

Information and Communication Technologies for Assessing and Treating Operational Stress Injury (OSI)



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1. Executive Summary

Operational stress injury (OSI) and posttraumatic stress disorder (PTSD) are health issues faced by many Canadian veterans of military operations in the previous century and more recently in Afghanistan. Assessing and treating OSI and PTSD is complex and costly. This report reviews current and recent research on how information and communication technologies (ICT) can be used effectively for this purpose.

Background

This report defines both OSI and PTSD and discusses their most common forms of assessment and treatment. The background section of the report provides an overview of these health issues and their clinical, social, and economic implications. This section includes a discussion of co-morbidity – co-occurring mental health problems associated with OSI – including traumatic brain injury (TBI), suicide, alcohol and substance abuse and anxiety and mood disorders, with a focus on Posttraumatic Stress Disorder (PTSD). The causes of PTSD can be understood in a variety of ways, as the result of pathophysiological changes in areas of the brain or the processing of trauma in ways that result in a reoccurring sense of danger. Retired and current members of the Canadian forces are at higher risk of developing OSI than members of the general public, and can face clinical, economic and social challenges to obtaining assessment and treatment, some of which can be addressed by using ICT.

OSI Assessment and ICT

ICT used for OSI and PTSD assessment includes computerized assessments, internet-based assessments, telephone interviews, videoconferencing, and other forms of ICT. The assessment section of the report reviews each of these technologies, comparing their effectiveness with more traditional methods. This section also discusses ethical, clinical, and other issues to consider when using ICT for assessing OSI and PTSD.

Researchers have used computerized assessments for psychological assessment since the 1970s. Computerized assessments, based on traditional pen and paper methods, can be administered on self-contained software or over the internet. While some people might express anxiety about using a computerized assessment tool, studies demonstrate that most clients react positively towards this method of assessment. Computerized assessment tools

can prompt clients to fill out missing fields, a feature that results in higher completion rates than traditional pen and paper methods. Internet-based assessments in particular are useful because they can reach clients across a broad geographical range.

Telephones are a ubiquitous technology easily accessed by the vast majority of Canadians. Privacy is one initial concern with telephone assessments, as clients could potentially be overheard, but computer assisted telephone assessment systems, where answers are given by using the numbers on the keypad rather than verbalizing, allow for greater anonymity.

Videoconferencing is currently the most popular ICT used for telemental health. Videoconferencing is a viable alternative to time-consuming and costly travel for in-person assessments, and some scholars suggest that assessments over videoconferencing are even preferable to in person assessment. Clients may feel less threatened and more comfortable in a videoconference session and may report more information than they would in an in-person assessment. Also, with the client's permission, videoconference sessions can be recorded and review by clinicians or specialists at a later date. Studies report high levels of patient satisfaction with this method of assessment, but it is important that the patients are comfortable with the equipment and assured of the confidentiality of the videoconference session. For example, clients need to know if the session is being recorded, and, if so, who will have access to the recording. More recent forms of ICT used for assessment include cell phone technology and handheld computers.

ICT and the Treatment of PTSD

Currently pharmacological and psychological interventions, including psychodynamic and cognitive behavioural approaches, among others, are used to treat clients with PTSD. ICT can offer important tools for the delivery of psychological treatments.

For treating OSI and PTSD, approaches using ICT include computer programs and internet-based tools such as websites and social networking sites. While used for decades for assessment and education, computer programs are still somewhat controversial means for delivering treatment because of issues concerning usability, computer skill levels and the potential to compromise the therapist-client relationship. However, more recent computer-mediated therapies are offered with varying levels of patient-therapist interaction and show promising results in the literature. Cognitive behavioural therapy in particular is well-suited

for delivery by computer, and, delivered over the internet, has the potential to reach isolated and stigmatized people and motivate clients through interactive activities and therapist feedback. Patient portals in particular can give clients a sense of empowerment; however, there is little research on patient portals for mental health despite the potential of portal applications in this area.

Videoconferencing has been used successfully for many years for treating mental health conditions, including OSI and PTSD. Videoconference is used for supportive group therapy, structured clinical interviews, family interviews and cognitive behavioural therapy with high rates of patient satisfaction. The literature reviewed for this report suggests that treatment over videoconference is comparable or better than the same treatment delivered in person. Treatment delivered over videoconferencing offers several advantages, including saving the time and money needed to travel for in person treatment and shorter wait times for follow-up appointments. Some veterans are more willing to discuss private and painful experiences in group therapy held over videoconferencing than in person, and some researchers suggest that videoconferencing for PTSD treatment may be a better means of treatment than in-person therapy because avoidance is a key feature of PTSD.

More recent approaches include virtual reality. Successfully used in the late 1990s to treat anxiety and phobias, virtual reality is a fairly new tool used to treat PTSD. Virtual reality increases presence, allowing the clinician to control exposure and reduce avoidance, which can be important for exposure therapy. However, there are several negative physical side effects documented, and the success of virtual reality treatment in the literature is based on small sample sizes. Handheld computers used for homework assignments and education are also briefly discussed in this section of the report.

Conclusions

When clinicians and clients are comfortable with using ICT, assessment and treatment can become equal to or can exceed in person assessment and treatment. Overall, the literature states that some types of ICT, like videoconferencing, can be highly effective tools for assessment and treatment, especially for those living in rural and remote communities. This report includes a comprehensive annotated bibliography as well as a chart detailing the various types of ICT used for the treatment of PTSD.

2. Introduction

In 2002, Veterans Affairs Canada and the Department of National Defence (DND) launched a mental health initiative to support Canadian Forces (CF) members, veterans, and eligible RCMP officers who suffer from OSI as a result of their service. The OSI initiative included opening and operation of OSI clinics across the country to provide specialized assessment and treatment services.

In January 2008, the OSI clinic to service the Atlantic Provinces opened in Fredericton, New Brunswick in partnership with River Valley Health (RVH) and Veterans Affairs Canada. In response to the launch of the OSI clinic, the National Research Council Institute for Information Technology (NRC-IIT) in Fredericton partnered with the Fredericton OSI Clinic and RVH to conduct this comprehensive literature review on how ICT could be used effectively to assess and treat OSI.

The immediate goal of this report is to provide the OSI Clinic and RVH with information to support their decisions on the best ways to use ICT for OSI assessment and treatment for clients in Atlantic Canada. The authors hope, however, that this report will additionally be more broadly useful to other OSI clinics across Canada facing similar challenges: how to best provide OSI services to clients living in rural and remote areas, and also urban areas located far from the OSI clinics.

The Fredericton OSI Clinic has a mandate to service clients in New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. In reality, to do this will require effective use of ICT. As a partner with River Valley Health, the Fredericton OSI Clinic will be able to draw on RVH's considerable experience with using telehealth for delivery of health services to a rural and remote population. In particular, RVH is a pioneer in the use of videoconferencing for health service delivery, with experience in this area dating back to the early 1990s and more recently having conducted several pilot initiatives using videoconferencing for mental health services in rural and First Nation communities.

The Fredericton OSI Clinic has state-of-the art videoconferencing facilities and staff capacity to use these facilities. The Clinic staff also has an active interest in using ICT effectively in its

operations. Recently, the OSI Clinic and RVH engaged the services of IT consultants to develop an operational model for delivering telemental health services to clients in the Atlantic region. This report will provide input to that process on possibilities and current practices related to ICT for OSI assessment and treatment.

ICT can support the work of the OSI clinic in many ways. The internet and videoconferencing can be used for assessing clients, particularly those who live a considerable distance from Fredericton and for whom the costs associated with travelling for a short assessment interview would be prohibitive. Applications such as social networking on the internet can be used to increase the contact time with clients at a pace suitable for both the client and clinician.

NRC-IIT is a partner on this project because of its mandate to develop and support ICT applications for health, in particular for health sector organizations in the New Brunswick Health Cluster. NRC-IIT researchers and other staff have considerable expertise to contribute to this project. Currently, NRC-IIT is exploring possibilities for developing innovative ICT applications that could be used by Canadian OSI clinics for more effective delivery of services to clients.

The general terms of reference for this project were to produce a comprehensive review of current and recent research on ICT for assessment and treatment of OSI. The project was conducted primarily by NRC-IIT staff, in partnership with RVH and the OSI Clinic in Fredericton. NRC-IIT staff on this project included research officers, analysts, and librarians with expertise on both the social and technical aspects of ICT in clinical health settings. The initial literature search, conducted by NRC-CISTI (Canada's primary institute for scientific and technical information), found literally hundreds of research publications. NRC-IIT researchers and analysts reviewed this initial list of publications and selected several hundred that are reviewed in this report. This report discusses published research only.

3. Background: Operational Stress Injury (OSI)

3.1. OSI Overview

The term "Operational Stress Injury" (OSI) is used by Veterans Affairs Canada to describe a host of persistent psychological difficulties that can arise from being involved in operational duties carried out while serving with the Canadian Military or the Royal Canadian Mounted Police (Veterans Affairs Canada, 2003). The term itself is not a medical term but rather a concept that encompasses a range of mental health problems, not limited to diagnosable ones. Anxiety disorders (e.g., posttraumatic stress disorder - PTSD), mood disorders (e.g., depression), substance abuse and dependence, as well as other problems that are not as severe but still interfere with the individual's daily functioning, can all comprise OSI.

Individuals who are exposed to traumatic or even stressful events, and who experience significant distresses following the event(s), are at risk of developing mental health problems. According to the Subcommittee on Posttraumatic Stress Disorder (2006), there are some unique risks of trauma associated with working in a war environment. These include dangerous military roles, (e.g., driving a truck at risk for encountering roadside bombs, patrolling the streets, searching homes for enemies), suicide attacks, sexual attacks, graves registration (e.g., searching for and recovering bodies), severe accidents, friendly fire, serving in medical units, killing or injuring someone, seeing someone being killed, injured, or tortured, and being taken hostage. With the on-going deployment of Canadian troops to Afghanistan, the issue of timely assessment and treatment of Canadian Forces' (CF) members returning with psychological difficulties is a forefront issue and one that the Department of Defence and Veterans Affairs Canada have recently been tackling (Veterans Affairs Canada, 2005). Often individuals might develop acute stress disorder, a diagnosis that is applicable within the first few weeks of the trauma, and some go on to experience symptoms that meet the Diagnostic and Statistical Manual of Mental Disorders' (DSM-IV-TR) criteria for Posttraumatic Stress Disorder. Others may not meet the criteria for either of these diagnoses but may exhibit symptoms characteristic of other OSI. What follows is a brief description of the major types of OSI, with a specific concentration on posttraumatic stress disorder. Whenever possible, Canadian data is utilized, and the literature is described

in terms of its relevance to CF members and veterans; the focus is not on the RCMP as military members are more likely to be receiving treatment at the Fredericton OSI clinic.

Sareen *et al.* (2007) conducted the first study which looked at the relationship between deployment-related experiences and mental health problems in the Canadian Military. A total of 8,441 currently active military personnel, aged between 16 and 54 years, participated in the study and underwent a mental health assessment. Results indicated that the prevalence of any mental disorder within the preceding year was 14.9%, and prevalence of self-perceived need for care was 23.2%. Additionally, the majority of individuals who met criteria for a diagnosable mental disorder did not use any mental health services. As might be expected, being deployed to combat operations and witnessing traumatic situations were associated with increased prevalence for both mental disorders and a perceived need for care.

3.2. Co-morbidity with OSI

A variety of mental health problems can co-occur within an individual; often, symptoms associated with one disorder might exacerbate or trigger the onset of another. For example, depression and alcohol abuse often co-occur at high rates, and one explanation for this finding is the self-medicating theory (Robinson, 2008). If a CF member returns from a tour and is experiencing symptoms of depression, and is having problems related to sleeping, it is possible that she/he could turn to substance use in an attempt to self-medicate (i.e., soothe symptoms and escape problems).

Anxiety and mood disorders also often overlap – so much so that some researchers (Barlow *et al.*, 2004) have questioned the utility of the separate categorical classifications of mental disorders that is put forth by the American Psychiatric Association in their Diagnostic and Statistical Manual for Mental Disorders (APA, 2000). Brown *et al.* (2001) documented the co-morbidity rates amongst over one thousand patients who had been diagnosed with a mood or anxiety disorder using a structured clinical interview. They found 55% of the sample had at least one other anxiety or depressive disorder at the time of the assessment, and when looking at the broader scope, the rate increases to 76% when additional diagnoses occur at any point in the lifetime. Clearly, co-morbidity is an ever-present issue in mental health and

is relevant because it can complicate treatment by creating more resistance and complicating factors that inhibit change and progress. In addition, the presentation of a disorder in an individual can be obscured by co-morbid issues (Brown & Barlow, 2002).

3.2.1. Traumatic Brain Injury (TBI)

According to Jones *et al.* (2007, p.1641), "*Mild traumatic brain injury is now claimed to be the signature injury of the Iraq and Afghanistan conflict*". Traumatic brain injury (TBI) occurs when a sudden trauma (e.g., a blow to the head or exposure to a toxin) causes damage or injury to the brain. TBI is also commonly called acquired brain injury, simply a head injury (National Institute of Neurological Disorders and Stroke, 2008), and sometimes has been termed "shell shock" (Jones *et al.*, 2007), though shell-shock has also been used as a label for other symptoms and disorders, including PTSD.

Symptoms of a TBI can include a loss of consciousness (for variable periods of time), headache, dizziness, confusion, ringing in the ears, a bad taste in the mouth, fatigue, change in sleeping patterns, behavioural and mood changes, and cognitive difficulties with memory, attention, or thinking in general (National Institute of Neurological Disorders and Stroke, 2008). Many symptoms of TBI also overlap with those of PTSD, mood disorders, and anxiety disorders. A TBI could potentially precipitate the development of these other disorders. This is why a thorough psychological assessment is always necessary, and in the cases of individuals who could be working and living in areas that put them at risk for TBI, a medical assessment by a physician would be an essential component of an overall assessment in order to rule out a TBI.

A study by Hoge *et al.* (2008) surveyed more than 2,500 U.S. infantry soldiers a few months after their return from a deployment of one year in Iraq. Of the sample, 4.9% reported sustaining injuries with loss of consciousness, 10.3% reported injuries which resulted in altered mental status, and 17.2% reported sustaining other injuries. Further analysis showed that of the soldiers who reported loss of consciousness, 43.9% met criteria for PTSD, as did 27.3% of those reporting altered mental status – this is compared to 9.1% of participants with no injuries who met criteria for PTSD. Finally, soldiers with a mild TBI were more likely to report missed work days, medical visits, more bodily complaints, and poor

general health, than soldiers not reporting a TBI. . A relationship was found between PTSD, depression, and TBI – specifically, these first two diagnoses were found to predict more physical health outcomes than just TBI alone.

TBI often co-occurs with substance abuse issues and severe mental illnesses; in Corrigan and Deuschle's (2008) study, 72% of participants who had a dual diagnosis of a substance abuse disorder and a severe mental illness reported at least one TBI. Furthermore, participants who reported a TBI had an earlier age of first substance abuse and tended to have worse current functioning.

3.2.2. Suicide

Suicide is a serious problem in society and, in general, certain groups have higher rates of suicide (e.g., individuals with a mental illness, Aboriginal people) (Canadian Mental Health Association, 2006). Some research has shown that more than 90% of individuals who commit suicide have a diagnosable psychiatric illness (Mann, 2002). PTSD and major depression have been associated with increased risk for suicide (Oquendo *et al.*, 2003); in a study of 156 psychiatric inpatients with a diagnosis of major depression, those who had co-morbid PTSD were more likely to attempt suicide. This finding held even after taking into account substance use, childhood abuse, and personality disorders.

Suicide is a particular challenge for the Canadian Military. The rates of suicide have been increasing, and in 2007 they reached the highest level for the past decade (36 suicides in total; a rate of 41.44 per 100,000 regular and reserve soldiers) (Hildebrandt, 2008). The current suicide rate in the Canadian Military is triple that of the general Canadian population (Hildebrandt, 2008). Some researchers and clinicians have posited that the recent increase is associated with the intensification of situations in Afghanistan, when troops moved to a more dangerous area in 2006 (Hildebrandt, 2008). People who are experiencing OSI are potentially at risk for suicide, depending of course on several factors, such as their premorbid level of functioning – the level of functioning prior to the onset of the OSI.

A study explored the suicide rates and associated demographic and clinical factors among veterans who were receiving treatment for depression (Zivin *et al.*, 2007). Nationally representative data from 1999-2004, comprised of information on 807,694 U.S. veterans,

was used in this study. Of this sample, 0.21% (1,683) had committed suicide by the final period of assessment. Some of the identified risk factors for suicide included: being male; being aged between 18 to 44; having had a psychiatric hospitalization in the year before their diagnosis of depression; and substance use. The researchers noted that both older and younger veterans were found to be at a higher risk of suicide compared to middle-aged veterans.

3.2.3. Alcohol and substance abuse

As noted earlier, alcohol and substance abuse disorders often simultaneously co-exist with other OSI and are common traps into which individuals trying to cope with significant stress might fall. Within the DSM-IV-TR there exists disorders of substance abuse and substance dependence – both involving the maladaptive use of a substance (e.g., alcohol, cannabis, cocaine, nicotine, etc.). Substance *abuse* is characterised by continued use of a substance despite negative consequences, and *dependence* is conceptualized as a more extreme form of abuse – where there are several cognitive, behavioural, and physiological symptoms that indicate that the individual is continuing to use a substance despite significant problems related to that use (APA, 2000). A diagnosis of dependence can be applied to all types of substances besides caffeine (American Psychiatric Association, 2000).

Federman *et al.* (2000) examined substance use among U.S. military personnel to explore whether it was associated with deployment. The results indicated that there was a higher incidence of heavy alcohol use among deployed personnel. This relationship was especially strong for women; they were three times more likely than non-deployed women to report heavy alcohol use.

Bray *et al.* (1999) studied the substance use patterns and levels of stress of more than 16,000 U.S. military personnel who had completed a survey related to their health behaviours. Findings indicated that both men and women were more likely to report that their military duties were more stressful than their personal or family lives. Furthermore, for women, stress associated with being a female in the military was related to use of illicit drugs and cigarettes. Specifically, the prevalence rates were as follows: for illicit drug use in the past year – 5.3% for females, 6.7% for males; for heavy alcohol use in the past month

– 5.3% for females, and 18.8% for males; and for cigarette use in the past month, for women the rate was 26.3% and for men, 32.7%.

3.2.4. Mood disorders

Mood disorders are a diagnostic category in the DSM which include several disorders such as major depression, bipolar (manic) depression, cyclothymia and dysthymia (milder versions of bipolar and depression respectively), and major depression, among some other less common types of mood disorders (APA, 2000). Depression is the most salient mood disorder to this report as it is the most commonly reported mental health problem among members of the Canadian Forces, according to the Canadian Forces Mental Health Survey (Statistics Canada, 2002).

Depression is characterised by feelings of worthlessness, hopelessness, lack of energy, and loss of interest, and also sometimes by suicidal ideation. Prevalence rates of depression for those in regular forces (e.g. full-time Canadian Forces members) suggest that in one year about 7.6% of CF members will meet criteria for Major Depression, and that 16.2% will meet criteria for it sometime during their lifetime. Indeed, the rate of depression in the Canadian military surpasses that of the general population (Statistics Canada, 2002).

3.2.5. Anxiety disorders

Anxiety disorders are the most prevalent type of mental disorder (Health Canada, 1996). In fact, research suggests lifetime prevalence rates for the general population for experiencing any type of anxiety disorder are noted to be as high as 24.9% - 25.1% (Kessler *et al.*, 1994; Bourdon *et al.*, 1988).

