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Evaluating the promise of Health IT to enhance/expand the reach of mental health services

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Introduction

The concept of “reach” as described in the RE-AIM framework (Glasgow, Vogt, & Boles, 1999) refers to the proportion of diverse consumer groups who receive adequate, appropriate, and timely mental health (MH) services. Improving the overall reach of MH care, and reducing disparities in reach across groups in need, are urgent health care issues in the United States. Access to quality MH care is limited for nearly all populations, but is particularly limited for vulnerable populations such as the oldest and youngest persons, racial/ethnic minorities, the socioeconomically disadvantaged, and rural populations (Rost, Zhang, Fortney, Smith, & Smith, Jr., 1998; Melfi, Croghan, & Hanna, 1999; Snowden, 2001; Cachelin, Rebeck, Veisel, & Striegel-Moore, 2001; Alegria et al., 2002; Wang et al., 2005; Charney et al., 2003; Neighbors et al., 2007; Neighbors et al., 2008). While some of the gap between prevalence and treatment described in these studies may be due to consumer preference (e.g., low perceived need, cultural beliefs around the unacceptability of MH treatment), poor access and related barriers also interfere with receipt of treatment (Mojtabai et al., 2011). Limits on the reach of MH care can occur at a variety of levels, located within organizations, providers, and patients. At the organizational level, a shortage of MH providers can limit reach, particularly in rural and low income counties (Thomas, Ellis, Konrad, Holzer, & Morrissey, 2009). Individuals with private or public health insurance often find it difficult to locate or receive quality MH care due to constrained provider panels or long waiting lists. In most Medicaid and uninsured populations the need for mental health services far outstrips the capacity of safety-net providers. Provider-level barriers can include bias and stigmatizing beliefs (Wahl, 1999); discomfort with assessing and treating mental health conditions (Loeb, Bayliss, Binswanger, Candrian, & Degruy, 2012), beliefs about treatment (in)effectiveness, resource and time constraints, and burnout (Williams, Manwell, Konrad, & Linzer, 2007). Patient-level barriers include cost (Simon, Fleck, Lucas, & Bushnell, 2004), health-insurance coverage, distance to MH providers (Marcus, Fortney, Olfson, & Ryan, 1997; Fortney, Rost, Zhang, & Warren, 1999; Rost et al., 1998), lack of English proficiency (Derose & Baker, 2000), stigma (Barney, Griffiths, Christensen, & Jorm, 2009), and consumer discomfort with disclosure (Mohr et al., 2006).

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How can Health Information Technology (HIT) research improve the reach of mental health care?

Health information technologies (HIT) such as smart phones, apps or desktop software, and the Internet hold enormous promise for significantly expanding the reach of quality MH care (McHugh & Barlow, 2010) by addressing several of these barriers. HIT interventions have potential to reach a wide geographic area via remote delivery of care (Judd et al., 2001), to decrease the costs in delivering self-help and/or social networking interventions, and to allow for relatively rapid, centralized scaling up of interventions to a public-health dissemination level. In addition, some patients prefer anonymous self-help- and/or low-intensity treatments. Yet, little robust evidence exists about how using HIT might accomplish these goals. Currently, direct evidence is relatively sparse that HIT interventions deliver MH services to a greater proportion of persons in need than traditional MH interventions. In this paper we review the gaps in evidence supporting the promise of HIT interventions to increase reach, and propose recommendations for future research.

What have previous studies shown about HIT interventions for MH care?

A central justification for developing and disseminating HIT MH interventions is their potential to enhance reach by reducing multiple barriers to care. This may be particularly so in environments where MH specialists may be limited or unavailable, such as in rural communities, low SES areas, schools, or primary-care clinics—or in situations where demand for MH care may suddenly soar and outstrip existing capacity, such as in the case of natural disasters. In this section we review the evidence supporting or contradicting the increased reach of HIT MH interventions.

