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## No digital divide? Technology use among homeless adults

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### ABSTRACT

Homeless adults experience increased risk of negative health outcomes, and technology-based interventions may provide an opportunity for improving health in this population. However, little is known about homeless adults' technology access and use. Utilizing data from a study of 421 homeless adults moving into PSH, this paper presents descriptive technology findings, and compares results to age-matched general population data. The vast majority (94%) currently owned a cell phone, although there was considerable past 3-month turnover in phones (56%) and phone numbers (55%). More than half currently owned a smartphone, and 86% of those used Android operating systems. Most (85%) used a cell phone daily, 76% used text messaging, and 51% accessed the Internet on their cell phone. One-third reported no past 3-month Internet use. These findings suggest that digital technology may be a feasible means of disseminating health and wellness programs to this at-risk population, though important caveats are discussed.

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### KEYWORDS

Homelessness; technology use; cell phones; internet access; digital divide

### Introduction

Homeless persons experience greatly increased risk for many negative health and social outcomes (Fazel, Geddes, & Kushel, 2014; Hwang & Burns, 2014). Technology is an important resource that may improve health and wellbeing; however, technology access may be differentially distributed based on social and economic inequality (a phenomenon known as the "digital divide"; McAuley, 2014), which can exclude those at the greatest risk for negative health and other outcomes. This may be of increased importance as technology-based interventions for health promotion rapidly proliferate (Okorodudu, Bosworth, & Corsino, 2015; Sawesi, Rashrash, Phalakornkule, Carpenter, & Jones, 2016; Silva, Rodrigues, de la Torre Díez, López-Coronado, & Saleem, 2015). The increasing ubiquity of digital technology could exacerbate marginalization among those without access and may worsen existing health disparities (McAuley, 2014).

Because of transience and unstable living conditions, cell phones and Internet access can be especially crucial for maintaining social and service contacts among homeless persons (Eyrich-Garg, 2010; Rice, Lee, & Taitt, 2011). However, little previous research has examined technology use among homeless adults. Rice et al. (2011) demonstrated the prevalence of cell phones among homeless youth, though research with homeless adults has found mixed rates of access (Eyrich-Garg, 2010; McInnes et al., 2014). A systematic review by McInnes, Li, and Hogan (2013) found cell phone access among homeless populations varied

from 44 to 62% and Internet use estimates range from 19 to 84%; these authors also noted the sparse body of research on these topics.

In order to develop technology-based interventions for homeless adults, we must first better identify patterns of use in this population. Toward this end, this study presents descriptive information from a sample of homeless adults about Internet and cell phone access and use. We subsequently compare these results to data from an age-matched general population sample.

### Methods

Respondents were 421 homeless adults moving into permanent supportive housing (PSH) in the Los Angeles or Long Beach, CA areas, and were referred directly from 26 housing/service provider agencies, or recruited during building lease-up events. Given the number of agencies and individual staff members involved in recruitment, it was not feasible to calculate an overall refusal rate; however, 93.4% of persons approached at building lease-up events agreed to complete a study eligibility screener, and 89.5% of those screened were study eligible. Eligibility requirements were age 39+, moving in without minor children, and ability to complete interviews in English or Spanish. These participants were enrolled as part of a larger study of HIV risk behavior change over time in PSH; as such, the age and non-parenting requirements were implemented to maximize our ability to detect changes in HIV risk outcomes by minimizing

variability due to developmental life stage or current parenting status. Interviews were conducted from August 2014 to October 2015, occurred prior to or within 5 days of PSH move-in, and assessed a variety of topics, including technology use. Participants were

**Table 1.** Demographic characteristics and technology use among homeless adults.

Transitioning to permanent supportive housing ( <i>n</i> = 421)	%( <i>n</i> )/mean (SD)	Limited to respondents ages 50–64 only ( <i>n</i> = 261)	
		Our data (%)	Pew data (%) <sup>a</sup>
<i>Demographic characteristics</i>			
Age	54.4 (7.5)		
Gender			
Male	71.5 (301)		
Female	27.8 (117)		
Transwoman/transfemale	3 (0.7)		
Race/ethnicity			
Black	56.0 (235)		
White	24.3 (102)		
Latino/Hispanic	10.5 (44)		
Multiracial	5.0 (21)		
Other race/ethnicity	4.3 (18)		
Completed high school	77.0 (324)		
Monthly income	594.0 (472.6)		
Military veteran	30.4 (128)		
Most common place of stay (past 3 months)			
Shelter	41.8 (176)		
Transitional living	20.9 (88)		
Outside	17.1 (72)		
Vehicle	7.1 (30)		
Another location	13.1 (55)		
Lifetime duration of literal homelessness (years)	6.0 (6.9)		
Any literal homelessness in past 3 months	76.7 (323)		
<i>Technology use in the past 3 months</i>			
Currently own a cell phone	93.6 (394)	95	90
Owned a cell phone in past 3 months	96.1 (407)		
2+ cell phones (among those with a cell phone in the past 3 mo.)	55.8 (228)		
2 phones	32.4 (132)		
3 phones	13.3 (54)		
4 phones	4.7 (19)		
5+ phones	5.7 (23)		
2+ phone numbers (among those with a cell phone in the past 3 mo.)	54.5 (223)		
2 numbers	33.4 (136)		
3 numbers	12.0 (49)		
4 numbers	4.4 (18)		
5+ numbers	4.9 (20)		
Currently own a smartphone	58.0 (244)	59	58
Smartphone operating system (among those with smartphones)			
Android	85.6 (209)		
Apple	7.0 (17)		
Other	7.3 (18)		
Use cell phone daily	85.0 (358)		
Use cell phone to			
Send/receive texts	75.5 (318)	76	75
Access the Internet	51.1 (215)	49	45
Listen to music	50.4 (212)	48	26
Download apps	38.7 (163)	35	33
Send/receive email	38.2 (161)	38	43
Internet use			
Daily	39.0 (164)		
Less than daily	28.5 (120)		
Never	32.5 (137)	34	12
Own a computer/tablet	21.9 (92)		

