Published in final edited form as:

J Soc Work Pract Addict. 2017 ; 17(1-2): 114–134. doi:10.1080/1533256X.2017.1304948.

Technology-based interventions and trainings to reduce the escalation and impact of alcohol problems

STELLA M RESKO, Ph.D.,

Associate Professor, School of Social Work, Wayne State University, Detroit MI, USA

SUZANNE BROWN, Ph.D.,

Assistant Professor, School of Social Work, Wayne State University, Detroit MI, USA

JAMES J. LISTER, PH.D.,

Assistant Professor, School of Social Work, Wayne State University, Detroit MI, USA

STEVE ONDERSMA,

Associate Professor, Merrill Palmer Skillman Institute for Child and Family Development, Wayne State University, Detroit MI, USA

REBECCA CUNNINGHAM, M.D.,

Professor, Emergency Medicine, Associate Chair, Research, Department of Emergency Medicine, University of Michigan Medical School, MI, USA

MAUREEN WALTON, PH.D.

Professor, Department of Psychiatry, University of Michigan Medical School, MI, USA

Abstract

There has been a rapid increase in the development of technological innovations to reduce the escalation and impact of alcohol problems among adolescents and adults. Technology-based interventions offer the possibility of reaching individuals who otherwise might not seek treatment, (e.g., those in remote areas, those not perceiving a need for treatment, or others who may resist treatment). This article describes four case examples of technology-based interventions for risky drinking: 1) a freely available and interactive website that provides individualized feedback and information on risky drinking patterns; 2) a brief intervention for adolescents that provides individualized feedback to teens regarding their alcohol use; 3) a computer-delivered screening and brief intervention for alcohol use among pregnant women, and 4) a simulation program for training social workers in screening and brief intervention. These case examples highlight how technology may have a role in addressing the Alcohol Misuse Grand Challenge.

Keywords

Alcohol; computer; technology; Internet; mobile; intervention

Social work researchers have identified alcohol misuse as one of the most important and compelling social issues facing society (Begun, Clapp and the Alcohol Misuse Grand Challenge Collective, 2016), due in part to its tremendous health and social consequences. The World Health Organization (2004) has identified myriad consequences of alcohol misuse across the globe. These include lost workplace productivity, unemployment, workplace accidents, and family consequences, such as Fetal Alcohol Spectrum Disorders, family violence, and mental health issues among the family members of individuals who misuse alcohol. The negative outcomes of alcohol misuse are especially concerning for adolescents and young adults for whom brain development, specifically frontal lobe maturity, is incomplete, leaving youth more likely to engage in substance misuse and impulsive behaviors associated with alcohol misuse such as risky sexual behaviors, violence, mental health issues, and higher risks for early death (Casey, Jones, & Somerville, 2011). Social workers encounter problems related to alcohol misuse across all practice settings and among clients across the developmental spectrum (Begun et al., 2016). Simply ignoring problems related to alcohol misuse may result in barriers to meaningful change in other domains as well (Perron & Vaughn, 2013). For this reason, the American Academy of Social Work and Social Welfare has identified reducing and preventing alcohol misuse and its consequences as one of its grand challenges for social work policy and practice.

Developing Interventions to Address Alcohol Misuse

In recent years, considerable progress has been made in understanding the etiology of alcohol use disorders and developing evidence-based treatments (Begun et al., 2016; Warren & Hewitt, 2010). Therapies for alcohol use disorders include a growing number of pharmacological treatments such as naltrexone (Revia or Vivitrol), acamprosate (Campral) and disulfiram (Antabuse) (Douaihy, Kelly & Sullivan, 2013). Treatment providers often utilize these pharmacological therapies in conjunction with behavioral interventions. The evidence base for these behavioral therapies addressing alcohol misuse has been growing. Researchers have identified numerous psychosocial therapies that are widely considered effective in dealing with substance use disorders. These include motivational interviewing, motivational enhancement therapy, cognitive behavioral therapy, and community reinforcement approaches (Marsch, Carroll & Kulik, 2014).

Despite these advances, many individuals with alcohol use disorders do not receive treatment. Estimates suggest that 86% of the 21.7 million people aged 12 or older who needed substance use treatment in 2015 did not receive any services (Center for Behavioral Health Statistics and Quality [CBHSQ], 2016). Small portions of young people with substance use disorders, 11.2 percent of adolescents aged 12 to 17 and 10.4 percent of young adults aged 18 to 25, receive any type of services for substance misuse (CBHSQ, 2016). The dissemination of evidence-based interventions has been a particular challenge for the social work profession and the substance use treatment field more generally (Begun et al., 2016). Lack of clinician knowledge and skills have been cited as reasons for the difficulty implementing evidence-based practices (Corrigan et. al., 2001). Lack of agency resources and infrastructure to support the dissemination of evidence-based interventions has been another barrier to their use in substance abuse treatment settings (Gotham, 2004). Because of these shortcomings, interventions that are easy to use and cost-effective, such as

technologically based techniques, may offer one possibility for increasing access to evidence-based interventions.

Technology-based Interventions for Alcohol Misuse

There has been a rapid increase in the development of technological innovations to help reduce the escalation and impact of alcohol problems among adolescents and adults (See Table 1 for examples). Interventions utilizing information and communication technologies include computer-based interventions, educational websites, interactive web-based tools (e.g., dynamic, modular programs often modeled after face-to-face interventions), interventions on mobile devices (e.g., tablets, phones), online counseling and support groups, gaming, and text messaging support. Researchers have also used technology to support more traditional face-to-face social work (Berzin, Singer, & Chan, 2015). Information and communication technologies, for example, can augment a face-to-face intervention by providing clients with computerized feedback on alcohol use during a therapist-delivered intervention (Walton, et al., 2010; Resko, et al., 2012) or providing supportive text messages following up a traditional intervention session (Berzin et al., 2015). Studies have demonstrated that technology-based interventions for substance misuse can achieve high levels of acceptability from clients and can make them more comfortable when addressing sensitive topics (Choo, Ranney, Wong, & Mello, 2012).