The anxiety disorder category of the DSM-IV-TR is comprised of several distinct disorders. One of these is panic disorder, the main feature of which is recurrent and unexpected panic attacks which result in fear of the physiological symptoms of panic. Following depression, panic disorder is one of the most commonly reported mental health problems among CF members (Statistics Canada, 2002). Some other anxiety disorders include agoraphobia – fear of certain places or situations that might render escaping from feelings of panic difficult

– and social phobia, which is characterised by fear of certain social situations (e.g., performance situations). Generalized anxiety disorder, of which the key features are chronic and excessive anxiety and worry, is also among these disorders, as is obsessive-compulsive disorder the features of which include obsessions which cause distress and or compulsions (e.g., checking appliances, counting, etc.) and which serve as attempts to neutralize the anxiety caused by the obsessions. Lastly, posttraumatic stress disorder, and acute stress disorder (which is characterised by the same symptoms as PTSD but is diagnosed immediately after a traumatic event), fall within the category of anxiety disorders. PTSD is an issue which has recently had widespread media attention in Canada, due to it being particularly combat-specific as it is often triggered by disturbing events that might take place in the life of a military member.

3.3. Posttraumatic Stress Disorder (PTSD)

According to the DSM-IV-TR (APA, 2000), PTSD is a disorder that is diagnosed when a person has been exposed to a traumatic event where she/he experienced actual or threatened death or serious injury, or experienced such threats to others (e.g., close family members or coworkers), and their response to this event involved intense fear, horror, or a sense of helplessness. Individuals with PTSD often persistently re-experience the traumatic event(s) through such things as nightmares, recurrent thoughts, feeling as if the event were actually recurring, having physiological anxiety reactions, and flashbacks, among other things (APA, 2000). PTSD is also characterised by avoidance of any stimuli that reminds the individual of the trauma. Individuals with PTSD are also hyper-vigilant and often experience over-arousal (ranging from having sleep problems to feeling irritable and having anger outbursts). Lastly, the DSM-IV-TR criteria specify that the symptoms must be experienced for at least a month.

Prevalence estimates for PTSD among members of the Canadian military suggest that it is the 4th most common mental health problem (Statistics Canada, 2002). Prevalence of PTSD symptoms in the CF was found to be 2.8% for regular forces and 1.2% for the reservists (Statistics Canada). Other documented research suggests, however, that PTSD rates can be quite variable, and that amongst some CF patients who had served in Yugoslavia in the mid 1990s, PTSD rates were as high as 13% (CBC news, 2006). Fikretoglu and colleagues

(2007) note that, in the nationally representative study of 8,441 CF members, of the 549 participants who met criteria for PTSD, only approximately two-thirds sought treatment. PTSD combined with depression was found to result in a higher likelihood of seeking treatment.

Among the general population, the prevalence of PTSD is higher in females (APA, 2000); there is debate, however, over whether this gender difference holds among military personnel. In some studies research has found that female military personnel are indeed more likely to report symptoms of PTSD, but there are contradictory findings that suggest the likelihood of development of PTSD is similar across genders in the military (Hoge *et al.*, 2007).

A study by Yarvis and colleagues (2005) that explored PTSD among Canadian peacekeepers abroad, noted the occurrence of PTSD as a result of both foreign and domestic service. The researchers also discussed how individuals with symptoms of PTSD may not meet criteria for full PTSD, but sub-threshold PTSD – where some symptoms are present but not enough to warrant a full diagnosis – can still be debilitating and can result in the development of full-blown PTSD later on. Yarvis *et al.* also documented that those peacekeepers in the PTSD group reported more depressive symptoms, alcohol use disorders, and physical health problems. Additional research has found that PTSD is associated with being at higher risk for developing health problems such as gastrointestinal, cardiovascular, endocrinological, and musculoskeletal system problems (Schnurr & Green, 2004).

Deployment has been associated with increased PTSD symptoms: in a large-scale study of U.S. military members, those deployed were three times more likely to report symptoms (Smith *et al.*, 2008).

3.4. Theoretical Formulations of OSI and PTSD

A variety of psychological theories exist for the explanation of causes behind psychological disorders and OSI specifically (e.g., psychodynamic, cognitive-behavioural, learning theories, and biological theories). To appeal to the scope of this paper only some of the theoretical explanations for PTSD will be discussed.

According to Vieweg and colleagues (2006), the clinical course of PTSD is driven by pathophysiological changes in 1) the amygdala (the part of the brain that regulates emotion), and 2) the hippocampus, which is responsible for memory and also the stress response. Tryon (1999) offers a neural network explanation called the Bidirectional Associative Memory model to help explain PTSD. The model has been supported with empirical evidence, and helps explain factors associated with PTSD.

One of the more popular psychological theories of PTSD is the cognitive-behavioural theory, put forth by Ehlers and Clark (2000). Based on this approach, PTSD is understood to occur when individuals experience and process the trauma in a way that leads to an ongoing sense of threat, due to overly negative appraisals of the trauma and consequences of it. In addition, disturbances in autobiographical memory are said to result in a strong associative memory and perceptual priming related to the trauma, meaning that many triggers may remind the individual of the trauma.

People experience trauma in various ways, and not all military personnel or RCMP who are exposed to traumatic situations will develop PTSD. The impact of traumatic events is influenced by personality characteristics of the individual and other environmental factors – as the severity of the trauma increases, the likelihood that PTSD will be an outcome increases regardless of personal and environmental factors (Barlow & Keane, 2001).

3.5. Current OSI Issues and Implications

3.5.1. Clinical

There are particular factors associated with the Canadian Military which might put some members at risk of developing PTSD. For example, according to a Canadian psychiatrist who specialises in treating CF members with PTSD (CBC, 2006), because of the small size of the Canadian military, often the front-end combat personnel have to go on more than one tour, and of course the more traumatic situations a person is exposed to, the higher likelihood of developing OSI or PTSD (Smith *et al.*, 2008).

Another issue that has clinical implications is the fact that PTSD and OSI symptoms often manifest themselves in somatic symptoms (i.e., physical complaints such as headaches, stomach-aches, etc.), and often these patients will present themselves to primary care medical settings and their symptoms will go unrecognized and untreated (Greenburg & Roy, 2007). Additionally, because of the stigma associated with mental health problems, certain symptoms of OSI may be even more likely to be reported and framed as physical complaints. The stigma still associated with OSI and PTSD often deters military personnel from seeking treatment; in addition there are misconceptions among the CF that a diagnosed disorder may affect their career (Grenier, 2002).

Patients who live in rural areas face unique challenges to obtaining treatment for their OSI. For example, the only Operational Stress Injury clinic for the Atlantic Provinces is located in Fredericton, New Brunswick, a considerable distance from many rural and remote areas of the Atlantic region. The Atlantic Provinces are especially likely to face rural treatment challenges since they are predominantly rural provinces. Transportation and travelling distance can be a major challenge for rural patients. The use, therefore, of telemental health has increasingly become a keystone to being able to effectively assess and treat OSI in veterans (Veterans Affairs Canada, 2005).

Some populations in the CF are particularly difficult to reach and to offer mental health services to – for example, it has been noted that trying to reach reservists once they are back from tours is a particular challenge (Nason personal communication, 2008). The length of time that it takes to detect PTSD and treat it can have serious implications on its course. Wait-times for assessment and treatment of OSI are, therefore, a serious clinical issue. According to Kessler and colleagues (1995), the average time to remission of symptoms of PTSD is significantly shorter in those individuals who seek treatment as compared to those who do not. There are significant costs to an individual's functioning if he/she does not seek treatment, as remission could easily take up to two years without treatment, if remission occurs at all. PTSD is already a very challenging disorder to treat (ScienceDaily, 2007), and the longer an individual needs to wait for treatment, the worse the prognosis.

Certain demographic factors of patients also have clinical implications. For example, some factors associated with older veterans in need of PTSD treatment present challenges to clinical treatment. This age group is likely to experience particular challenges such as having

difficulty or reluctance with regards to travelling, and increased hospitalization (Cook & O'Donnell, 2005). Furthermore, sometimes PTSD goes undetected and unassessed in older veterans who may have experienced trauma 50 years ago; often, the longer symptoms go untreated, the more complicated the issue becomes and so assessment and treatment becomes more challenging (Krystal, 1993).

3.5.2. Economic

OSI and PTSD have dramatic associated economic costs for the patients themselves, the Canadian Military, Veterans Affairs Canada, and Canadian society in general. For example, veterans with OSI may not be able to perform their typical occupational duties; fortunately, they can often seek compensation from Veterans Affairs Canada (Veterans Affairs Canada, 2008). Veterans Affairs and the Department of Defence cover the costs associated with assessment and treatment of OSI for current members and veterans – that is, they meet the costs of operating and running the Operational Stress Injury clinics within Canada, as well as funding treatment when personnel wish to consult with private practitioners or other non-military community resources (Veterans Affairs Canada, 2008; Nason personal communication, 2008).

Some estimates have been given of the economic costs of treating PTSD within the U.S. (Tanielian, & Jaycox 2008). For example, it has been estimated that to treat a case of mild TBI, the cost might be \$32,000 per case, and to treat more moderate or severe cases the range could be from \$268,000 to more than \$408,000. In the American context, again, it was found that the overall economic cost of treating PTSD and major depression for a two-year range is from \$4 billion to over \$6 billion.

3.5.3. Social

There are several social implications associated with OSI and PTSD specifically. Often individuals experiencing mental distress may not be able to function in their typical role as a family member, community member, or worker. This can impact not just the individual themselves, but people around them. In the case of a CF member suffering from PTSD who has a family, there is always the potential for negative impacts on their children, and on

their partners. Several of these disorders impact the social and interpersonal functioning of the individual (APA, 2000).

There are also safety issues at play. When CF or RCMP individuals are suffering from an OSI, especially if untreated, their ability to make decisions and to function could potentially be compromised – and if they are in a dangerous situation, or on tour, or other people’s lives are in their hands, then this is a serious risk. Substance abuse which is associated with OSI (Bray *et al.*, 1999) can most definitely be a risk to safety, if the individual is intoxicated while on duty, for example.

3.6. Accessing OSI and PTSD Assessment and Treatment

A mental health initiative to support CF members, veterans, and eligible RCMP officers who suffer from OSI as a result of their service was launched in 2002, by Veterans Affairs Canada and the Department of National Defence (Veterans Affairs Canada, 2008). This initiative focuses on enhancing the services and supports provided to Veterans, CF members, and eligible RCMP who suffer from OSI as a result of their work.

The opening and operation of OSI clinics across the country to provide specialized assessment and treatment services has been a feature of this initiative, and in January 2008 an OSI clinic to service the Atlantic Provinces opened in Fredericton, NB. A new OSI clinic is due to open in Ottawa, Ontario in December 2008 (Veterans Affairs Canada, 2008).

The process of accessing services for the assessment and treatment of an OSI was outlined during an information session with Mr. Nason, director of the Mental Health Clinic at CFB Gagetown, and the Atlantic VAC liaison for setting up the Fredericton OSI clinic. First, every CF member who returns from a tour of duty completes a “Bluebook” which is comprised of questionnaires on health-related issues; mental health practitioners enter the data from the questionnaires into a specialised software package, and are then alerted by the software to any CF member who might need a follow-up due to mental health concerns, such as suicidal ideation, for example. Next, in addition to all members completing the Bluebook, they are also scheduled to have an interview with a clinician. Unfortunately, not all CF personnel complete this interview (for a number of reasons, such as uncooperative commanding

officers (who are supposed to assist facilitation of interviews) and or uncooperative CF members themselves). This process is especially problematic for reservists, with whom contact is often lost following return from tour.

There are different referral processes depending on the individual who is seeking services from the OSI clinic. Veterans contact Veterans Affairs Canada directly, while members who are still in the CF contact their base medical officer, and RCMP personnel contact an RCMP medical doctor for a referral to an OSI clinic (Veterans Affairs Canada, 2008). Often if the CF member is still serving they will be treated on the base and will not be referred out to the OSI clinic.

CF personnel also have access to the Operational Stress Injury Social Support (OSISS) Program (Veterans Affairs Canada, 2008) which is made up of CF personnel who themselves have experienced OSI. In this program, a peer network helps support the individual with the OSI, and support is also offered to family members of those affected. Another service offered by Veterans affairs Canada is a 24 hour toll-free crisis telephone hotline (Veterans Affairs Canada, 2008).

3.7. Clinicians and Clients' Access and Use of ICT

Information and communication technologies (ICT) is a term that refers to any information or communication device(s) as well as its associated content, form, features, services and applications (Lievrouw & Livingstone, 2006). In this report ICT refers to computers, the internet, telephones, videoconferencing, virtual reality (VR), mobile phones, and other mobile devices (such as, for example, Personal Digital Assistants (PDAs)). Many ICT platforms are used for mental health, including computers (personal and handheld), virtual reality devices, audio and visual media (CD ROMs), and even handheld devices for empirical (evidence-based practices) research and clinical expertise.

The results of a 2002 Canadian Medical Association questionnaire on technology use revealed that, in one year, physicians' use of personal computers grew from 74% to 89%. Also more than a quarter (28%) of Canadian physicians were using a PDA in clinical practice, up 47% since 2001 (Martin, 2002). The number of Canadian physicians using PDAs grew to

almost one-third by 2003, with 32.5% of urban and 36.9% of rural physicians using the technology for medical applications (Garritty, 2006).

There is no one technology ideal for all aspects of clinical assessment and treatment. Instead research recommends the integration of ICT into all areas of clinical practice. For example, different ICTs can be used for screening and assessment (either virtual or in the clinic), psycho-education (teaching patients how to recognize signs and symptoms, relaxation techniques, etc.), homework (written exercises outside of regular therapy sessions), and treatment delivery (coping strategies, exposure – especially amenable to virtual reality technologies). Various ICT resources, such as personal and handheld computers, the internet, cell phones, text messages, email, CD-ROM, DVD, and VR need to be integrated with clinical experience. Health care providers need to identify IT resources relevant for their patient populations and use their clinical knowledge and patient preferences to integrate resources into their own clinical practices (Cucciare, 2007). What ICT will best work in a clinic depends on the individual clinics, the patients, and the clinicians.

In general, articles discussing ICT and client acceptance report high rates of user satisfaction, especially in rural and remote areas (Grubaugh *et al.*, 2008). As reported in several studies, clients are willing to use telehealth services for mental health assessment and treatment if it will save them travel time (Grubaugh *et al.*, 2008; Shore *et al.*, 2007b).

Some articles, however, report physician or clinician resistance to ICT assessment and treatment tools. In a 2006 study of a computerized behavioural health assessment tool administered in a clinic waiting room via a PDA, Zeman and colleagues noted that the clinic physicians' lack of motivation and interest was a barrier to the study. Many did not want to wait while patients filled out the electronic assessment in the waiting room, and as a result some of the forms were not completed. The authors noted, however, that physicians with a vested interest in the outcomes of the assessment, those who got to choose some of the specific questions asked, encouraged their patients to use the technology and were willing to wait a minute or two between appointments for the results. Their findings indicate that the use of technology in clinics is highly dependant on the interests and motivations of physicians (Zeman *et al.*, 2006).

Other authors also identify user expectations and hospital politics as additional factors that will determine the success or failure of ICT implementation (Lapointe & Rivard, 2006; Gryfe, 2006). “Resistance” to ICT, perhaps better termed as “reluctance” (Fraenkel, 2006), should ideally be met with the appropriate technology for the task and the particular clinic. ICT need to fit into the regular workflow of the OSI clinic, and should not be forced or artificially inserted. The successful implementation of new technologies necessitates careful consultation with all parties that will be involved in using the technologies (Fraenkel, 2006).

3.7.1. Access and use of ICT in rural and remote regions

As noted earlier, the only OSI Clinic in the Atlantic region will be serving clients in rural and remote regions of Atlantic Canada. It is interesting to note that people living in rural and remote areas have not only a higher need for telehealth services (to save travel time and costs), but also the lowest level of ICT access and broadband network services. The latest Statistics Canada survey of internet use (The Canadian Press, 2008) found a persistent pattern of lower use by rural Canadians compared to urban Canadians. Additionally, broadband network infrastructure is generally much poorer in rural and remote communities (O’Donnell *et al.*, 2008).

The lower level of broadband infrastructure in rural and remote communities means that some ICT solutions for OSI assessment and treatment – particularly videoconferencing and mobile applications – will face more challenges in these areas. For example, in satellite-served communities in Newfoundland and Labrador, mental health professionals using videoconferencing for professional development experienced ongoing transmission problems, including weather-related interference and transmission delay (Cornish *et al.*, 2003).

A number of studies have discussed mental health care delivered by telehealth to remote and rural populations (Grubaugh *et al.*, 2008; Grady and Melcer, 2005; Hilty, 2006; Shore *et al.*, 2007b; Shore and Manson, 2005). In the study by Grubaugh and colleagues (2008) rural clients felt more comfortable using telepsychiatry if it saved them an hour’s drive or more, and younger patients were more positive than older patients. As travelling by car

becomes more expensive due to rising gasoline costs, telemental health may become even more of an attractive option for both patients and clinicians.

River Valley Health (RVH), the partner organization on this project, has been delivering telemental health since 2005. RVH currently has a number of pilot programs and ongoing services using telehealth for mental health services for clients in rural areas. These include the telemental health and teleaddictions project with Tobique First Nation (River Valley Health, 2006b), ongoing clinical consultations by videoconference by psychology clinicians with patients, and a pilot project for psychological assessment by videoconference with patients in emergency rooms (ER) at a rural hospital (in 2007, this project was extended to all six ER departments in the region). All patients reacted positively to the program, with a high number (82%) preferring telehealth to travelling for care (Hagerman & McIntyre, 2007).

4. OSI Assessment and ICT

4.1. Current Clinical Practices for OSI Assessment

OSI assessments are typically conducted in-person with a health professional – a psychiatrist, psychologist, clinical social worker, or a psychiatric nurse. Clients are interviewed for symptoms, frequency of symptoms, and a history of traumatic events in order to determine if the patient meets the DSM-IV criteria for PTSD. The health professional also determines if there are any co-morbid psychiatric or medical conditions (Subcommittee on Posttraumatic Stress Disorder, 2006).

Time is a major factor in assessments. Assessments can be as brief as one hour, but can also take many hours, depending on the likelihood of co-morbidity and/or additional medical conditions. Other issues include access and potential stigma associated with OSI, as well as additional physical and psychiatric issues, including alcohol and substance abuse (Subcommittee on Posttraumatic Stress Disorder, 2006).

Excluding older rarely-cited tests, the Published International Literature on Traumatic Stress (PILOTS) database reveals 102 tests for adults and children. According to a sample survey of 565 International Society for Traumatic Stress Studies (ISTSS) members, the most popular tests include the Posttraumatic Stress Diagnostic Scale, Trauma Symptom Inventory, Life Events Checklist, Clinician-Administered Posttraumatic Stress Disorder (PTSD) Scale, PTSD Checklist, Impact of Event Scale-Revised, and Trauma Symptom Checklist for Children. The authors did not ask in the survey if any of these tests were administered via computer, which may have affected their findings (Elhai *et al.*, 2005). Rates of OSI and PTSD can vary according to the assessment method used (Engdahl & Eberly, 2004).

4.2 ICT Used in the Assessment of OSI

Adoption of ICT is successful when experts and clinicians work together to determine the OSI clinics' needs, the clients' needs, and match these needs with the available tools (Fraenkel, 2006). Clinics are currently adapting ICT for remote and onsite assessments for many reasons.

Currently there is a shortage of medical professionals in many areas in Canada, and access to health specialists is limited, especially in rural and remote areas. Assessments of mental health conditions are time consuming, and, after an initial learning period (Fraenkel, 2006), ICT used for assessment onsite or remotely can decrease time spent by medical professionals inputting data (Zeman, 2006).

Assessments administered by ICT can also help standardize presentation of questionnaires and eliminate incomplete data sets. Some ICT can also reduce experimenter bias and scoring errors (Collins & Jones, 2004), increasing accuracy while saving time.