Enhancing delivery of mental health care in primary care settings

HIT interventions can support MH services provided by primary care practitioners (PCPs)—who often lack the support, training, and time to provide full-service MH care—by allowing PCPs to engage in telemedicine consults with remotely located specialists before providing some components of care such as pharmacotherapy and/or to clarify complex MH diagnoses. Work in this area is underway with efforts to develop telepsychiatry (virtual consultation), clinical decision support tools, and on-line treatment algorithms (Trivedi et al., 2007; Simon, Ludman, & Rutter, 2009; Wang et al., 2007; Hunkeler et al., 2000). It is not yet clear whether these efforts can scale to meet the needs of front-line clinicians in areas that are short of MH specialists, or indeed whether such remote support will be acceptable to clinicians. More work in this area is clearly needed to determine these HIT services improve reach.

HIT implementation of language variants for minority groups

Another route for HIT-enabled interventions to facilitate the reach of MH services to priority populations is through the rapid translation of evidence-based treatments (EBTs) into multiple languages. Currently, most HIT-enabled interventions in the US are initially created and evaluated in English. Creating additional language variants (e.g., in Spanish) requires some significant effort and time, and should go beyond simple language translation/back translation to include adaptations for cultural differences in perceptions of MH issues, acceptable actions to address these, etc. However, such HIT-enabled language variants may preserve and reuse much of the original programming, navigation, and structure of the initial HIT intervention, making it easier and more efficient to create additional language variants. Once these adaptations are created and validated these HIT-enabled language variants may ease the delivery of high quality treatments to groups that are typically under-served.

MH services in disasters

One of the few situations where the increased reach of HIT MH interventions is apparent has been when providing assistance to people experiencing mental health crises in widespread catastrophes or natural disasters. In these situations some HIT-enabled interventions could be rapidly scaled up to provide initial evaluation, triage, and/or intervention to very large numbers of people much more quickly than traditional services. A few HIT crisis interventions have been piloted. These are typically similar to a telephone hotline, but offering more psycho-educational content, self-evaluation, and triage. Early examples include self-assessment Internet sites to assist victims of the 2004 Indian Ocean Tsunami with evaluating whether they needed help for PTSD or other mental health difficulties (Vetter et al., 2011), Internet monitoring of mental health outcomes following Hurricane Katrina (Harvey, Smith, Abraham, Hood, & Tannenbaum, 2007), a feasibility pilot of an Internet-delivered intervention conducted following the September 11th 2001 terrorist attacks (Ruggiero et al., 2006) and a randomized trial of an updated version of the same program following Hurricane Ike in 2008 (Ruggiero et al., 2012). However, none of these studies directly examined the reach of these HIT MH services. Research in this area needs to be launched rapidly, requiring pre-planning of design and assessment methods suited to large-scale evaluation of HIT interventions for post-disaster mental health issues (Ruggiero et al., 2012). Future implementation of these protocols should include evaluation of whether HIT-delivered screening and interventions improves the reach of MH services, particularly early in the response to disasters.

Support for training, supervision, and ongoing quality improvement

Another way in which HIT may improve the reach of MH services is through systematized training and ongoing supervision in EBTs for providers. Although this approach has typically had the goal of improving the quality of existing MH care, lower cost and widely accessible HIT training experiences have the potential to expand the number of MH specialists, thus increasing service capacity as well as improving treatment quality. Several trials have tested Internet or other HIT-enabled therapist training programs (Dimeff et al., 2009; Mitchell et al., 2011; Gega, Norman, & Marks, 2007; Dimeff, Woodcock, Harned, & Beadnell, 2011; Epstein et al., 2011; Carise et al., 2009; Lysack, Lichtenberg, & Schneider, 2011; Jorm, Kitchener, Fischer, & Cvetkovski, 2010; Harned, Dimeff, Woodcock, & Skutch, 2011). These trials generally examined whether EBTs can be successfully implemented by existing MH organizations and providers, studying issues of interventionist fidelity/implementation, and organizational adoption and persistence, as well as impacts on consumer outcomes. However, to date there have been no studies of whether these HIT training programs can increase the overall capacity of the healthcare system and improve the reach of MH services.

