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mHealth for Mental Health: Integrating Smartphone Technology in Behavioral Healthcare

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The rapid growth in the use of smartphones has opened a new world of opportunities for use in behavioral health care. Mobile phone software applications (apps) are available for a variety of useful tasks to include symptom assessment, psychoeducation, resource location, and tracking of treatment progress. The latest two-way communication functionality of smartphones also brings new capabilities for telemental health. There is very little information available, however, regarding the integration of smartphone and other mobile technology into care. In this paper, we provide an overview of smartphone use in behavioral health care and discuss options for integrating mobile technology into clinical practice. We also discuss limitations, practical issues, and recommendations.

Keywords: smartphone, mobile device, mHealth, apps, technology

Smartphones are mobile telephones with computer functionality that allow users to run software applications and connect to the Internet or other data networks. This technology provides users with the ability to engage in some activities on their phone much in the same manner that they could with a traditional personal computer except with the advantage and convenience of compact size and mobility. In 2008, smartphones only made up 10% of cellular phones used in the United States. Before the end of 2011, however, smartphones will likely become the most commonly used cellular phone device (Entner, 2010), and by 2013, smartphones are expected to overtake PCs as the most common Web access device worldwide ("Gartner Highlights Key Predictions," 2010). At least 300,000 software applications or *apps* have been developed for smartphones ("Introducing the App," 2010), and as of November 2010, more than 8,000 health related apps were available for users to download (Dolan, 2010).

Medical professionals have long been some of the earliest adopters of personal mobile technology for assisting with the daily routine of their practice. Portable electronic devices and specialized software have been utilized for health research, education, communication, reference, and patient care from the very earliest commercially marketed examples in the 1990s, such as the Apple Newton (Schweitzer & Hardmeier, 1996; Stratton et al., 1998) through the rise and decline of Palm Pilots and other personal digital assistants (PDAs; Teall, 2009; Vishwanath, Brodsky, & Shaha, 2009) to the current boom in multifunctional smartphones.

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Smartphone tools are now found in almost every facet of conventional medicine (Johnson, 2010; Oliveira, 2010; Solomon, 2009) with some apps such as *Epocrates* (Epocrates, 2011) and *MedCalc 3000 Complete* (Foundation Internet, 2010) medical calculator almost ubiquitous. Examples of medical uses cited in the literature range from diabetes management (Ciemins, Coon, & Sorli, 2010; Rao, Hou, Golnik, Flaherty, & Vu, 2010), perioperative practice (Brusco, 2010), infectious disease management (Focosi, 2008; Oehler, Smith, & Toney, 2010), immunization management (Kaewkungwal et al., 2010), and CPR instruction (You, Park, Chung, & Park, 2010), to highly specialized uses in radiology (Baerlocher, Talanow, & Baerlocher, 2010) as well as digital imaging and bio-optical sensing (Barsam, Bhogal, Morris, & Little, 2010; Choudhri & Radvany, 2010; Jonathan & Leahy, 2010).

Although handheld mobile platforms and smartphones have been in use within the medical community for some time, the adoption of the technology for specific use in behavioral health care has been slower, but is on the rise. Some recent examples of mobile technology use in behavioral health include assessment of alcohol and substance use (Bernhardt et al., 2009; Freedman, Lester, McNamara, Milby, & Schumacher, 2006), support of individuals with a traumatic brain injury and intellectual disability (DePompei et al., 2008), treatment of tobacco use (Obermayer, Riley, Asif, & Jean-Mary, 2004; Brendryn & Kraft, 2008), and for severe mental illness (Depp et al., 2010). Recent advancements in mobile device technology and the development boom of mobile device apps, however, have opened a new world of opportunities. We conducted a search on the BlackBerry App World site (http://appworld.blackberry.com/webstore/) in April 2011 and found more than 200 unique mobile phone apps specifically associated with behavioral health. The apps cover a wide array of common topic areas such as anxiety, depression, smoking, alcohol use, psychosis, diet, exercise, weight loss, nutrition, parenting, cognitive performance, relationships, relaxation, sleep, spirituality, and general wellbeing. As can be seen in Table 1, apps for Blackberry and other popular smartphone platforms, such as the iPhone and Android, exist for clinical assessment, symptom monitoring, psychoeducation, resource location, tracking treatment progress, skills training, and two-way communication with providers and other clinical resources. With this paper, we provide an overview of smartphone technology relevant for behavioral health care and discuss examples of its application. We also discuss primary issues involved when integrating this technology into clinical practice.

