Published in final edited form as:
Drug Alcohol Depend. 2013 April 1; 129(1-2): 145–150. doi:10.1016/j.drugalcdep.2012.10.003.

Utilization of communication technology by patients enrolled in substance abuse treatment

Erin A. McClure[1], **Shauna Acquavita**[2], **Emily Harding**[2], and **Maxine Stitzer**[3]

[1]Medical University of South Carolina School of Medicine

[2]University of Cincinnati School of Social Work

[3]Johns Hopkins University School of Medicine

Abstract

Background—Technology-based applications represent a promising method for providing efficacious, widely available interventions to substance abuse treatment patients. However, limited access to communication technology (i.e., mobile phones, computers, internet, and e-mail) could significantly impact the feasibility of these efforts, and little is known regarding technology utilization in substance abusing populations.

Methods—A survey was conducted to characterize utilization of communication technology in 266 urban, substance abuse treatment patients enrolled at eight drug-free, psychosocial or opioid-replacement therapy clinics.

Results—Survey participants averaged 41 years of age and 57% had a yearly household income of less than $15,000. The vast majority reported access to a mobile phone (91%), and to SMS text messaging (79%). Keeping a consistent mobile phone number and yearly mobile contract was higher for White participants, and also for those with higher education, and enrolled in drug-free, psychosocial treatment. Internet, e-mail, and computer use was much lower (39–45%), with younger age, higher education and income predicting greater use. No such differences existed for the use of mobile phones however.

Conclusions—Concern regarding the *digital divide* for marginalized populations appears to be disappearing with respect to mobile phones, but still exists for computer, internet, and e-mail access and use. Results suggest that mobile phone and texting applications may be feasibly applied for use in program-client interactions in substance abuse treatment. Careful consideration should

Corresponding Author: Erin A. McClure, Clinical Neuroscience Division, Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina, 125 Doughty St., Suite 190, Charleston, SC 29407, Phone: 843-792-7192, Fax: 843-792-3982, mccluree@musc.edu.
Co-author information
University of Cincinnati, School of Social Work, 3202 Eden Ave, Cincinnati, OH 45267. Johns Hopkins University, School of Medicine, 5510 Nathan Shock Drive, Baltimore, MD 21224

Contributors. All authors contributed to the design and execution of the study, analyses of data, and manuscript preparation. All authors have approved the manuscript.

Conflict of Interest. The authors have no conflicts of interest to declare.

Notes. This work was conducted at the Behavioral Pharmacology Research Unit at the Johns Hopkins University School of Medicine. The corresponding author now holds a position with the Clinical Neuroscience Division at the Medical University of South Carolina School of Medicine.

be given to frequent phone number changes, access to technology, and motivation to engage with communication technology for treatment purposes.

Keywords

mobile phones; SMS text messaging; internet; e-mail; substance abuse treatment; digital divide

1. INTRODUCTION

Use of communication technology (i.e., computers, internet, e-mail and mobile phones) is ubiquitous in our society and accessibility is improving at a rapid pace. It is estimated that 88% of adults in the United States have a mobile phone, and 78% of adults use the internet (Zickuhr and Smith, 2012). Adolescent rates of communication technology use are also on the rise, with estimates of mobile phone and computer use being 75% and 93% respectively (Lenhart et al., 2010). Such high rates of technology use among the US population have provided a strong foundation and rationale for the integration of technology into research and health services delivery. Over-reliance on technology, however, threatens to aggravate health disparities among the socioeconomically disadvantaged, who may have limited access to communication technology resources.

The *digital divide* refers broadly to the unequal access to technology across various groups of the population. Communication technology encompasses mobile phones, computers, internet, and e-mail and access to each type of communication technology may have differential use in marginalized populations. Thus, the idea of the digital divide is a general concept regarding limited resources for certain individuals, but may be better conceptualized by the specific technology type being used. The digital divide has plagued healthcare by contributing to inequities in obtaining and utilizing health information (Kreps, 2005), as well as compromised access to social services (Steyaert and Gould, 2009). A recent report suggested that web-enabled applications may assist in addressing health disparities, and recommended tailoring technology-based interventions and education to underserved populations with limited health literacy (Gibbons et al., 2011). According to Lopez and colleagues (2011), people who are older, poor, belong to a racial or ethnic minority, or who are less educated are less likely to use the internet. Consistent with those results, Wang and colleagues (2011) found that internet use was lower among African Americans and Hispanics, as well as among those living in rural settings. Access to technology is only one obstacle though. A recent poll found that among adults who do not use the internet, the main reason is that they do not believe there is anything relevant to them on the internet (Zickuhr and Smith, 2012). These findings are particularly important in a substance abusing population with notoriously limited resources. Of patients entering substance abuse treatment in 2010, nearly 80% endorsed being unemployed or not being in the labor force (SAMHSA, 2012), indicating a generally low level of income that may presage low utilization of technology, especially computers and the internet. Computer and internet use represents only one source of technology contributing to the digital divide, and a thorough assessment of numerous communication technologies is needed to determine the extent of the digital divide in a substance abuse treatment population.