Another reason for the adoption of ICT is because the population base is aging. Older adults are more likely to be hospitalized, have reduced mobility, have increased responsibilities at home (including the care of infirm relatives), and are less likely to travel in poor weather. Older patients overall are more likely to miss an appointment which indicates a need for alternative assessment and treatment options (Cook, 2005). While older populations may be less comfortable with, and less likely to own ICT, there have been studies that show that older adults are willing to use ICT if unable to receive care in their own communities (Shore and Manson, 2005; Shore *et al.*, 2007a; Shore, *et al.*, 2007b).

Researchers measuring the accuracy of ICT assessment tools are primarily concerned with how ICT-based assessments compare to traditional assessments – either pen and paper questionnaires or the structured clinical interview. Many studies found that ICT tools are just as valid as traditional assessments.

ICT can offer many benefits traditional tools lack. In some rural and remote areas ICT tools may be the only way in which people can seek initial screening or assessment for mental

health. It might, therefore, be more accurate to compare assessments using ICT tools to no assessment at all, and assessment via ICT is more effective than no assessment. ICT tools can also be superior to traditional methods for people who face anxiety issues or are afraid of stigmatization (Emmelkamp, 2005).

There are many types of ICT used for the assessment of OSI and other mental health issues. Computers with specialized programs, as well as internet-based programs, can aid in assessing mental health. Similarly, telephone administered structured clinical interviews are also used for assessments, sometimes in conjunction with a computer-assisted program that automates the process. Videoconferencing allows clinicians access to see the client while administering assessments. Finally, other technologies, such as mobile ICT can also aid clinicians in performing assessments. The different types of technologies, as well as the accuracy of assessment of each ICT, will be discussed in the following sections.

4.3. Computerized assessments

Researchers began to use computers in the 1970s for psychological assessment. In particular, questionnaire assessments, traditionally administered via pen and paper, could be easily converted into a computerized format (Collin & Jones, 2004).

Computer-based assessments are self-contained software systems. In this format the software is loaded onto, and run on, a personal (typically, desktop) computer. Data entered is retrievable in a form compatible with the analysis software (Hardre, 2007). This method of assessment can be helpful in a busy clinic where potential clients can enter their data onto a computer prior to their meeting with the clinician.

Computerized assessments allow for the standardized collection of information, can generate automatic scoring, and can employ branching logic so that if a client answers a question a certain way additional related questions will appear (Zeman, 2006). Computerized scoring and branching can ensure that data is entered correctly and that important questions are not overlooked. In fact, researchers have suggested that data collected by computers is more likely to be complete and accurate than data collected by clinicians because computer-assisted assessment programs automate scoring procedures, therefore eliminating data

entry errors (Coles, 2007; Kovera *et al.*, 1996); it is crucial, however, that medical professionals interpret the results, drawing on clinical expertise and judgement instead of relying solely on computer-generated assessment reports (Zeman, 2006; Alexander, 2006). Information not typically collected by the computer program (e.g., observational data, information from collateral sources, family background issues) may be very relevant in determining the overall diagnosis or in understanding contributing factors.

Computer administered assessments can be useful tools for clinics that need to service bilingual populations. In a trial of a speech recognition application for screening depression using a computer – the Voice-Interactive Depression Assessment System (VIDAS) – Gonzalez and Shriver (2004) evaluated aural and multimedia (including visual) methods for screening depression. They found that both visual and auditory elements were important components. The authors note that in the speech recognition program there were differences in the 158 English and 158 Spanish subjects' pronunciation, which may have significantly diminished the program's recognition. They conclude that the speech recognition was imperfect but that the VIDAS system worked well and subjects felt the interview was comfortable. Participants especially enjoyed the visual elements of the program, and the authors suggest that visual cues could be important in facilitating the interview process, especially for depressive clients. In assessments aided by computer systems there is a preference for visual and audio together, rather than audio alone (Gonzalez & Shriver, 2004; Gonzalez *et al.*, 2007; McGinty, 2006).

4.3.1. Clinical and related considerations

A negative attitude towards computers is one potential issue with computerized assessments of psychiatric patients. Some clients may be overcome with stress or anxiety when confronted with a computerized assessment tool, either on-line or in a clinical setting. In a 2008 study of computer attitudes in acute psychiatric patients, Weber *et al.* determined that an overall positive attitude to computers was evident even in severely ill patients, with 76.9% of 160 patients endorsing positive items in the "Attitudes towards Computers Scale" (ATCS). Researchers note that positive or negative attitudes towards computers in the study resulted from differences in age, gender, and educational level, with educational level being the best predictor of computer attitude (Weber *et al.*, 2008; Bai *et al.*, 2001).

Computerized assessments raise a whole host of potential ethical issues, including standard of care, appropriate use, and professional relationships. In order to assure standards of care there needs to be a multidisciplinary approach to the development of information systems for healthcare (Alexander, 2006).

The decision-making tool must be used for its designed purpose, with adequate training and care. Systems need to be designed with a usable interface that identifies problems in a timely manner. Clinicians also need to be qualified to use the technology in a way that does not place the client at risk (Alexander, 2006).

Individuals and groups should not become overly dependant on technology – clinical assessments should be based on both the computer generated reports as well as the clinician’s professional opinion. Computer reports should be used to inform clinicians but should not be their only guide (Alexander, 2006; Harvey & Carlson, 2003).

There are also concerns about the interpersonal and conceptual distance between the medical professionals and the clients that need to be considered. Clinicians need to communicate an understanding of the medical information system to the patient, who in turn needs to understand the system (Alexander, 2006). It is important that patients are informed of the limits of confidentiality of the technology from the beginning (Harvey & Carlson, 2003).

Individual psychologists are responsible for ensuring that the computer programs they use are appropriate. This can be accomplished through reading unbiased program evaluations (Harvey & Carlson, 2003).

Medical professionals also need to be aware of the potential for misinterpreting information exchanged using ICT. Email, for example, can be easily misinterpreted because of the potential quick response time, the plethora of email received, and the lack of social cues displayed by the ICT. Misinterpretation of such communications can be avoided by allowing for time before responding, limiting messages to one clear topic, and clearly labelling email with a subject header (Harvey & Carlson, 2003).

Documentation also exists that expresses concern over the potential misuse of computer test results. Researchers are concerned that automatically scored tests could lead to an oversimplification of the interpretation process. Unqualified clinicians could potentially rely solely on computer interpretations for diagnosis – a serious ethical issue covered by ethical codes for psychologists. Instead, clinicians need to carefully examine computer generated reports in order to ensure valid assessments of clients (Schulenberg & Yutrzenka, 2003). There are limitations to self-report data – for example, some patients have very limited insight, and so relying on data obtained from this type of method could result in invalid assessments.

4.3.2. Pen and paper vs. computer assessment tools

Most of the studies that have compared ICT-based assessment methods to traditional methods of assessment note that the computer method was comparable, or better than, traditional methods; the exception to this is the aforementioned study by Hardre and colleagues (2007) that compared pen and paper, computer, and web based assessment tools and found the traditional method to be the more accurate.

In a 2007 study comparing delivery of the Obsessive Compulsive Inventory via computer and pen and paper, Coles and colleagues (2007) noted that both methods of testing had similar means, consistency, and intra-correlations, suggesting that this particular test can be accurately taken on a computer.

4.3.3. In-person clinical interviews vs. computer assessment tools

There have been reliability trials of computer assessment tools specifically for OSI. Neal and colleagues (1994) conducted a study of 40 military personnel from the Royal Air Force Hospital Wroughton PTSD unit in the United States, comparing CAPS-1 (clinician administered) to CC-1-R (Computerized version of CAPS-1 Revised). In the study the computer version demonstrated high reliability and a high test-retest reliability, which

suggests that the computerized version of CAPS-1 can successfully measure PTSD (Neal *et al.*, 1994).

4.4. Internet-based assessments

Internet-based data collection is a type of computer-based assessment (Collin & Jones, 2004), which not only has the same issues as computer-based tools, but also has additional benefits and challenges.

Internet-based forms are diverse in nature; they can exist in many forms, from interactive and dynamic – incorporating sound and images – to verbatim digital versions of questionnaires traditionally administered in paper form (Hardre, 2007). Internet-based assessments are completed online by visiting a website, in some cases by logging onto a site, and either selecting items from a drop down menu, clicking on items, or typing into fields (Hardre, 2007).

A simple online keyword search for mental health assessment reveals a plethora of internet-based assessment tools for depression, anxiety and other mental health issues. Internet-based assessments are popular because they offer greater revision flexibility, can reach geographically isolated populations, are easier to translate into digital data, and offer shorter turnaround times than mailed items (Hardre, 2007).

Internet-based assessments also have other advantages. Internet-based programs can be set up anonymously, and can be important resources for individuals who are avoiding clinical assessment for fear of stigmatization. Internet tools also can reach large numbers of people across a wide geographic area, all at a low cost to the provider and the client. Internet-based tools allow participants to work at their own pace wherever computer terminals are located. Test results can be automatically scored and immediately given to medical professionals and/or patients. Most internet-based assessments also generate personalized reports, which can be printed out by the client and brought to their medical appointments (Lin, 2007; Carlbring *et al.*, 2007). Information received via web assessments can be more complete because registration items can be made necessary before submission of the questionnaire and clients can be given prompts to fill out missing information (Carlbring *et*

al., 2007). Internet-based questionnaires generally receive higher completion rates and generate greater self-disclosure from participants (Jones, 2008). Rural healthcare providers, in particular, report higher satisfaction rates with computerized assessment systems than in suburban or urban areas (McGinty, 2006).

4.4.1. Clinical and related considerations

Internet-based assessments also have additional constraints as well as benefits. Research has found that internet-based results are not the same as results from computer-based systems; there are different constraints on internet-based assessments and they need to be evaluated and shown to be equivalent (Collin & Jones, 2004). It is important to note that not all assessment questions can be transferred directly onto the web. Adjustments in wording and scoring of assessment tools may be needed (Carlbring *et al.*, 2007). If improperly designed, web-administered assessments may be biased towards younger and more technologically skilled users (Hardre, 2007). There also can be issues related to the environment in which the assessment is completed. The testing environment and presentation of the testing stimuli for internet-based assessments cannot be controlled and may affect the assessment outcome (Cole, 2007).

The nature of the relationship and rapport with the clinician doing the assessment facilitates the retrieval of sensitive information. This relationship may not be as fully developed in online assessment; asking certain sensitive questions, however, such as asking about a history of abuse, is sometimes easier to do through the online medium (Bai *et al.*, 2001).

While there can be negative attitudes towards assessments conducted over the internet, researchers have also demonstrated that internet-delivered assessments can be superior in several ways. Bai *et al.* (2001) suggest that people with anxiety issues are predisposed to seeking help via the internet. In their observations of a virtual psychiatric clinic they found that their clients were, for the most part, younger than the average outpatients, college educated, and had not previously visited a psychiatric clinic. They note that the convenience and privacy of the virtual clinic may increase motivation to seek help, and that the internet can be used to educate and reach future patients (Bai *et al.*, 2001).

Clients filling out assessments online also need to be aware of privacy issues. Online health assessments should only be filled out on a private or semi-private computer in a location where the client feels able to accurately answer all questions without fear that someone will view the answers.

Clinicians as well as clients need to exercise caution when sending electronic mail related to mental health services without using appropriate technologies, such as patient portals which allow for secure two way e-mail communication. It should be assumed that e-mail records will be permanent, and therefore both parties should avoid sending any information over e-mail that is private and confidential (Harvey & Carlson, 2003). Often mental health institutions and milieus will have their own policy guiding e-mail use by practitioners. In cases where one is not present (and even when one is) clinicians would be guided by their code of ethics.

4.4.2. Pen and paper vs. Internet-based assessment tools

As a result of the rapid availability of online assessments, most of the assessment accuracy studies compare the validity and reliability of internet-based assessments to traditional pen and paper methods. Many comparison studies of internet-based tools to pen and paper forms have been conducted on university populations (Jones *et al.*, 2008; Fortson *et al.*, 2006; Coles *et al.*, 2007). Student populations tend to be an easy resource for researchers to draw upon; such populations are not, however, representative of those seeking telemental health assessments – for example, populations of psychiatric patients may have lower levels of education and experience with IT (Jones *et al.*, 2008). Studies using this demographic group are more concerned with comparing the reliability and validity of internet questionnaires than, for example, studying how psychiatric respond to internet-based assessment tools.

Fortson and colleagues (2006), in their study of 411 undergraduate students, hypothesized that students responding to the internet versions of traumatic assessment questionnaires would state that they had experienced more events and symptoms than the paper ones; they found, however, that people responded similarly to both formats, suggesting that trauma-related psychological data can be accurately collected via the internet.

In a 2007 study, Carlbring and colleagues (2007) found that an internet version of a questionnaire for panic disorder did not yield higher scores or differences than a pen and paper version. Their research also suggests that web versions of questionnaires can accurately assess mental illnesses, but each individual questionnaire needs to be tested and studied before being made available for online use. Likewise, Lin *et al.* (2002) note that, in their study of an Internet-based Self-assessment Program for Depression (ISPD), reliability was excellent, although there is a need for future studies on internet reliability testing.

4.4.3. In-person clinical interviews vs. internet-based assessment tools

There are several problems with in-person assessment of mental illness. Researchers Farvolden and colleagues (2003) state that most people seek assessment for depression through their general practitioner. Current data suggests that up to half of the cases of depression presented to family doctors go undiagnosed, which suggests a need for better screening tools. In their study comparing the Internet-based Depression and Anxiety Test (WB-DAT) to in-person structured clinical interviews, Farvolden *et al.* (2003) found that agreement levels ranged from acceptable to good levels.

A 2007 study of 55 participants tested the Internet-based Self-assessment Program for Depression (ISP-D) online and onsite. In-person interviews took longer for participants to complete than those conducted over the internet; Lin *et al.* (2007) concluded, however, that the ISP-D administered on the Web was a comparative tool for the assessment of depression.

4.5. Telephone interviews

Telephone interviews are cost effective and easily accessed by clients, no matter where they live or what their schedules are like. Assessments conducted over the phone are valuable for screening as well as following up on clients who are unavailable for on-site interviews because of travel constraints (Cacciola et al., 1999). Telephone interviews also give patients a level of anonymity, and they are sometimes more likely to disclose sensitive information over the phone than in person (Aziz and Kenford, 2004).

4.5.1. Clinical and related concerns

There are, however, several challenges with telephone interviews. Telephone communications lack visual cues that could help the clinician objectively assess the patient. Studies also show that some clients assessed over the telephone are less likely to disclose symptoms of substance abuse (Aziz and Kenford, 2004). Some researchers advocate the use of telephone interviews for initial screening but suggest that in-person reassessment is needed, especially in cases of major depression (Cacciola *et al.*, 1999); many mental disorders can, however, be assessed over the phone, and potential clients can then be referred to clinics for further treatment.

Realizing the importance of subtleties in communication, researchers are currently experimenting on detecting emotional cues from speech. Additional technologies, like speech recognition that detects the emotional state of the client through voice cues, could add additional emotional cues when applied to computerized telephone assessments (Yu *et al.*, 2001).

4.6. Computer-assisted telephone systems

The use of a computerized voice instead of a human being can provide additional benefits and constraints to a telephone-based assessment tool. Computer-assisted telephone systems free up valuable clinician time, but can be an even more impersonal experience for clients.

Computer-assisted telephone systems can be used to screen or assess potential clients, as well as monitor remote patients or monitor patients in between visits to the clinic. Usually, short screening scales for mental health disorders or PTSD are used for telephone assessments (Breslau *et al.*, 1999; Farzanfar *et al.*, 2007a; Farzanfar *et al.*, 2007b).

Computer-assisted telephone systems like The Telephone-Linked Communications for Detection of Mental Health Disorders in the Workplace (TLC-Detect) can help assess people for mental health disorders and refer them for treatment. Clients use the keypad (or their

own voice) to answer questions given by a computer-controlled pre-recorded human voice. The system also gives information, advice and, if programmed to, could potentially give behavioural counselling. The system has an interactive voice response (IVR) subsystem for its speech, a speech recognition subsystem, database management for storing and managing user data, and a conversation control subsystem. The system can also monitor the client's mental health through periodic phone calls. There is also a TLC-Helpline that can be used in conjunction with the telephone system (Farzanfar *et al.*, 2007a).

In a study of the computerized telephone system to support self-care, Telephone-Linked Communications: TLC-Depression, participants felt the system was designed to appear human-like and spoke of the system as if it was a social actor. Suggestions for improvement centered on the idea that the system should sound even less like a machine and more like a professional. Patients were impressed that the machine not only called them by name but also recalled and referred to previous conversations. The authors note that the effectiveness of computer systems like this one depends on the extent to which they act like a human professional (Farzanfar *et al.*, 2007b).

Telephone systems are generally used in screening or assessment to identify the potential number of cases, which are then refined in a second phase. Researchers see computer-assisted systems being particularly useful when dealing with large numbers of potential cases (Breslau *et al.*, 1999); for example, when assessing PTSD in the general public after a major catastrophe like an earthquake or flood. Computer assisted telephone systems are also useful tools for collecting daily information from patients on pain experience, severity of symptoms, etc. This type of data collection was typically recorded by the patient via pen and paper and relied on the patient's ability to recall information and keep track of the information on a daily basis. Many patients would wait until just prior to a clinic visit and fill in the information all at once instead of collecting the information daily (Heapy *et al.*, 20007).

4.6.1. Clinical and related considerations

Recommendations for improving computer-assisted telephone programs include the need to monitor the system on a daily basis. New systems also need to be pilot tested, and

parameters need to be set for the answers, especially when using the telephone keypad to type in answers (Heapy *et al.*, 2007).

Telephone assessments could also have potential privacy issues, especially when the assessments are conducted by actual clinicians or by computer software using voice recognition (instead of using the telephone number or keypad to answer the questions). In these two cases the client could potentially be overheard, and, depending on the environment in which the client is making the call, jeopardize the confidentiality of his/her medical record and also potentially influence his/her answers (Aziz, 2004).

Many computerized telephone assessment tools, like The Telephone-Linked Communications for Detection of Mental Health Disorders in the Workplace (TLC-Detect), offer an option to answer questions using the telephone key-pad, which could reduce these privacy concerns (Farzanfar *et al.*, 2007a). In telephone assessments with actual clinicians, patients should be advised to decline participation (and chose another means of assessment) if they feel that the presence of others nearby could jeopardize their privacy rights or quality of care (Aziz, 2004).

4.6.2. In-person interviews vs. phone interviews

Telephone assessments administered by clinicians are largely equivalent to in-person interviews when assessing PTSD and other mental illness. Although the inclusion of both the visual as well as the audio is important, researchers have found that personal and sensitive topics can adequately be assessed over the telephone by clinicians and by computerized systems (Aziz and Kenford, 2004; Heapy, *et al.*, 2007).

In a 1999 study of telephone assessment of depression using the Structured Clinical Interview for DSM-IV (SCID), Cacciola and colleagues found the telephone tool good for diagnosing major depression. Lifetime major depression was, however, better diagnosed in person than over the phone. Phone assessments are useful for screening or initial assessments, but the authors recommend an in-person reassessment. There were a few issues with this particular study; the researchers administering the telephone assessments were not trained for this method of assessment prior to the study, and the questions were

not adapted for telephone administration (Cacciola et al, 1999).

Caution must be exercised when administering assessment over the phone. Medical personnel administering assessments over the phone need to have formal training, and the rewording of assessment questions also may need to be considered for telephone administration (Cacciola *et al.*, 1999).

4.7. Videoconferencing

Rudimentary videoconference links were established in the 1920s by telephone corporations (Molyneaux *et al.*, 2007), and the technology has been experimented with for telepsychiatry since the 1950s. The costs involved, however, in purchasing and maintaining the equipment, as well as transmission, prevented the mainstream use of the technology until more recently. New technologies in the last decade have made videoconferencing less expensive, and as a result health authorities are seeing the benefits (Ruskin *et al.*, 1998). Currently, most telepsychiatric services are offered over videoconference, making videoconferencing the most popular ICT used for all aspects of telemental health (Hilty *et al.*, 2004).

