

Current Directions in Videoconferencing Tele-Mental Health Research

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The provision of mental health services via videoconferencing tele-mental health has become an increasingly routine component of mental health service delivery throughout the world. Emphasizing the research literature since 2003, we examine (a) the extent to which the field of tele-mental health has advanced the research agenda previously suggested and (b) implications for tele-mental healthcare delivery for special clinical populations. Previous findings have demonstrated that tele-mental health services are satisfactory to patients, improve outcomes, and are probably cost effective. In the very small number of randomized controlled studies that have been conducted to date, tele-mental health has demonstrated equivalent efficacy compared to face-to-face care in a variety of clinical settings and with specific patient populations. However, methodologically flawed or limited research studies are the norm, and thus the research agenda for tele-mental health has not been fully maximized. Implications for future research and practice are discussed.

Key words: access-to-care, mental health care, rural, service delivery, tele-mental health, telepsychiatry, telepsychology, videoconferencing. [*Clin Psychol Sci Prac* 16: 323–338, 2009]

As a service delivery medium, tele-mental health using videoconferencing technology holds promise as a viable means of delivering high-quality mental health services to settings with significant access-to-care barriers (Frueh et al., 2000; Frueh, Monnier, Elhai, Grubaugh, & Knapp, 2004; McGinty, Saeed, Simmons, & Yildirim, 2006; Monnier, Knapp, & Frueh, 2003; Schopp, Demiris, & Glueckauf, 2006). Tele-mental health can be delivered via a range of technologies, including telephone, Internet and email, virtual reality simulators, and videoconferencing. However, the multisensory output and real-time quality of videoconferencing make it an attractive alternative to other technologies that access a narrower range of sensory modalities when assessing or intervening in mental health settings.

As suggested by the many novel program demonstrations reported in the tele-health literature generally, and the significant investment in tele-mental health infrastructure by large government agencies, such as the Veterans Affairs (VA) administration in the United States (Godleski, Nieves, Darkins, & Lehmann, 2008),

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it appears that the use of tele-mental health via videoconferencing has been widely embraced as a cost-efficient and effective service—particularly for those facing access-to-care barriers (Antonacci, Bloch, Saeed, Yildirim, & Talley, 2008; McGinty, Saeed, Simmons, & Yildirim, 2006; Norman, 2006; Shore & Manson, 2005). Research into videoconference tele-mental health has grown to reflect the attractiveness of this mode of service delivery, which takes a variety of forms including direct patient intervention and psychotherapy, assessment and evaluation, medication management, case management, supportive counseling, psychoeducation, and professional supervision and training, as well as administrative and managerial tasks (see Glueckauf & Ketterson, 2004; Godleski et al., 2008).

From an initial review of 68 peer-reviewed journal articles in the period 1970–2000 (Frueh et al., 2000), there were 63 new published reports three years later (Monnier et al., 2003) and 148 new publications from April 2003 to July 2008. This review is focused on the application of tele-mental health via videoconferencing to deliver patient interventions (as opposed to training or administrative activities via this modality) and the measurement of various outcomes from those interventions. Additionally, we briefly review recent findings regarding the application of tele-mental health to special populations for whom this medium may offer particular benefits. As we have completed two reviews of the tele-mental health literature previously (i.e., Frueh et al., 2000; Monnier et al., 2003), this article will predominantly draw on peer-reviewed literature from April 2003 to July 2008. Because technology advances have occurred rapidly in the past five years, studies conducted since 2003 are using much more sophisticated, faster, and cheaper technology than prior studies.

We examined MEDLINE, PsycINFO, and Telemedicine Information Exchange databases for literature on telepsychiatry. The search encompassed the period April 2003 (the end date of our previous reviews) to July 2008. The following terms were used independently in this search: telepsychiatry, telepsychology, tele-mental health, videoconferencing, and video conferencing. Articles resulting from the search of “video conferencing” and “videoconferencing” that were

unrelated to mental health practice were not reviewed. Nonreviewed articles from these searches focused on telemedicine that incorporated nonpsychological or nonpsychiatric disciplines (e.g., radiography, neurology). Both positive and negative outcome reports were identified in the literature, thereby limiting the likely influence of publication bias. Only articles published in peer-reviewed scientific journals were included. The lack of consistency in the terminology used in the tele-mental health literature remains an unresolved challenge (see Antonacci et al., 2008), and arguably, no single term adequately captures the nuances of the various related service delivery formats. For ease of comprehension, the term “tele-mental health” will be used in this review to describe only videoconferencing in mental health, which is typically referred to as telepsychiatry, telepsychology, and behavioral tele-health elsewhere. This review is not intended to be exhaustive of all information technology service delivery mediums and does not include telephone, email, or web-based mental health services.