Interventions that utilize information- and communication-based technologies are appealing, particularly as the use of technological innovations has grown. According to Pew research, 89% of the U.S. population currently use the internet or own a smart phone (Poushter, 2016). Facebook, which is the most popular social media platform, is used by 79% of online adults (68% of the U.S. population) (Greenwood, Perrin, & Duggan, 2016). Many populations, including adolescents and young adults, have widely adopted technology. Approximately 99% of adults ages 18 to 34 in the U.S., use the Internet and the majority (92 %) also own a smart phone (Poushter, 2016).

The appeal of technology-based interventions has increased as racial and socioeconomic disparities in technology use have narrowed. In 2016, 88% of Whites and 88% of Hispanics and 85% of African Americans used the Internet (Pew, 2017). This contrasts with 2000, when 53% of whites and 38% of African Americans in the U.S. used the Internet (Pew, 2017). Although disparities related to socioeconomic status remain, the disparities in Internet use based on income have gotten smaller since 2000 (See Figure 1). In 2000, the lowest income group (<\$30,000) had rates of internet use that were 47% lower than the rate for Americans with incomes over \$75,000. In 2016, 79% of individuals with incomes below \$30,000 were Internet users, a rate that is 19% lower than rates for Americans with incomes over \$75,000 (Pew, 2017). Technology-based interventions may offer the possibility of broader access to evidence-based behavioral treatments (Marsch, Carroll, & Kiluk, 2014; Ondersma, Chase, Svikis, & Shuster, 2005). There is a potential to reach broader segments of the U.S. population, including more adolescents and young adults. It provides opportunities to reach groups like sexual minority youth (Berzin, Singer, & Chan, 2015), individuals in rural communities, or individuals without health insurance who traditionally have not had broad access to substance use treatment (Campbell, Muench & Nunes, 2014).

It also provides an opportunity to reach individuals who do not recognize a need for alcohol treatment (Muench, 2014). These types of communication are portable, flexible and easy to disseminate, creating the potential to reach far greater numbers of individuals who need treatment and may ultimately having a greater overall impact than traditional face-to-face interventions (Berzin, Singer & Chan, 2015; Litvin, Abrabtes, & Brown, 2013).

Technology-based interventions bring the possibility of reaching individuals who might otherwise not seek treatment or prefer to do so using technology. This may be particularly helpful for individuals in remote areas without access to treatment (Berzin ET AL., 2015; Copeland, 2011). Social workers often provide services for clients who do not perceive a need for treatment or others who may resist treatment due to the stigma associated with alcohol use or seeking help (Resko, Brown, Mendoza, Crosby & Gonzalez-Prendes, 2017). This delivery method may help in such situations (Copeland, 2011; Ondersma, Grekin, & Svikis, 2011). Privacy concerns can be a barrier to substance use treatment (CBHSQ, 2016) and the possibility of accessing interventions autonomously can help increase the comfort of clients and allow for anonymity (Marsch & Dallery, 2012; Ondersma et al., 2011). This has been some of the appeal of text-based interventions for adolescents and young adults. These approaches may be particularly helpful with sensitive or stigmatized behaviors such as alcohol consumption (Marsch & Dallery, 2012). Technology may similarly aid social workers in reaching individuals who engage in substance use but do not self-report use (Ondersma et al., 2011). For example, many substance-use interventions with adolescents or with pregnant women or new mothers are reliant on self-reports of substance use. Adolescents frequently underreport (Delaney-Black, et al., 2010) and interventions reliant on these reports may miss a substantial portion of adolescents who may benefit from these services. Concerns regarding child custody or the criminal justice system can prevent pregnant women or women with children from disclosing alcohol or other substance use or seeking treatment (Ondersma et al., 2011). Technological innovations may help promote wider use of indirect interventions that engage clients in discussions of change (e.g., focused on “parenting strengths” or “health and wellness”) without assuming alcohol or drug use or offending clients (Ondersma et al., 2011).

The temporal flexibility of technology-based interventions may help overcome the rigid structures and timeframes of traditional services, allowing for “on-demand,” ubiquitous access to therapeutic support (Berzin, et al., 2015; Litvin, Abrabtes, & Brown, 2013). Waiting lists are a contemporary reality of many substance use treatment programs, particularly for those that serve individuals with limited resources (Carr, et al, 2008). Long waiting times can be a barrier to accessing treatment. Individuals seeking assistance for substance use problems are less likely to enter treatment when they have to wait for services, and often continue to use alcohol and drugs while waiting, which places them at heightened risk for health complications (e.g., overdoses, injuries, exposure to infectious diseases) (Carr, et al., 2008). Those who seek treatment at night or during weekends may also relapse because they are unable to endure waiting for treatment providers to open during regular business hours (Boyer, Smelson, Fletcher, Ziedonis, & Picard, 2010). Technology-enhanced services may eliminate waits by providing services 24/7.

Using technology to deliver evidence-based interventions for alcohol misuse may also enable wider dissemination of treatment to audiences in diverse settings (Marsch & Dallery, 2012). Web-based interventions, for example, can be offered in the home or integrated into community organizations, schools, workplaces, emergency rooms, primary or specialty care clinics, as well as via mobile devices. Technology has the potential to address some of the challenges associated with the delivery of science-based interventions, as it allows complex interventions to be delivered at a low cost, without substantially increasing demands on staff time or training needs (Marsch & Dallery, 2012). This is particularly helpful when providing treatment for alcohol misuse in busy settings (e.g., primary care clinics, emergency departments) where substance use problems have not traditionally been the focus. Technology-based interventions have the potential to be more cost effective than face-to-face interventions (Bervin, Singer & Chan, 2015; Ondersma, et al., 2005). Although these interventions may have greater upfront costs, the marginal cost per additional user is low, unlike conventional face-to-face interventions (Khadjesari, Murray, Hewitt, Hartley, & Godfrey; 2011; Tebb, et al., 2016).

