions

- a. Please briefly introduce yourself, including your educational/medical background, and your role at the Burn Center.
  - i. How long have you been working at the Burn Center? Have you held other positions at UW Medicine outside of the Burn Center?
    1. How long have you been working with burn patients?
  - ii. Can you talk about your daily responsibilities as a (insert participant's role) at the Burn Center?

## II. Current System

- a. Currently, what are the ways in which you engage with unhoused burn patients when providing follow-up care?
  - i. What approaches have been successful in keeping unhoused patients engaged in care?
  - ii. What approaches have not been helpful in keeping unhoused patients engaged in care?

## III. In-person Visits

- a. Can you describe what an in-person clinic visit with you or someone in your role looks like?
  - i. What type of care do you provide during the visit?
  - ii. On average, how much time are you spending with a patient?
- b. In your experience, what are the advantages of having unhoused patients come in for in-person visits?

- c. Could you share your perspective on possible challenges posed by scheduling in-person visits for unhoused patients?
- d. In your opinion, do the advantages outweigh the challenges?

#### IV. Telemedicine Visits

- a. Can you describe what a telemedicine visit with you or someone in your role would look like?
  - i. What software and/or devices are used for these visits?
  - ii. What type of care do you provide during the visit?
  - iii. How much time are you spending with a patient during the visit?
- b. Could you share your perspective on possible challenges posed by scheduling a telemedicine visit for unhoused patients?
- c. From your point of view, what are the benefits of scheduling telemedicine visits for unhoused patients?
- d. In your opinion, do the benefits outweigh the challenges?

#### V. Areas of Growth

- a. What is needed to improve in-person visits for unhoused patients?
- b. What do you think needs to be in place for the Burn Center to support telemedicine for unhoused burn patients?
  - i. Are there technologies that could impact access to care?
  - ii. Are there resources impacting access to this method of care?
  - iii. Are you aware of any regulations/policies (hospital, state, or federal level) impacting delivery of care via telemedicine?

*Appendix D*

## Final codebook, codes and definitions

| <b>Id</b> | <b>Parent Id</b> | <b>Title</b>            | <b>Description</b>  |
|-----------|------------------|-------------------------|---|
| 1         |                  | Barriers to care        | Factors that may impeded patients from being able to access healthcare in general. This includes but is not limited to factors that may delay and/or prevent an individual from seeking out care. |
| 2         |                  | Basic necessities       | Access to basic necessities of life including but not limited to water, shelter, clothes, food, hygiene, healthcare.  |
| 3         |                  | Burn injuries           | Discussion of burn injuries, including but not limited to risk factors, potential complications, and length of recovery.  |
| 4         | 3                | Burn severity           | Mention of the severity of burn (broadly) but can include classifications such as 1st, 2nd, 3rd degree.   |
| 5         |                  | Community resources     | Mention of other resources that patients may be able to access outside of Harborview and the clinic.  |
| 6         | 5                | Community clinics       | Accessing clinics in the community.   |
| 7         | 5                | Mobile unit             | Creating a mobile unit to provide services to unhoused.   |
| 8         | 5                | Partnerships            | Non-profits, shelters, case managers, ect...  |
| 9         | 5                | PCP                     | Accessing PCPs in the community.  |
| 10        | 5                | Respite                 | Discharging patients to respite for continued care. Discussion of the use of this resource which is geared towards unhoused individuals.  |
| 11        |                  | Distance from provider  | Mention of patients being distant from a PCP, local community providers (clinics), hospital, or the burn clinic.  |
| 12        |                  | Engagement with care    | Mention of a patient's involvement in their care plan. Not limited by a participants' perception of the patient's willingness or ability to be engaged.   |
| 13        |                  | Health literacy         | Including but not limited to understand insurances, condition/diagnosis, and medical terminology.   |
| 14        |                  | Improving care          | Examples of ways in which the clinic and it's staff can improve care and access to care for patients.   |
| 15        | 14               | In-person improvements  | Examples of ways to improve in-person visits.   |
| 16        | 14               | Telemed improvements    | Examples of ways to improve telemed visits.   |
| 17        |                  | In-person care          | Examples of care provided during in-'-person visits   |
| 18        | 17               | In-person advantages    | Anything that a participant identifies as an advantage of meeting a patient in-'-person.  |
| 19        | 17               | In-person disadvantages | Anything that a participant identifies as a disadvantage of meeting a patient in-'-person.  |