WHAT WE ALREADY KNEW ABOUT VIDEOCONFERENCING TELE-MENTAL HEALTH

The research base for tele-mental health-related interventions is slightly more than 50 years old and a number of prior reviews are available (e.g., Frueh et al., 2000; Hilty, Liu, Marks, & Callahan, 2003; Hilty, Marks, et al., 2004; Hyler & Gangure, 2003; Monnier et al., 2003; Norman, 2006), though they predate a major proportion of the total research conducted on this topic, including most clinical trials. Prior to 2003, the tele-mental health literature largely consisted of novel applications and case studies, and based on the above reviews, provided the following:

1. Strong evidence for high patient and moderately high provider satisfaction for a range of tele-mental health services;
2. Strong evidence for the reliability of clinical assessments (neuropsychological testing, clinical interviews, mental status examinations) relative to face-to-face assessments;
3. Minimal evidence supporting the effectiveness of tele-mental health to treat specific mental health

diagnoses such as depression and anxiety disorders using well-established treatments;

4. Minimal evidence and anecdotal reports suggesting that unique qualities of tele-mental health may enhance treatment outcomes for certain populations;
5. Minimal evidence and anecdotal reports suggesting comparable effectiveness of tele-mental health for specific populations, including incarcerated patients, children and adolescents, rural populations, and older adults, particularly as a compensatory approach to service gaps in real-world practice settings.

The weaknesses previously identified in the research literature include a paucity of methodologically rigorous efficacy, effectiveness, and cost studies, and lack of research into the legal, ethical, and regulatory issues inherent in this application of technology to clinical practice (Antonacci et al., 2008; Frueh et al., 2000; Glueckauf & Ketterson, 2004; Hilty et al., 2003; Hyler, Gangure, & Batchelder, 2005; Kuulasmaa, Wahlberg, & Kuusimäki, 2004; Monnier et al., 2003; Norman, 2006; Pesämaa et al., 2004; Urness, Hailey, Delday, Callanan, & Orlik, 2004; Wootton, 2006). Very few tele-mental health studies include randomized, controlled designs. Further, the field has underutilized standardized clinical outcome measures, instead emphasizing satisfaction as a primary outcome domain (Antonacci et al., 2008; Myers, Valentine, & Melzer, 2008), even when psychometric properties of satisfaction measures were unknown or questionable (for a review, see Mair & Whitten, 2000). If tele-mental health was still considered within a framework of developmental research, such methodological shortcomings would be expected; however, sufficient evidence now exists to advance the field to randomized, controlled studies of outcome, process, and cost variables.

CLINICAL RESEARCH: 2003–2008

Clinical Outcomes

Novel Applications and Program Descriptions. The bulk of published reports on tele-mental health since 2003 falls into the category of novel clinical demonstrations and program descriptions. Tele-mental health service

or program descriptions have been published from around the world, although such reports from underdeveloped nations are rare. These service or program descriptions include reports in the areas of child and adolescent mental health service delivery (Browne, Reilly, & Bradley, 2006; Nelson, Barnard, & Cain, 2003, 2006; Ryan, Stathis, Smith, Best, & Wootton, 2005; Savin, Garry, Zuccaro, & Novins, 2006; Staller, 2006); family therapy (Bischoff, Hollist, Smith, & Flack, 2004; Hill et al., 2004; Keilman, 2005; Kuulasmaa et al., 2004); mental health services for the deaf (Austen & McGrath, 2006b; Lopez et al., 2004); substance use (Frueh, Henderson, & Myrick, 2005); cognitive-behavior therapy (CBT) for mood and anxiety disorders (Frueh, Monnier, Grubaugh, et al., 2007; Griffiths, BIGNault, & Yellowlees, 2006; Himle et al., 2006); cancer patients with adjustment disorder (Cluver, Schuyler, Frueh, Brescia, & Arana, 2005; Shepherd et al., 2006); mental health practitioner training and supervision (Ekblad et al., 2004; Fahey, Day, & Gelber, 2003; Heckner & Giard, 2005; Hilty, Alverson, et al., 2006; Meyer et al., 2005; Walter, Rosenquist, & Bawtinhimer, 2004); psychiatric consultation-liaison services (Hilty, Yellowlees, Cobb, et al., 2006; Hockey, Yellowlees, & Murphy, 2004); deployed military personnel (Grady & Melcer, 2005; Hill et al., 2004; Neufeld, Yellowlees, Hilty, Cobb, & Bourgeois, 2007); and diagnosis/assessment (Hildebrand, Chow, Williams, Nelson, & Wass, 2004; Kobak, 2004; Shore, Hilty, & Yellowlees, 2007).