Technology based interventions also are more likely to be implemented with fidelity, because they rely less on clinician skills, motivation and performance (Resko, Walton, Chermack, Blow, & Cunningham, 2012; Tebb, et al., 2016). Technological advances allow interventions to be delivered with a standardized approach, while also providing individually tailored messages (Litvin, et al., & Brown, 2013; Tebb, et al., 2016). These benefits may be seen in interventions delivered through computers or the web as well as face-to-face interventions that are augmented by technology (e.g., face-to-face interventions that use computer-based prompts or personalized feedback).

Social work has an important role to play in the development and use of technology to prevent and intervene with alcohol misuse. Social workers encounter substance misuse in a broad range of practice settings (Begun, et al., 2016), and substance misuse affects individuals and families throughout lifespan. Social work has identified the importance of harnessing technology for social good as one of its Grand Challenge agendas for the coming decade (Berzin, et al., 2015). Social workers provide more than 50% of prevention and treatment services in the substance abuse and mental health fields (NASW, 2000). Therefore, it is vital that social workers be knowledgeable about innovations in intervention implementation, especially interventions that target hard-to-reach populations, such as technology-based intervention techniques.

In the following section, we describe three examples of technology-based interventions addressing problematic alcohol use: (1) Rethinking Drinking (RethinkingDrinking.niaaa.nih.gov), (2) SafERteens, and electronic screening, and (3) brief intervention for alcohol use in pregnancy (e-SBI). We also describe a web-based client simulation program for training social workers in screening and brief intervention for adolescent alcohol misuse. These healthcare settings are increasingly important for social workers as treatment for alcohol and drug use disorders extends beyond specialty treatment providers to settings where substance use problems are seen but have not traditionally been the focus of services (National Drug Control Policy, 2015; Perron & Vaughn, 2013).

Rethinking Drinking

The National Institute on Alcohol Abuse and Alcoholism (NIAAA), a part of the National Institutes of Health developed the Rethinking Drinking initiative (RethinkingDrinking.niaaa.nih.gov). It is a freely available and interactive website that has evidence-based information on alcohol for the general public and health professionals such as social workers. NIAAA designed many of the resources for individuals who drink more than their low risk limits.¹ Rethinking Drinking suggests strategies for individuals who are ready to cut down on their drinking (e.g., keeping track of how much you drink, measuring drinks, setting goals) and recommends other approaches for those who are not ready (e.g., weighing reasons for or against making a change). The website includes interactive tools providing information on several alcohol-related topics (e.g., what is a standard drink, how many standard drinks are in various-sized containers, the caloric content of alcohol, blood alcohol concentration levels and symptoms of alcohol use disorders). Several of the interactive tools provide individualized feedback and can help a person better understand their drinking patterns, whether they exhibit signs of a possible drinking problem, and whether and how to change their behaviors. A few resources can be downloaded and printed, including a 16-page educational booklet available in English or Spanish (http://pubs.niaaa.nih.gov/publications/RethinkingDrinking/Rethinking_Drinking.pdf).

Researchers conducting several medication trials (e.g., Litten et al., 2013), have used the Rethinking Drinking resources (e.g., online modules) as part of the behavioral therapy in their studies. Other researchers have incorporated the Rethinking Drinking materials into standard practice by providing a printed copy of the brochure or information about the website to all patients who received either an in-person or a computer intervention (e.g., Book et al., 2010).

The Rethinking Drinking tools have also been used to educate health professionals on screening, and treatment for alcohol use disorders. In a study of SBIRT training in primary care settings, Ornstein and colleagues (2013), provided primary care treatment providers with information about the Rethinking Drinking website. A training program on SBIRT for registered nurses (RN-SBIRT) included similar content, and involved a live demonstration of the Rethinking Drinking website (Broyles, Kraemer, Kengor, & Gordon, 2013). The interactive tools on the Rethinking Drinking website may be particularly helpful in educating social workers and social work students on alcohol misuse. In a general course on substance misuse designed for master's level social work students, we have used an assignment that incorporates Rethinking Drinking (See Appendix for our sample web-based assessment and drinking feedback assignment). This experiential and writing assignment has students complete the online assessment, receive personalized feedback and then write a brief paper (two to three pages).

¹NIAAA's Low-risk drinking guidelines recommend no more than four drinks in a single day for males and no more than 14 drinks in a week. For females and individuals over age 65 (male or female), the low-risk drinking guideline recommends no more than three drinks in a single day and 7 drinks in a week. These guidelines are not recommended for individuals who are underage, pregnant/trying to become pregnant, planning to drive/operate machinery, or taking medications that interact with alcohol, and have health conditions made worse by alcohol.