Addressing system capacity, efficiency

The recent passage of mental health parity legislation (Barry & Huskamp, 2011) and the possible expansion of health-care coverage (Henry J. Kaiser Family Foundation, 2011) has focused attention on health-care provider shortages in many domains, including mental health. Many private and public health-care organizations have long waitlists for MH specialty appointments. Treatment delays are likely to become more pronounced if a greater proportion of the population obtains healthcare coverage, as intended in recent health-care reforms. If individual, traditional face-to-face treatment remains the norm, then inadequate access to evidence-based treatments will likely persist as well. A recent analysis of the unmet need for psychological services (Kazdin & Blase, 2011) recommends capitalizing on advances in technology to reduce the burden of mental illness. For example, HIT-enabled treatments may be provided as a “tiding over” service while waiting for traditional care, and/or paired with traditional visits so that the psycho-education and preliminary skills building

imparted via the HIT-enabled interventions may help make the most of limited direct contact sessions. This approach permits the MH clinician to focus on customizing individual patient implementation of the treatment and problem solving difficulties, while leaving the initial psycho-education and introductory explanations of new skills (e.g., activity scheduling and self-monitoring in cognitive-behavioral therapy) to the HIT interventions. In this way limited MH staff capacity can be most efficiently employed in this blended approach to expand the system capacity for service delivery.

Centralized telephone calling banks of specialists represent another HIT-enabled MH intervention approach that addresses limited capacity while offering greater efficiencies and catering to the desires of some consumers to minimize travel and/or receive services at times other than usual office hours (Simon et al., 2009; Wang et al., 2007; Hunkeler et al., 2000). However, as is also true of Internet-delivered interventions, it is not yet clear whether telephone-delivered interventions increase the reach of these services.

Lowering consumer threshold for initiation of treatment

Many individuals who might otherwise benefit from MH treatments are reluctant to initiate care because of stigma (Barney et al., 2009), discomfort with disclosure or with talking about private topics with an unfamiliar person (Mohr et al., 2006), fear of loss of confidentiality, or, in the case of pharmacotherapy, ambivalence about medications and/or concerns about harmful side effects (Aikens, Nease, Jr., Nau, Klinkman, & Schwenk, 2005; Aikens, Nease, Jr., & Klinkman, 2008). Many of these individuals may go entirely without appropriate care or delay seeking services until they are in a crisis state, at which time treatment is more difficult. HIT-enabled interventions may help lower the threshold for people who do not seek traditional treatment for the above reasons, thus extending reach for entry-level MH services. While self-help books, pamphlets or other media have been available for many years, variants of these programs may be distributed more widely and efficiently via HIT channels, thus lowering “acquisition costs”—that is, effort spent locating appropriate care, costs, etc. HIT-enabled screening tools such as self-report questionnaires may also aid in the rapid and low-effort matching of individuals’ concerns/symptoms with appropriate interventions. Finally, health information delivered via HIT channels may act as a “gateway” and increase consumer willingness to seek subsequent *traditional* MH treatment, although at least one study failed to find such a result (Costin et al., 2009).