Recent reports build on earlier research that focused on the application of tele-mental health to determine the reliability of psychiatric interviews and assessments (e.g., Baer et al., 1995; Ruskin et al., 1998; Zarate et al., 1997), its utility as a consultation, educational, and professional supervision tool (e.g., Clark, 1997; Hilty, Servis, Nesbitt, & Hales, 1999), and other case studies (e.g., Cowain, 2001; Glueckauf et al., 2002; Mitchell, Myers, Swan-Kremeier, & Wonderlich, 2003). Outcome findings common to recent program descriptions include high patient satisfaction, moderate to high clinician satisfaction, and positive clinical outcomes, albeit typically in the form of qualitative anecdotal evidence (Bischoff et al., 2004; Griffiths et al., 2006; Kuulasmaa et al., 2004). A recent study also demonstrated that both rural and urban primary care

patients were generally receptive to using medical and tele-mental health interventions via videoconferencing if offered; and they did not believe that videoconferencing technology would be overly sophisticated or complicated (Grubaugh, Cain, Elhai, Patrick, & Frueh, 2008). This same study found that rural patients in particular expressed a willingness to use telepsychiatry if it improved their access to services they would not otherwise receive.

The diversity of the novel applications described above highlights the increasingly ubiquitous and creative use of videoconferencing in mental health, but also demonstrates its greatest weakness. That is, most of these reports are nonrandomized and statistically underpowered with regard to sample size. Interestingly, there are several tele-mental health services that have now been operating for close to 10 years or more (e.g., Appal-Link, South Australia's Rural & Remote Mental Health Service, University of Arizona, University of California–Davis, University of Michigan, University of Nebraska–Lincoln), so more robust quantitative indicators of the success or failure of large-scale programs may soon be available.

Clinical Trials. In general, outcomes across clinical trials have been positive. However, only a handful of randomized, controlled studies of tele-mental health clinical outcomes has been published (De Las Cuevas, Arredondo, Cabrera, Sulzenbacher, & Meise, 2006; Fortney et al., 2007; Frueh, Monnier, Yim et al., 2007b; O'Reilly et al., 2007; Poon, Hui, Dai, Kwok, & Woo, 2005; Ruskin et al., 2004). These studies have all randomized participants receive either tele-mental health or face-to-face services, but differ significantly in terms of sample size, intervention approach, and outcome measures. The methodological shortcomings of these studies include inadequate power due to small sample size (Frueh, Monnier, Yim, et al., 2007; Poon et al., 2005), mixed diagnostic subject pools (De Las Cuevas et al., 2006; Fortney et al., 2007; O'Reilly et al., 2007), mixed or nonstandardized interventions that are difficult to replicate (O'Reilly et al., 2007; Ruskin et al., 2004), relatively small clinical within-group change between delivery conditions (O'Reilly et al., 2007), and as noted by others (Antonacci et al., 2008; Greene, Morland, Durkalski,

& Frueh, 2008) flawed conceptual and methodological approaches.

Some of the clinical studies described above have randomly assigned participants receive "treatment as usual" (TAU) via videoconferencing or face-to-face. These TAU packages have included components of supportive counseling, psychoeducation, and medication delivered to depressed veterans ($n = 119$; Ruskin et al., 2004) or a combination of CBT with medication delivered to adult psychiatric outpatients ($n = 140$; De Las Cuevas et al., 2006). In each of these studies, both intervention conditions yielded comparable outcomes, with few between-groups differences in symptom severity, treatment adherence, retention, or satisfaction. Participants in the videoconferencing conditions of these studies also reported high satisfaction with the medium and a rapid and strong development of therapeutic alliance (Ruskin et al., 2004). Although these larger tele-mental health efficacy studies controlled for provider and evaluator effects and used standardized assessments, the interventions delivered were generally brief in duration (20–30 min), nonmanualized, and difficult to replicate given their focus on site-specific patients and their needs.

The largest ($n = 495$) randomized, controlled study thus far compared tele-mental health to face-to-face TAU clinical psychiatric services delivered to distant communities in Canada (O'Reilly et al., 2007). TAU consisted of a clinical assessment by a psychiatrist and up to four monthly follow-up sessions, including some combination of medication management, psychoeducation, supportive counseling, and triage services. The two forms of service delivery were compared on self-report clinical outcomes, satisfaction, and postintake psychiatric admissions over 12 months. On all measures of clinical outcome, tele-mental health was comparable to face-to-face service delivery, with both groups reporting clinically and socially relevant levels of reduced symptomatic distress and improved mental health (i.e., a reduction from diagnostic caseness and reduced number of psychiatric hospitalizations). Participants also reported moderate levels of satisfaction with the medium. In the cost analysis, the average cost of tele-mental health was 10% less per patient, and 16% less per visit, than the cost of face-to-face treatment when travel and reimbursement expenses for

psychiatrists were taken into account. Overall, this study concluded that a brief tele-mental health intervention provided a more cost-effective clinical service with no loss of efficacy compared with traditional face-to-face care. However, the authors noted that while the brief tele-mental health intervention was as successful as TAU, they would not draw similar conclusions about equivalency with regard to more complex psychotherapies that they viewed as “more dependent on the therapist-patient relationship” (p. 842).