SafERteens

SafERteens is a brief intervention for adolescents that uses motivational interviewing and normative resetting² to decrease alcohol use and aggression among adolescents receiving care in emergency departments (ED) (Walton et al., 2010). The urban ED represents an underutilized venue for delivering substance use and violence interventions among adolescents (Cunningham et al., 2009). The interactive, one-session intervention is tailored to the adolescent's gender and level of involvement in alcohol use, binge drinking, fighting, and weapon carrying. The one session intervention is administered onsite in the ED by a therapist (i.e., research social worker) or a computer. The therapist and computer interventions were designed to have similar content, but with different modes of presentation (Walton et al., 2010). As part of efforts to enhance the cultural relevance of the intervention, it was developed with input from urban youth and uses culturally relevant visuals (e.g., racially diverse virtual peers), content (e.g., goals and values) and language tailored to the communities where it is delivered. In both the therapist- and computer-based delivery of the SafERteens intervention, adolescent patients complete a computer-based screening and receive feedback on their drinking and involvement with violence in an open, non-judgmental manner. The intervention is grounded in harm reduction principles, which are well suited for adolescents (Monti, Barnett, O'Leary & Colby, 2001). Consistent with motivational interviewing (Miller & Rollnick 2012), SafERteens emphasizes uncovering a discrepancy between current behavior and future goals and increasing problem recognition, motivation, and self-efficacy (Walton et al., 2012). The intervention includes sections that address the adolescent's goals, provide personalized feedback regarding alcohol usage, participation in violence, and weapon use, a decisional balance exercise for the potential benefits of deciding to reduce or stop drinking and fighting, five role-play situations, and a referral (Walton et al., 2010). In both delivery mechanisms of the SafERteens intervention, the role-plays are individualized to each participant, based on responses from the screening survey and address topics such as anger management, conflict resolution, alcohol refusal skills, and avoiding drinking and driving (Walton et al., 2010).

In the therapist-delivered intervention, tablet computers guide the process and display content and tailored feedback to prompt discussions (Cunningham et al., 2012; Walton et al., 2010). The research social workers who delivered the intervention were initially trained on motivational interviewing techniques and the specific SafERteens intervention and received additional supervision and training throughout the study (Walton et al., 2010). The use of tablet computers standardized the delivery of the intervention by the therapist. This helps to ensure greater levels of fidelity to the intervention (Resko et al., 2012) and can be helpful in ED's and other busy clinical settings (Cunningham et al, 2012).

The computer SafERteens intervention is a stand-alone interactive program with touch screens and audio via headphones (Cunningham et al., 2009; Cunningham et al., 2012). A virtual buddy guides patients through the computer program and provides feedback on

²Normative resetting addresses perceptions that substance use is very common among one's peers. Addressing these descriptive social norms is particularly important for adolescent substance use prevention (Eisenberg, Toumbourou, Catalano, & Hemphill, 2014)

choices made. The buddy is a virtual peer selected by the participant and helps the adolescent identify reasons to avoid drinking and aggression.

The three armed SafERteens Study (n=235 for control group; n=237 for computer intervention, and n=254 for therapist intervention) has demonstrated positive results as an ED-based brief intervention for youth involved with violence or alcohol use. At 6 months after the intervention, participants in the therapist intervention showed self-reported reductions in alcohol consequences, (therapist, -32.2%; control, -17.7%; odds ratio, 0.56; 95% CI, 0.34–0.91) compared with controls; participants in the computer intervention also reported reductions in alcohol consequences (computer, -29.1%; control, -17.7%; odds ratio, 0.57; 95% CI, 0.34–0.95) (Walton et al., 2010). These differences, however, were not maintained at one year (Cunningham et al., 2012); further, this program did not reduce alcohol consumption, likely reflecting low drinking levels among adolescents in the study. The SafERteens therapist intervention has demonstrated more lasting changes related to violence; changes in attitudes, self-efficacy, and reductions in violent behaviors, peer victimization, and violence-related consequences were maintained at one year following the intervention (Cunningham et al., 2012). In terms of costs, the SafERteens therapist intervention cost about \$17 per violent event or consequences averted (Sharp et al., 2014). Further, both the therapist and computer interventions showed promise for reducing dating violence victimization (Cunningham et al., 2013).

To reduce alcohol misuse and violence on a broader scale, future studies are needed to discover methods for improving these outcomes, particularly those related to alcohol misuse, and to further understand the effectiveness of the SafERteens behavioral intervention when delivered by social workers and other clinical staff (i.e., non-research staff). In this regard, a current study is underway to integrate and translate this brief intervention, focusing primarily on violence, into a practical program incorporated into routine clinical practice in the ED. This study will use ED staff to conduct screenings for violent behaviors and delivery of a brief intervention; the original program is also being augmented by automatic delivery of tailored text messages (containing reminders of content discussed during the intervention session) over a two-month period. To address the practical barrier of lack of 24/7 availability of on-site ED staff to deliver interventions, the study will also test remote delivery by off-site therapists using Health Insurance Portability and Accountability Act compliant technology. These efforts will determine the reach, effectiveness, adoption, implementation, and maintenance of the SafERteens BI (Glasgow, Lichtenstein, & Marcus, 2003). Additional information about the SafERteens intervention, including training materials (e.g., role-play videos of interventions), is available at www.SafERteens.org.

Electronic Screening and Brief Intervention to Reduce Alcohol Use in Pregnancy (e-SBI)

The third technology-based intervention we describe is an electronic screening and brief intervention designed to reduce alcohol use during pregnancy (e-SBI) (Ondersma et al., 2015). Since the e-SBI for pregnant women has been developed more recently, less research has been published on it. The e-SBI intervention is based on the principles of Self-Determination Theory, (Ryan & Deci, 2000) and motivational interviewing (Miller & Rollnick, 2012). The intervention emphasizes the use of the nonspecific or common therapy

factors such as empathy, optimism, and being non-judgmental (see Wampold, 2001). The intervention is tailored to women's race/ethnic identities (e.g., uses culturally diverse actors in the intervention videos, uses culturally relevant language and content) and alcohol risk perceptions. In addition, the computer-delivered technology uses techniques to create a lifelike feel (referred to as "ethopoeia") that has been shown to elicit social responses from participants (Nass & Moon, 2000) and which may enhance motivation (Mumm & Mutlu, 2011) as well as working alliance and engagement (Bickmore, Gruber, & Picard, 2005) with computer-delivered interventions. For example, this software uses an animated narrator that displays emotion, speaks aloud, refrains from placing judgment on participants, and seeks out the perspectives of participants throughout the brief intervention.