Delivery of preventive mental health services

Most MH care has traditionally focused on treatment of active disorders or conditions. However, HIT may facilitate MH prevention programs to an even greater degree. Preventive interventions are typically of lower intensity, which makes them a good fit for the presumed lower complexity of most HIT-enabled interventions. Further, prevention programs are typically delivered to very high risk or universal populations. This population-level implementation is facilitated by the ability of HIT programs to be scaled up more efficiently and often at a lower per capita cost compared to traditional face-to-face MH preventive interventions. For example, scaling up an Internet-delivered intervention (e.g., expanding access to an entire state’s safety net population) might require only modest additional effort in terms of making the URL available (e.g., publishing this in patient newsletters, in “referral” handouts delivered by providers), increasing server capacity for handling the anticipated increase in user accounts and traffic, and executing license and data use contracts. Scaling up traditional MH prevention or treatment for the same population would involve huge new staffing hires, training for the same, increased office space for visits, and so on. Further, nearly all of the effort for scaling up a HIT intervention typically occurs at a single hosting organization (making it easier to enforce quality control). In contrast, scaling up traditional MH capacity would most often be widely distributed across many different

clinical settings. This latter, distributed approach is less amenable to improving reach because of its greater cost and complexity; in addition, it is more vulnerable to variation in adherence and quality.

Some trials have evaluated HIT prevention programs, most with positive benefits (Morgan, Jorm, & Mackinnon, 2012; Lintvedt et al., 2011; Eyrich-Garg, 2010; Christensen et al., 2010a; Hoek, Schuurmans, Koot, & Cuijpers, 2009; Van Voorhees et al., 2009). However, the issue of reach has not been systematically addressed in these trials, but is often inferred as being increased by use of HIT.

Speeding innovation and adoption

There are at least three additional ways in which HIT-enabled interventions may speed the cycle of intervention development, evaluation, and eventual dissemination—and thus accelerate the reach of these interventions to a greater number of individuals. First, the widely distributed nature of the various HIT modalities—smart phones, Internet, telepsychiatry—means that the initial versions of most HIT-enabled interventions are already in a dissemination-ready format. Too often, the development of traditional treatments has resulted in an initial protocol that is too cumbersome for easy dissemination, and eventually must go through a process of revision and streamlining to make it more feasible in real world settings. Many HIT-enabled interventions skip this initial “over-built” stage, and are initially evaluated in effectiveness or dissemination trials. Similarly, many HIT interventions can be updated in an iterative fashion while the program remains in use (e.g., updated webpage content periodically posted), in contrast to traditional interventions where updates or refinements may be disseminated very slowly.

Second, trials of HIT-enabled interventions often meet recruitment goals more quickly and cheaply (with samples of several thousand or more), permitting them to qualify more quickly as evidence-based treatments and thus build the evidence base more rapidly and efficiently. Finally, unlike traditional psychotherapies but in common with pharmacotherapy, many HIT-enabled interventions are developed and marketed by for-profit organizations that have a built-in motivation to promote the widespread dissemination of their product to as broad a market as possible. While profit is a motivation for these companies, the per-consumer cost of these HIT programs is typically only a fraction of the cost of traditional treatments. For example, many pay-to-use Internet programs cost \$25 to \$50 total per user, regardless of the frequency/duration of use of the program. All these factors have the potential to increase the reach of these services to the relevant consumers. However, these advantages remain theoretical at this point; anecdotal evidence has not yet been supplemented by formal evaluation or review.

Reducing financial and cost barriers to treatment

The potentially lower costs of HIT interventions, compared to traditional MH interventions, are often cited as an important means by which HIT MH interventions will improve reach. It is useful to examine the facts associated with this assumption. The initial costs of developing HIT-enabled interventions can be relatively high, with programmers, interface designers, and hardware in addition to content experts such as MH specialists. However, once initial programming and development costs are incurred, the incremental cost for delivering the intervention to each additional person is often very low. This is particularly true for self-help or entirely automated programs, but less true for interventions requiring modest coaching by live therapist/coach via email, phone, or text messaging (SMS). Little evidence exists about the cost-benefit of HIT-enabled interventions relative to traditionally delivered MH treatments. There has been a long standing assumption that while traditional psychotherapies are more expensive they are also more curative, and that inexpensive HIT-enabled

interventions yield less clinical benefit. However, few studies have made the direct comparisons of clinical outcomes obtained via these different intervention routes, and fewer still include economic analyses to examine cost-benefit ratios. While a few trials currently underway either compare HIT-enabled interventions to traditional treatments (Christensen et al., 2010b) and/or include economic analyses (Tate, Finkelstein, Khavjou, & Gustafson, 2009; Kaltenthaler et al., 2006) much more research is needed in this area of study. Studies are needed that first demonstrate that HIT interventions are in fact less expensive overall than traditional treatments, and that they are more cost effective (that is, cost per unit of improvement). Finally, research is needed to examine whether less costly HIT interventions do in fact improve reach.