Smaller controlled trials of tele-mental health have used CBT to treat a variety of conditions, including adults with panic disorder and agoraphobia (Bouchard et al., 2004), combat veterans with posttraumatic stress disorder (Frueh, Monnier, Yim, et al., 2007), and children with depression (Nelson et al., 2003, 2006). CBT may be particularly well suited to tele-mental health in that it is focused on learning principles, is often time limited, and may not be as dependent on the therapeutic relationship than other insight-oriented or experiential therapies, thereby reducing the potential impact of technological interference on therapeutic alliance (Bouchard et al., 2004). Results suggest that CBT delivered via videoconferencing is at least as effective as CBT delivered face-to-face, although each of the above studies had small sample sizes (e.g., $n \leq 40$) and therefore may have been unable to detect statistically significant differences between groups. Furthermore, as argued elsewhere (e.g., Greene et al., 2008; O’Reilly et al., 2007), failure to detect a statistically significant difference in outcome does not necessarily indicate equivalence of outcome.

Results so far demonstrate that treatment delivered by videoconferencing results in no worse clinical outcomes than the same treatment delivered face-to-face. However, due to the lack of randomized clinical trials (especially for specific treatments and for specific patient populations) and the many methodological limitations in extant published studies, the evidence base to support the clinical efficacy of tele-mental health interventions remains underdeveloped.

Process Outcomes and Issues

Most tele-mental health research includes indices of clinical processes such as satisfaction, therapeutic alliance, therapeutic environment, clinical context, and

clinician skills (e.g., Bischoff et al., 2004; Foster & Whitworth, 2005; Frueh, Monnier, Yim, et al., 2007; Miller, 2003; Modai et al., 2006; Rees & Stone, 2005; Shores et al., 2004; Singh, Arya, & Peters, 2007). The most consistently reported outcomes for tele-mental health research are satisfaction and acceptance, which are virtually always high (Browne et al., 2006; Cluver et al., 2005; De Las Cuevas, Artiles, De La Fuente, & Serrano, 2003; Dobscha, Corson, Solodky, & Gerrity, 2005; Ekblad et al., 2004; Frueh et al., 2005; Greenberg, Boydell, & Volpe, 2006; Greenwood, Chamberlain, & Parker, 2004; Keilman, 2005; Krupinski, Barker, Lopez, & Weinstein, 2004; Meyer et al., 2005; Modai et al., 2006; Morgan, Patrick, & Magaletta, 2008; Morland, Frueh, Pierce, & Miyahara, 2003; Urness, Wass, Gordon, Tian, & Bulger, 2006). Patients participating in tele-mental health have specifically cited the benefits of reduced travel time, decreased lost work time, shorter wait times for services, and a greater sense of personal control over sessions (Hilty, Nesbitt, Kuenneth, Cruz, & Hales, 2007; Simpson, Bell, Knox, & Britton, 2005).

Compared to symptom reduction and cost-effectiveness, satisfaction is a simple variable to measure, and it is perceived to be a necessary first step for the development of good therapist-client relationships (Rees & Haythornthwaite, 2004). However, a common weakness of tele-mental health research, particularly in small studies and novel demonstrations, has been to overemphasize patient satisfaction as being the same as clinical effectiveness. Furthermore, the majority of studies examining satisfaction with tele-mental health have typically used study-specific measures of this outcome, and the psychometric properties of these instruments are largely unknown. Finally, we do not know whether patient satisfaction with tele-mental health would remain as high in the presence of alternative mental health services, or if ratings of high satisfaction are a by-product of simply being pleased to receive any service at all.

With low-quality videoconferencing, the potential exists for the therapeutic alliance to be ruptured or underdeveloped in tele-mental health (Rees & Haythornthwaite, 2004; Rees & Stone, 2005; Schopp et al., 2006; Starling & Foley, 2006). However, several studies suggest that patients rate the strength and

quality of the therapeutic alliance similarly in face-to-face versus videoconference service delivery regardless of intervention (Cluver et al., 2005; Morgan et al., 2008; Simpson et al., 2003; Simpson et al., 2005). To date, research has yet to empirically delineate optimal technical and environmental conditions for tele-mental health consultations, although experiential-based recommendations have been proposed (Cruz et al., 2004; Jones, Leonard, & Birmingham, 2006; Major, 2005; Miller, 2003; Rees & Haythornthwaite, 2004; Urness, 2003). Additionally, extant studies demonstrate that if transmissions do suffer from an “artificiality” as a consequence of bandwidth, camera resolution, color/picture, or sound distortion, this artificiality does not significantly disrupt patient satisfaction, accuracy of assessments, reliability of evaluations, or clinical outcomes for patients in a number of settings (Cruz et al., 2004; Hyler et al., 2005; Jones et al., 2006; Kennedy & Yellowlees, 2003; Sorvaniemi, Ojanen, & Santamaki, 2005; Urness, 2003).