|    |    |                               |   |
|----|----|-------------------------------|---|
| 20 |    | Lack of consistency           | Can include staying in different location in a short period of time and difficulty maintaining communicating with patients.   |
| 21 |    | Licensure limitations         | Rules, regulations, and limits of clinic staff's professional license(s).   |
| 22 |    | Participant's preference      | Examples of participants' preference of engaging with a patient, or recommendations that a participant makes about patient care   |
| 23 | 22 | In-person preference          | Preference to meet patient in-person, or would recommend this option.   |
| 24 | 22 | No preference                 | No preference for the way participants meet with a patient, either in-person or telemed is recommended/patient preference is a priority.  |
| 25 | 22 | Telemed preference            | Preference to meet patient via telemed or would recommend this option   |
| 26 |    | Patient time                  | Time spent providing care to a patient.   |
| 27 | 26 | Patient time in-person        | Time spent providing care to a patient in-person.   |
| 28 | 26 | Patient time telemed          | Time spent providing care to a patient in telemed.  |
| 29 |    | Patient volume                | Mention of how many patients are seen over a given period of time.  |
| 30 |    | Privacy                       | Access to a quite/isolated space to meet without distraction from others.   |
| 31 |    | Provider availability         | Can include hours of operations, appointment slots, number of medical staff, access to specialized staff.   |
| 32 |    | Rapport building with patient | Opportunity to connect with patients, getting to know them, understanding their needs. The way participants interact/treat a patient.   |
| 33 |    | Services provided             | Any type of care that patients can receive by meeting with a clinic provider and/or staff via any form of healthcare modality. Can also include direct and indirect work done by participants than can impact patient care.         |
| 34 | 33 | Consults/Therapies            | Opportunity to meet/talk with specialty non-burn specific providers/medical professionals. This includes but is not limited to physical therapists, occupational therapists, mental health counselors, and substance use providers. |
| 35 | 33 | Dressing supplies             | Access to dressing supplies intended to support healing process of a wound.   |
| 36 | 33 | Pain medication               | Mention of clinic and/or its providers supporting with pain medication management, accessing pain prescriptions.  |
| 37 | 33 | Patient support               | Includes but is not limited to answering patients' questions about current and/or future appointments, insurance, and care they may receive at the clinic.  |
| 38 | 37 | Contact info                  | Verifying and/or updating client contact information.   |

|    |    |                       |   |
|----|----|-----------------------|---|
| 39 | 33 | Training              | Examples of opportunities for clinic providers to train other non-'clinic providers in the community on burn related care/patient needs |
| 40 | 33 | Wound care            | Any type of care that supports the treatment of a patients' wounds that is done and managed by a provider/medical professional          |
| 41 |    | Technology            | Access to technology, using technology, includes technology used by the providers and patients.   |
| 42 | 41 | Software/hardware     | Devices, internet connection, cellphone service, online portals, etc...   |
| 43 | 41 | Technology literacy   | Knowledge and education on using technology. Can include software and hardware.   |
| 44 |    | Telemed care          | Examples of care provided through telemedicine.   |
| 45 | 44 | Telemed advantages    | Anything that participants identify as an advantage of telemedicine.  |
| 46 | 44 | Telemed disadvantages | Anything that participants identify as a disadvantage of telemedicine.  |
| 47 |    | Transportation        | Examples of how transportation may impact access to care.   |
| 48 |    | Unhoused              | Mention of factor that is specific or unique to a person experiencing homelessness.   |