Smartphone Use in Clinical Practice

Smartphone apps provide useful functions that can be integrated into conventional manualized treatments. For instance, apps designed for self-assessments can help patients assess and monitor symptoms. In the context of therapy, these assessments can be shared with the treating clinician, tracked over time, and presented in a useful visual display to characterize treatment outcome. Smartphone apps can also be programmed to respond to critical items in self-assessments to auto-detect significant distress and, when appropriate, offer one-touch contact to a support hotline. The *eMoods Bipolar Mood Tracker* app (Gigaram Technologies, 2011), for example, consists of a daily tracking system that enables users to input and keep track of subjective mood ratings in an electronic mood journal. The app also keeps track of hours of sleep, anxiety levels, and medication use and can generate reports that can be sent to a family member, caregiver, or clinician.

Some evidence-based treatments include therapist audio recording of therapy sessions for patients to review later. The convenience, portability, and excellent quality of digital audio and video recording on today's smartphones make them an ideal choice for recording sessions. The capability of apps to record and date-stamp homework review can help ensure treatment compliance. Moreover, the integration of calendar and phone contacts by smartphone apps can improve tracking of therapy appointments and can hold therapist contact information for convenient and immediate reference.

Apps can also include virtual coaches that provide real-time audio and visual instruction while a patient practices a skill. For example, clinicians often provide therapeutic skills training, such as relaxation breathing techniques, and sometimes audio record in-session training for their clients so that they can practice later at home. Interactive or adaptive virtual training tools could coach the skill rehearsal to ensure successful skill acquisition. Also, physiological variables could be monitored by an app that incorporates gaming motivations and reinforcement for increased relaxation.

Behavioral health apps can also take advantage of the global positioning system (GPS) functionality of many smartphones that locates the device, and hence the user (patient), in geographic space. This feature can be useful for locating patients with dementia if they wander away and can help caregivers find them (Miskelly, 2005). Similarly, the GPS capabilities of many smartphones could be used to increase behavioral activation. That is, the smartphone can track the location of the client, such as to a busy mall during exposure therapy.

Real-Time Two-Way Communication Capabilities

The latest generation of smartphones, such as the iPhone4 and those running the Android operating system, have incorporated a video camera feature that allows synchronous and real-time audio and video capabilities from the palm of one's hand. This capability provides real-time remote communication between patients and providers similar to what is currently delivered by traditional videoteleconferencing (VTC). Because smartphones are not tethered to networks at fixed geographic locations, the two-way audio and video capability provides new opportunities for telebehavioral health that is low cost, flexible, and mobile, especially in rural and underserved areas where clinical services are not readily available. Although it is expected that these applications will expand concepts of care delivery, research into the usability for health care delivery is scant. The National Center for Telehealth and Technology (T2) is one organization that is leading usability research on these smartphone functions for use among military Service Members and health care providers. This research is important to demonstrate not only the capabilities of these devices, but also whether Service Members and providers will use them, especially in more austere environments such as on deployments overseas.

Information Resources and Psychoeducation

The smartphone platform is also an excellent and efficient method for accessing databases or other clinical information ex-

Table 1
Examples of Behavioral Health Apps Based on Clinical Area, Platform, and Purpose