Technological illiteracy (lack of knowledge, limited exposure to technology, or education about the equipment) and lack of confidence to manage problems involving technology are the main impediments patients describe in using tele-mental health (Alverson et al., 2004; Shore, Savin, Novins, & Manson, 2006; Starling & Foley, 2006). However, these issues can typically be overcome with education, exposure, and early-stage on-site support (Bischoff et al., 2004; Greenwood et al., 2004; Shore et al., 2006; Shore, Hilty, et al., 2007). Generally speaking, successful tele-mental health services depend on how practitioners and patients adapt to the technology and how they incorporate it into routine use, rather than on technical issues (Kerr & Norris, 2004; Morgan et al., 2008; Sulzbacher, Vallin, & Waetzig, 2006).

In contrast to typically positive patient ratings of satisfaction associated with the use of tele-mental health services, clinicians have often reported lower expectations regarding the value of tele-mental health (Austen & McGrath, 2006a; Cruz, Krupinski, Lopez, & Weinstein, 2005; Elford et al., 2000; May et al., 2001; Schopp, Johnstone, & Merrell, 2000; Werner, 2004; Whitten & Kuwahara, 2004). One study demonstrated that clinical psychologists report lower therapeutic alliance indices in tele-mental health conditions when ran-

domly assigned to evaluate face-to-face or videoconference therapy sessions (Rees & Stone, 2005). Despite initial concerns, clinicians generally report being satisfied with videoconferencing technology after using it (Austen & McGrath, 2006a; Foster & Whitworth, 2005; Grealish, Hunter, Glaze, & Potter, 2005; Ruskin et al., 2004; Starling & Foley, 2006; Wagnild, Leenknecht, & Zauher, 2006; Whitten & Mackert, 2005). Fortunately, evidence suggests that tele-mental health usually requires little to no additional clinician preparation time compared to a traditional consultation (Aas, 2003) and typically does not require significant modifications to adult protocols (Singh et al., 2007). Additionally, based on an examination of therapist fidelity ratings, it appears that manualized interventions can be delivered via tele-mental health in a competent and adherent manner (Frueh, Monnier, Grubaugh, et al., 2007).

Cost Outcomes

Cost data suggest that tele-mental health services demonstrate adequate cost-effectiveness, even when the assessment of success is extended beyond direct costs to include administrative, clinical, and social outcomes (Hailey, Bulger, Stayberg, & Urness, 2003; Hilty, Bourgeois, Nesbitt, & Hales, 2004; Hyler & Gangure, 2003, 2004; Kennedy, 2005). One study reported decreased costs associated with performing telepsychiatric consultations on a 384 kbps integrated services digital network from 2003 to 2005 (Shore, Brooks, Savin, Manson, & Libby, 2007). Psychiatrists administered the Structured Clinical Interview for DSM (SCID) to 53 non-VA-affiliated American Indian veterans and concluded that tele-mental health interviews cost \$8,000 less per clinic in 2005 than in-person interviews conducted the same year. In established clinics, the cost for tele-mental health in 2003 was \$1,700 more per clinic than in-person clinical interviews conducted the same year, but \$12,000 less in 2005. While costs associated with personnel, travel, and equipment remained relatively stable over the study period, a nearly $2\frac{1}{2}$ times reduction in transmission costs and three times greater frequency of use of tele-mental health technology were responsible for the greater economic efficiency of videoconferencing in the same time frame.

In a study conducted in Canada, individual patient costs for tele-mental health were lower compared to face-to-face consultations when a comparable number of patients were seen in both conditions (Persaud et al., 2005). Another study compared the cost of videoconferencing with the cost of sending a patient from a remote community for suicide risk assessment (Jong, 2004). The author of this study concluded that tele-mental health assessments saved nearly \$141,000 for 71 patients during 2003, while proving satisfactory to clinicians and patients alike. A report in the United States found that the cost of lost consultations via videoconferencing varied according to the type of consultation, number of appointments scheduled, and the baseline service level of the clinical setting (Krupinski et al., 2004). However, the cost of videoconferencing equipment and transmission since the time period of Krupinski's report (i.e., 1997–2003) has dropped considerably. This report also identified factors associated with unsuccessful consultations, such as changes in tele-health subspecialties, personnel turnover at tele-health sites, and missed or cancelled appointments by patients. More recently, data suggest that the cost-effectiveness of providing traditional face-to-face psychiatric consultations in rural areas is four times greater than the cost of tele-mental health consultations (Harley, 2006).