Despite concern regarding the digital divide, technology-based applications to improve healthcare delivery have advanced dramatically and represent a promising avenue for providing efficacious, widely available treatment that could greatly benefit those who might not otherwise contact services. One example is the relatively simple use of short-message service (SMS) text messages to remind patients of healthcare appointments. A recent Cochrane review showed higher rates of attendance at healthcare visits with SMS-text message reminders compared to no reminders and postal reminders (Car et al., 2012). While

text message and phone call reminders appeared to result in similar attendance rates, costs associated with phone call reminders were shown to be higher. It is unclear, however, if certain sub-groups might be more receptive to text message reminders compared to phone calls (i.e., adolescents, night-shift workers).

Specifically within substance abuse treatment, a number of innovative, evidence-based, and efficacious applications have been developed. These interventions are based in already established psychosocial treatment and are currently being converted into an electronic format (i.e., mobile phones, computer, web-based), and also as supplements to treatment (see Moore et al., 2011; Marsch, 2012; Marsch and Dallery, 2012 for reviews). Technology-delivered treatments are meant to serve as an additional tool for counselors and service providers, as well as being continuously available for clients to access as needed. A recent meta-analysis showed the efficacy of computer-delivered interventions for alcohol and tobacco use with relatively minimal contact (Rooke et al., 2010), suggesting that computer-delivered interventions for more mild forms of substance use may be successful without formalized treatment.

The promise of technology integration into substance abuse treatment is appealing, however, there has been no comprehensive estimate of access to and familiarity with communication technology for those enrolled in substance abuse treatment, a factor that could significantly impact the feasibility of these efforts. Recent data have shown that mobile phone ownership and internet use among individuals making less than $30,000 per year is approximately 75% and 57% respectively, as compared to 95% use and ownership in individuals making more than $75,000 per year (Jansen, 2012), thus making it reasonable to expect high mobile phone usage in substance abusing populations enrolled in treatment, but low internet use. Even with high rates of mobile phone ownership, the use of *pay-as-you-go* phones that are frequently discarded when minutes expire may still impose a barrier on delivery of phone-based interventions.

The extent to which substance abusing populations use computer and internet technology is also largely unknown. Rates of internet access in patients enrolled in substance abuse treatment reported as part of larger interventions have varied greatly, ranging from 20% (King et al., 2009) to approximately 71.6% (VanDeMark et al., 2010). Results from a recent study utilizing focus groups comprised of substance abuse treatment patients (N=11) showed that participants reported having more online access and knowledge than clinic treatment staff expected (Wolf-Branigin, 2009). These studies, while providing useful preliminary estimates of communication technology use, do not provide a comprehensive data set to accurately characterize communication technology use among patients enrolled in substance abuse treatment. Such a data set would serve to improve treatment interventions, supplements, participant contact and retention, and other service delivery provided through technological means. Therefore, we conducted a survey study across eight urban, psychosocial or opioid-replacement clinics with the purposes of characterizing utilization of communication technology (i.e., mobile phones, computers, internet, and e-mail), and exploring facets of technology use that may serve as barriers to their utility for treatment in this population.

2. METHODS

Participants (N=266) were recruited from eight study sites located in the Baltimore city metropolitan area. These sites were either affiliated with the Johns Hopkins University School of Medicine or were community treatment programs that included four outpatient clinics providing both psychosocial services and opioid replacement therapy (N = 144), two outpatient methadone and buprenorphine maintenance programs (N = 87), one primary care

clinic providing buprenorphine maintenance for substance abuse disorders (N = 6), and one outpatient clinic providing only psychosocial services (N = 29). Participants were recruited through posted fliers in clinic areas, word of mouth, and clinic staff. The only criterion for participation was age older than 18 years and currently enrolled in substance abuse treatment. All study procedures were approved by the Johns Hopkins School of Medicine Institutional Review Board.