Clinical area		
App name	Platform	Purpose(s)
Developmental disorders		
Autism Network	Android	Provides information, resources, and a forum for autism
ADHD Psychopharmacology	iPhone/BlackBerry/Android	Provides information on diagnosis and treatment of ADHD
Behavior Tracker Pro	iPhone/Android	Tracks and graphs behaviors
Life Skills Winner Pro	Android	Teaches life and social skills
Dyslexia Helper	iPhone	Provides treatment for dyslexia
Cognitive disorders		
Dementia News	Android	Provides information about dementia
Alzheimer's Info	Android	Provides information about Alzheimer's
Parkinson's i-pocketcards	iPhone	Provides information on the diagnosis, course, and treatment of Parkinson's
Geriatrics at Your Fingertips	iPhone/BlackBerry	Provides information on the assessment and management of geriatric disorders
Caregiver's Touch	iPhone	Allows caregivers to store personal, appointment, and health information
Substance-related disorders		
Blood Alcohol Tracker	Android	Tracks BAC
AlcoDroid	Android	Tracks alcohol use
Substance Abuse & Addiction Assessments	iPhone	Assesses substance abuse and addiction
Cravings Manager	iPhone/Blackberry	Helps control cravings
12 Steps AA Companion	iPhone/Android	Provides the "Big Book" and other materials for members of AA
Psychotic disorders		
Schizophrenia Psychopharmacology	iPhone/BlackBerry	Provides information on diagnosis and treatment of schizophrenia
SchizoTracker	Android	Tracks symptoms and triggers for individuals with schizophrenia
Mood disorders		
eMoods Bipolar Tracker	Android	Tracks mood and other symptoms
Mood Journal Plus	iPhone/BlackBerry	Tracks mood and other symptoms
T2 Mood Tracker	iPhone/Android	Tracks mood and other symptoms
Depression	iPhone	Provides assessments for depression
eCBT Mood	iPhone	Treats mood using CBT
Anxiety disorders		
PTSD Coach	iPhone	Provides information, assessment, and tools for individuals with PTSD
Breath 2 Relax	iPhone	Teaches breathing exercises
Stop Panic & Worry Self-Help	Android	Uses CBT to treat anxiety and panic
Anxiety Release Hypnosis Program	BlackBerry	Provides hypnosis for anxiety
iCounselor: OCD	iPhone	Treats OCD using CBT
Eating disorders		
Anorexia News	Android	Provides information on anorexia
BMI Calculator	iPhone/BlackBerry	Calculates BMI
Eating Disorder Assessments	iPhone/Android	Assesses for eating disorders
iCounselor: Eating Disorder	iPhone	Treats eating disorders using CBT
Stop Bulimia	iPhone	Treats bulimia using hypnosis
Sleep disorders		
Sleep Bot Tracker Log	Android	Tracks sleep patterns
Relax and Sleep Plus	Android	Provides ambient sounds designed to help individuals sleep
SleepCyclesApp Alarm	BlackBerry	Helps individuals wake up more refreshed by using alarms
Sleep +	iPhone	Provides relaxing music to help individuals sleep
Better Sleep	iPhone	Provides natural and white noise to help individuals sleep
Other		
Lookout Mobile Security	Android	Provides smartphone security
Healthful Apps	iPhone	Provides a database of useful health apps
DSM-IV-TR	iPhone	Provides DSM-IV coding information
ICD-10 Search	Android	Search for ICD-10 codes
Psych Central	iPhone/Android	Provides information on psychology

(*table continues*)

Table1 (*continued*)

Clinical area		
App name	Platform	Purpose(s)
Concussion	iPhone	Provides information on recognizing and diagnosing concussions
Epocrates	iPhone/Android	Provides information on medications
Parenting Toolbox	Android	Provides parenting skills training
Socialize!	iPhone	Encourages social interaction
Marriage Counselor by FeelSocial	iPhone	Provides marital counseling
Brain Booster	BlackBerry	Improves cognitive functioning
iEnforce Fitness	iPhone	Encourages exercise
iCBT	iPhone	Provides treatment using CBT

temporaneously. Apps, such as *DSM–IV–TR* (Application 6, 2011) and *ICD-10 Search* (Queo Sistemas, 2010), provide users with an efficient reference for psychiatric diagnoses. Furthermore, there are apps available, such as *Psych Central,* that summarize current behavioral health research findings and therefore can help clinicians to stay up-to-date in a focused area. Apps that are already in use in the medical field can also be useful for behavioral health providers. The *Epocrates* app (Epocrates, 2011), for example, is in use by more than one million health care providers in the United States ("Overview," 2011) and provides reference information on pharmaceuticals, dosing, contraindications, interactions and pricing information. Also, the basic Web browsing function on most smartphones allows users to access the world of information available on the Internet, no matter where they are located.

The audio and video functionality on smartphones also allows for both real-time and recorded media streaming and podcasts. Smartphones therefore offer an engaging audiovisual alternative to text-based psychoeducation materials. Podcasts are becoming a very popular way for individuals to obtain behavioral health information (Dingfelder, 2010). One behavioral health podcast website, thepsychfiles.com, produces podcasts that cover a wide variety of topics. It is estimated that 3.8 million podcasts from this website have been downloaded worldwide (Britt, 2011). Podcasts are also starting to be used by some peer-reviewed journals to disseminate information to subscribers. For example, *The American Journal of Psychiatry* offers audio podcasts that highlight each issue and provide clinicians with an alternative way to learn about current research being done in the field. It is likely that the use of smartphones and other smart mobile devices for disseminating behavioral health information will increase as the adoption of this technology grows and developers find more creative ways to use mobile technology for this purpose.