The use of in-home portable videophones as opposed to desk-mounted videoconference systems is yet to be fully demonstrated despite their potential to offer even greater convenience and access to consumers (Cluver et al., 2005). The average cost of plug-and-play videophones is likely to be prohibitive for most consumers at this time; however, as technology improves and prices for videoconferencing equipment decrease, the capacity for larger clinical services to purchase and “loan out” this technology to clients is likely to become more feasible. The potential of Voice over Internet Protocol technology to replace closed transmission networks offers significant cost savings through the use of Internet Protocol to Internet Protocol transmission. However, the quality of this transmission may vary and the critical issue of security and data encryption has yet to be effectively addressed in the tele-mental health literature (Miller et al., 2005).

Ethical, Regulatory, and Legal Issues

Published reports on the ethical, legal, and regulatory issues involved in the use of tele-mental health are largely anecdotal and generally describe recommendations to address regulatory or financial barriers to service implementation. These issues include integrating technology and evidence into practice, collaboration with law enforcement, cross-state licensure or collaboration with certified personnel, standard-of-care issues (including emergency protocols, determination of roles and responsibilities of involved staff, liability for risks of abandonment or negligence in the face of equipment failure), managing reimbursement regulations and disincentives, practice behavior and treatment approaches, clinical risk management, privacy and security, and infrastructure management (Hylar & Gangure, 2004; McGinty et al., 2006; Miller et al., 2005; Schopp et al., 2006; Shore, Hilty, 2007). Some patients have expressed concerns that videoconferencing technology may use insecure networks and reduce patient privacy if equipment is situated outside of traditional clinical areas, thereby increasing the risk that tele-mental health interactions may be overheard by others (Myers, Valentine, Morganthaler, & Melzer, 2006). The use of secure networks, encryption (Miller et al., 2005), and appropriate setup, and demonstration of the technology, should allay such fears (Frueh et al., 2000; Jones et al., 2006).

Concerns regarding tele-health practitioner experience and credentialing remain, and do not yet have any legal precedent set (Hylar & Gangure, 2004; Jones et al., 2006). However, the implementation of videoconferencing appears to be confined primarily to larger mental health service organizations/networks as adjuncts to traditional services; and these organizations are typically governed by preexisting standards of professional and ethical practice, including professional codes of conduct. So far, many ethical and regulatory issues surrounding tele-mental health service delivery via videoconferencing remain unaddressed (Hylar & Gangure, 2004; Koocher, 2007), and this lack of clarity extends to other electronic means of mental health service delivery as well (for a review of ethical considerations of online counseling, see Mallen, Vogel, & Rochlen, 2005). However, practice guidelines to address these shortfalls are gradually emerging (e.g., Shore & Manson, 2004, 2005; Shore, Hilty, et al., 2007).

RESEARCH WITH SPECIAL POPULATIONS: 2003–2008

Rural and Remote Populations

Significant differences in socioeconomic status, lifestyle behaviors, and access to care have resulted in health disparities between rural and urban communities (Institute of Medicine, 2004). Rural populations have unique characteristics that affect conditions of tele-mental health service provision, including provider cultural awareness and “local knowledge” that influence referral and support responses, firearm ownership that affects risk assessment and emergency management, and dual relationships or boundary issues in small communities (Alverson et al., 2004; Bischoff et al., 2004; Schopp et al., 2006; Shore, Hilty, et al., 2007). In addition, rural service providers face a number of unique challenges, including limited access to specialized training and consultation and limited options for assessment and treatment referral sources (Griffiths et al., 2006; Hilty, Yellowlees, & Nesbitt, 2006; Hilty et al., 2007). Despite these issues, research into rural populations supports the potential for tele-mental health to address the mental health disparities of isolated communities, particularly with regard to the provision of services where none are otherwise available (Bischoff et al., 2004; Greenwood et al., 2004; Myers et al., 2008; Thomas, Miller, Hartshorn, Speck, & Walker, 2005).

Active military personnel represent a unique population of remote patients who generally seek health care from military providers because they are perceived to better understand illness in the context of military life relative to civilian providers (Morland et al., 2003). However, travel to receive mental healthcare services from military personnel may be timely and cost prohibitive (Morland, Pierce, & Wong, 2004). A retrospective analysis of tele-mental health compared to face-to-face services for military personnel found no significant differences across conditions in prescription rates, service recommendations, tests ordered, or indices of therapeutic alliance (Grady & Melcer, 2005). Even more promising, the tele-mental health treatment condition in this study was associated with significantly better global assessment of functioning scores, compliance with medication plans, and attendance at follow-up appointments. These data offer hope that tele-mental health can address the access-to-care issues faced by patients and providers in rural or remote areas.

Ethnoracial Minorities

Although the literature on tele-mental health with ethnoracial minority groups is limited, a systematic framework (based on the *DSM-IV* outline for understanding cultural issues in psychiatric treatment) has been proposed to address cultural aspects of tele-mental health care (Shore et al., 2006). Since 2003 only a handful of tele-mental health studies have reported on ethnoracial minorities (Krupinski et al., 2004; Nieves & Stack, 2007; Vega, Pollitt, & Mays, 2007). One recent empirical study has indicated preliminary support for the diagnostic reliability of psychometric assessment tools administered via tele-mental health in an ethnically diverse sample of veterans (Shore, Savin, Orton, Beals, & Manson, 2007), while another small study conducted with Native American children and their families ($n = 21$) found preliminary support for the reliability of clinical assessments using tele-mental health, in addition to adequate acceptability and high satisfaction for tele-mental health services (Savin et al., 2006). Despite these promising findings, more methodologically rigorous research with various ethnic and minority groups is needed.