The survey included 12 locally-developed questions about use of communication technology, which were embedded within a 133-item survey that asked about various topics including: tobacco use and dependence, employment status, smoking attitudes, knowledge, and cessation services provided at the treatment clinic and demographic information. The items not related to technology will not be discussed in the current report. Questionnaires were self-administered via paper and pencil surveys (N = 191) or via computer (N = 75). Choice of preferred questionnaire method (computer or paper) was not always available (i.e., clinics did not have wireless, laptops were already being used, etc), and was not included in any analyses. Individuals who were unable to read the questions were administered the survey by research staff. All participants were given either $5 or a small prize for survey completion.

Communication technology questions were: 1) regular (weekly) use of a mobile phone (Y/N), 2) ownership of the phone (Y/N), 3) contract type (*pay-as-you-go*/yearly), 4) frequency of changing phone numbers in the past year (never, 1 time, 2 times, 3 times, 3+ times), 5) SMS text message usage (sending and receiving) (Y/N), 6) text message limits (Y/N; if yes, how many), 7) call limits (Y/N; if yes, how many calls per day), 8) does clinic staff ever call or text (call, text, call and text, neither), 9) regular (weekly) use of computers (Y/N), 10) location of computer (house, work, library, friend, family, other), 11) regular (weekly) use of the internet (Y/N) and 12) regular (weekly) use of e-mail (Y/N).

All data were analyzed using SPSS version 19. T-tests and Chi Squares were performed to examine relationships between technology characteristics across various demographic variables. Based on meaningful predictors of technology outcomes ($p < .10$), binary logistic regression analyses were run to control for inter-related predictors. All technology variables were binary, and most demographic and substance abuse predictors were also binary, with the exception of age (continuous), and education (less than HS, HS/GED, Some college or greater). Beta values (β) and standard error (SE) are presented from these analyses. Logistic regression analyses were exploratory and since groups did not consistently have equal distribution across technology outcomes, power was occasionally low for logistic models.

3. RESULTS

3.1 Participants

Demographic information for survey participants is shown in Table 1. The mean (SD) age of the sample was 44.1 (11.5), 64% were male, 69% were African American. The majority of participants had less than a high school diploma (40%), 83% had a yearly household income of less than $30,000, with 57% of those making less than $15,000 per year, and 46% working either full time or part time, mostly in blue collar or service industry employment (78%). Fifty-five percent of the sample reported opiates as their primary substance of abuse, with 44% being maintained on opioid-replacement therapy.

3.2 Technology characteristics

Technology utilization characteristics of the sample are listed in Table 2. The vast majority of participants had access to a mobile phone that either belonged to them or they regularly used (91%), and 79% of the total sample had the capability to send and receive text

messages. Sixty percent of the sample had *pay-as-you-go* phones, which included monthly contracts, and 23% of the sample endorsed changing phone numbers three or more times in the past year. A small portion of the sample noted limitations on the number of text messages and phone calls they could place and receive. For text messages, these limitations were generally in the hundreds per day. For call limitations, participants reported making between 5–10 calls per day, but this does not capture the number of minutes allowed, which reflects a better estimate of call constraints. When asked if clinic staff ever call or text the patient's mobile phone, 44% reported being called, while SMS text message contact was extremely low.

Regular computer, internet, and e-mail use was low, with 39–45% of participants endorsing at least weekly use. Of the survey respondents who reported regular computer use, the majority had a computer in their home (58%), while most others relied on computers at work, the library, or other locations, such as a friend's or family's computer, their treatment center, or recovery house. Reporting of internet and e-mail use was higher than computer use, indicating that some participants may access the internet through smart phones, though data on type of phone used was not collected.

3.3 Demographic and technology relationships

Significant predictors of technology use and characteristics determined via binary logistic regression are shown in Table 4. When controlling for inter-related demographic and substance abuse characteristics, younger age predicted greater technology use in terms of weekly computer, internet, and e-mail use, as well as having text messaging capabilities. White participants were more likely to be contacted by clinical staff by text or calls to their mobile phones than African American participants, as well as changing mobile phone numbers fewer times throughout the year. African American participants were more likely to have text messaging capabilities on their mobile phones, however. Significant differences were also found among education levels, such that participants who had more education were more likely to regularly use a computer, internet and e-mail as compared to those who had less than a high school diploma. Also, those with more education were more likely to have a yearly mobile phone contract. Those with income levels of greater than $15,000 per year were more likely to make regular use of the internet.