Smartphones can also be used to provide patients with psychoeducation via text messaging. Although less technologically advanced than most apps, there is evidence that text messaging can be an effective way to disseminate behavioral health information (Kim & Jeong, 2007; Kubota, Fujita, & Hatano, 2004). Texting is especially popular among adolescents with over 50% of adolescents with cell phones sending at least 50 text messages per day (Lenhart, Ling, Campbell, & Purcell, 2010). Because text messaging offers a relatively simple and inexpensive way to send information to patients, text messaging will likely continue to be popular despite the advent of more advanced ways to communicate using specialized apps.

Other Smartphone Capabilities

Many smartphones have the capability to connect to external hardware devices, such as biofeedback sensors, for monitoring physiological signals. Biofeedback apps are a relatively new introduction to mobile devices that can be used for a range of behavioral health purposes, to include management of stress and related health and health problems, such as headaches (Nestoriuc, Martin, Rief, & Andrasik, 2008), insomnia (Taylor & Roane, 2010), chronic pain (Palermo, Eccleston, Lewandowski, de C. Williams, & Morley, 2010), and hypertension (Linden, & Moseley, 2006). The PLX xWave, for example, is a portable sensor that attaches to an iPhone, iPad, or iPod Touch that can track gamma, delta, theta, alpha, and beta brain waves to provide neurofeedback. Also, at the time of writing, Apple Inc. has plans for a "Seamlessly Embedded Heart Rate Monitor" for the iPhone platform. The device has an integrated sensor for detecting a user's cardiac activity and cardiac electrical signals. Apps providing this kind of physiological monitoring may provide increased fidelity, portability, and functionality over some traditional home-based biofeedback monitors.

Games are among the most frequently downloaded and used apps on the various smartphone app markets. Increased attention is being given to the potential to leverage video game technologies to promote health-related behaviors (Papastergiou, 2009) and this capability could also be extended to smartphone behavioral health apps. Furthermore, the unique capabilities of smartphones compared to traditional game consoles have the potential to improve the game experience by mixing real world behaviors with software performance. For example, a number of apps combine GPS, compass, and real world viewing capabilities that overlay computer generated information and stimuli to create augmented reality experiences. Given the number of evidence-based interventions that include difficult real world excursions for clients, there is high potential for engaging behavioral health apps that provide game motivations for desired behaviors. Apps for behavioral activation, exposure-response prevention, exercise, and in vivo exposure could prove quite useful, however, more research is needed in this area.

Social support is a frequently targeted area in clinical practice and social networking via the Internet is recognized for its potential to provide new opportunities for social engagement and connection (Amichai-Hamburger & Furnham, 2007; Campbell, Cummings, & Hughes, 2006). Several empirical studies have

demonstrated the benefits of social networking sites for mental health and well being (Ellison, Steinfield, & Lampe, 2007; Liu & Larose, 2008) and smartphones increase opportunities for social networking by making social media sites more accessible. Some of the most popular social networking websites (e.g., Facebook, Twitter, MySpace) have developed apps in order for users to more easily connect with others from their smartphone (Facebook, 2011; Twitter, 2011; MySpace.com, 2011). These apps provide patients with the opportunity to connect with others without having to sit in front of a computer, thus increasing the potential for them to give and receive support regardless of time or location. Several websites that provide health resources are also available on social networking sites, such as Facebook (http://www.facebook.com/). For example, Afterdeployment.org is a website that provides military service members, Veterans, and their family members with health resources and interventions. The site also can be found on Facebook where users can interact with others interested in the information on the website and ask one another questions that may aid them in seeking care.

Considerations

Although there are multitudes of possibilities that smartphone technology brings to behavioral health care, there are also several key considerations and limitations that both providers and consumers of care should be aware of. In the following section, we provide a brief overview of these considerations in order to familiarize the reader with the basic limitations and best practices when considering use of smartphone technology in patient care.