This intervention aims to cultivate self-directed change and/or improve attitudes and behaviors with regard to seeking treatment for alcohol use. The 20-minute session features a brief set of videos, which include an African-American physician describing the effects of alcohol use during pregnancy and a testimonial from a mother who details the benefits of choosing to stop drinking during pregnancy. In addition to the videos, the intervention has other components, which focus on: (1) information regarding the risks of drinking alcohol during pregnancy, (2) assisting the participant in weighing the costs and benefits that changing their alcohol use behavior might have, and how it relates to strongly held personal goals or values, (3) providing normed feedback about the prevalence of alcohol use during pregnancy and consequences/gains should the participant stop drinking during pregnancy, and (4) offering participants the option of setting a specific change goal for their alcohol use throughout their pregnancy.

The e-SBI for pregnant women has demonstrated acceptability among two samples of primarily African American pregnant women. The women in each study rated the e-SBI intervention favorably with regard to ease of use, helpfulness and general appeal (scores of 4.7 to 5.0 on a 1–5 Likert scale) (Ondersma et al., 2015; Tzilos, Sokol, & Ondersma, 2011). It also has shown preliminary efficacy in a small Stage I clinical trial during which women were randomized to either e-SBI ($n=24$) or a control condition ($n=24$) (Ondersma, et al., 2015). Although the study had limited statistical power, women who received the intervention reported less frequent alcohol use during pregnancy and improved pregnancy outcomes (e.g., birth weight). The e-SBI intervention demonstrated medium-sized intervention effects that did not reach statistical significance ($p < .10$ and $p < .20$), which is likely related to being underpowered (Ondersma et al., 2015).

Patient Simulation for Training in Adolescent Screening and Brief Intervention

The independent research organization NORC at the University of Chicago, partnered with the Council on Social Work Education, Center for Clinical Social Work, American Association of Colleges of Nursing, and New York-based technology company Kognito to develop a curriculum and training materials for integrating adolescent SBIRT education into undergraduate and graduate courses in social work and nursing (McPherson, Goplerud, Adam, 2015). As part of these efforts, they developed an online simulation that enables learners to practice conducting brief interventions for alcohol misuse with virtual adolescent patients.

The web-based training program includes information about SBIRT and three interactive role playing situations that feature emotionally responsive virtual patients with problems at different levels of severity (e.g., weekly alcohol use/high risk use, monthly alcohol use/moderate risk use) and contexts (e.g., primary care, ED, school social worker/nurse office setting). These simulated role-play conversations can be delivered on computers, tablets and mobile devices and use gaming technology to prepare social workers and other professionals to effectively lead real-life conversations related to substance misuse (McPherson, Goplerud, Adam, 2015). Initial feedback from social work students has shown that the use of virtual clients can help students feel less self-conscious when learning new practice skills (Walters et al., 2016). The simulation helps health professionals screen young patients for substance use, and to conduct brief interventions, using the principals of motivational interviewing (McPherson, Goplerud, Adam, 2015). Participants that complete the online training receive scores and considerable feedback on their performances. The simulation can be completed by students on their own (e.g., as a homework assignment) or in class (e.g., in multiple small groups or by the class as a whole) (Walters, et. al., 2016). Through financial support from the Conrad N. Hilton Foundation, the simulation has been made available to educators at free or reduced cost through the Adolescent SBIRT Learning Collaborative (<http://sbirt.webs.com/learning-collaborative>). Several universities (e.g., the University of Pittsburgh, the University of Southern California, and Wayne State University) are currently evaluating the effectiveness of this screening and brief intervention training for social workers and nurses.

Discussion & Future Directions

Alcohol is a complex biopsychosocial problem that impacts individuals, families and communities across the lifespan (Begun, et al., 2016). Social workers, along with other substance-use prevention and treatment professionals have a growing collection of evidence-based psychosocial interventions available for the treatment of alcohol use disorders. Social workers frequently work with individuals experiencing substance misuse problems and have important roles in the treatment of alcohol and drug disorders that include providing substance abuse treatment and prevention services.

Considerable opportunities exist for leveraging technology in the delivery of evidence-based social work interventions to promote widespread reach and impact (Berzin, et al., 2015; Marsch & Dallery, 2012). As the examples reviewed here demonstrate, this line of intervention is promising and underscores the potential public health impact of technology-based therapeutic tools.

With the growing emphasis on cost-effective care and the integration of treatment for alcohol and drug use into other areas of health care in which providers may have limited expertise in treating individuals with substance use disorders (Office of National Drug Control Policy, 2015; Perron & Vaughn, 2013), technology-based therapeutic tools may become increasingly important and clinically useful. These tools as well as other technologies (e.g., short message service or text messages) are well-positioned to meet these unmet needs in this new model of care (Marsch & Dallery, 2012). Interventions like the computer SafERteens or the e-SBI that are delivered via computers, mobile devices or other

emerging technologies may be cost-effective approaches that help social workers reach underserved populations in diverse settings. Technology-enhanced interventions, like the therapist-delivered SaferTeens brief intervention, may be helpful in ensuring that therapeutic services provided in busy clinical settings are consistently high in quality (Cunningham et al., 2012). Such interventions provide an opportunity for social workers to develop and study multidisciplinary solutions to alleviate alcohol misuse and its related consequences. Social workers have important roles in this effort, and should consider utilizing or adapting technology to enhance intervention and prevention for alcohol misuse.