Medical professionals and organizations choose videoconferencing for many reasons. It saves time and money, offers a green alternative to travel, and allows people to meet over video who might not be able to meet in person. For example, Sorvaniemi and colleagues note, in a 2005 follow-up survey of patients assessed by videoconference in emergency situations, that 55 out of 60 patients preferred videoconference assessment over a referral by the local medical professionals for an in-person appointment 35 miles away (Sorvaniemi *et al.*, 2005). Telehealth is a growing application for videoconferencing worldwide and is particularly valuable in remote or rural communities where access to health care and medical experts is limited (Molyneaux *et al.*, 2007).

Telepsychiatric videoconferencing is already successful in the United States, Canada, Australia, and Finland – countries with high medical standards and numerous isolated communities (Cuevas *et al.*, 2006). Most studies on the use of videoconferencing for telepsychiatry are positive and demonstrate high rates of patient satisfaction, especially

among rural populations (Cuevas *et al.*, 2006, Hilty *et al.*, 2004, River Valley Health, 2006a; Sorvaniemi *et al.*, 2005).

Videoconferencing also allows for a higher social presence than other computer-mediated communications and is seen as a more acceptable ICT for telemental health. Social presence is the extent to which a technology can provide a social or personable feeling to the interaction (Short, 1976; Molyneaux *et al.*, 2008). In the literature there is a clear patient preference for technology that utilizes both the visual and the audio, rather than just audio alone (Hilty, 2004; Gonzalez & Shriver, 2004; Gonzalez *et al.*, 2007; McGinty, 2006) and assessments conducted over broadband networks can offer both visual and audio cues.

In certain situations psychiatric assessment over videoconferencing offers more advantages for patients and clinicians than in-person assessment. Some patients view videoconferencing as less threatening, and report that they feel less inhibited and they have a greater sense of control. Some feel more comfortable appearing on videoconference because they feel less scrutinized than during in-person communication (Norman, 2006). Videoconference also increases the safety of clinicians when assessing clients who are potentially dangerous, although providers need to be trained to cope with such situations (Shore, 2007c).

4.7.1. Clinical and related considerations

Videoconferencing can be an important tool if the patients are comfortable with the technology and feel that their privacy is ensured (Deistsch *et al.*, 2000). Rees & Haythornthwaite (2004) recommend that local health care professionals remain with the client at the remote site; others stress the importance of the awareness and attitudes of the clinicians and directors of the clinics, stating that the clinician needs to be aware of relevant cultural issues as well as the background/family history of the patient (Shore & Manson, 2005). During videoconference sessions medical professionals may, additionally, need to allow extra time for communications (Hilty, 2004). Overall, the literature states that videoconferencing is a highly effective tool for telepsychiatry, especially for those living in rural and remote communities.

While videoconferencing offers more visual cues than other forms of ICT there are some disadvantages. Many variables affect the potential level of participation within videoconferences, including the equipment itself, the interactions between the users and the technology, the organization of the videoconference and the group dynamics (Molyneaux *et al.*, 2007).

There are also privacy concerns about the type of networking infrastructure used for telemental health assessment over videoconference. Tele-health programs are gradually making the shift from ISDN to TCP/IP videoconferencing. There are pros and cons for both ISDN and TCP/IP videoconferencing (Molyneaux *et al.*, 2007; Liu *et al.*, 2008; McGinty *et al.*, 2006).

Providers also need to be trained to deal with the equipment. Users need to know about the storage and retrieval of data capacities of the system as well as other medico-legal and ethical issues related to maintaining patient privacy (McGinty, 2006).

Patients also need to be informed of any people located out of the range of the camera, how the video will be stored, and who will have access to the archived videoconference.

There are several clinical ethical concerns with videoconference assessments, some related to social factors. Shore *et al.*, writing about emergency telepsychiatry assessments where psychiatric care over videoconference is used to treat patients who are potentially dangerous to themselves or to others, notes that telepsychiatric professionals need to be aware of their “*duty to warn*” others when their patients make direct threats. This “*duty to warn*” can involve contacting potential victims and the patient’s local law enforcement (Shore *et al.*, 2007b). Tele-health providers need to be aware of the safety of staff at the other site, and have procedures in place to contact them immediately if there is an upset or disruptive client. Also there needs to be a protocol in place to handle clients who leave a telehealth session abruptly, especially if there is a safety issue (e.g., risk of suicide) for the client and/or for others (Shore *et al.*, 2007b).

Standard of care issues at the patient’s site must also be followed; Shore *et al.* note, however, that telepsychiatric care is equal to in-person care, and can be better than the care offered in many rural communities (Shore *et al.*, 2007b). Many rural community members

do not have access to mental health resources. All the studies on videoconference and telehealth in general state that telehealth care is more effective than no care at all, and the majority of studies rate telehealth care as just as effective as in person care.

4.7.2. In-person interviews vs. videoconferencing

Videoconferencing has been shown to be just as effective in assessing patients as in-person interviews. In a 2005 study of 63 patients treated by videoconference and 44 treated in-person, researchers Grady and Melcer (2005) found that those treated by telehealth faced shorter wait-times for their initial and follow-up appointments, and were more likely to comply with medication plans.

4.8. Other ICT, including mobile and handheld devices

The use of virtual reality, used in conjunction with monitoring vital signs, is also mentioned in the literature; when virtual reality technologies are used, however, they are used after the assessment process for treatment purposes. Rizzo *et al.* (2002) note that virtual environments have the potential to supplement traditional assessment means (pen and paper, observations and history taking), but we did not find any studies that specifically examined the use of virtual reality for assessment. Virtual reality technologies will be discussed in greater detail in the treatment section in the second part of this document.

Cell phone technology has also been tested for screening and assessment of mental illness. A 1995 study of 30 Spanish and 22 English speakers evaluated a bilingual computerized speech-recognition system for screening clinical depression compared to in-person administration of the same scale, the Center for Epidemiological Studies Depression scale (CED-D). Gonzalez and colleagues (1995) noted that both Spanish and English speakers gave the system a positive rating. Although there were a few issues with the speech recognition, English speakers in the study in fact preferred the computerized method over the in-person method. Benefits of the cell phone administration include time saved. The computer-telephone method gave high consistencies, reliabilities and similar correlations to in-person interview methods (Gonzalez *et al.*, 1995).

Currently there are numerous medical applications for PDAs, including adapted versions of medical textbooks, downloadable journal content, pharmacopeias that allow access to the latest drug information, medical calculators and patient tracking programs, to name a few (Adata & Bedard, 2003). Clinicians could directly input assessment answers into a PDA while performing a structured interview with a patient. Using a PDA instead of a personal computer allows for greater mobility. The clinician can choose to conduct the assessment in their office, or can move to a different environment, for example a less threatening environment like a family room. PDAs also are much smaller than PCs – specifically, the PDA screen is a much smaller barrier between the clinician and client than a traditional PC monitor. This method of assessment eliminates concerns about the lack of in-person contact while ensuring a standardization of the structured clinical interview. Results can also be quickly scored and generated (Fraenkel, 2006). Researchers predict that the use of PDAs and handheld devices will continue to rise (Fischer *et al.*, 2003).

Handheld computers can contain programs making assessment and treatment available in any environment, at any time. They can also collect and process relevant treatment data about the client's adherence to the treatment as well as the behavioural, subjective, and psychophysiological influence of therapy (Maheu, 2005). Handheld devices can also help motivate clients to comply with homework assignments and can be used to monitor their responses, which can aid in clinical decision-making. Researchers note that handheld devices are particularly appropriate for anxious or depressed clients, and clients with anxiety disorders (Maheu, 2005).

In a 2006 study, handheld computers, or PDAs, were used to implement a computerized behaviour assessment program in 4 urban primary care clinics in Detroit, Michigan (Zeman *et al.*, 2006). The assessment was administered to patients in the waiting room prior to their appointment with the physician. The PDA was connected to a computer and a report was generated. While physician interest varied, 90% of the patients noted that they enjoyed using the PDA assessment tool.

4.8.1. Clinical and related considerations

Privacy protection is especially important when health care providers are using handheld devices. The most common form of protection is through the use of a password to access the device. Medical providers can also code patient identities. Handheld devices, like PDAs, come with a locking feature; it is, however, up to the owner to activate this feature. There are programs, like Tealock, that will automatically lock the device after a certain period of inactivity (Fischer, 2003).

There are similar methods of privacy protection for clients using PDAs for assessment. For example, in Zeman *et al.*'s (2000) study of a PDA-administered assessment program, patients were given a user name and used their own password. Currently, PDAs have multiple security options, including password protection and encrypted data. Consumers can also purchase a wide range of privacy protection tools, including a polarized screen film that ensures PDA screens cannot be viewed from the sides.

5. ICT and the Treatment of PTSD

5.1. Current Clinical Practices for the Treatment of PTSD

Both pharmacological and psychological clinical trials show that treatment for PTSD is less effective (i.e., smaller treatment gains) for veterans with PTSD related to combat-experiences than for non-veterans with PTSD related to non-combat traumatic experiences (Creamer & Forbes, 2004). Furthermore, interventions with the veteran population are likely to take longer and be more complex (Creamer & Forbes). Engagement in treatment and development of a therapeutic relationship is problematic for veterans. Potential reasons for this include elevated rates of childhood trauma among military recruits compared with the general community (Rosen & Martin, 1996; Stretch, Knudson & Durand, 1998 as cited in Creamer & Forbes, 2004). Some research (Rosen & Martin, 1996) has found that rates of childhood sexual abuse, for example, are higher among military personnel than among the general population (e.g. in one military sample 49% of women reported a history of childhood sexual abuse; rates in the general population vary greatly but usually fall around 20%). Also, military training promotes a high level of emotional toughness and resilience, and can lead to additional stressors that create hostile homecoming experiences (Creamer & Forbes, 2004); veterans also tend to present high rates of comorbidity.

5.2. Pharmacological Treatments

Pharmacological treatments of PTSD target abnormalities in the psychobiological response to stress associated with PTSD (e.g., overactive Sympathetic Nervous System, over activity of the adrenergic system, etc.) (Friedman, 2006). Selective Serotonin Reuptake Inhibitors (SSRIs) are considered the first-line treatment for PTSD because they have broad-spectrum effects against all PTSD symptom clusters (i.e., hyperarousal, avoidance/numbing, and reexperiencing), and are effective against many comorbid disorders and associated symptoms (e.g., impulsivity, aggression, suicidal thoughts, etc.) (Friedman, 2006). Only two SSRIs (paroxetine and sertraline) are approved by the FDA for the treatment of PTSD (Friedman, 2006). Second-line treatments include Monoamine Oxidase Inhibitors (MAOIs), and Tricyclic Anti-Depressants (TCAs). Antiadrenergic Agents, Anticonvulsants and

Antipsychotics may be used to augment first or second-line medication treatment (Friedman, 2006).

5.3. Psychological Interventions

Many treatments for PTSD encourage the patient to remember and focus on the trauma (trauma-focus treatment), while others encourage the patient to increase coping skills for current stressors to improve daily functioning and decrease PTSD symptoms (supportive treatment). Trauma focus therapies, which range from psychodiagnostic to cognitive behavioural approaches, use in-depth exploration of traumatic material to facilitate healing. The goal of these interventions is for patients to take control of their lives by gaining mastery over past traumatic memories (Friedman, 2006).

5.3.1 Psychodynamic interventions

Psychodynamic interventions seek to understand the context of traumatic memories and the defensive processes through which the client's unconscious mind transforms repressed memories into maladaptive symptoms of PTSD. Symptom reduction happens when patients are aware of how their repressed memories have been transformed into their symptoms and are able to exercise control over the repression defence (Friedman, 2006). Schottenbauer and colleagues (2008) have also found that this type of therapy for PTSD may help improve the types of schemas and working models for relationships that the client has, which can help improve social interactions and functioning.

5.3.2 Cognitive behavioural interventions

Cognitive Behavioural Therapy (CBT) focuses more on thoughts and behaviors, as opposed to feelings in contrast to psychodynamic approaches, though certain approaches such as CBT with an interpersonal focus exist. CBT is based on principles of learning and cognitive theories and works to reduce symptoms of PTSD by evoking, challenging, and altering erroneous, anxiety-inducing thoughts. Techniques of this therapeutic intervention include

prolonged exposure therapy, cognitive restructuring, biofeedback and relaxation training, and dialectical behaviour therapy.

Prolonged exposure therapy for PTSD involves assisting the patient to confront their traumatic memory and remain engaged until their anxiety reduces or extinguishes. The intent of exposure is for the client to separate the traumatic memory from their emotional response so that it no longer dominates their thoughts, feelings, and behaviours (Friedman, 2006). Exposure may be *imaginal* (confronting trauma memories through mental imagery), or *in vivo* (practicing techniques learned in therapy in the feared environment). While undergoing exposure, patients report their distress on the Subjective Units of Distress Scale (SUDS) which ranges from 1 (minimally anxiety provoking) to 100 (extremely anxiety provoking).

Flooding is another type of exposure therapy which is sometimes practised but lacks an evidence base (Spira *et al.*, 2006); additionally, it is often too overwhelming for the client and risks being unsuccessful, leading to client drop-out, among other things. Flooding includes carefully exposing the client to prolonged and repeated images of the trauma until the images no longer cause severe anxiety (usually after 20 minutes).

Cognitive restructuring involves assisting the client to identify and challenge dysfunctional thoughts and beliefs about the world, other people, or themselves that have developed because of, or been strengthened by, the traumatic experience (e.g., “the world is unsafe”, “I cannot trust anyone”). This therapeutic technique aims to help the client to form a new perspective on the traumatic event and regain a sense of control in their life.

Biofeedback is a therapeutic process in which the client is given information about their own physiological processes (e.g., heart rate feedback) and is taught to consciously control these processes. Successful treatment results in reduction of tension and anxiety.

Relaxation techniques, including diaphragmatic breathing and progressive muscle relaxation, aim to teach clients to learn to relax their musculature in situations where they experience anxiety. Some clinicians will avoid using relaxation techniques with clients who are in a crisis state or who are experiencing psychosis, because other techniques, such as grounding (e.g. having the client become more aware of their external environment by touching things or

counting things) are more clinically effective in times of very high emotional distress. Studies demonstrate that relaxation training is moderately effective in reducing PTSD symptoms, but generally less effective than exposure therapy (Thordarson *et al.*, 2003). There is little evidence to support relaxation therapy as a treatment in itself; relaxation therapy is, however, sometimes incorporated into exposure therapy, CBT, or attentional treatments (Spira *et al.*, 2006). Relaxation therapy should not be dismissed as it can help reduce hyperarousal symptoms (Thordarson *et al.*, 2003).

Dialectical Behavioural Therapy (DBT), a form of treatment originally pioneered by the therapist Marsha Linehan, is a modification of CBT. DBT was developed for the treatment of borderline personality disorder but has wide applications and is specifically useful for individuals who have self-harm tendencies or substance use problems (Linehan, 2003). It is a form of treatment which aims to increase clients' ability to tolerate distress, help them develop new and healthy coping strategies, help improve interpersonal interactions, and help with the healthier experience of emotions, among other things (Linehan, 2003). When delivered according to its original format this type of therapy is comprised of individual therapy, skills groups, and phone coaching. DBT's effectiveness has traditionally only been researched with limited populations, but has been found to be an empirically supported treatment (Behavioral Tech, 2008).

5.3.3 Eye movement desensitization and reprocessing

Eye Movement Desensitization and Reprocessing (EMDR) is based on the premise that maladaptive behaviour and unhealthy responses are a result of negative and traumatic experiences that have not been properly processed and stored as memories (Shapiro, 2001). This intervention method integrates elements of imaginal exposure, cognitive therapy, and psychodynamic therapies along with eye movement intervention which focuses on the element of moving the eyes back and forth. Some researchers believe that the movements of the eyes reprogram brain function so the emotional impact of a trauma can be resolved (Shapiro, 1989 and 1995 in Friedman, 2006). In the past, use of EMDR has been considered to be controversial because of scepticism concerning its effectiveness. Some research suggests that eye movements are not necessary for EMDR to work (McNally, 1999 in Friedman, 2006); other research shows EMDR is more effective than psychodynamic

or supportive therapies (Friedman, 2006). Indeed, EMDR is considered to be a valuable first-line of treatment for veterans (Silver, Rogers, & Russell, 2008), and has been identified as an efficacious treatment for PTSD according to the Department of Veteran Affairs & Department of Defence Practice Guidelines (2004).

5.3.4 Narrative interventions

Narrative Interventions techniques involve patients writing, emotionally processing, and then rewriting their trauma narrative. Through articulating, processing, and coping with the emotional response the traumatic memory triggers, this intervention aims to improve coping with re-experiencing symptoms, promoting mastery and reducing avoidance.

5.3.5 Supportive therapy

Supportive Therapy inventions do not focus on the trauma but, alternatively, encourage skill building and problem solving for current issues in the clients' lives in order to increase adaptive functioning and a sense of control in their lives (Friedman, 2006). Efficacy of these programs for PTSD has yet to be demonstrated and there are no guidelines which show if clients would benefit from this as opposed to trauma-focus therapies.

5.3.6 Combined treatments

The range of PTSD treatment options can be used in combination in both individual (e.g., CBT, eye-movement desensitization reprocessing or psychodynamic psychotherapy), or group formats, and clients may participate in family or marital therapy concurrently. Additionally, psychotherapy may be supplemented with medication in order to reduce symptoms of PTSD sufficiently to allow clients to engage in psychotherapy. Although no peer-reviewed studies exist which compare combined therapy to other treatment methods, research suggests the first-line of treatment should be prolonged exposure combined with medication.

5.4. Computer Programs as Treatment Tools

Computer programs have been used for a number of years for psychological assessment and education but their use for psychological *treatment* has been controversial because of concerns regarding usability, client suitability for computer program treatments (e.g., computer skill level, comfort level), inability to intervene in crisis situations, competence of clinicians using the technology, and compromise of the therapist-client relationship. Initially, computer-mediated therapies were offered without any patient-therapist interaction, but there has been a shift toward increased therapist input to supplement self-help therapy. Some programs are exclusively client and computer-based while other computer programs supplement clinician contact. Cognitive Behaviour Therapy is well suited for delivery by computer because it is structured, well described and focused on specific behaviours, and it increases mastery and control for the user (Newman *et al.*, 1997, in Anderson *et al.*, 2004). Computer programs usually present aspects of CBT, including rationale for treatment, instruction in various anxiety management techniques and exposure (Anderson *et al.*, 2004)

Computer assisted therapy is a cost-effect method of delivering mental health treatment, costing on average 1/3 to 1/6 less than traditional behavioural therapy (Newman, 2000, in Eisen *et al.*, 2007). Computer programs can also provide treatment for higher numbers of patients because fewer limits are placed on the number of patients entering computer-based treatment when it no longer depends on the availability of the clinician.

Several studies demonstrate the positive outcomes of computer-based treatment programs. One review article (Barlow *et al.*, 2000) demonstrated that computer-based programs are just as effective as more costly professionally led therapy for people with phobias, although further research is needed to identify those patients for whom such approaches are appropriate. Computer-based treatment is also considered comparable to live exposure therapy in reducing phobic symptoms (Gilroy *et al.*, 2000) as well as an effective means of delivering standard aspects of CBT for anxiety, including relaxation training, cognitive restructuring stress management and instruction in systematic desensitization and exposure (Anderson, *et al.* 2004).

5.4.1. Ethical and related considerations

While computer-based treatment tools are cost efficient, there are often better outcomes if they are done in combination with face-to-face contact with clinicians (Carlbring *et al.*, 2007; Carlbring, & Andersson, 2006).