Usability and Acceptance Issues

Available technologies and popular preferences for using those technologies are constantly changing. It is therefore important for those planning the use of smartphone technology in behavioral health care to consider usability and acceptance by end-users. Feedback from users, when available, can be used to assess usability and preferences of particular apps. Review of published findings from usability and feasibility testing can be useful for determining what products may be acceptable. It is also important to consider that some patients will embrace use of smartphones while others might not prefer them or be able to afford them. It is therefore important to have alternative options available in the clinical tool set.

Some smartphone apps allow for end-user customization that could help to increase ease of use and preference for using a particular app. For example, visual appearance or choice of male or female voice narration can be adjusted on some apps. Content can also be "versioned" by developers to appeal to and best fit the needs of various audiences. Software built into smartphones as well as specialized apps can also be used to improve accessibility for persons with disabilities. For example, the app *TalkBack* (Eyes-Free Project, 2011) on the Android platform provides spoken feedback that can assist persons with visual impairments. Overall, it is important for providers to discuss usability issues with their clients and consider options for customizing the tools available.

Quality Standards and Safety

The sheer number of apps available makes quality control a significant concern. Currently, no oversight or standards for behavioral health via smartphone and associated apps exist. It is possible that behavioral health apps contain inaccurate information or purport to provide an assessment or intervention that is not evidence based. Therefore, it is important for those planning the use of smartphones and behavioral health apps to be aware of the evidence base for their use. We also recommend that users seek information about the developer of an app as this might provide some insight into the quality of the app. For example, *PTSD Coach* (Department of Veterans Affairs, 2011) is an app that was developed by the VA's National Center for PTSD and the Department of Defense's National Center for Telehealth and Technology. Users can therefore use the app with confidence regarding its purpose, accuracy, and adherence to established treatment guidelines. Overall, there is a lack of published research in this area and more data is needed to address the quality and efficacy of behavioral health associated apps that are being produced.

Patient safety should also be considered when using smartphones in behavioral health practice. Dropped calls and battery failures are some of the technological problems that could occur. Reliance on this technology with remote high-risk patients, such as those who are in crisis, might place them at greater risk if the technology fails. It is therefore important for providers to address these potential issues with clients and to have backup plans established as part of a safety plan. One the other hand, the use of smartphones or other mobile device technology can help providers to stay in closer contact with high-risk patients and to gather data rapidly, such as from symptom or behavioral checklists. Ultimately, we recommend that providers use clinical judgment to assess risk and to consider when and for which of their clients is the use of this technology appropriate.

Data Security and Privacy

Data security and patient privacy must be carefully considered when integrating smartphone technology into behavioral health care. Some of the most common threats to data security and patient privacy come from unauthorized access or physical loss of the mobile device. One of the most basic steps that should be taken to reduce unauthorized access to smartphones is to use the built-in password protection feature on the device. The use of third party encryption apps can also help to secure patient information that is stored and transmitted on smartphones. There are also apps available, such as *Lookout Mobile Security* (Lookout, 2011), which can be used to remotely delete data or "wipe" the smartphone in case the phone becomes lost.

The app software used on smartphones also poses a unique risk to patient confidentiality. Many apps gather and send user information back to the software developers, which can include the individual's username and password, contact information, age, gender, location, phone ID, and phone number. Furthermore, 55% of apps tested in one study were found to send some of this information to other companies (Thurm & Kane, 2010). This can pose a significant risk to user confidentiality if information were automatically released without the user's consent. In order to reduce risk to patient privacy, clinicians should be aware of what information apps collect and how this information is used once it is obtained. This information should then be presented to clients in an informed consent procedure that clearly states the benefits and risks associated with use of the smartphone.

In general, the Health Insurance Portability and Accountability Act (HIPAA) does not apply to end-users who store or share data between other end users on a personal mobile device. If the user transmits or shares protected health information with a health care provider (if a covered entity), however, the provider must ensure HIPAA compliance. Thus, it is important for behavioral health practitioners to be cognizant of how data is stored and transmitted when integrating smartphones or other mobile technology into their practice. The American Psychological Association (APA) Practice Central site (http://www.apapracticecentral.org/) provides specific information regarding HIPAA requirements for psychologists as well as information on the new The Health Information Technology for Economic and Clinical Health Act (HITECH Act). Also, The Ethical Principles of Psychologists and Code of Conduct provides some useful guidance on the issue of client privacy and confidentiality. The Code states that Psychologists take reasonable precautions to protect confidential information obtained through or stored in any medium and recognize that the extent and limits of confidentiality may be regulated by law or established by institutional rules or professional or scientific relationship. This would therefore apply to confidential information that can be transmitted and stored on smartphones or other mobile electronic devices.