<sup>a</sup>These numbers come from publicly available general population data, as published by the Pew Research Center (Anderson, 2015; Duggan, 2013; Perrin & Duggan, 2015).

paid \$20. Study protocols were approved by the authors' University's Institutional Review Board.

Demographics included age, gender, race/ethnicity, education, and income. Place of stay questions were adapted from prior research with homeless persons (Tsemberis, McHugo, Williams, Hanrahan, & Stefancic, 2007; Wenzel, 2009), and literal homelessness was defined as staying in temporary/emergency shelter, outside, abandoned building, garage or shed not meant for living in, indoor public place, vehicle, or public transportation (National Alliance to End Homelessness, 2012). Author-created items assessed cell phone and other device ownership, including number of different phones and phone numbers in the past 3 months. Measures regarding smartphones and cell phone usage activities were adapted/adopted from the Pew Research Center (2013). Frequency of cell phone and Internet use items were adapted from Rice et al. (2011).

## Results

As shown in Table 1, homeless adults in this study were 54 years old on average, mostly male (72%), and predominantly Black (56%) or White (24%). Nearly one-third were military veterans, 77% completed high school, and average income was \$594/month. Most common place of stay was temporary/emergency shelter (42%), followed by transitional living program (21%), and outdoors (17%). Average lifetime literal homelessness duration was 6 years, and 77% reported past 3-month literal homelessness.

The vast majority of respondents owned a cell phone currently (94%) or in the past 3 months (97%). Turnover in both phone ownership and phone numbers was high, with 56% of those with cell phones reporting 2+ phones in the past 3 months (13% reported 3 phones; 5% 4 phones; 6% 5+ phones) and 55% reporting 2+ phone numbers (12% had 3 phone numbers; 4% 4 numbers; 5% 5+ phone numbers). More than half (58%) currently owned smartphones; 86% of smartphones used Android operating systems. Daily cell phone use was reported by 85%, and 76% reported text messaging in the past 3 months. Other common past 3-month phone activities included Internet use (51%), listening to music (50%), downloading apps (38%), and email (38%). Daily Internet use was reported by 39%, while 33% reported no past 3-month Internet access. Twenty-two percent reported past 3-month tablet or computer ownership.

## Comparisons to general population

Table 1 also shows descriptive statistics for selected variables limited to respondents aged 50–64 years old. Variables included are those that could be directly compared to publicly available data from the Pew

Research Center for the same-age group (Anderson, 2015; Duggan, 2013; Perrin & Duggan, 2015). These comparisons show that our respondents report slightly higher rates of current cell phone ownership than same-age persons in the general population, at 95%, compared to 90%. Rates of smartphone ownership (59 and 58%, respectively), text messaging (76 and 75%), and downloading apps on cell phones (35 and 33%) were remarkably similar between our respondents and same-age Pew Research Center respondents. Homeless respondents had slightly higher rates of accessing the Internet on cell phones (49 and 45%) and slightly lower rates of checking email on cell phones, at 38%, compared to 43% in the general population data. There was a larger gap between the groups in listening to music on cell phones, at 48% in our sample and 26% in the general population.

## Discussion

### Limitations

These data come from a cohort of homeless adults moving into PSH and are therefore not necessarily representative of all homeless adults in Los Angeles. Although persons moving into PSH are some of the most vulnerable homeless adults (Henwood, Byrne, & Scriber, 2015), we do not know how technology use measured in this study might compare to homeless persons not preparing to move into housing, nor how the necessity of being connected to service providers in order to engage in the housing process may impact technology use (i.e. technology use may be different among those homeless persons who do not engage with housing service providers in any way). Given our study recruitment methods, we were also unable to accurately assess differences between persons who agreed to be part of this study and those who refused. Further, these data came from Los Angeles, a dense, urban area that is home to the largest population of homeless persons in the U.S.A.; technology use in this context may be different from that in rural or other urban settings. Finally, the current study sample excluded persons under the age of 39 and those moving into PSH with minor children; developmental life stage and parenting may impact technology use in ways that cannot be addressed with these data.