Children and Adolescents

The data on tele-mental health with children and adolescents are promising, though controlled trials with this population are lacking (Alessi, 2003; Browne et al., 2006; Savin et al., 2006; Starling & Foley, 2006). A review of 27 tele-mental health studies from 1966 to 2003 found that most studies on children and tele-mental health focused on satisfaction with clinical care, which was typically rated as high, or described novel programs or care (Pesämaa et al., 2004). Only two randomized, controlled studies of tele-mental health with children and/or adolescents have been published during our period of review (Elford et al., 2000; Nelson et al., 2003, 2006). Reporting twice on various outcomes of the same study, Nelson et al. (2003, 2006) reported positive and equivalent treatment outcomes between videoconferencing and face-to-face conditions. In their research, children ($n = 28$) with depression were randomized to receive eight sessions of CBT either via tele-mental health or face-to-face. They found an 82% depression remission rate that did not differ between service delivery conditions and concluded that

tele-mental health studies could feasibly be designed as randomized, controlled studies, and that CBT for depression delivered to children via tele-mental health was as effective as that delivered face-to-face (Nelson et al., 2006).

In the only other randomized, controlled study of tele-mental health with children, Elford et al. (2000) reported good concordance between psychiatric diagnoses and treatment recommendations delivered via tele-mental health versus face-to-face settings and high satisfaction with tele-mental health from parents and child participants; however, a preference for face-to-face assessments was maintained by psychiatrists.

More recent studies of children and adolescents (Greenberg et al., 2006; Myers, Sulzbacher, & Melzer, 2004; Myers et al., 2006, 2008; Pesämaa et al., 2004; Savin et al., 2006; Sulzbacher et al., 2006) have replicated earlier efforts to establish the acceptability or feasibility of tele-mental health for this population, yet concerns remain that this research is primarily descriptive rather than empirical (Greenberg et al., 2006). One report described a successful Australian program that has been in service for 10 years and has provided more than 600 telepsychiatry sessions annually in clinical intervention, professional supervision, and training (Starling & Foley, 2006). Clinicians in these studies reported the need for modified tele-mental health protocols for children under the age of five, those with developmental delays, and those who are extremely impaired. These studies also suggest that it may be helpful for a local provider to be present with the parent(s) and child for the initial assessment (e.g., Savin et al., 2006).

Older Adults

Older adults may have less experience with both interactive technology and mental healthcare use, possibly limiting their ability to benefit from tele-mental health technology. However, older adults may also be a group for whom tele-mental health can have particular advantages (i.e., by addressing transportation and mobility issues). Since 2003, studies with older adults have yielded equivalent diagnostic accuracy of dementia and cognitive functioning between face-to-face and tele-mental health modes of service delivery (Cullum, Weiner, Gehrman, & Hynan, 2006; Hildebrand et al.,

2004; Poon et al., 2005; Shores et al., 2004). It has also been suggested that videoconferencing can facilitate communication with dementia patients by limiting distracting gestures or behaviors from view (Savenstedt, Zingmark, Hyden, & Brulin, 2005). Although the data on tele-mental health in older adults are growing, extant studies have been small in size (i.e., $n < 30$) and have generally consisted of uncontrolled study designs. The study by Poon et al. (2005) was the first randomized, controlled study to compare the effectiveness of a cognitive intervention delivered via tele-mental health versus face-to-face among elderly, mildly demented, community-dwelling residents in Hong Kong ($n = 22$). Results from this study were promising and demonstrated the suitability of using tele-mental health with cognitively impaired elderly; however, the small sample size, small delay between treatment end and follow-up, and the lack of information regarding the content of the cognitive intervention limit the conclusions that can be drawn.

Incarcerated Patients

Descriptions of tele-mental health programs with incarcerated patients suggest this medium may provide increased clinician safety, cost savings, privacy, and an expanded range of services, including neuropsychological and competency assessments, diagnosis, and treatment (Brett & Blumberg, 2006; Khalifa, Saleem, & Stankard, 2007; Leonard, 2004; Lexcen, Hawk, Herrick, & Blank, 2006; Manfredi, Shupe, & Batki, 2005; Miller et al., 2005; Myers et al., 2006; Nelson, Zaylor, & Cook, 2004; Price & Sapci, 2007; Stankard & Saleem, 2007). Data also support the reliability of tele-mental health assessments in this population (Lexcen et al., 2006; Nelson et al., 2004). Once again, research with this particular special population of tele-mental health users is fraught with methodological limitations, including limited outcome evaluations, small sample sizes, and lack of controlled trials.