To fully realize the potential of technology-delivered interventions for alcohol misuse, several areas of inquiry remain important. Efforts are needed to reduce economic barriers that prevent social service agencies from using of technology based interventions (Campbell, Muench, & Nunes, 2014). While such interventions can have relatively low costs per client, they can present considerable barriers for social service agencies with limited financial resources. Research is needed to ensure technology-based interventions are optimally designed to produce maximal behavior changes. Efficient and effective methods should be identified to integrate technology-based interventions into systems of care in a manner that is most responsive to the needs of clients (Marsch & Dallery, 2012). Social workers can play an important role in this process. Finding ways to increase the reach of technology-based interventions is important. Several of the case examples described here have had success in getting individuals to complete technology-based interventions in health care settings. For mobile interventions or websites like Rethinking Drinking, efforts are needed to enhance the use of stand-alone interventions. We need to learn more about the mechanisms underlying behavior change from technology-delivered interventions (Ondersma, et al. 2011; Resko et al., 2012; Walton et al., 2009). Further research along these lines will be important in isolating mechanisms that are useful in predicting treatment responses, and in ensuring that key ingredients are present, as these interventions become widely available (Begun, et al., 2016; Marsch & Dallery, 2012).

Appendix: Web-based Assessment and Feedback on Alcohol Use

Experiential component:

Complete the Rethinking Drinking web-based tools

Rethinking Drinking, <http://rethinkingdrinking.niaaa.nih.gov/>, is an evidence-based, on-line alcohol intervention and personalized feedback tool. It was developed by researchers at the National Institute on Alcohol Abuse and Alcoholism. You will complete the following interactive tools that provide information, assessment and personalized feedback on alcohol use: What Counts as a drink? Check your drinking pattern, Calculators for cocktail content, drink size, alcohol calories content, alcohol spending, and blood alcohol concentration.

Written component:

Write a two- to three-page summary of your reactions to the program, personalized assessment and feedback you completed and received. Is your feedback consistent with or different from what you thought? Will it affect your future behavior? Is it useful? How might

web-based programs be useful in addressing problematic substance use? Was the web-based program you completed relevant to the needs of different groups (e.g., men, women, young adults, older adults, racial or ethnic minorities)? What recommendations would you have for improving such programs?

Options for instructors:

Instructors can have students complete the tool to check drinking patterns more than one time to see how the feedback differs for men and women with various levels of alcohol use. Instructors may allow students to select modules themselves or instruct students to complete specific modules/interactive tools. Other web or app-based interventions, such as the electronic check up to go (e-CHUG), may be available at some universities and can be used for this assignment.

References

- Agyapong VI, Ahern S, McLoughlin DM, & Farren CK (2012). Supportive text messaging for depression and comorbid alcohol use disorder: single-blind randomised trial. *Journal of Affective Disorders*, 141(2), 168–176. [PubMed: 22464008]
- Begun AL, & Clapp JD (2016). Reducing and preventing alcohol misuse and its consequences: A Grand Challenge for social work. *The International Journal of Alcohol and Drug Research*, 5(2), 73–83.
- Bendtsen P, Johansson K, & Åkerlind I (2006). Feasibility of an email-based electronic screening and brief intervention (e-SBI) to college students in Sweden. *Addictive Behaviors*, 31(5), 777–787. [PubMed: 15996827]
- Berzin SC, Singer J, & Chan C (2015). Practice Innovation through Technology in the Digital Age: A Grand Challenge for Social Work. Retrieved from: <http://aaswsw.org/wp-content/uploads/2013/10/Practice-Innovation-through-Technology-in-the-Digital-Age-A-Grand-Challenge-for-Social-Work-GC-Working-Paper-No-12.pdf>
- Bewick BM, West R, Gill J, O'May F, Mulhern B, Barkham M, & Hill AJ (2010). Providing web-based feedback and social norms information to reduce student alcohol intake: a multisite investigation. *Journal of Medical Internet Research*, 12(5), e59. [PubMed: 21169171]
- Book SW, Thomas SE, Smith JP, Randall PK, Kushner MG, Bernstein GA, ... & Randall CL (2013). Treating individuals with social anxiety disorder and at-risk drinking: Phasing in a brief alcohol intervention following paroxetine. *Journal of Anxiety Disorders*, 27(2), 252–258. [PubMed: 23523988]
- Boyer EW, Smelson D, Fletcher R, Ziedonis D, & Picard RW (2010). Wireless technologies, ubiquitous computing and mobile health: application to drug abuse treatment and compliance with HIV therapies. *Journal of Medical Toxicology*, 6(2), 212–216. [PubMed: 20623215]
- Broyles LM, Kraemer KL, Kengor C, & Gordon AJ (2013). A tailored curriculum of alcohol screening, brief intervention, and referral to treatment (SBIRT) for nurses in inpatient settings. *Journal of Addictions Nursing*, 24(3), 130–141. [PubMed: 24621542]
- Campbell AN, Muench F, & Nunes EV (2014). Technology-based behavioral interventions for alcohol and drug use problems In Marsch LA, Lord SE, & Dallery J(Eds). *Behavioral Healthcare and Technology: Using Science-based Innovations to Transform Practice*, 40–55.
- Casey BJ, Jones RM, & Somerville LH (2011). Breaking and accelerating of the adolescent brain. *Journal of Research on Adolescence*, 21(1), 21–33. [PubMed: 21475613]
- Carr CJ, Xu J, Redko C, Lane DT, Rapp RC, Goris J, & Carlson RG (2008). Individual and system influences on waiting time for substance abuse treatment. *Journal of Substance Abuse Treatment*, 34(2), 192–201. [PubMed: 17512159]
- Center for Behavioral Health Statistics and Quality. (2016). Key substance use and mental health indicators in the United States: Results from the 2015 National Survey on Drug Use and Health

(HHS Publication No. SMA 16–4984, NSDUH Series H-51). Retrieved from: <http://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2015/NSDUH-FFR1-2015/NSDUH-FFR1-2015.pdf>