Technical problems which may arise from treatment conducted through computer programs could distract the client's attention, especially if the client is not familiar with, or comfortable using, a computer. For example, in their 2004 study Anderson and colleagues found that clients spent time talking to an attending nurse about technical assistance problem-solving issues the computer did not address and further interventions that were not part of the computer program (Anderson, 2004).

Andersson and colleagues (2004) assert that, ethically speaking, clinicians should practice only within their realm of their expertise. For example, clinicians who are not competent in CBT should not assume that technology will compensate for a lack of training, understanding, or skill in the implementation of this therapeutic method.

Computer-based treatments often require clients to make an appointment to go to a clinic in order to access the computer and program necessary for treatment. This method takes time and requires travel. Computer-based treatments located in a clinic, however, usually give the client the opportunity to ask for help if they are having technical difficulties, and they might receive some personal attention, factors that may encourage participants to continue with the program (Spek *et al.*, 2007).

Computer support can be a useful tool to encourage clients to be proactive while providing them with expert guidance. Clients can record their symptoms in the program and work on homework assignments given by medical professionals. These programs can be completed at home, but originally some of these computer programs were designed so that patients could complete tasks and record symptoms in the waiting rooms of a general practice clinic. For example, a program for depression and asthma titled CLIMATE was originally designed for this model of use but, after focus groups with medical professionals, the designers of CLIMATE concluded that this system of administration could result in stigmatization;

CLIMATE currently is now distributed over the internet under the supervision of a client's local GP (Andrews & Erskine, 2003).

5.5. Internet-based Treatment Tools

Interest in computer-based tools began to decline in the 1990s, evidenced by declining numbers of academic articles on the topic, only to be revived in the early 21st century as a result of the increasing accessibility of the internet (Abney & Maddux, 2004). Internet-based treatment tools are used in clinical psychology for a variety of reasons: to service those with chronic disabilities in a cost-effective manner; to accommodate growing patient preference for accessing therapy online; and to support communication in order to improve the client-clinician relationship (Castelnuovo *et al.*, 2004). Various types of internet applications are used in the field of psychological health care, including self-help websites or websites developed to administer cognitive behavioural therapy, secure internet-based portals for health delivery, social networking sites utilized for group discussions, and multiple internet-based tools like e-mail used in conjunction with websites delivering cognitive behavioural therapy.

A popular format for internet-based treatments resembles that used by Carlbring and colleagues (2001) wherein clients are given a password to an introductory therapeutic module on a secure site during initial contact with a clinician. When clients complete a module, they email the clinician their completed 'homework'; the clinician provides feedback and gives the client the password to the successive online treatment module, thus allowing patients to proceed through the modules at their own pace and revisit past materials as needed.

Lange and colleagues (2003) stress the importance of both instruction and feedback in their 2003 report on the Dutch Interapy PTSD treatment website – a Dutch language website that contains questionnaires, writing assignments, and additional treatment instructions dedicated to PTSD treatment. The writing assignments on the site are based on clinical practice. The authors noted the positive outcomes of the study; measures of anxiety and depression showed significant reduction of symptoms as a result of this form of treatment (Lange *et al.*, 2003; Lange *et al.*, 2001).

Internet-based options for treatment have many benefits. Internet-based methods of treatment allow medical professionals to reach various clients with a single message, and allow for automatic updates, personalized feedback, and even the option of video. Medical practitioners can reach isolated groups – including stigmatized groups (those too embarrassed to seek help in person) – using internet-based tools. Many clients enjoy internet-based tools because they allow for user control and customization, while medical professionals are also able to tailor programs to their, and their clients', needs. Web programs have been identified as a means of reducing health service costs incurred during in-person treatments (Griffiths, 2006). Internet-based treatments can also be more cost-effective for the consumer than in-person treatment, especially when significant investments in time and travel are involved (Carlbring *et al.*, 2005; Griffiths, 2006).

The technology itself can also be a motivational factor for clients – the format of online treatment tools, which often includes interactive activities and the opportunity for feedback, is a more engaging means of administering cognitive behavioural therapy than, for example, a self-help book (Christensen, 2007). Online discussion groups offer social support – a place for sharing experiences and developing positive role models. Effectiveness of these groups is generally high (Castelnuovo *et al.*, 2003).

Internet-based treatment programs can be accessed where and when it is convenient for clients and allow for greater outreach of mental health services to underserved populations. Online programs also can provide anonymity for people who avoid traditional therapy for fear of being stigmatized. Research shows online therapy helps eliminate the stigma and embarrassment clients may feel, and creates a disinhibition effect where people feel less vulnerable about discussing personal matters (Abney & Maddux, 2004).

The design of online treatment programs can allow for additional benefits. For example, the act of writing and e-mailing information allows time for self-reflection by the client and time for clinicians to consider the client's issues without having to think on their feet (Abney & Maddux, 2004). Additionally, built-in applications can track how much time clients spend on certain pages and the website as a whole, which materials they access, and how often they log onto the site (Adney & Maddux, 2004). This information can be useful for the clinician in reviewing the client's progress.

5.5.1. Websites and patient portals

Websites can be an important source of information for clients seeking self-directed treatments and support groups. Self-treatment programs offered on websites delivering cognitive behaviour therapy and education are used in the treatment of PTSD. In a 2004 study on the online delivery of cognitive behaviour therapy for sufferers of mild to moderate depression, Andersson and colleagues (2004) note that websites can be an important option for *some* clients. In their study of 71 participants who completed the program – composed of text-based modules followed by quizzes – and a six-month follow up, they conclude that online self-help treatments are not effective for everyone. They suggest the potential use for website-based treatments within a staging protocol, where patients could begin with self-help and, if needed, move on to more therapist-involved treatments or alternative regimes.

The added privacy of online programs has the potential to overcome barriers preventing people from seeking help/treatment for PTSD. In general, online treatments have a 25% success rate (compared to the 5% rate of supportive counselling) (iHealth Beat, 2007). Another study of a protocol-driven internet treatment for patients suffering from trauma (but not necessarily from PTSD) boasts of a 50% improvement rate (Lange *et al.*, 2003).

In a 2004 study of clients with PTSD, Litz and colleagues describe a website used to collect daily symptom ratings, provide instructions for homework, and facilitate contact with the clinician (e.g., email). They note that the internet can educate, encourage, monitor, prompt, and oversee self-help interventions that are designed and overseen by trained clinicians. Moreover, the use of websites may increase collaborative disease management and promote communication between consumers and health care professionals; for example, fifty percent of users in a study done by Farvolden and colleagues (2005) at the Center for Addiction and Mental Health in Toronto, Ontario said they intended to share the results of their online intervention with a health care professional.

Andrews and Erskin (2003), in their article on the use of websites for treating anxiety and depressive disorders, also highlight the use of computers in providing client education, proactive practice, and expert systems for cognitive behaviour therapy. They developed a program for clients with depression and asthma that allowed clients – with a physician

referral – to enter an assigned login name and choose their own password to access homework assignments and enter symptoms. If the symptoms persisted or worsened participants were asked to contact their GP. The system also sent reminder messages to the clients and contacted the GP if their clients dropped out of the system.

Andrews and Erskin (2003) decided to make this system password protected and by referral only because of potential legal issues, noting that "*Internet therapy has not yet been tested at law and no quantification of the risk is possible*". The authors have, in fact, created a (quite popular) educational self-help site that clients can navigate themselves; clients can take self-assessments and, depending on their scores, may be prompted by the site to seek medical attention.

Originally the system was going to be delivered via computer in the waiting rooms of clinics but the authors conducted a focus group comprised of GPs who felt that this would result in stigmatization of those using the computer. One of the many benefits of online delivery is that the patient can potentially access the website from a more private location (Andrews and Erskin, 2003).

Not every client will react positively to internet-based treatment. Andersson and colleagues' (2004) review of internet-based treatment notes the need to identify potential patients in advance – those who will respond to this type of treatment. In their review of computer-supported cognitive behavioural treatment of anxiety disorders they found that, although clients may experience symptom reduction with this form of intervention, these gains are not always maintained once the therapeutic program is completed (Baer *et al.*, 1987; Baer *et al.*, 1988 in Andersson *et al.*, 2004). Further, they found no differences between gender or education level and outcomes; they assert their findings may be biased, however, as patients deciding to participate in the internet-based intervention might have been more highly educated and had more experience working with computers.

Patient portals are health delivery systems that facilitate electronic communication between medical staff and patients via secure web-based entry points (Kittler *et al.*, 2004). Studies have demonstrated patient acceptance of internet-based web portals, even indicating willingness to pay for the service, suggesting the potential for the growth and development of health portals (Christenson, 2007). Many patient portals are starting to evolve into secure

sites containing personal records with individualized information on medications, medical appointments, and other personalized health care information. Ideally, personalized patient portals should be a medium for interaction between the patient and medical staff (Drake, 2007).

In the last few years, the literature on patient portals has been increasing. To date, however, very little has been published on portals for mental health services; our search found only four articles about two patient portals – one in the US and one in Finland. Neither of them has information tailored to individual patients; the information on the two sites is available to all participating patients and health care staff. It should be noted that both portals are primarily for staff and patients who are co-located, not separated by distance. We describe both portals more fully below.

In the US, a web-based portal was developed for staff and patients in community mental health clinics in Virginia that are run out of an in-patient psychiatric facility. The portal contained general and comprehensive information of interest to patients hospitalized for mental health conditions. A preliminary study (Farrell et al., 2004) based on staff focus groups and nine patient interviews found that patients liked the comprehensive range of information available on the portal, especially on crisis response services, stress and coping, mental health information, protection and advocacy, work and rehabilitation services, family and community support, peer support, income support and entitlements, and a range of practical info such as housing, health, and dental care. The study did not look at the impact of the portal or the extent to which the final product was useful for staff and patients.

The other portal research was conducted by a team in Finland studying Mieli.Net (Mental.Net in English), an interactive online service for patients with schizophrenia spectrum psychosis. Miele.Net is aimed at supporting patients' independence and awareness of their own situation. The portal is described in Koivunen *et al.* (2007) as designed for use by nurses working in psychiatric hospitals. At the basic level, the portal offers information for patients and their treatment, support available in Finland, and information about patients' rights. At the more advanced level, Mieli.Net includes patient-centred multimedia information (text, audio, figures, photos), a channel for peer support (discussion room, chat room, open internet diary), and an eSupport tool for counselling and support between clients and staff

via a question-answer column. Nurses can use the portal to update their knowledge of the illness and treatment. The portal can be used by patients alone or with a nurse.

Valimaki *et al.* (2008) describe the comprehensive process used to design and develop the Mieli.Net portal, including an initial needs assessment involving a survey of 55 psychiatric hospitals, a survey of discharged patients, and interviews with patients and their relatives. Based on the analysis of users' needs, five general informational areas were identified: illness; treatment; well-being; daily activities; and patients' rights. Next, the portal developers conducted 10 focus groups with a multi-disciplinary team of mental health professionals. The article describes the considerable effort involved in designing and producing a high-quality health information portal for individuals suffering from mental illness.

The Finnish research team studied the usability of Mieli.Net by one of the user groups – the nursing staff (Koivunen *et al.*, 2007). The analysis found that the portal was user-friendly, and the content was interesting, understandable, and easy to read. The nurses especially liked the audio content and photos. The fact that the portal was only in Finnish was a negative factor; Swedish is the second official language in Finland and there was no Swedish content. Some nurses were concerned about the effects of the portal on patients' care and well being, or on personal contacts between staff and patients. The study recommends that, when developing portals, emphasis should be placed on the motivation and concerns of the nurses who will be using it because their level of acceptability will influence future implementation. The study also identified barriers and facilitators that influenced the implementation of Mieli.Net by nurses. Four main categories of facilitators and barriers were found: organizational resources; nurses' individual characteristics; patient-related factors; and portal-related factors. A specific challenge is to ensure that staff have adequate technological resources and that they are motivated to use computers and implement new processes.

5.5.2. Social networking sites

A variety of online self-help groups have formed, including bulletin boards, chat rooms, and discussion groups (Castelnuovo *et al.*, 2003). Some of these are unstructured discussion groups while others are led by an individual (a moderator or facilitator) (Castelnuovo *et al.*,

2003). Both asynchronous means of communication on social networking sites – such as blogs, message boards, and Facebook wall and message posts – and synchronous means of communication – like Facebook chat, Second Life, and website chat groups – are currently utilized as spaces for online self-help groups as well as places where health information is disseminated and treatment is sought.

A variety of other social networking groups include asynchronous types such as blogs (that note personal experiences, and link to self and professional help websites, etc) and discussion groups online. Current social networking sites devoted specifically to healthcare include DailyStrength – a site that connects members to anonymous online support groups, has an online journal, contains selections from support groups and enables members to send virtual hugs to each other (www.DailyStrength.org; Sappington, 2008) – and RateMDs – a site where patients share stories and a rating of their doctors for others to view (www.rateMDs.com; Sappington, 2008).

Facebook is a social networking website where users join networks, add friends, send messages, and update personal profiles. Users can chat with each other asynchronously by leaving private messages or posting on people’s “walls” – a space on individual sites that can be seen by all their friends. In the summer of 2008 Facebook also introduced a synchronous method of communication to allow users to chat with their friends who are online. Facebook also has an option to create and join groups. Some groups are for fun (for example, for social activities) while other groups act as places for discussion and group support.

As of August 2008, there were 170 groups created for PTSD on Facebook; the majority were self-help, general, or not-for-profit groups. The largest PTSD group was titled “Coping with Combat PTSD” and had 496 members. Coping with Combat PTSD is operated by Operation Vets (a non-partisan support network for veterans, their families, and civilian supporters) and operates from Providence, R.I. in the U.S. The largest Canadian Facebook group is called “Post Traumatic Stress Disorder”; it has 252 members and is a non-profit group run by a paramedic in Nova Scotia. Both group sites feature pictures, videos, discussion boards with multiple topics, wall postings, links to online questionnaires by people doing research in military psychology, and recent relevant news postings

There are also synchronous types of social networking sites that can be used for mental health education and treatment. Second Life is a virtual world, a computer-based environment running over the web in which users interact with each other in real time through the use of avatars. Avatars are computer representations of the users – typically, cartoon-like images that users create. Users choose their avatar’s first name and second life generates a selection of family names for the user from which to choose, allowing for anonymity within Second Life. The Second Life program also uses multimedia content – music and video – and allows users to browse document collections, visit virtual worlds, attend live events like concerts and even support groups, play multi-player games (including educational and health related games), and develop social skills by socializing and interacting with other avatars through text message or voice chat (Kamel, Boulos & Wheeler, 2007).

Second Life also supports and features a number of projects dedicated to health information. Users (through their avatars) can, for example, attend Second Life lectures on mental health issues, such as Ilona Meagher’s Sept. 27, 2007 discussion of her book, *Post Traumatic Stress Disorder and America’s Returning Troops* (<http://ptsdcombat.blogspot.com/>). There are also specific locations in Second Life devoted to medical and consumer health, the most noteworthy being HealthInfo Island, funded by a US National Library of Medicine grant. HealthInfo Island provides training programs, resources for consumers, and one-on-one support for Second Lifers. The HealthInfo Island is run by medical librarians in collaboration with a variety of medical professionals (a physician, retired pharmacist, nursing educator, and others). One of the three main buildings on the Island is a Medical Library, the second is a Consumer Health Library, the third is the Health and Wellness Center that supports group discussions or private consults (Kamel Boulos & Wheeler, 2007).

On internet chat rooms, participants log onto a website to communicate with each other via typed, textual messages that are immediately displayed onscreen. Chat rooms can provide many services, including immediate care for clients waiting for treatment. Chat programs and message boards can also act as a preventative measure, as a supplement to in person treatment and a means for aftercare and maintenance. Chat rooms are currently being employed in aftercare programs like Internet-Bridge, an internet chat room that supports chat groups for aftercare in psychosomatic and psychotherapeutic medicine in Germany. The Internet-Bridge chat groups have a maximum of 10 members, chat weekly at a fixed time

for 90 minute sessions, and are overseen by group therapists from the hospital as a part of their aftercare (Haug *et al.*, 2008b). In a study of 121 participants suffering from affective or neurotic disorders enrolled in the Internet-Bridge aftercare chat groups, authors Haug *et al.* discovered that there were no substantial differences in recovery outcomes between chat and in-person groups, noting that for the 121 participants there was an upward recovery trend at the beginning of therapy until their completion of the chat program sessions. Their conclusions support the idea that internet chat groups can supplement or even replace traditional methods of group treatment and aftercare, important when in-person groups are not easily accessible (Haug *et al.*, 2008a).

In both asynchronous and synchronous means of communicating in social networks, participants can write to one another and receive replies simultaneously. Participants do not have to wait for a pause to chat, which might make it easier for people to convey their thoughts (Haug *et al.*, 2008a).

Synchronous social networking can be more interactive than asynchronous methods because the communication is immediate, compared to e-mail or message boards (Haug *et al.*, 2008b). Asynchronous communication, however, also has benefits. In contrast to synchronous interaction (such as in-person, telephone, videoconference, and chat communication) where interactions are immediate, asynchronous tools (like email) allow clients and clinicians time to process information (Abney & Maddux, 2004).

Some social networking options – like text-based blogs, message boards, Facebook, and chat rooms – can lack visual cues because communication is based on text. This issue is mitigated, in part, by the use of emoticons – symbols indicating emotions – and disclaimers (Haug *et al.*, 2008b). In Second Life, user avatars can add additional visual cues, and web cams can also be added to chatting functions.

5.5.3. Ethical and related considerations

Internet treatment leads to several issues related to the credibility of both the clinician offering online services and the client seeking services. Currently, the qualifications of associated online mental health care providers are unclear on many mental health treatment

websites. As Abney & Maddux (2004) noted in their study of online sites, it is difficult to view the credentials of the people online, and hard to tell whether or not they are legitimate.

When online treatment programs are anonymous, and do not require a referral, there can also be credibility issues. When compiling information from clients online, clinicians cannot always be assured of the accuracy of personal information; for example, people seeking mental health treatment on Second Life do so through their virtual selves, their avatars. To create an avatar all you need is an e-mail address, which you can get by using false information – i.e., a fake name, fake address. Additionally, clinicians may not know the material they are receiving is truly from their client, as it may be from other sources.

It can be difficult for a psychologist to ensure that their ethical responsibilities are met when, for example, online group members are dispersed geographically (Castelnuovo *et al.*, 2003). Clinicians cannot ensure the health and safety of an anonymous person online because they cannot check on their safety or monitor them throughout treatment (Abney & Maddux, 2004). In crisis events, clinicians working with clients over the internet might have less control over the situation than in person. For example, their client may log off, end transmissions, or discontinue the treatments and the clinician might not know why (Abney & Maddux, 2004). Legal issues could arise when clinicians conduct online therapy and treatment with a client in a location in which the clinician is not licensed – for example, when the clinician is located in a different province, state, or even country than the client (Recupero & Rainey, 2006).

Clinicians offering online therapy may have difficulty ensuring patient confidentiality (Abney & Maddux, 2004). Websites can be hacked and secure information can be leaked; clinicians need, therefore, to use firewalls, intruder detection systems, and virus detection software. Online therapy also creates a paper trail on the client's computer, which creates additional opportunities for confidential information to be exposed. Most websites, however, use login ID's and encryption technologies which can help ensure patient privacy.

Palmqvist and colleagues (2007) warn that the suitability of clients for internet-based therapy needs to be considered. If, for example, people are not motivated or are too

depressed to manage the computer-based treatment program, they may conclude therapy does not work for them and not seek further treatment.

Familiarity and comfort with technology could also affect treatment outcomes. Clients may have different skill and comfort levels with the internet which will likely influence their performance and disclosure. Slow typing speed, for example, may constrain the ability of an individual to contribute to a group discussion or to effectively write/communicate their thoughts and feelings. Additionally, clients may be distracted by events the clinician cannot observe, such as difficulties with their internet connection, and in online treatments, clinicians cannot observe important non-verbal behaviour exhibited by their clients unless the program utilizes webcams for either synchronous or recorded video.