Stepped care and reach

Even if HIT interventions are found to have lower potency, they may still have a role to play in a progression of interventions such as a stepped-care sequence of treatments from least to most intensive/costly (Bower & Gilbody, 2005; Scogin, Hanson, & Welsh, 2003; Katon et al., 1999). This is in recognition that not all consumers need or desire the most intensive of interventions, and that lower cost (and potentially lower benefit) HIT-enabled interventions may be sufficient for a significant proportion of persons with less severe conditions (Scogin et al., 2003). These approaches also enable a more rational allocation of limited MH treatment funds, matching intensity/cost of treatment to the level of individual need.

One area where clinical efficacy and cost efficiency has been studied in more detail is telepsychiatry—the delivery of psychiatric applications using tele- or video-conferencing. Telepsychiatry-delivered therapy appears to yield clinical benefits equivalent to face-to-face therapy (O'Reilly et al., 2007; Garcia-Lizana & Munoz-Mayorga, 2010; Ruskin et al., 2004) and several studies have found greater cost savings or cost efficiency relative to usual care, face-to-face services in both observational samples and randomized clinical trials (Hyler & Gangure, 2003; Rabinowitz et al., 2010; Spaulding, Belz, DeLurgio, & Williams, 2010). Of particular relevance for improving reach, much of the savings came from reduced consumer expenses related to travel. However, the costs to the healthcare system may be higher for telepsychiatry than for traditional face-to-face services (Modai et al., 2006), especially as expensive new equipment is first put into place and large up-front costs have yet to be spread across a higher patient volume (Persaud et al., 2005). Countering this are newer and less expensive technologies such as PC webcams or similar capabilities on smartphones, paired with peer-to-peer videoconferencing apps such as Skype or Facetime. Despite the potential benefits and cost-saving of telepsychiatry, there are still barriers to more widespread adoption—one being the difficulty in obtaining reimbursement for such services (Hilty, Cobb, Neufeld, Bourgeois, & Yellowlees, 2008) and another being the currently limited availability of videoconferencing equipment and capabilities in settings such as rural communities where telepsychiatry may be desired.

Looking beyond the mental health literature, we find reviews of general telemedicine impacts on reach. An AHRQ review (Hersh et al., 2001) examined the literature for three modalities of telemedicine services for the Medicare population. They concluded that there was only weak evidence for office/hospital-based telemedicine services improving access to care for consumers, and then predominantly just for rural locations. For other telemedicine modalities, they found little or no research examining whether it improved access or reach. Another review of interventions to improve the reach of health services to veterans (Kehle, Greer, Rutks, & Wilt, 2011) found that telemedicine-enabled consultation (for a variety of non mental-health specialties) was perceived as easier and more convenient than traveling to meet with specialists face-to-face. However, these outcomes were limited to self report in

the context of clinical trials or small scale comparisons, and do not address the issue of population-level impacts on reach as telemedicine is more widely implemented.

What Work is Needed?

More work is clearly needed in each of the areas described above, but there are at least four major domains in which our knowledge gaps are substantial and research must be encouraged.