Treatment modality and primary substance of abuse also yielded significant predictors of technology use and characteristics. Participants contacting drug-free, psychosocial services compared to those maintained on opioid replacement treatment were more likely to use e-mail, and less likely to have changed their phone number more than one time in the past year. Differences were also found in level of care, whereby participants enrolled in intensive outpatient (IOP) were less likely to use e-mail than those in outpatient (OP) treatment.

4. DISCUSSION

These data provide an examination of technology utilization in substance abuse treatment patients and will help advance the use of appropriate technology integration into treatment efforts. The majority of patients enrolled in substance abuse treatment had regular access to mobile phones at rates comparable to and slightly higher than national adult averages (88%; Zickuhr and Smith, 2012). Participants also had access to SMS text messaging features (79%), though this is a conservative estimate due a small sample of participants reporting that they could send text messages but not receive them and vice versa. When assessing texting capabilities, these individuals were not represented. No demographic or substance use variables predicted differential use of mobile phones, not surprisingly, as use was high in this sample overall. Mobile phone characteristics that may serve as barriers to client contact or intervention implementation, such as contract type, frequency of changing

numbers, and text messaging were predicted by being older, being an ethnic minority, having less education, and being in opioid replacement therapy treatment. Computer, internet, and e-mail were used regularly by 39–45% of the sample, which falls below adult national averages (78%; Zickuhr and Smith, 2012). Generally, participants who were White, were more educated, and had a higher income were more likely to use computers, the internet, and e-mail regularly, while also having yearly mobile phone contracts and changing numbers less frequently. In terms of treatment characteristics, those contacting drug-free, psychosocial services who attended their treatment program fewer than 9 hours per week (OP), and were not on opioid replacement therapy were more likely to use e-mail, revealing a trend that those with less severe forms of substance abuse were more likely to regularly use e-mail accounts. This finding was only present with one form of technology however, but it is possible that greater technology differences may emerge with a more heterogeneous sample of those enrolled in substance abuse treatment.

Some notable concerns were confirmed from this data set that should be addressed in future technology-based interventions development. First, the limited use of computers, the internet, and e-mail, specifically in older adults of this population is problematic and may impact the accessibility and engagement with web-delivered interventions. This is also of concern when considering that technology may lead to information regarding services provided locally for substance abuse treatment, as well as health information about substance abuse. Those with increased access to computers and the internet and with greater health literacy may be more likely to seek information about their substance abuse and be more equipped to find and utilize treatment resources in their community. Though access to technology alone represents a significant barrier to use, other barriers, such as attitudes and knowledge play a role as well. Those enrolled in substance abuse treatment may feel that they do not have the necessary skills or understanding to benefit maximally from these interventions. One study showed that when new clients to substance abuse treatment were approached with the opportunity to enroll in an electronic-based therapy program to supplement traditional treatment, those more likely to engage in electronic-based treatment tended to be female, have children, have a positive relationship with their recovery coach, and were less likely to have previously completed a treatment program (VanDeMark et al., 2010). That study also showed that access to the internet was not predictive of engaging in the computerized program, but internet access was high among both engagers and non-engagers (75.8% and 67.4% respectively). Contrary to that finding however, a survey of preferences for technology-based interventions in emergency department patients found that baseline technology use was significantly associated with preference for various categories of behavioral intervention (Ranney et al., 2012). Ranney and colleagues (2012) suggested tailoring interventions to the participant’s level of use, comfort with technology, and concerns regarding confidentiality. These studies provide useful information in predicting those who may be more likely to engage in technology-based treatments. Effective means of motivating and educating substance abuse treatment patients to use technology-based interventions may be more important than access. Barriers noted in other studies, such as limited knowledge of the internet and computers that require technical support throughout the intervention (King et al., 2009; VanDeMark et al., 2010) must also be considered beyond simply providing access.

A second point of concern was that 23% of the participants reported changing mobile numbers three or more times in the past year, suggesting that mobile interventions and/or supplements to treatment may be ineffective if contact numbers are not kept current by treatment staff. This frequency of changing numbers is not surprising given that 60% of the sample reported having *pay-as-you-go* contracts. These plans often have little to no charge for the actual phone, and phones are then typically discarded when minutes are depleted.