In non-visual communications, messages have a greater chance of being misunderstood. Techniques typically used to convey meaning, intonation, or intent – such as the use of ‘emoticons’, capitalizing words, or switching fonts – may not accurately convey the intended message. Knaevlesrud (2006) found, however, that a positive, stable, and ‘personal’ therapeutic alliance *can* be made and maintained online.

Internet-based treatments that include additional therapist support – through telephone calls, e-mail, supervision of chat groups, and so on – seem to be the most effective means of providing internet-based treatment. In their review of the literature, Palmqvist and colleagues (2007) found that, across disorders and intervention methods, as therapeutic contact increases so does the effectiveness of internet-delivered treatments.

In a review of 12 controlled studies on the use of internet-based therapies for mental health treatment, Spek *et al.* found that effect size was demonstrably higher in a study where participants were in an internet-based treatment program with therapist support (Spek *et al.*, 2007). In that study –, “*Treatment of Panic Disorder*” by Carlbring *et al.* (2005) – the researchers found the on-line self-help program, supplemented by therapist support via e-mail feedback, to be just as effective as in-person cognitive behavioural therapy.

The results of Carlbring and colleagues’ study indicate that there is a need for researchers to examine the level of therapist involvement in online programs. The authors suggest that adding in a short weekly phone call to supplement the e-mail feedback on the self-directed

online exercise would increase the effectiveness of the online treatment (Carlbring *et al.*, 2005). Internet tools are not alternative methods of treatment, but are resources that can be added to traditional psychotherapy in order to free up clinician time, reduce wait times, and enhance traditional treatment methods (Castelnuovo *et al.*, 2003).

In a 2007 study of service members suffering from PTSD from the 9/11 attack on the Pentagon in Washington, DC, researchers compared an internet-delivery, therapy-assisted, self-management system for cognitive behaviour therapy to in-person cognitive therapy treatment. The internet-delivery system incorporated various multi-technical components – for example, clients conducted self-monitoring online, participated in writing sessions, took part in educational components and were reviewed online – but clients also had the ability to ask for therapists to call them and could also access therapists via e-mail. The authors report that the online system was well received by clients, and there was a greater reduction of symptoms in 3 months in the internet therapy group compared to the in-person group. At 6 months one third of the former group achieved high end functioning (Litz *et al.*, 2007).

The authors noted the importance of multi-module approaches, ranging from an internet-based system to in-person treatment to guide CBT components. They recommend the use of self-help resources, such as the internet programs, DVDs or booklets, to supplement in-person treatment and maximize the therapists' time and resources (Litz *et al.*, 2007).

In their review of internet-based treatments with or without clinician input, Palmqvist and colleagues (2007) found that therapies *with* therapist support had better outcomes (e.g., therapeutic change, reduction of symptoms) than those without. They also found that client adherence increased along with clinical contact and that there were better outcomes with scheduled as opposed to client-initiated contact with clinicians. The authors assert that these findings suggest that face-to-face contact with clients may act as a motivator to engage in self-directed therapy.

The success of internet treatments is perhaps the result of the impact of the internet on the youth. Young people typically use a mix of interactions in social lives – in-person, telephone, chatting on line, text messaging, Facebook, and blogging. The use of mixed ICT seems to be the future for mental health professionals in order to make treatment relevant to young people and future generations of older people as the current youth ages (Maheu, 2005).

5.6. Videoconferencing

Videoconferencing (VC) has a long history in mental health treatment; published studies on the use of videoconferencing for clinical and educational telemental health date back to 1965 (Hilty *et al.*, 2004). Studies examining the uses and success of videoconferencing for OSI also note high rates of satisfaction from patients, especially those patients from isolated areas who would have to travel for treatment (Morland *et al.*, 2004; Deitsch *et al.*, 2000; Cuevas *et al.*, 2006; Frueh *et al.*, 2007; Shore & Manson, 2004). Videoconferencing also enables patients to be seen within a shorter wait-time period (Grady & Melcer, 2005).

Studies examining the uses and success of videoconferencing in treating PTSD also note high rates of satisfaction from patients, especially those from isolated areas who would have to travel for treatment (Morland *et al.*, 2004; Deitsch *et al.*, 2000; Cuevas *et al.*, 2006; Frueh *et al.*, 2007; Shore & Manson, 2004). Relative to PTSD treatment, videoconferencing is currently used for family interventions, structured clinical interviews (SCID), and group therapy, including cognitive behaviour therapy like social and emotional rehabilitation (SER), patient education, and PTSD skills training.

PTSD affects families as well as individuals. Videoconferencing has been used for treatment sessions involving family members who are at a distance. Anecdotal studies on videoconferencing note that communication links over satellite between troops and family members for mental health treatment have been positive (Hill *et al.*, 2004). The use of videoconferencing can serve to improve family relationships. Over videoconference, troops or veterans may be able to confront and discuss issues that would not have been addressed in person (Maheu, 2005; Hill *et al.*, 2004).

Videoconferencing has also been used for conducting structured clinical interviews (SCID). In a 2007 study of clinical interviews within a rural American Indian community of 60 Vietnam veterans, researchers found no significant differences between telepsychiatry administered via videoconference and same -room interviews (Shore *et al.*, 2007).

Group therapy, education, and skills training are common treatments administered over videoconference. In a study of 38 men suffering from PTSD, researchers compared two delivery modes – telepsychiatry and same-room – for the Cognitive Behavioural Therapy treatment known as Social and Emotional Rehabilitation (SER). In these sessions, a therapist taught skill foundations with four components: social environment awareness; interpersonal skills enhancement; anger management; and veteran’s issues management. The study examined the group sessions as well as follow-up session for three months. They discovered that therapist adherence to the therapy is the same for both delivery systems, videoconference is a viable means of treating people with PTSD in rural or remote areas, and videoconferencing does not compromise the quality of care given (Frueh *et al.*, 2007).

More recently, videoconferencing technology has been used for Eye Movement Desensitization and Reprocessing (EMDR) – another treatment for acute stress disorder and PTSD. In a 2007 publication, authors Todder and Kaplan outline the EMDR treatment of a 25 year old woman experiencing acute stress disorder (ASD) after an explosion on the Gaza strip. Her GP arranged for a consultation with a clinician via videoconference, and the client consented to EMDR treatment employing rapid eye movements over videoconference. During the session, the clinician focused the camera on the client’s eyes and the client’s camera was focused on the therapist’s hand. The patient focused on the clinician’s hand movements while talking about the traumatic event. Several sessions of EMDR rapid eye movement therapy were provided, until the patient could no longer concentrate on the memory. At a follow-up meeting with her GP 3 months after treatment, the patient stated that she was no longer experiencing ASD. While these results appear positive, they were based on self reported results with only one client. The authors note that there needs to be further development in the clinical protocol and assessment of EMDR treatment and its delivery over videoconference (Todder & Kaplan, 2007).

5.6.1 Video and video phones

The application of videophones for point-to-point mental health care has been explored, but to a lesser degree than videoconferencing. In a 1998 study of five cases where videophones were used for homecare supervision of telepsychiatric patients, both clients and clinicians were satisfied with the service. The authors noted that, while clinical information was

primarily obtained through audio, the visual – even low quality visual – feedback was important because it gave people visual recognition of each other, the impression of non-verbal cues, social presence, and the feeling that others are paying attention (Cukor *et al.*, 1998).

The use of video itself in telemental health has also been examined. Todder and colleagues' 2007 study on using videoconference for assessment and brief CBT notes one case where recorded video was used. One patient with PTSD was assessed and treated through the use of videoconference. With her permission, the sessions were recorded and the videos were used for a consultation session. The patient was given a follow-up session via videoconference six months after treatment, and self-reported a lessening in the number and frequency of dissociative episodes and an overall improvement in daily functioning (Todder *et al.*, 2007).

5.6.2. Ethical and related considerations

Several studies mentioned group therapy conducted over videoconference as a potential treatment tool for PTSD (Deitsch *et al.*, 2000; Morland *et al.*, 2004; Shore & Manson, 2004). The studies revealed high rates of user satisfaction, noting that videoconferencing offers advantages over traditional modes of service delivery because it reduces travel time and costs. Group members can exercise control over the camera to ensure security (to check to make sure that no one else is in the off-site room) (Deitsch *et al.*, 2000). Some scholars even state that, since avoidance is a core feature of PTSD, videoconferencing may in fact be a better way to treat PTSD than in-person group sessions (Morland *et al.*, 2004).

Another study of American Indian Vietnam veterans with PTSD presents group videoconferencing and educational sessions as a solution to those fearing stigma and/or unable to receive treatment from health care providers who are familiar with combat-related illness. In this study of 50 telepsychiatric interactions, the researchers reported that clients quickly became comfortable with the technology and appreciated the availability of care enabled by videoconferencing (Shore & Manson, 2004).

Videoconferencing can be an important tool for treating PTSD if the clients are comfortable with the technology and feel that their privacy is being ensured (Deistsch *et al.*, 2000). If the clients are unable to control the off-site camera, for example, they may not feel that they can confide in the clinician, thus compromising the treatment.

Rees & Haythornthwaite (2004) advise clinicians that there should be a local health care worker with the client at the remote site. Others stress the importance of the clinic psychiatrist, stating that the psychiatrist needs to be aware of relevant cultural issues as well as the background and family history of the patient (Shore & Manson, 2004).

The literature surveyed on videoconference use for treatment of mental health issues suggests that group PTSD treatment delivered via videoconference is comparable to the same PTSD treatment delivery with the clinician in the same room (Frueh *et al.*, 2007). Day and Schneider (2002) found no difference in outcome variables between face-to-face therapy and real time video conferencing. The use of videoconferencing did not seem to affect group cohesion. As Deitsch and colleagues (2000) noted in their study of veterans with PTSD, participants were willing to discuss personal, sensitive, painful issues with the group over videoconference.

Videoconferencing is currently used for family interventions and structured clinical interviews (e.g., the Structured Clinical Interview for DSM Disorder). In a 2007 study of clinical interviews with a rural American Indian community of 60 Vietnam Veterans, researchers found no significant differences between the outcomes achieved using telepsychiatry administered via videoconference and same-room interviews (Shore *et al.*, 2007). Overall, the literature on the treatment of PTSD states that videoconferencing is a highly effective method, especially for those living in rural and remote communities.

5.7. Virtual Reality

The use of virtual reality (VR) is a fairly new development in the treatment of PTSD. VR is technology which allows a user to interact with a computer-simulated environment, either real or imagined (Rizzo *et al.*, 2002). Virtual reality is made possible by the capability of computers to synthesize a 3D graphical environment from data. The input devices, like a headtracking device, sense the user's motion, and the computer modifies the synthetic

environment accordingly, thus creating the illusion of interacting with, and being immersed in, the virtual environment (Gorini, 2008)

The VR system combines hardware that receives input from user devices and software that conveys multisensory outputs to create the illusion of a virtual world (Gorini, 2008). Output tools that immerse the user often include a head-mounted display (like a helmet or goggles) with screens for each eye, earphones, and a head-tracking device which enables virtual world view changes with movement as in the real world. Additional add-ons which can be used to increase immersion include: joy stick or hand-held devices to navigate the environment (Anderson *et al.*, 2003); gesture sensing gloves, and haptic-feedback (Rizzo *et al.*, 2002); vibration platforms located under the patient (to simulate helicopters, explosions, etc.) (Spira *et al.*, 2006); and devices that emit scents, reminiscent of a location (e.g., ethnic foods cooking, tires burning etc.) – in the case of PTSD, the location of the traumatic event (Pair *et al.*, 2006).

VR software handles the geometry, texture, and physical modeling of the objects in the virtual world, and generates the virtual environment usually at 20-30 frames per second (Gorini, 2008). These environments may be bought or licensed from developers or adapted by clinicians using commercially available 3D software packages (Gregg & Tarrier, 2007). Recent advancements in VR software include capabilities such as perspective shifts and realistic visual effects modeled on real-life locations. Pair and colleagues (2006) describe the user-centered design process of a VR therapy application made specifically for veterans of the Iraq war which features combat tactical simulation scenarios based on the popular X-Box game *Full Spectrum Warrior*.

Virtual reality has been successfully used since the late 1990's to treat anxiety and phobia disorders, and researchers of PTSD are currently interested in using virtual reality as a tool to aid in Effective Imaginal Exposure Therapy. The main theoretical underpinning of exposure therapy is the Emotion Processing Theory which posits that to cope with a fear, the fear structure must be activated and new incompatible information must be provided so that a new memory can be formed (Foa & Kozak, 1986 in Rothbaum, 1999). Exposure facilitates emotional processing by activating the fear structure and allowing the client to stay in the situation long enough to process information inconsistent with their fear and form a new non-threatening memory.

VR is potentially an ideal medium for exposure therapy as it is capable of activating the fear structure (in the case of PTSD traumatic memories, both visual and auditory) and allowing emotion processing in a safe and controlled environment. VR may be particularly suited to exposure therapy with clients with PTSD. Many of these clients are unwilling or unable to effectively imagine or visualize the traumatic event – in fact, avoidance of reminders of the trauma is one of the cardinal symptoms of PTSD (Pair, 2006). VR is an appropriate medium for exposure therapy involving traumatic memories because it allows clients to experience presence (interpretation of an artificial stimulus as if it were real), which is an essential element of exposure therapy that contributes to the experience of anxiety and thus facilitates emotion processing (Rothbaum, 1999; Pair, 2006).

The use of VR in exposure therapy does not necessarily lead to a loss of the client-clinician relationship. Commonly, initial sessions focus on educational aspects and skills training, including relaxation techniques followed by cognitive restructuring and then, subsequently, clients participate in VR exposure therapy (Anderson *et al.*, 2003). For PTSD-specific exposure, the typical protocol is the use of an initial orientation stage followed by an exposure stage in which the client and therapist progress through imaginal scenarios which are ranked hierarchically from low to high anxiety inducing. Clients are encouraged to remain engaged throughout the exposure and to practice breathing and relaxation skills learned while rating their level of anxiety on the Subjective Units of Distress Scale (SUDS) (Rothbaum *et al.*, 1999). Even within VR sessions, client-clinician interaction continues to take place; VR is seen as a tool that enables and enhances treatment but is not a treatment in itself (Rizzo *et al.*, 2002).

Virtual reality tools can have many benefits. VR increases presence, which is the client's interpretation of artificial environments as being real (i.e., as though one is physically immersed in the virtual environment), and contributes to the experience of anxiety which, subsequently, facilitates exposure (Pair *et al.*, 2006; Price & Anderson, 2007). The flexibility of the VR environment also allows for exposure to be repeated, gradual, and prolonged – the three main tenants of successful exposure therapy – and allows for maximally effective exposure. With VR, the clinician can control the dimensions and features of the stimulus and may vary the intensity of the experience based on objective (e.g., heart rate monitors) and subjective (e.g., SUDs ratings) measures in a safe and predictable environment, which

exposes the patient to less risk, harm or embarrassment. Furthermore, the fact that these VR exposure sessions can be conducted in the clinician's office saves time and money as it eliminates the need for client and therapist to travel to sites of traumatic memories which may be expensive or, in some cases impossible, to do (Gorini, 2008).

Preliminary research shows high acceptance rates of the use of VR in exposure therapy. In a 2007 study, Garcia-Palacios and colleagues conducted a survey of VR-based treatment of 150 participants suffering from phobias. The majority of the participants (76%) stated that they would be more likely to participate in VR exposure than *in vivo* exposure (Garcia-Palacios *et al.*, 2007). Furthermore, in their 2001 study of 10 Vietnam combat veterans with PTSD, Rothbaum and colleagues found that over ten, 90-minute VR sessions involving virtual jungle and helicopter scenes, all participants experienced an objective and subjective reduction in PTSD symptoms. Similarly, Hoffman and colleagues (2002) found their patient, who suffered PTSD as a result of the 9/11 attack on the World Trade Center, reported a 90% reduction rate of PTSD symptoms after completing six, 1-hour sessions of VR exposure, including scenes of planes flying over the twin towers, crashing into the twin towers, and the towers collapsing. In their meta-analysis of articles that examine the use of virtual reality for anxiety disorder therapy, Gregg and Tarrier (2007) concluded that VR is acceptable to the majority of patients and that VR environments are capable of evoking the anxiety responses necessary for exposure to be effective.

5.7.1. Ethical and related concerns

There are many clinical concerns and ethical issues surrounding the use of virtual reality treatment tools. These include the patient's ability to use the tools, the potential negative outcomes – both psychological and physical – and the potential for the misuse of these tools by untrained clinicians.

The navigation of VR systems may prove problematic for clients with cognitive or motor difficulties (Gregg & Tarrier, 2007) and the extra effort required to navigate the VR equipment may serve as a distraction and limit the treatment process (Rizzo *et al.*, 2002). Likewise, if the technology becomes more accessible, patients could potentially explore virtual reality treatment options by themselves; with little or without clinician guidance and

support this type of self-treatment could be detrimental to the patient's mental health and well being (Rizzo *et al.*, 2002).

VR technologies may be harmful to specific populations – for example, for individuals with cognitive impairments and altered awareness and those with conditions resulting in distorted views on reality. These impairments might lead the clients to use VR technology as a form of escapism (Rizzo *et al.*, 2002).

There are also difficulties in knowing how individual patients will react within a virtual environment. Stress levels would be difficult to predict (Rizzo *et al.*, 2002).

Video game researchers have noted the potential of violence games to induce violent behaviour. One major concern in the creation of virtual environments is that 'dehumanizing' behaviour could result, whereby the client feels even more detached from their own emotions and from other people as a result of the VR world (Rizzo *et al.*, 2002).

Negative side effects of virtual reality have been reported, including: simulation sickness; cybersickness; and after effects. Simulator sickness is a specific form of motion sickness that is a visually induced disruption of the human motion detection system and may result in imbalance, disorientation, headaches and extreme nausea (Gorini, 2007). It occurs in an estimated 20% of users of higher end simulators and in as many as 60% of users of lower-end VR models. Cybersickness is a form of motion sickness related to incongruent sensory cue information, and can result in a number of symptoms, including nausea and vomiting as well as disorientation, eye strain, and vertigo. Negative after effects include motor disturbances, flashbacks, fatigue, drowsiness and lowered arousal in general. Research suggests repeated exposure could gradually reduce these side effects. Anecdotal sources indicate that changes in the technology used, for example flatscreen televisions instead of the head mounted display, may reduce symptoms, although there are no systematic studies on the topic (Rizzo *et al.*, 2002).

There is the potential for misuse of VR by clinicians as the tools become more widely available. Clinicians should only employ treatments within their own area of expertise and virtual reality should be viewed as a tool rather than a new type of therapy or a way to attract patients. Clinicians should also be aware of the potential impact of the VR tool on the

patient relationship, and discourage the clients from 'hiding' behind the technology – i.e., talking about the tool for treatment rather than focusing on the stimuli of the treatment itself (Rizzo *et al.*, 2002).

Studies that suggest VR is a useful tool for mental health are usually based on small numbers of actual cases: for example, Rothbaum and colleagues (2004) – in a study of the use of virtual reality for social anxiety – examined the results of two patients, and only had follow-up information on one, which is typical of many of the current studies on VR for treatment. Their study was anecdotal, and did not contain any statistical analysis. In their follow-up research on one of the two participants they found that the score on standardized PTSD measures decreased but not until months after finishing therapy – suggesting that important aspects of therapy were taking place after the exposure (Rothbaum *et al.*, 2004).