### Conclusions

Nearly every homeless adult in this study had a cell phone; as such, technology access is unlikely to be a major barrier to the dissemination of cell phone-based health interventions for this population. Combined with previous research identifying receptiveness to the use of cell phones for health interventions among homeless persons (Burda, Haack, Duarte, &

Alemi, 2012; McInnes et al., 2015), the high-prevalence of cell phones found in this study suggests that technology-based programs may be promising methods for improving health and wellness among homeless adults. However, such programs should take into account the high rate of turnover in both phones and phone numbers, which may complicate consistent technology use over time.

Cell phone ownership in this study was higher than that found in previous research with homeless adults (Eyrich-Garg, 2010; McInnes et al., 2013, 2014), suggesting that the digital divide between homeless and housed adults has narrowed. Further, given similar rates of smartphone access in this population compared to the general population, smartphone applications may be a feasible option for technology-based interventions among homeless adults. Android operating systems were the most common; as such, providers and researchers interested in utilizing smartphone-based interventions with this population might consider targeting Android operating systems to ensure reaching the greatest number of persons.

Homeless adults in this study reported low rates of Internet access and limited ownership of computer or tablet devices. It is not unexpected that few respondents would own computers or tablets, given that most people were staying in emergency shelters or on the street, where it is more difficult to maintain ownership of larger devices. However, given that computers and tablets may be better suited than phones for certain tasks requiring extensive typing or editing – such as writing resumes and completing job applications – and Internet access can provide important informational and social support resources, housing programs may consider focusing on providing device and Internet access, including free wireless Internet in PSH buildings, and training in technology use for residents.

The results presented here suggest that homeless adults are using cell phones in ways similar to the general population, indicating that technology-based intervention programs are viable for this population. However, as providers and researchers seek to utilize technology-based interventions with homeless adults, it may be helpful to be mindful of the myriad intersecting vulnerabilities (e.g. physical/mental health conditions, cognitive deficiencies, trauma) that may complicate an individual's ability to engage effectively with technology. In designing or delivering technology-based programs, providers and researchers might consider taking into account several potential concerns:

- (1) High turnover in phones/phone numbers may impact long-term connectivity, as well as create difficulties for participants who may be forced to frequently re-learn the basic functionality of new phones.



- (2) Homeless persons experience the onset of aging-related physical health problems an average of 20 years earlier than their housed counterparts (Brown et al., 2016), and many of these health problems (e.g. hearing, vision, and cognitive impairments) may impact their ability to use and understand new technology. As such, programs may want to focus on simple designs and the incorporation of ongoing training and support to minimize technology use limitations related to physical health and cognitive issues, particularly as this population ages. There may additionally be a need for cell phones and other digital devices designed specifically for older adults experiencing vision or hearing impairment.
- (3) Smartphone programs may be most effective if they are available on Android operating systems, as those are most commonly used among this population.
- (4) Providers and funders might consider focusing on improving Internet access, as this is one area where this population lags behind their housed counterparts.

Taking such steps may help ensure that technology-based programs are truly conferring the intended benefits for this vulnerable population of homeless adults.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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### Notes on contributors

**Harmony Rhoades** holds an MS in Epidemiology and a PhD in Sociology from UCLA, and is a research assistant professor at the USC School of Social Work. Her research focuses on understanding behavioral health and social integration outcomes and the impact of the built environment and service utilization among vulnerable populations, including socioeconomically disadvantaged groups, persons experiencing homelessness, sexual and gender minority populations, those living with HIV/AIDS, and those with serious mental illness.

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**Eric Rice**, PhD, is an associate professor in the USC Suzanne Dworak-Peck School of Social Work. He is an expert in social network theory and analysis, and the application of social network methods to HIV prevention research. He is committed to community-based participatory research, and has worked closely with many community-based organizations on issues of HIV prevention for homeless youth and impoverished families. He has served as an external reviewer for Los Angeles County's Office of AIDS Programs and Policy and has helmed multiple large-scale research projects with homeless youth and high risk adolescents.

**Hailey Winetrobe**, MPH, is the project manager on the NIDA-funded Transitions to Housing study in the USC Suzanne Dworak-Peck School of Social Work. Her research interests include homelessness, HIV risk and preventive behaviors, and social networks. Hailey earned her Master's in Public Health from the University of California Los Angeles and is a certified health education specialist.

**Benjamin Henwood**, PhD, MSW, is a recognized expert in mental health and housing services research whose work connects clinical interventions with social policy. He is a co-author of *Housing First: Ending Homelessness, Transforming Systems, and Changing Lives* published by Oxford University Press, and his proposal to end homelessness has been adopted by the American Academy of Social Work and Social Welfare as a grand challenge to orient the profession. Dr. Henwood is currently an assistant professor at the USC Suzanne Dworak-Peck School of Social Work.

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