When a new phone is purchased, it is equipped with another phone number, making it difficult to maintain contact, especially when the individual has left a treatment program.

While frequent changing of phone numbers is of great concern to treatment, some innovative solutions may be used to remedy this issue. For example, one service allows individuals to have a free telephone number, not attached to any device, which can forward calls from other phone numbers, including mobile phones and landlines (Google Voice, 2012). It also features free voice mail whereby messages can be e-mailed to the individual if they choose (Google Voice, 2012). This technology began as an effort to provide individuals who were homeless with a permanent number and free voicemail (Waker and Paquet, 2007). These types of technology hold promise to provide a way for individuals who change their phone numbers frequently to remain accessible. In addition, another service has recently received media attention for launching a campaign to promote improved broadband access through reduced rates, specifically with the goal of narrowing the digital divide for internet access among low-income families (Comcast, 2012). Providing internet services at a more reasonable cost may serve to increase access, however, the issue of motivation and relevance of the internet to marginalized populations is still one that requires attention, and potentially intervention.

While nearly a quarter of the sample reported frequent changing of phone numbers, 37% reported having the same phone number over the past year. Those individuals hold the potential to benefit greatly from supplements to treatment through phone calls, automated messages, text reminders, etc. A client may be more likely to maintain contact through text messages with clinic staff than to answer and return phone calls. Text messages can also be used to provide information to clients on other beneficial services (i.e., job opportunities, skills training, etc), and could provide an inexpensive way to promote attendance at the clinic and improve treatment outcomes with incentives (i.e., additional mobile phone minutes, ringtones, applications). Since such a high proportion of participants in this study used mobile phones, across all age groups, they may be more comfortable utilizing interventions offered on their phones. Though mobile interventions are far more limited than computer and web-delivered interventions, population reach and the potential for increased patient engagement should be carefully considered.

Although evidence suggests that the digital divide is beginning to narrow in some respects, Lopez and colleagues (2011) recommend further investigation to understand the barriers that vulnerable populations face in gaining access to technology and the skills to use it effectively. The current report suggests that mobile phones represent a common and ubiquitous technology among substance abuse treatment patients, but interventions should be sensitive to frequent phone number changes that tend to occur with *pay-as-you-go* contracts. Those who are younger, have higher levels of education, and less severe substance abuse appear to already be engaging with communication technology, which should be further expanded. Those not engaging with communication technology represent a marginalized group that will require motivation and education, in addition to access, to promote their independent use of technology and engagement with technology-delivered interventions to improve treatment outcomes.

Optimism regarding the promise of technological treatments for substance abuse should not be tempered by this population's limited access to technology, but rather, should work to address these concerns and tailor treatment to what is readily available. The digital divide for individuals in substance abuse treatment remains an ever-present problem of social and economic justice to be solved through means of increased access, tailored interventions based on knowledge and comfort levels with technology, and motivational and educational components that precede technology-based interventions.

Acknowledgments

Role of Funding Source. Funding for this study was provided by the NIDA training grant (T32DA07209) and the Clinical Trials Network – Mid-Atlantic node (U10 DA13034).

The authors wish to thank Corey Molzon, Leanne Simington, Jasmine Dixon, Rajni Sharma, Wendy Parker, and Samuel King for their hard work on survey administration and data entry. We thank the directors and staff of the participating clinics: Harbel Prevention and Recovery, The Broadway Center, the Johns Hopkins Behavioral Pharmacology Research Unit clinic, Tuerk House, Cornerstone, Comprehensive Care, Mountain Manor, and Addiction Treatment Services. We also wish to thank the Biostatistics section of the South Carolina Clinical and Translational Research (SCTR) Institute at the Medical University of South Carolina for assistance with statistical analyses.