Much of the recent literature on new technologies for treatment of PTSD is focused on VR; for example, in the 2006 text *Novel Approaches to the Diagnosis and Treatment of Posttraumatic Stress Disorder* a dozen articles examine virtual reality technologies for exposure therapy (Roy, 2006). The high success rate of virtual reality in the treatment of phobias has driven this research on the use of virtual reality in the treatment of PTSD. Many of these studies, however, involve limited numbers of participants; most articles are based on a single case study (Maheu, 2005; Rothbaum, *et al.*, 1999; Difede, 2002). Other articles on the use of virtual reality for PTSD are proposals for development, or discuss the technology itself and do not examine the actual effect on those with PTSD (Mrdeza & Pandzic, 2003).

Some authors have questioned the methodology of past research involving VR in exposure treatment for anxiety disorders. For example, Gregg and Tarrier (2007) reviewed studies which compared the effectiveness of VR treatment with *in vivo* exposure, another treatment, or no treatment control. The authors used the Clinical Trials Assessment Measure (CATM) to determine the soundness of the methodology utilized in the 17 studies they analyzed, which included participants with various anxiety disorders including fear of heights, spiders, and flying, as well as PTSD. The authors reported that, although the maximum score on the CATM was 100, the average score achieved across the 17 studies was 37.4. The authors noted the studies contained many methodological flaws; for example, all but two of the studies had less than 27 participants, which was the minimum recommended in order to

show a treatment effect. Additionally, although many of the studies claimed to include random assignment to groups, only one contained details of the randomization process utilized. In the studies, the majority of treatment groups were compared to waiting list controls and not other standardized treatments like CBT exposure, thus limiting the ability to clearly state the comparative efficacy to traditional therapeutic methods. Moreover, most of the studies used different and non-standardized measures, making comparisons between studies impossible. Due to these methodological problems it is difficult to comment on how well the VR treatment effects documented in the aforementioned studies generalize to the real world or other treatment populations, thus limiting the validity of conclusions drawn from their research findings. In conclusion, Gregg and Terrier (2007) found that, although superior to no treatment, the effectiveness of VR over other traditional therapeutic approaches is not conclusively supported.

Exposure therapy has proven to reduce avoidance, one core symptom of PTSD, but does not necessarily treat other symptoms, such as numbness. Also exposure therapy is not beneficial for all patients. Studies indicate that PTSD can worsen from exposure therapy in some cases (Thordarson, 2003).

Gregg and Terrier (2007) note that the cost of VR systems can be onerous (\$2,000 to \$5,000 for a Head Mounted Device, and up to \$200,000 for a complete system), and that it may require trained technicians to assist with technical problems which may be costly. There is a need for further studies on the use of virtual reality for the treatment of PTSD. Although virtual reality is immersive and interactive, other 'simple' video tools could also aid patients who are undergoing Effective Imaginal Exposure Therapy (Rizzo *et al.*, 1998).

Virtual reality treatments may be effective when clients themselves are unwilling or unable to verbalize their experience of trauma (avoidance of reminders is one of the symptoms of PTSD); that said, if clients can verbalize their experience, that information could be used to personalize the VR program. VR stimuli can be general or specific to the trauma, and even general environments can be enough of a reminder. Realism, immersion, and interaction are important elements of treatment. Exact replications are not needed, clients only need enough detail to "trigger" traumatic recurrence. Studies on VR recommend use of a head mounted display with good clarity, viewing range, and comfort. With a head mounted unit, the client can see the environment as they move their head and body, allowing for greater

immersion and perhaps greater arousal. VR also can allow for a high level or degree of interaction (Spira, 2007). Studies also show that VR may promote treatment-seeking by young military personnel experience PTSD symptoms because young people are attracted to, and are more comfortable with, virtual reality technology (Rizzo, 2007).

5.8. Other ICT, Including Handheld and Mobile Devices

Handheld computers can support software programs that make treatment available in any environment, at any time. They can also collect and process relevant treatment data about the client's adherence to the treatment as well as the subjective and behavioural impact of therapy (Maheu, 2005). Handheld devices can also help motivate clients to comply with homework assignments and can monitor their responses, which can aid in clinical decision-making. Researchers note that handheld devices are particularly appropriate for anxious or depressed clients (Maheu, 2005).

Researchers have developed behavioural intervention programs which are designed for handheld computers. In these interventions, clients use a stylus to select options from the computer's touch screen (Bobsicz, 2003). For example, Newman and colleagues (1997) created software for a palmtop computer which contained both a therapy mode, which had breathing retraining exercises and tools to help clients through exposure exercises, and a symptom recording mode which prompted participants to rate their anxiety levels at four random times during the day.

A general constraint to the more widespread use of handheld devices for therapy is the cost of the individual devices; however, compared to other methods of treatment, the cost is minimal. Also, the cost of handheld devices is lessening over time. The market for handheld and mobile devices in general is moving toward multi-purpose devices such as iPhones and Blackberries that combine phone, web-access, and other capabilities.

6. Conclusions

ICT tools for assessment and treatment can facilitate client intake and therapy. Not all ICT tools will, however, be a good fit for every clinic, clinician, and client. There are a few important issues to keep in mind when considering which tools to adapt for clinical practice.

Trust is very important when implementing ICT solutions. When using ICT for assessment and treatment, OSI clinicians have to be able to trust that the technology will ensure a high quality of service. Clients using technologies to interact with the clinician also have to be comfortable with the tools and be able to trust not only the clinician, but also the technology. Privacy concerns, quality of care, and the accuracy of ICT-assisted assessment and treatment are three major issues for clinicians and clients to consider.

Patient confidentiality is a big concern for healthcare providers. There are ethical codes for the creators of software for ICT (Alexander, 2006); ultimately, however, clinical responsibility for the patient's well being rests with the clinician. Clinicians are responsible for the ICT that they use, and they must be sure that patient confidentiality and privacy concerns are addressed (Harvey & Carlson, 2003; Maheu, 2005). There are a number of privacy concerns and potential solutions when using computers, telephones, videoconferencing, and other technologies for the assessment and treatment of OSI.

Psychologists and clinicians are also responsible for decisions made based on ICT. They will use technology only if it improves quality of service over other methods of assessment – such as, for example, providing assessment and treatment to people living in remote communities where telehealth or other ICT-supported assessments are the only reasonable option. Patients must be fully informed about the risks and responsibilities inherent in the process so they can provide informed consent. Practitioner competence must be ensured, and safety of both clinicians and clients needs to be protected through safe hardware and software (Harvey & Carlson, 2003).

7. Annotated Bibliography (201 references)

Abney, P.C., Maddux, C.D. (2004). Counselling and technology: Some thoughts about the controversy. *Journal of Technology in Human Services* 22(3), 1-24.

In this article authors Abney and Maddux provide an overview of computer-based test administration, interpretation and internet-based technologies for counselling based on a literature review. The benefits and issues relating to these three categories are then discussed in order to enlighten and inform counsellors about technological tools used in the profession.

Adatia, F. & Bedard, P.L. (2003). Palm reading: 2. Handheld software for physicians. *Canadian Medical Association Journal*. 168(6), 727-734.

The authors present two different case studies in which PDA software can be used in the medical profession and list various software tools for both medical students and professionals.

Alcaniz, M., Botella, C., et al. (2007). EMMA: An adaptive display for virtual therapy. *Foundations of Augmented Cognition*, 258-65.

Description of a Spanish Virtual Reality program which allows modification of virtual environment by the therapist. Case study showing its utility for the treatment of a phobia in a 9-year-old child. Child underwent exposure therapy in various manipulated environments over 11, hour-long VR sessions and follow up in vivo sessions. Results indicate a reduction in anxiety and avoidance of feared stimulus (i.e., the dark).

Alexander, G.L. (2006) Issues of trust and ethics in computerized clinical decision support systems. *Nurs. Admin. Quarterly* 30(1), 21-29.

Computerized clinical support systems model the clinician's decision-making process. In this article Alexander explores the ethical issues surrounding computerized clinical decision support systems. He notes the importance of clinician trust for success, stating that ethical tensions occur if professionals do not understand the support system.

American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th, text revision ed.). Washington, DC.: American Psychiatric Association.

This resource, the standard diagnostic manual for mental health clinicians, provides information on all of the possible diagnosable mental health disorders, along with their associated factors, etiology, and prevalence rates.

Anderson, P., Jacobs, C., & Rothbaum, B.O. (2004). Computer-supported cognitive behavioral treatment of anxiety disorders. *Journal of Clinical Psychology*, 60 (3), 253-267.

Review article examines the use of computer supported cognitive-behavioural treatment of anxiety disorders. Article outlines advantages and disadvantages to the use of palmtop computers, Virtual Reality and computer-assisted programs in the treatment of anxiety disorders.

Anderson, P., Rothbaum, B.O., Hodges, L.F. (2003). Virtual reality exposure in the treatment of social anxiety. *Cognitive and Behavioural Practice* 10, 240-247.

Social anxiety is treated by the use of exposure therapy and cognitive-behavioural group therapy, two methods that can be difficult to control or intimidating for those with social anxiety. The authors of this article present data from two cases of clients receiving VR

exposure therapy for public speaking anxiety, providing background information for future VR studies.

Andersson, G. (2006). Internet-based cognitive-behavioral self help for depression. *Expert Review of Neurotherapeutics*, 6(11), 1637-1642.

Study reviews evidence for internet-delivered self-help for depression from five existent independent, randomized controlled trials. Results suggest computerized self-help is both effective and cost effective particularly when it involves contact with a clinician (e.g., feedback). However, none of the studies used face-to-face diagnostic interviews to validate depression diagnosis. Proposal of stepped-care model (i.e., internet-based program stepped up to face-to-face if needed).

Andersson, G.G. (2006). Treatment of depression and anxiety- internet-based self- help with therapist feedback and in vivo group exposure for social phobia: a randomized controlled trial. *Journal of Consulting and Clinical Psychology* 74(4), 677-686.

Article describes internet-based cognitive behavioural treatment for social phobia. Treatment included 9-week internet modules coupled with two, three-hour exposure sessions. Results indicate those in the treatment condition experienced significant reduction of anxiety symptoms and increase in quality of life.

Andersson, G., Bergstrom, J., Hollandare, F., Ekselius, L., Carlbring, P. (2004). Delivering cognitive behavioural therapy for mild to moderate depression via the internet: Predicting outcome at 6-month follow-up. *Verhaltenstherapie* 14, 185-189.

Depression can be successfully treated with cognitive behaviour therapy. In this study Andersson et al. follow 71 participants in a randomised trial who completed a 6 month follow-up. The authors' results are inconclusive, but they note the need to identify those who would benefit from internet therapy in advance.

Andrews, G., Erksine, A. (2003). Reducing the burden of anxiety and depressive disorders: the role of computerized clinician assistance. *Current Opinion in Psychiatry*, 16, 41-42.

Andrews and Erksine's short editorial review examines the use of computers for the delivery of computerized cognitive behaviour therapy (CCBT) for anxiety and depressive disorders. In particular, the review mentions the author designed computer CLIMATE and the ethical issues involved with computer assisted therapy.

Antony, M. M., & Swinson, R. P. (1996). *Anxiety disorders and their treatment: A critical review of the evidence-based literature*: Health Canada.

Anxiety disorders are the most prevalent disorders, with research studies citing high prevalence rates for these types of disorders. Their associated features are discussed. A review of the literature on empirically supported treatment for this category of disorders is also provided.

Aziz, M.A., & Kenford, S. (2004). Comparability of telephone and face-to-face interviews in assessing patients with posttraumatic stress disorder. *Journal of Psychiatric Practice*, 10(5), 307-313.

Phone interviews are one means of administering structured clinical interviews. This article compares in-person and phone interviews of the Hamilton Rating Scale for Depression (Ham-D). 34 veterans from the Cincinnati VA Medical Center were recruited to take the test

in the two methods. The authors found phone interviews to be a reliable way to assess posttraumatic stress disorder and depression.

Baer, L., Greist, J., & Marks, I.M. (2007). Computer-aided cognitive behavior therapy. *Psychotherapy & Psychosomatics* 76(4), 193-195.

Literature review suggests Computer-aided Cognitive Behavioural Therapy is more successful if users are screened, given access by password, and supported by phone, email or face-to-face contact. Description of Behaviour Therapy Steps computer-driven interactive voice response system which helps user plan and carry out exposure practices by using the phone and computer outside of working hours. The article indicates that system is useful for panic, phobias, depression and OCD symptoms and is cheaper and more efficient than face-to-face intervention.

Bai, Y. M., Lin, C. C., Chen, J. Y., & Liu, W. C. (2001). Virtual psychiatric clinics. *The American Journal of Psychiatry*, 158 (7), 1160-1161.

This is a letter to the editor reporting on the demographics of visitors to a non-commercial virtual psychiatric clinic where people interact with staff via email. Clients generally sought information about anxiety disorder, were younger than outpatients and college educated, and had not previously visited a psychiatric clinic. The authors suggest that people with anxiety issues are predisposed to seeking help via computers to access resources. Authors suggest that convenience and privacy of the virtual clinic may increase motivation to seek help, and that the internet can be used to educate and reach future patients.

Barlow, D. H., Allen, L. B., & Choate, M. L. (2004). Toward a unified treatment for emotional disorders. *Behavior Therapy*, 35(2), 205-230.

Authors discuss the overlap between anxiety and mood disorders, and how the high comorbidity rates and commonalities suggest that something greater is underlying these similarities. A unified intervention approach is suggested, and three components to treatment are discussed, including changing cognitive appraisals, preventing emotional avoidance, and the use of action tendencies.

Barlow, D., & Keane, T. (2002). Posttraumatic stress disorder. In D. Barlow (Ed.), *Anxiety and its disorders: The nature and treatment of anxiety and panic*. (2nd ed.), pp. 418-453. New York: The Guilford Press.

PTSD, its symptoms, and historical background are discussed. Symptoms associated with PTSD are portrayed in historical classics dating back to Homer's Iliad and Odyssey. Authors discuss how trauma at a less severe level interacts with other individual and environmental factors to determine how the individual will experience the event, but as the severity of trauma increases, the likelihood of PTSD symptom development increases regardless of these other factors. PTSD in military personnel is discussed; even peacekeepers are at risk for developing it. Assessment and treatment options are discussed in detail.

Barlow, J.H., Ellard, D.R., Hainsworth, J.M., Jones, F.R., & Fisher, A. A review of self-management interventions for panic disorders, phobias and obsessive-compulsive disorders. *Acta Psychiatrica Scandinavica* 111(4), 272-285.

This review article reveals that computer-based interventions were effective for symptom reduction in panic disorder, phobic and obsessive-compulsive disorder clients. However, in one study, clients with severe OCD responded better to clinician-led behaviour therapy than internet based treatment.

Behavioral Tech (2008). What is DBT? Retrieved September 1 2008 from <http://behavioraltech.org/resources/whatisdbt.cfm>.

The main tenets of DBT are reviewed here, along with its history and development. The empirical evidence base supporting DBT is also listed, including two randomized controlled clinical trials that examined the treatment of DBT for individuals with borderline personality disorder substance abuse. Significant treatment outcomes were found, including a decrease in suicidal behavior and hospitalization, among other things.

Bobicz, K. P., & Richard, D. C.S. (2003). The virtual therapist: behavior therapy in a digital age. *The Behavior Therapist* 26(3), 265-270.

Review article of the ways in which the computer is being used in behaviour therapy such as, expert systems (report generation), the internet (self-help modules), and handheld computers (behaviour recording). Also, the utility of Virtual Reality in therapy for anxiety reduction and visual spatial skills training is discussed. Benefits of the use of Virtual Reality include greater control of exposure experience and environment.

Bourdon, K. H., Boyd, J. H., Rae, D. S., Burns, B. J., Thompson, J. W., & Locke, B. Z. (1988). Gender differences in phobias: Results of the ECA community study. *Journal of Anxiety Disorders*, 2, 227-241.

The authors discuss gender differences in the prevalence of anxiety disorders. For example, women are twice as likely to develop PTSD, three to four more times likely to have simple phobia, and are also more prone to social phobia and agoraphobia. Possible explanations are put forth.

Bray, R. M., Fairbank, J. A. & Marsden, M. E. (1999). Stress and Substance Use Among Military Women and Men. *The American Journal of Drug and Alcohol Use*, 25(2), 239-256.

This article explores the relationship between various areas of perceived stress (e.g. occupational, personal, gender) and substance use (drinking an illegal drug use, and cigarette smoking). Data from the 1995 Department of Defense Survey of Health Related Behaviors is used. Findings reveal that women report less heavy drinking than men, but have similar rates of other substance use. In addition, both genders identified operational stress as their most significant stressor.

Breslau, N., Peterson, E. L., Kessler, R. C., & Schultz, L. R. (1999). Short screening scale for DSM-IV posttraumatic stress disorder. *American Journal of Psychiatry*, 156(6), 908-911.

The authors constructed and tested a short screening scale for PTSD using a computer-assisted telephone interview. A representation sample of 2,181 subjects from the Detroit area were contacted and given the short version of a structure diagnostic interview. The system is used to maximize a potential number of cases which are then refined in a second phase. The system is useful when dealing with large numbers of potential PTSD cases.

Brown, T. A., & Barlow, D. H. (2002). Classification of anxiety and mood disorders. In D. H. Barlow (Ed.), *Anxiety and its' disorders: The nature and treatment of anxiety and panic* (2nd ed.). New York: The Guilford Press.

This chapter discusses the high rates of comorbidity and overlap in symptoms between anxiety and mood disorders. The authors suggest that based on pre-existing empirical evidence, perhaps there is an underlying unifying construct shared by the two different classifications. Treatment implications are discussed.

Brown, T. A., Campbell, L. A., Lehman, C. L., Grisham, J. R., & Mancill, R. B. (2001). Current and lifetime comorbidity of the DSM-IV anxiety and mood disorders in a large clinical sample. *Journal of Abnormal Psychology, 110.* 49-58.

Comorbidity is a complicating factor in the mental health field; often mood disorders and anxiety disorders overlap. The authors present comorbidity rates on patients who had been diagnosed with a mood or anxiety disorder using a structured clinical interview. Results indicated that 55% of the sample had at least one other mood or anxiety disorder.

Cacciola, J. S., Alterman, A. I., Rutherford, M. J., McKay, J. R., & May, D. J. (1999). Comparability of telephone and In-person structured clinical interview for DSM-III-R (SCID) diagnoses. *Assessment, 6*(3), 235-242.

In this study comparing the Structured Clinical Interview for DSM-III-R (SCID) administered by telephone and in person to 41 college-aged men, researchers found overall agreement for lifetime diagnosis of conditions but poor agreement for current diagnosis. Accordingly the authors urge caution in comparing in-person and telephone diagnosis while discussing improvements to reliability and circumstances where telephone SCID is useful. Authors recommend using the telephone method when screening participants in a control group (of "never ill" participants). They also noted that in their study there was no formal training for using the SCID over the telephone, which may suggest a need for training. The wording of questions should also be considered when administering tests over the telephone.

Canadian Mental Health Association (2006). *Suicide Statistics*. Retrieved July 1, 2008, from http://www.ontario.cmha.ca/fact_sheets.asp?cID=3965

This website provides information on certain risk factors for suicide, such as gender, age, mental health, among other things. Information is included on rates of suicide and the incidence of suicide in certain populations.

The Canadian Press. (2008). "Internet use still growing in Canada." Retrieved July 8, 2008, from <http://www.thestar.com/News/Canada/article/442010>.

The results of the 2008 StatsCan survey on internet use in Canadian are presented in this article. The study notes that while most young Canadians are online, there still is a digital divide between urban and rural users.

Carlbring, P., & Andersson, G. (2006). Internet and psychological treatment. How well can they be combined? *Computers in Human Behavior, 22*(3), 545-553.

Article suggests internet delivered self-help programs are effective treatments for various panic disorders. However, authors suggest research be expanded to include more rigorous controlled, randomized designs, and compare internet to face-to-face designs. Evidence of the cost and time benefits is reviewed and cautions for treatment are detailed such as security of privacy, lack of visual and facial cues and identification and management of internet-delivered interventions.