DISCUSSION AND CONCLUSIONS

Since our last review (Monnier et al., 2003), high levels of satisfaction and acceptance with tele-mental health have been consistently demonstrated among patients across a variety of clinical populations and for a broad range of services. Moreover, mental health

services delivered via teleconferencing technology generally appear to be clinically superior to reduced or no mental health services at all. Nevertheless, low tele-mental health session uptake rates and service surveys suggest that many clinicians who have not used tele-mental health remain skeptical about the feasibility of this medium of care (Austen & McGrath, 2006a; Rees & Stone, 2005). Similar to concerns noted more than 10 years ago (Baer, Cukor, & Coyle, 1997), inexperienced clinicians continue to believe that the artificiality of the transmission experience has the potential to negatively affect the therapist–client relationship. These beliefs remain despite the fact that process studies consistently indicate that tele-mental health sessions require minimal technical modifications on the part of the therapist, and the communication medium of videoconferencing appears to have little negative influence on clinical outcomes or satisfaction.

The clinical effectiveness of tele-mental health interventions in children, nonelderly adults, and elderly adults has been demonstrated via case studies, program evaluations, and some controlled trials. To date, however, there are few controlled efficacy and effectiveness studies, and research explicitly conducted with racial minorities or people living in rural areas is minimal. Of the studies that evaluate clinical efficacy, few ensure that both the face-to-face and tele-mental health conditions are assessed in a standardized or consistent manner. Additionally, with few exceptions (e.g., Krupinski et al., 2004; Shore & Manson, 2004), these studies typically fail to address the issue of missed appointments or missing data. It has also been argued that all tele-mental health efficacy studies should assess direct and indirect costs associated with this medium of care, and include longitudinal formal cost-effectiveness, cost-benefit, cost-offset, and opportunity-cost assessments (Glueckauf & Ketterson, 2004; Hilty, Bourgeois, et al., 2004). Such data are still lacking in the majority of published reports.

Although some studies have demonstrated an advantage for specific patient groups to benefit from tele-mental healthcare relative to face-to-face interventions (i.e., dementia patients, incarcerated patients, patients with eating disorders), the conditions under which the unique qualities of tele-mental health offer more to the patient than TAU remain elusive. In general, efficacy studies have focused on general psychiatric services

(Rees & Haythornthwaite, 2004) rather than on the delivery of psychotherapy, and most of the psychotherapy studies reviewed have failed to use manualized or replicable interventions. Large trials targeting specific populations with specific psychiatric disorders and using uniform approaches across conditions are needed to advance the tele-mental health evidence base. Thus, the same recommendations for the field remain four years after our last review of tele-mental healthcare: There is a need for randomized trials using established efficacious treatments and participants with similar symptom and demographic profiles.

One last methodological issue concerns the conceptual framework of study designs. Mental health outcomes research usually incorporates a traditional significance testing, between-groups study design that is based on the hypothesis that one group is statistically superior to another. However, this may be conceptually inappropriate for studies of tele-mental health service delivery where the hypothesis is that the experimental intervention (tele-mental health) does not differ from the control intervention (face-to-face care) in either direction by more than a prespecified unimportant or insignificant amount (i.e., *equivalence*), or does not differ by less than a certain amount in a one-sided test (i.e., *noninferiority*; Greene et al., 2008). In other words, because the goal of much tele-mental health research is to demonstrate that the novel mode of service delivery is “about as good” as traditional modes of service delivery, different study designs and statistical concepts are required. Such study designs and statistical concepts are poorly understood and rarely or inadequately applied (for a review of concepts, issues, and practical applications, see Greene et al., 2008).

In the past, tele-mental health research may have been inherently biased toward those providers and patients who already embraced the technology and service delivery medium (Whitten & Mackert, 2005). Studies that systematically assess users and nonusers of tele-mental health could ameliorate such biases and help identify barriers to implementation. The extant literature suggests that the use of tele-mental health in routine clinical practice settings is increasing, costs associated with videoconferencing are decreasing, quality is improving, and patients appear receptive to trying tele-health interventions to address their mental healthcare

needs. Given the growth and apparent success of tele-mental health service delivery over the past five years, it is reasonable to expect that tele-mental health will eventually demonstrate clinical outcomes for specific populations and mental health problems that are comparable to face-to-face care in randomized trials. In fact, there are currently a number of large-scale, federally funded clinical trials under way (see <http://clinicaltrials.gov>). Findings from these and future studies will be all the more significant in light of the growing data to suggest that tele-mental health interventions represent a feasible and cost-effective way to improve access to care for underserved clinical populations, such as ethnoracial minorities and people living in rural areas.

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Received May 8, 2008; revised October 23, 2008; accepted December 1, 2008.