- Choo EK, Ranney ML, Wong Z, & Mello MJ (2012). Attitudes toward technology- based health information among adult emergency department patients with drug or alcohol misuse. *Journal of Substance Abuse Treatment*, 43(4), 397–401. [PubMed: 23107105]
- Copeland J (2011). Application of technology in the prevention and treatment of substance use disorders and related problems: opportunities and challenges. *Substance Use & Misuse*, 46(1), 112–113. [PubMed: 21190411]
- Corrigan PW, Steiner L, McCracken SG, Blaser B, & Barr M (2001). Strategies for disseminating evidence-based practices to staff who treat people with serious mental illness. *Psychiatric Services*, 52, 1598–1606. [PubMed: 11726749]
- Cunningham RM, Chermack ST, Zimmerman MA, Shope JT, Bingham CR, Blow FC, & Walton MA (2012). Brief motivational interviewing intervention for peer violence and alcohol use in teens: one-year follow-up. *Pediatrics*, 129(6), 1083–1090. [PubMed: 22614776]
- Cunningham RM, Walton MA, Goldstein A, Chermack ST, Shope JT, Raymond Bingham C, & Blow FC (2009). Three month Follow up of Brief Computerized and Therapist Interventions for Alcohol and Violence among Teens. *Academic Emergency Medicine*, 16(11), 1193–1207. [PubMed: 20053240]
- Cunningham RM, Whiteside LK, Chermack ST, Zimmerman MA, Shope JT, Bingham CR, Blow FC, Walton MA (2013). Dating Violence: Outcomes Following a Brief Motivational Interviewing Intervention among At-Risk Adolescents in an Urban ED. *Academic Emergency Medicine*. 20(6), 562–9. PMID: PMCID: PMC3728000 [PubMed: 23758302]
- Delaney-Black V, Chiodo LM, Hannigan JH, Greenwald MK, Janisse J, Patterson G, ... & Sokol RJ (2010). Just say “I don’t”: lack of concordance between teen report and biological measures of drug use. *Pediatrics*, 126(5), 887–893. [PubMed: 20974792]
- Douaihy AB, Kelly TM, & Sullivan C (2013). Medications for substance use disorders. *Social Work in Public Health*, 28(3–4), 264–278. [PubMed: 23731419]
- Eisenberg ME, Toumbourou JW, Catalano RF, & Hemphill SA (2014). Social norms in the development of adolescent substance use: A longitudinal analysis of the International Youth Development Study. *Journal of Youth and Adolescence*, 43(9), 1486–1497. [PubMed: 24633850]
- Glasgow RE, Lichtenstein E, & Marcus AC (2003). Why don’t we see more translation of health promotion research to practice? Rethinking the efficacy-to-effectiveness transition. *American Journal of Public Health*, 93(8), 1261–1267. [PubMed: 12893608]
- Gotham HJ (2004). Diffusion of mental health and substance abuse treatments: Development, dissemination, and implementation. *Clinical Psychology: Science and Practice*, 11, 60–176.
- Greenwood S, Perrin A, & Duggan M (2016). Social Media Update 2016. Retrieved from: <http://www.pewinternet.org/2016/11/11/social-media-update-2016/>
- Khadjesari Z, Murray E, Hewitt C, Hartley S, & Godfrey C (2011). Can stand alone Computer based interventions reduce alcohol consumption? A systematic review. *Addiction*, 106(2), 267–282. [PubMed: 21083832]
- Litvin EB, Abrantes AM, & Brown RA (2013). Computer and mobile technology-based interventions for substance use disorders: An organizing framework. *Addictive Behaviors*, 38(3), 1747–1756. [PubMed: 23254225]
- Marsch LA, Carroll KM, & Kiluk BD (2014). Technology-based interventions for the treatment and recovery management of substance use disorders: a JSAT special issue. *Journal of Substance Abuse Treatment*, 46(1), 1–4. [PubMed: 24041749]
- Marsch LA, & Dallery J (2012). Advances in the psychosocial treatment of addiction: the role of technology in the delivery of evidence-based psychosocial treatment. *The Psychiatric Clinics of North America*, 35(2), 481. [PubMed: 22640767]
- Mason M, Benotsch EG, Way T, Kim H, & Snipes D (2014). Text messaging to increase readiness to change alcohol use in college students. *The Journal of Primary Prevention*, 35(1), 47–52. [PubMed: 24114551]