References

Car J, Gurol-Urganci I, de Jongh T, Vodopivec-Jamsek V, Atun R. Mobile phone messaging reminders for attendance at healthcare appointments. Cochrane Database Syst Rev. 2012:7.10.1002/14651858.CD007458.pub2

Comcast. [accessed September 17, 2012] Conquering the digital divide: closing the broadband opportunity gap. 2012. Retrived at https://www.internetessentialspartner.com/Downloads/LaunchReport.pdf

Gibbons MC, Fleisher L, Slamon RE, Bass S, Kandadai V, Beck JR. Exploring the potential of Web 2.0 to address health disparities. J Health Commun. 2011; 16:77–89.10.1080/10810730.2011.596916 [PubMed: 21843097]

Google. [accessed July 20, 2012] About Google Voice. Google Voice basics. 2012. Retrieved at, http://support.google.com/voice/bin/answer.py?hl=en&answer=115061&topic=1707989&ctx=topic

Jansen, J. [accessed August 1, 2012] Use of the Internet in Higher-Income Households. Pew Internet and American Life Project. Nov 24. 2012 http://pewinternet.org/Reports/2010/Better-off-households/Overview.aspx

King VL, Stoller KB, Kidorf M, Kindbom K, Hursh S, Brady T, Brooner RK. Assessing the effectiveness of an internet-based videoconferencing platform for delivering intensified substance abuse counseling. J Subst Abuse Treat. 2009; 36:331–338.10.1016/j.jsat.2008.06.011 [PubMed: 18775625]

Kreps GL. Disseminating relevant health information to underserved audiences: implications of the digital divide pilot projects. J Med Libr Assoc. 2005; 93:S68–73. [PubMed: 16239960]

Lenhart, A.; Purcell, K.; Smith, A.; Zickuhr, K. [accessed on May 15, 2012] Social Media and Young Adults. Pew Internet and American Life Project. Feb 3. 2010 http://www.pewinternet.org/Reports/2010/Social-Media-and-Young-Adults.aspx

Lopez L, Green AR, Tan-McGrory A, King R, Betancourt JR. Bridging the digital divide in health care: the role of health information technology in addressing racial and ethnic disparities. Jt Comm J Qual Patient Saf. 2011; 37:437–445. [PubMed: 22013816]

Marsch LA. Leveraging technology to enhance addiction treatment and recovery. J Addict Dis. 2012; 31:313–318. [PubMed: 22873192]

Marsch LA, Dallery J. Advances in the psychosocial treatment of addiction: the role of technology in the delivery of evidence-based psychosocial treatment. Psychiatr Clin North Am. 2012; 35:481–493.10.1016/j.psc.2012.03.009 [PubMed: 22640767]

Moore BA, Fazzino T, Garnet B, Cutter CJ, Barry DT. Computer-based interventions for drug use disorders: a systematic review. J Subst Abuse Treat. 2011; 40:215–223.10.1016/j.jsat.2010.11.002 [PubMed: 21185683]

Ranney ML, Choo EK, Wang Y, Baum A, Clark MA, Mello MJ. Emergency department patients' preferences for technology-based behavioral interventions. Ann Emerg Med. 2012; 60:218–227.10.1016/j.annemergmed.2012.02.026 [PubMed: 22542311]

Rooke S, Thorsteinsson E, Karpin A, Copeland J, Allsop D. Computer-delivered interventions for alcohol and tobacco use: a meta-analysis. Addiction. 2010; 105:1381–1390.10.1111/j.1360-0443.2010.02975.x [PubMed: 20528806]

Steyaert J, Gould N. Social work and the changing face of the digital divide. Br J Soc Work. 2009; 39:740–753.

Substance Abuse and Mental Health Services Administration. DASIS Series S-61, HHS Publication No (SMA) 12-4671. Substance Abuse and Mental Health Services Administration; Rockville, MD: 2012. Center for Behavioral Health Statistics and Quality. Treatment Episode Data Set (TEDS): 2000–2010. National Admissions to Substance Abuse Treatment Services.

VanDeMark NR, Burrell NR, Lamendola WF, Hoich CA, Berg NP, Medina E. An exploratory study of engagement in a technology-supported substance abuse intervention. Subst Abuse Treat Prev Policy. 2010; 5:10.10.1186/1747-597X-5-10 [PubMed: 20529338]

Walker, C.; Paquet, V. [accessed on August 16, 2012] Re: Supporting Grand Central's Project CARE. 2007 Aug 29. Retrieved from http://googleblog.blogspot.com/2007/08/supporting-grandcentrals-project-care.html

Wang JY, Bennett K, Probst J. Subdividing the digital divide: differences in internet access and use among rural residents with medical limitations. J Med Internet Res. 2011; 13:e25. [PubMed: 21371989]

Wolf-Branigin M. New media and social networks: considerations from clients in addictions treatment. J Technol Hum Serv. 2009; 27:339–345.10.1080/15228830903329864

Zickuhr, K.; Smith, A. [accessed on June 1, 2012] Digital Differences. Pew Internet and American Life Project. Apr 13. 2012 http://pewinternet.org/Reports/2012/Digital-differences.aspx

Table 1

Demographics.