Additional Ethical and Policy Related Issues

In addition to confidentiality concerns, communication with clients via smartphones or other mobile devices involves several other ethical and policy issues. For example, although texting and email provide almost immediate delivery of messages, users may falsely expect immediate responses (Luxton, June, & Kinn, 2011). It is therefore important to clearly specify expected response time with clients. It is also relevant for the practitioner to consider potential issues with multiple relationships and boundaries setting. The use of texting and email between clients and practitioners could create situations where therapeutic boundaries blur, such as messages during off hours or for social reasons outside of the scope of the therapeutic relationship. The Ethical Principles of Psychologists and Code of Conduct (APA, 2010) provides general guidance regarding these types of issues that should be considered when communicating with clients via smartphones.

It should also be acknowledged that the technological and functional advances of smartphones do not alleviate the need for providers to follow existing policy and local jurisdictional requirements. A prime example is the need to abide by state licensure requirements set by state psychology licensing boards (APA Practice Organization, 2010). Licensure is dictated by the state in which the patient is located and in the most simplistic form this requires a provider to be licensed in that state or risk liability of practicing without a valid license. There are varied nuances in these rules and the states are not consistent in how they interpret guidance pertaining to cross-state health care delivery or how they define telehealth services. Given the complexities of telehealth and the potential mobility of both providers and clients, state boards are actively pursuing updates to these regulations to both clarify and expand the level of cross-state care allowed. It is recommended that practitioners understand local jurisdictional requirements as well as their own malpractice insurance before engaging in cross-state care.

Conclusion

Current and emerging smartphone technology offers numerous capabilities and benefits for consumers and providers of behavioral health care. Advances in smartphone capabilities are increasingly viewed as solutions to expanding the range of health care delivery options. These technological advances, however, are outpacing many policies regarding the delivery of telemental health care. This is most evident in standard of care discussions about the delivery of clinical telemental health care to nontraditional locations such as mobile clinics or directly into a patient's home. Although these policies are designed to protect consumers and providers, the real consequence is often the creation of artificial barriers that limit the full potential of telemental health care delivery. Luxton, Sirotin, and Mishkind (2010) conducted a review of telemental health studies reported in peer-reviewed journals to provide an overview of safety issues associated with general telemental health care and to evaluate the safety of telemental health care delivered to unsupervised settings. Their review provides evidence that telemental health delivered to nontraditional locations can be safely managed. Demonstrating safety and usability are first steps to determining standard of care as they show both practicality and feasibility of delivery solutions. Once these first steps are met, policies to expand the widespread use of smartphones to deliver synchronous telemental health care can be addressed.

Although there are a number of apps available today that could address individual components used in evidence-based treatments, another approach is to develop specialized apps that deliver the full range of capabilities required for a patient and provider to engage in a specific manualized treatment. Despite the establishment of clinical practice guidelines, dissemination and implementation of evidence-based treatments has progressed very slowly (McHugh & Barlow, 2010) and it is possible that apps designed to support specific treatments could reduce provider implementation barriers and barriers to patient participation. If accurate, smartphone apps that support behavioral health clinical practice may go well beyond increasing personal convenience by further improving the quality and outcomes of behavioral health care.

Future widespread use of smartphone technology in the behavioral health field can be expected. Our increasingly mobile, tech-savvy, and health conscious society will demand care delivery solutions that expand beyond traditional office-based requirements to better fit diverse needs and lifestyles. Smartphone technology has the potential to make behavioral health care more accessible, efficient, and interactive for patients and can improve the delivery of evidence-based treatments. As we outlined in this paper, there are many advantages of the technology as well as key issues involved when planning its integration into clinical practice. More research is needed to provide data on the usability and clinical effectiveness of smartphone technology in the behavioral health field. Overall, the use of smartphones and other mobile technology has many benefits for both clients and practitioners. We recommend that behavioral health researchers and clinicians consider the evaluation and use of them as part of their practice, but also keep the evolving privacy, ethical, and policy issues in mind.

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