- McPherson T, Goplerud E, & Adam C (2015). Integrating adolescent substance abuse screening, brief intervention and treatment in health professions education. *Addiction Science & Clinical Practice*, 10(2), 1.
- Miller WR, & Rollnick S (2012). *Motivational interviewing: Helping people change*. New York: Guilford press.
- Monti PM, Barnett NP, O'Leary TA, & Colby SM (2001). Motivational enhancement for alcohol-involved adolescents In Monti PM, Colby SM, O'Leary TA(Eds.) *Adolescents, Alcohol, and Substance Abuse: Reaching teens through brief interventions*. New York: Guilford Press, 145–182.
- Muench F (2014). The promises and pitfalls of digital technology in its application to alcohol treatment. *Alcohol Research*, 36(1), 131–142. [PubMed: 26259008]
- Office of National Drug Control Policy (2015). *National Drug Control Strategy*. Retrieved from: https://www.whitehouse.gov/sites/default/files/ondcp/policy-and-research/2015_national_drug_control_strategy.pdf
- Ondersma SJ, Beatty JR, Svikis DS, Strickler RC, Tzilos GK, Chang G, ... & Sokol RJ (2015). Computer Delivered Screening and Brief Intervention for Alcohol Use in Pregnancy: A Pilot Randomized Trial. *Alcoholism: Clinical and Experimental Research*, 39(7), 1219–1226.
- Ondersma SJ, Chase SK, Svikis DS, & Schuster CR (2005). Computer-based brief motivational intervention for perinatal drug use. *Journal of Substance Abuse Treatment*, 28(4), 305–312. [PubMed: 15925264]
- Ondersma SJ, Grekin ER, & Svikis D (2011). The potential for technology in brief interventions for substance use, and during-session prediction of computer-delivered brief intervention response. *Substance Use & Misuse*, 46(1), 77–86. [PubMed: 21190408]
- Ornstein SM, Miller PM, Wessell AM, Jenkins RG, Nemeth LS, & Nietert PJ (2013). Integration and sustainability of alcohol screening, brief intervention, and pharmacotherapy in primary care settings. *Journal of Studies on Alcohol and Drugs*, 74(4), 598–604. [PubMed: 23739024]
- Perron BE, & Vaughn MG (2012). Conclusions and future directions In (Vaughn MG & Perron BE (Eds.) *Social Work Practice in the Addictions* (pp. 261–264). Springer New York.
- Pew Research Center (2017). *Internet/Broadband Fact Sheet*. Retrieved from: <http://www.pewinternet.org/fact-sheet/internet-broadband/>
- Poushter J (2016). Smartphone ownership and internet usage continues to climb in emerging economies. Retrieved from: <http://www.pewglobal.org/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies/>
- Resko SM, Brown S, Mendoza NS, Crosby S, & Gonzales-Prendes A (In Press). Perceived treatment needs among women with co-occurring substance use disorders and PTSD. *Journal of Dual Diagnosis*. DOI: 10.1080/15504263.2016.1248309
- Resko SM, Walton MA, Chermack ST, Blow FC, & Cunningham RM (2012). Therapist competence and treatment adherence for a brief intervention addressing alcohol and violence among adolescents. *Journal of Substance Abuse Treatment*, 42(4), 429–437. [PubMed: 22119182]
- Riordan BC, Conner TS, Flett JA, & Scarf D (2015). A brief orientation week ecological momentary intervention to reduce university student alcohol consumption. *Journal of Studies on Alcohol and Drugs*, 76(4), 525–529. [PubMed: 26098027]
- Ryan RM, & Deci EL (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68. [PubMed: 11392867]
- Sharp AL, Prosser LA, Walton M, Blow FC, Chermack ST, Zimmerman MA, & Cunningham R (2014). Cost analysis of youth violence prevention. *Pediatrics*, 133(3), 448–453. PMID: PMC3934329. [PubMed: 24515518]
- Suffoletto B, Callaway CW, Kristan J, Monti P, & Clark DB (2013). Mobile phone text message intervention to reduce binge drinking among young adults: study protocol for a randomized controlled trial. *Trials*, 14(1), 93. [PubMed: 23552023]
- Tebb KP, Erenrich RK, Jasik CB, Berna MS, Lester JC, & Ozer EM (2016). Use of theory in computer-based interventions to reduce alcohol use among adolescents and young adults: a systematic review. *BMC Public Health*, 16(1), 517. [PubMed: 27317330]
- Tzilos GK, Sokol RJ, & Ondersma SJ (2011). A randomized phase I trial of a brief computer-delivered intervention for alcohol use during pregnancy. *Journal of Women's Health*, 20(10), 1517–1524.

- Walters A, McPherson T, Adam C, Copeland V, Mayeda S, and Resko SM, (2016, 10). Integrating Adolescent SBIRT throughout Social Work and Nursing Education. Panel Presentation at the annual meeting of the Council on Social Work Education Atlanta, GA.
- Walters ST, Vader AM, & Harris TR (2007). A controlled trial of web-based feedback for heavy drinking college students. *Prevention Science*, 8(1), 83–88. [PubMed: 17136461]
- Walton MA, Chermack ST, Shope JT, Bingham CR, Zimmerman MA, Blow FC, & Cunningham RM (2010). Effects of a brief intervention for reducing violence and alcohol misuse among adolescents: a randomized controlled trial. *Journal of the American Medical Association*, 304(5), 527–535. [PubMed: 20682932]
- Warren KR, & Hewitt BG (2010). NIAAA: Advancing alcohol research for 40 years. *Alcohol Health & Research World*, 33(1), 5.
- World Health Organization. (2004). *Global Status Report on Alcohol*. WHO Department of Mental Health and Substance Abuse. Geneva.

Figure 1:
Rates of Internet Use in the U.S. by Education Level (Pew, 2017).

Table 1.**Examples of Technology Based Interventions for Alcohol Use Disorders**

Intervention	Description	Target Population	Outcomes
Brief Orientation Week Ecological Momentary Intervention Riordan, Conner, Flett, & Scarf, (2015)	Text-message intervention implemented during Orientation Week	University students	Reduced alcohol consumption among female students
Electronic Check-Up to Go (E-CHUG) (Walters, Vader & Harris, 2007)	On-line assessment, information and personalized feedback	Young Adults (aged 18–21)	Reduced consumption and frequency of intoxication among high risk drinkers
Electronic Screening and Brief Intervention (E-SBI) (Bendtsen, Johansson, & Akerlind, 2006)	Web-based screening and personalized feedback	College Students (aged 18–24)	Greater motivation to change drinking among students with risky drinking patterns
Web based feedback (Berwick, West, Gill, O'May, Mulhern, Barkham, & Hill, 2010)	8-week electronic personalized feedback and social norms information on drinking behavior	College-age young adults (aged 18–24)	Reduction in drinking over a 24-week period
Texting to Reduce Alcohol Consumption (Suffoletto, Callaway, Kristan, Monti, & Clark, 2013)	12-week short weekly text message feedback following emergency room in person screening.	High Risk Young Adults (aged 18–25)	Decreased number of binge drinking days over 3 months
Increasing Readiness to Change (Mason, Benotsch, Way, Kim, & Snipes, 2013)	4–6 personalized booster messages daily for 4 consecutive days	College students with problem alcohol use	Significantly increased participants' readiness to change
Supportive Text Messaging (Agyapong, Ahern, McLoughlin, & Farren, 2012)	Twice daily supportive text messages for three months	Adults with depression and alcohol use disorder	Improvements in depression and global functioning