Variable	% (N)
Gender	(260)
Male	64
Female	35
Transgender	1
Race	(248)
AA/Black	69
White	27
Other	4
Ethnicity	(258)
Latino	2
Relationship Status	(254)
Married/Long-term relationship	33
Divorced/Separated/Widowed	27
Never Married	40
Education	(256)
Less than HS Diploma	40
HS/GED	36
Some College or more	24
Employment	(265)
Unemployed	34
Full/Part time or Student	49
Retired or Disability	17
Income	(259)
< 15,000	57
15,000 – 29,999	26
≥ 30,000	17
Treatment Program	(266)
IOP	42
OP	58
Type of Treatment	(260)
Drug Free	56

Variable	% (N)
Opioid Replacement	44 (115)
Methadone	68
Buprenorphine	32
Primary Drug of Abuse	(252)
Alcohol	17
Cocaine	15
Marijuana	11
Opiates	55
Other	2

Note: Intensive outpatient (IOP) includes nine or more hours of treatment per week. Outpatient (OP) refers to fewer than nine hours per week.

Table 2

Technology characteristics.

Mobile phone use	**% (N)**
Regular access (ownership)	85 (226)
Regular access (do not own)	6 (16)
Pay-as-you-go contracts	60 (130)
Changed mobile number	37% never, 22% once, 18% twice, 14% 3x, 9% > 3x
SMS text message usage	79 (211)
Any text limitations per day?	18 (42)
Any call limitations per day?	10 (25)
Clinic staff ever contact you?	44% call, 0.4% text, 7.8% call and text, 47.8% neither
Computer use	
Regular computer use	39(104)
Computer location	58% home, 7% work, 19% library, 16% other
Internet/e-mail use	
Regular internet use	44(116)
Regular e-mail use	45 (102)

Table 3

Significant predictors of technology characteristics using logistic regression.

	Yearly vs. *Pay as you go*		Change phone ≤ once		Text Messaging		Clinic Staff Contact		Use Computers Weekly		Use Internet Weekly		Use E-mail Weekly	
	β	**S.E.**	**β**	**S.E.**	**β**	**S.E.**	**β**	**S.E.**	**β**	**S.E.**	**β**	**S.E.**	**β**	**S.E.**
Age	.01	.02	−.02	.01	**.09** *	**.04**	−.02	.01	**.06** **	**.02**	**.10** **	**.02**	**.06** **	**.02**
White vs. Other	−.57	.38	**−.81** *	**.36**	**2.0** *	**.81**	**−.91** *	**.36**	−.26	.36	−.49	.39	−.35	.39
Less than HS vs. HS/GED	**.92** *	**.41**	.57	.39	1.4	.94	−.12	.39	**2.0** **	**.42**	**1.8** **	**.45**	**1.9** **	**.46**
Less than HS vs. Some college	**.87** *	**.41**	.75	.41	−.48	1.3	−.35	.40	**.97** *	**.40**	**1.1** *	**.44**	**.97** *	**.46**
>$15,000 vs. < $15,000	.54	.32	.29	.30	−.93	.78	.21	.30	.44	.31	**.69** *	**.33**	.34	**.34**
OP vs. IOP	.43	.34	.19	.30	−.17	.72	.23	.31	−.06	.32	−.15	.33	**.73** *	**.35**
Drug Free vs. Opioid Replacement	.45	.43	**.94** *	**.38**	.33	.92	−.07	.41	.10	.40	.68	.41	**1.2** *	**.44**
Other Drugs vs. Opioids	.19	.42	−.14	.38	−.66	1.1	−.01	.41	.48	.40	.56	.41	.66	.45

Note: The first group of predictors listed served as the comparison group for the binary logistic regression analyses, and were coded as 0 or 1, with the secondary group being coded as 1 or 2. The first condition listed for technology outcomes were more likely to use the technology identified, be contacted by clinic staff, have yearly contracts, and change phone number one time or fewer (when significance was found).

* p<.05,

** p<.005