- Research on impacts of HIT on reach of mental health care. While most novel interventions, such as new medications or psychotherapies, are initially evaluated in small tightly controlled efficacy trials, the evaluation of HIT-enabled interventions for effectiveness and impacts on access may ultimately prove quite different because so many HIT-enabled interventions are being implemented at present in real world settings, often with little or no evidence of benefit—nor, in most cases, with an ongoing evaluation of impacts. There is an incredible opportunity for researchers to partner with healthcare providers and systems to plan for evaluations of these real-world experiments. True randomized trials may not be possible in many cases. Instead, comparisons might be made within a single population before and after the implementation of HIT-enabled interventions (e.g., using interrupted time series analyses), or may be made between non-randomized groups differentially exposed to HIT-enabled interventions and compared using post-hoc adjustments for differences (e.g., propensity score methods).
- Research on engagement mechanisms. Understanding how and why consumers engage (or choose not to engage) in both traditional and HIT-enabled mental health care, is necessary to understanding how to refine HIT-enabled interventions to successfully reach out to those not currently receiving care.
- Research on the effect of HIT on therapeutic relationships with providers and peers. Does HIT lead to social isolation, or does it enable virtual connection that enhances treatment? Can patient improvement still occur even if HIT interventions generally fail to achieve the richness of psychotherapeutic relationships formed in high-quality traditional MH treatments?
- Comparative effectiveness research evaluating the strengths, weaknesses, and cost-effectiveness of traditional treatments vs. HIT alternatives. Although we are most interested in whether interventions improve reach, obviously clinical and cost outcomes—and implementation information—are very important outcomes as well.

Finally, it is important to briefly mention some concerns or limitations raised by researchers and consumers about HIT interventions potential solutions to improving the reach of MH services. First, there is a low (but growing) availability of high quality, evidence-based MH interventions on the Internet and it can be difficult for individual users to distinguish quality (tested) HIT interventions from other untested and potentially useless programs. Beyond initial efficacy studies of HIT-enabled mental health interventions, we need implementation studies testing the best approaches for making HIT interventions accessible and available, as well ways for patients to discern tested from untested programs. Relevant to the latter issue, trusted authorities such as the RAND Corporation, AHRQ, SAMSHA and others already screen and identify MH treatments that meet criteria for evidence based treatments; this could easily be expanded to include HIT interventions that meet similar quality standards. Second, there is some concern that consumer discomfort with “impersonal” technology and general HIT methods in this very personal area of mental health conditions could impede uptake. At this point, there is little evidence to substantiate this concern and indeed the opposite may be true: the lack of face-to-face contact may actually improve willingness to

seek mental health care. Third, privacy and legal constraints on HIT-enabled care (such as HIPAA, security issues limiting data exchange, uncertain “ownership” of data, lack of clarity about who is the responsible clinician or organization when MH care is provided via HIT, state-bound limits on licensed practice) have been noted as an area of concern. As these technologies are increasingly brought to market, policies and protections will need to be clear. Finally, there is some concern that HIT won't solve access problems in populations that lack access to smart phones, the Internet, or other e-communication modalities. The “digital divide”, with older, minority, or disadvantaged persons unable or unwilling to use HIT, may create further discrimination between “haves” and “have-nots.” However, a recent Pew Internet & America Life Project report (Smith, 2010) suggests that while the digital divide still exists it is closing at a relatively rapid pace and that much of the increase in Internet access among formerly unconnected groups is occurring via mobile technologies such as smartphones. It will be important for future research to address these cross-cutting topics.

Conclusion

Limited reach of mental health services is a pervasive problem in the U.S., and solving it will require innovations that enable us to extend our clinical reach into underserved populations without significantly expanding our workforce. In theory, HIT can extend access to MH care in several ways: by enhancing the reach to priority populations, addressing system capacity issues, supporting training, improving clinical decision making, lowering the “consumer's threshold” for treatment, delivering preventive mental health services, speeding innovation and adoption, and reducing cost barriers to treatment. At present, evidence is limited and research is needed, focusing on consumer engagement strategies, the benefits and harms of HIT for the therapeutic relationship, and the comparative effectiveness of various HIT alternatives.

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