Carlbring, P., Gunnarsdottir, M., Hedensjo, L., Andersson, G., Ekselius L., & Furmark, T. (2007). Treatment of social phobia: randomised trial of internet delivered cognitive-behavioral therapy with telephone support. *British Journal of Psychiatry*, 190, 123-128.

Evaluation of a 9 week internet based therapy designed to decrease attrition (common in traditional minimal therapist contact treatment design) by addition of weekly telephone calls from clinician to participant. 60 Swedish participants with social phobia read and posted text responses to nine online treatment modules. All participants received one weekly 10 minute telephone call from clinician. Compared to controls, treated participants reported greater reductions of general and social anxiety, avoidance and depression. Adherence was high and all improvements remained at one year follow-up.

Carlbring, P., Brunt, S., Bohman, S., Austin, D., Richards, J., Ost, L. G., et al. (2007). Internet vs. paper and pencil administration of questionnaires commonly used in panic/agoraphobia research. *Computers in Human Behavior*, 23(3), 1421-1434.

The article examines the results of a study of 494 people randomly assigned paper and pencil or computer questionnaires for panic disorder. The results of both methods showed high and significant correlations. The internet version did not give higher scores or effect sizes, and the authors conclude that internet administered questionnaires for panic disorder can be used with accuracy, but each different type of questionnaire needs to be tested for online use.

Carlbring, P., Nilsson-Ihrfelt, E., Waara, J., Kollenstam, C., Buhrman, M., et al (2005). Treatment of panic disorder : Live therapy vs. self-help via the internet. *Behaviour Research and Therapy*, 43, 1321-1333.

Carlbring and colleagues' 2005 article compares in person sessions of CBT with an online self-help program containing self-directed online exercises with e-mail feedback from a trained therapist. The researchers compared the results gathered from 49 participants and found the on-line self-help program, supplemented by therapist support via e-mail feedback to be just as effective as in person cognitive behavioural therapy, and suggest that there is a need for researchers to examine the level of therapist involvement in online programs, perhaps adding in a shortly weekly phone call.

Castelnuovo, G., Gaggioli, A., Mantovani, F., Riva, G. (2003) From psychotherapy to e-Therapy : The integration of traditional techniques and new communication tools in clinical settings. *CyberPsychology & Behaviour* 6(4), 375-382.

In this review article the authors explore new tools used in e-therapy and their possible applications. Topics include self-help therapy, directed online homework assignments and self-help groups. The authors also explore the pros and cons of different types of computer mediated communication – synchronous and asynchronous.

Castelnuovo, G., Claudio, B., De Ferrari, R., Gaggioli, A., Mantovani, F., et al (2004). New tools in cybertherapy: the VESPY web site. In G. Riva et al (Eds.) *Cybertherapy*. IOS Press, 15-35.

In this chapter the authors explore the different types of psychological internet applications in health care and the role of technology in psychotherapy. Castelnuovo et al. then present a framework for integrating tools into mental health care based on the use and influence of internet-based tools on the therapist/patient relationship. Finally they introduce the VESPY website, a virtual office tool to enable services for e-therapy.

Christensen, H. (2007). Computerized therapy for psychiatric disorders. *The Lancet*, 370, 112-113.

Christensen's editorial outlines the need for and the advantages of computerized therapy. While she lists various benefits of computer treatment she also points out that online interventions are not appropriate for all patients, and technical training and education as well as real therapists are necessary components of computerized therapy.

Coles, M. E., Cook, L. M., & Blake, T. R. (2007). Assessing obsessive compulsive symptoms and cognitions on the internet: evidence for the comparability of paper and Internet administration. *Behaviour Research & Therapy*, 45(9), 2232-2240.

This study tests the equivalence of the Obsessive Compulsive Inventory administered by traditional pen and paper means as well as by computer. The advantages of computer administration of questionnaires include the ability to save money on assessments and reach more diverse people. Computer-assisted assessment programs also automate scoring procedures, therefore eliminating data entry errors. However, the testing environment and presentation of the testing stimuli for internet or computer-based assessments cannot be controlled. The computer and traditional test was given to 105 university students. Both methods of testing had similar means, consistency and intra-correlations, suggesting that this particular test can accurately be taken online.

Collins, F.E., & Jones, K.V. (2004) Investigating dissociation online: validation of a web-based version of the Dissociative Experiences Scale. *Journal of Trauma and Dissociation*, 5(1), 133-147.

The results of a pilot internet-based version of the Dissociative Experiences Scales compared to the traditional paper method are presented in this article. The authors note the reliability of the online test and contribute to the literature on the validity of online questionnaires. They also state that the internet was an efficient collection tool, allowing for only complete data sets and processing the information efficiently.

Collins, G.B., McAllister, M.S., & Ford, D.B. (2007). Patient-provider e-mail communication as an adjunctive tool in addictive medication. *Journal of Addictive Diseases* 26(2), 45-52.

This article outlines 3 case reports of participants with substance addictions using email communications to interact with clinicians. Results indicate participants enjoyed the experience and maintained sobriety throughout the process. Authors assert that continual contact with patients (e.g., attention to recovery, reflection and self-assessment) decreases risk of relapse. However, participants were all high functioning professionals.

Cook, J. M., & O'Donnell, C. (2005). Assessment and psychological treatment of posttraumatic stress disorder in older adults. *Journal of Geriatric Psychiatry and Neurology*, 18(2), 61-71.

The article reviews studies of elders with PTSD, stating the need for more studies on the assessment and best practices for interventions because of the increasing number of older adults which likely will lead to greater mental health services demand. The authors also indicate that older adults are more likely to experience reduced mobility, hospitalization, and reluctance to travel which may lead to a great prevalence of missed session and therefore telephone sessions or hospital visits may be needed.

Cornish, P.A., Church, E., Callanan, T., Bethune, C., Robbins, C., Miller, R. (2003). Rural interdisciplinary mental health team building via satellite: A demonstration project. *Telemedicine Journal and e-Health*, 9(1), 63-71.

Cornish and colleagues examine the role of telehealth in a rural region of Atlantic Canada using questionnaires and on-site interviews. Satisfaction with videoconferencing was found to be high and the results of the study demonstrate that videoconference can be used for mental health training and to promote collaboration among medical professionals located in rural areas.

Corrigan, J. D. & Deuschle, J. J. (2008). The presence and impact of traumatic brain injury among clients in treatment for co-occurring mental illness and substance abuse. *Brain Injury*, 22(3), 223-231.

More than 70% of individuals who are being treated for substance use disorders comorbid with another mental health disorder have had a history of a traumatic brain injury. This study investigates the complicating role of TBI in treatment. Results indicated that having experienced a greater number of TBI, and an earlier age of receiving TBI, were related to worse functioning.

Creamer, M. & Forbes, D. (2004). Treatment of posttraumatic stress disorder in military and veteran populations. *Psychotherapy: Theory, Research, Practice, Training*, 41(4), 338-398.

Article explores possible explanations for reasons treatment for PTSD is more effective in civilian populations than military personnel including higher likelihood of childhood trauma, personality characteristics, military training and treatment resistant factors related to PTSD such as residual anger, hypervigilance and hyperarousal and inconsistent implementation of 'best practice' treatments with veteran samples. Description of evidence-based findings of efficacy of various treatments on military populations.

Creamer, M., Forbes, D., (2004) Military Populations In Taylor, S. ed. *Advances in The Treatment of Posttraumatic Stress Disorder: Cognitive-Behavioral Perspectives*. New York: Springer.

This article details the literature on cognitive-behavioural therapy (CBT) research with military populations. The authors also discuss aspects of treatment and call for a more systematic approach to CBT treatment.

Cucciare, M. A., & Weingardt, K. R. (2007). Integrating information technology into the evidence-based practice of psychology. *Clinical Psychologist*, 11(2), 61-70.

The article is a review of research published between 1999-2006 that includes the use of computers (personal and handheld), VR, and audio and visual media (CD ROMs) for empirical (evidence-based practices - EBP) research and clinical expertise. Authors note the advantages and disadvantages in the use of ICT for psychological assessment and treatment and present recommendations for integrating ICT use into clinical practice. Recommendations include ICT use for psycho-education (teaching patients how to recognize signs and symptoms, relaxation techniques, etc), homework (written exercises outside of regular therapy sessions), and treatment delivery (coping strategies, exposure – VR). The authors also call for an integration of ICT resources (personal and handheld computers, the internet, cell phones, text messages, email, CD-ROM, DVD, and VR") and clinical experience.

Cuevas, C., Arrendondo, M.T., Cabrera, M.F., Sulzenbacher, H., & Meise, U. (2006). Randomized clinical trial of telepsychiatry through videoconference versus face-to-face conventional psychiatric treatment. *Telemedicine and e-Health*, 12 (3), 341-350.

The authors note that telepsychiatry videoconferencing is successful in countries with high medical standards and isolated populations. Studies on videoconferencing demonstrate high levels of satisfaction, especially in rural populations.

Cukor, P., Baer, L., Willis, B.S., Leahy, L., O'Laughlen, J. (1998) Use of videophones and low-cost standard telephone lines to provide a social presence in telepsychiatry. *Telemedicine Journal* 4(4), 313-321.

Videoconferencing technology has rapidly improved since the 1990s. In this 1998 article the authors provide an overview of the state of videoconferencing and videophones, noting the poor connection quality at the time. The researchers provided videophones to clients and clinicians for follow-up home care "visits." Even though these phones presented a low quality visual participants in the study responded enthusiastically and felt they were a good communication tool to use in conjunction with occasional in person visits.

Cukrowicz, K.C., & Joiner, T.E. (2007). Computer-based intervention for anxious and depressive symptoms in a non-clinical population. *Cognitive Therapy and Research*, 1-17.

This study compares reduction of subclinical depression and anxiety symptoms in a treatment group using a computer-based brief cognitive-behavioural psychoeducation intervention to a control group who received no intervention. Results indicate a significant reduction in anxiety and depression symptoms in the treatment group.

de-Gara, F., Gallo, W. T., Bisson, J. I., Endrass, J., & Vetter, S. (2008). Investment in online self-evaluation tests: A theoretical approach. *J Trauma Manag Outcomes*, 3.

De-Gara's paper examines the cost effectiveness of monitoring populations in order to encourage people to seek early treatment. Early detection and treatment can increase recovery time from mental illness, decrease the duration of treatment time, and allow patients to return to work earlier and increase labour-market productivity. The author's theoretical model involves an on-line self-evaluation test administered to people who have experienced a traumatic event. Authors developed a mathematical equation to calculate direct and indirect cost scenarios.

De Las Cuevas, C., Arrendondo, T., Cabrera, M.F. et al. (2006). Randomized clinical trial of telepsychiatry through videoconference versus face to face conventional psychiatric treatment. *Telemedicine Journal and e-Health* 12(3), 341-350.

Randomized, controlled study comparing improvement and severity of illness scores of 140 psychiatric participants randomly assigned to face-to-face (F2F) or videoconference telepsychiatry (VCTP) delivery of cognitive-behavioural therapy. Results indicate that patients in both groups had significant improvements with severity of illness and symptom ratings demonstrating that both methods of treatment have equivalent efficacy. Some participants reported that VCTP enhanced the therapeutic relationship and it was less intrusive than F2F.

Deitsch, S.E., Frueh, B.C., & Santos, A.B. (2000). Telepsychiatry for post-traumatic stress disorder. *Journal of Telemedicine and Telecare*, 6(3), 184-186.

Group therapy is the most common format of intervention for veterans with PTSD. Case study of PC based videoconferencing system used between 2 communities in South Carolina involving 4 male combat veterans with PTSD. Overall, there were good or very good ratings for use of equipment and helpfulness of the session. Audio delay was rated as mildly distracting and participants admitted the equipment would 'take some getting used to'.

Department of Veterans Affairs & Department of Defense. (2004). VA/DoD Clinical Practice Guideline for the Management of Post-Traumatic Stress (Office of Quality and Performance publication 10Q-CPG/PTSD-04.). Washington, DC: Veterans Health Administration, Department of Veterans Affairs and Health Affairs, Department of Defense.

There exist a variety of treatments for PTSD. The different treatments and their empirical evidence is reviewed. It is noted that despite previous controversy, eye-movement desensitization reprocessing has been found to be an efficacious treatment for PTSD and is indeed recommended, along with several other treatments.

Difede, J. and H. G. Hoffman (2002). Virtual reality exposure therapy for World Trade Center post-traumatic stress disorder: a case report. *Cyberpsychology and behavior the impact of the Internet, multimedia and virtual reality on behavior and society* 5(6), 529-35.

This article follows the treatment of one World Trade Centre survivor suffering from PTSD. Virtual reality tools were administered in the treatment of PTSD, and the authors found a large reduction in depression and PTSD symptoms after VR treatment.

Drake, M. (2007). Web-based patient empowerment. *Health Management Technology*, 28(9), 46-47.

Drake's short article focuses on patient-centric portals, noting the cost savings to medical professionals as well as the creation of a patient-centered health experience. Drake speculates about what information future patient portals will be able to provide to clients, including real-time updating of medical information, forums and other means of interactions between patients and providers.

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behavior Research and Therapy*, 38, 319-345.

A cognitive behavioural model for posttraumatic stress disorder is put forth. Authors note how disturbances in appraisals as well as memory contribute to PTSD symptoms. Empirical evidence is reviewed in terms of this CBT framework of understanding.

Eisen, K.P., Allen, G.J., Bollash, M., & Pescatello, L.S. (2008). Stress management in the workplace: a comparison of a computer-based and an in-person stress-management intervention. *Computers in Human Behavior* 24(2), 486-496.

Comparison of outcomes from a stress-management intervention provided via an instructor versus a computer-presented format compared through a randomized, controlled design. Results indicate stress reduction resulted from both formats however, attrition was higher in the computer-presentation format and stress rates lowered more substantially for the instructor delivered intervention.

Elhai, J. D., Gray, M. J., Kashdan, T. B., & Franklin, C. L. (2005). Which instruments are most commonly used to assess traumatic event exposure and posttraumatic effects?: A survey of traumatic stress professionals. *Journal of Traumatic Stress, 18*(5), 541-545.

Article surveys the most widely used tests for PTSD assessment, according to a sample survey of 565 International Society for Traumatic Stress Studies (ISTSS) members. The Published International Literature on Traumatic Stress (PILOTS) database reveals 102 tests for adults and children, excluding older rarely cited tests. The most popular tests included the Posttraumatic Stress Diagnostic Scale, Trauma Symptom Inventory, Life Events Checklist, Clinician-Administered Posttraumatic Stress Disorder (PTSD) Scale, PTSD Checklist, Impact of Event Scale-Revised, and Trauma Symptom Checklist for Children. The authors did not ask in the survey if any of these tests were administered via computer – which may have affected their findings.

Elliot, J., Chapman, et al. (2007). Videoconferencing for a veteran's pain management follow-up clinic. *Pain management nursing , 8*(1), 35-46.

Studied whether stable patients and staff in a chronic pain clinic were satisfied with the use of a videoconferencing format in care delivery. 36 patients with chronic pain were seen at a Community Based Outpatient Clinic and were connected via videoconference to a psychologist and medical provider in a base hospital. 67% rated their satisfaction with the clinic excellent or very good, they indicated they could communicate adequately, that it was superior to a telephone call, they saved time and money via this mode and they found the technology easy to use. Barriers to care delivery included lack of smell and touch and equipment malfunctions. Other negatives- lack of 'the personal touch' of service providers and less flexibility in scheduling. Positives- saved time and money and provided consistent access to consistent clinicians and significantly decreased the cost to veteran services.

Emmelkamp, P. M. G. (2005). Technological innovations in clinical assessment and psychotherapy. *Psychotherapy and Psychosomatics, 74*(6), 336-343.

Technological Innovations is a review article on computer technology applications and internet use in mental health care, including online assessment. Emmelkamp states that internet treatment is just as effective as face-to-face treatment and more effective than no treatment. Internet-based assessment and treatment is of particular importance to patients in rural and remote areas, those with mobility issues or those who have anxiety issues or are afraid of stigmatization.

Engdahl, B. E. and R. E. Eberly (1994). "Assessing PTSD among veterans exposed to war trauma 40-50 years ago." *National Center for PTSD Clinical Quarterly*, vol. 4, no. 1, pp. 13-14, Winter 1994.

Engdahl and Eberly's article reviews various types of assessment tools for PTSD and their use in older veteran populations. They conclude that rates of PTSD among older veterans varied appreciably by assessment method.

Farrell, S.P., Mahone I.H. and Guibaud, P. (2004) Web technology for persons with serious mental illness. *Archives of Psychiatric Nursing ,18*(4), 121-125.

A internet-based portal was developed for use by staff and patients ("consumers") in community mental health clinics in Virginia, based in Western State Hospital, an in-patient psychiatric facility. The portal was not individualized to specific patients but rather contained general and comprehensive information of interest to patients hospitalized for mental health reasons. This preliminary study was based on staff focus groups and nine patient interviews. The study found that patients liked the comprehensive range of information available on the

portal, especially info on crisis response services, but also on stress and coping, mental health information, protection and advocacy, work and rehabilitation services, family and community support, peer support, income support and entitlements, and a range of practical info such as housing, health and dental care.

Farvolden, P., Denisoff, et al. (2005). Usage and longitudinal effectiveness of a web-based self-help cognitive behavioral therapy program for panic disorder. *Journal of Medical Internet Research*, 7(1).

Study examined the use and effectiveness of a freely available internet-based CBT program for spontaneous users with panic disorder. Results indicated that over 99,695 distinct users used the site several times, spent considerable time on the site, increased communication with their health care professionals and decreased frequency of panic attacks. Most users had comorbid anxiety disorders and most were passive users who viewed rather than posted material.

Farvolden, P., McBride, C., Bagby, R. M., & Ravitz, P. (2003). A web-based screening instrument for depression and anxiety disorders in primary care. *Journal of Medical Internet Research*, 5(3).

In this article the authors note that most people seeking mental health assessment for depression approach their general practitioner and that current data suggests that GPs fail to diagnosis up to half of all cases. This suggests a need for better screening tools. The authors test The Internet-based Depression and Anxiety Test (WB-DAT) with 193 subjects and compared the data to their structured clinical interviews. Agreement ranged from acceptable to good levels.

Farzanfar, R., Frishkopf, S., Friedman, R., & Ludena, K. (2007). Evaluating an automated mental health care system: making meaning of human-computer interaction. *Computers in Human Behavior*, 23(3), 1167-1182.

Fifteen patients who used a computer telephony system (Telephone-Linked Communications: TLC-Depression) to monitor their depression and support self-care were interviewed in order to evaluate the system. The subjects felt the system was designed to appear human-like and spoke of the system as if it was a social actor. The authors note that the effectiveness of computer systems like this one depends on the extent that they act like a human professional.

Farzanfar, R., Stevens, A., Vachon, L., Friedman, R., & Locke, S. E. (2007). Design and development of a mental health assessment and intervention system. *Journal of Medical Systems*, 31(1), 49-62.

The authors report on trials of an automated computer-assisted telephone system, The Telephone-Linked Communications for Detection of Mental Health Disorders in the Workplace (TLC-Detect) to assess workers for mental health disorders and refer them for treatment. Workers use the keypad (or their own voice) to answer questions given by a computer-controlled pre-recorded human voice. The system also gives information, advice and, if programmed to, could potentially give behavioural counselling. The system has an interactive voice response (IVR) subsystem for its speech, a speech recognition subsystem, database management for storing and managing user data, and a conversation control subsystem. The system will monitor the employee's mental health through periodic phone calls. There is also a TLC-Helpline to be used in conjunction with the telephone system.

Federman, E. B., Bray, R. M., & Kroutil, L. A. (2000). Relationships Between Substance Use and Recent Deployments Among Women and Men in the Military. *Military Psychology, 12*(3), 205-220.

The use of substances in military personnel who have recently been deployed is analyzed, using data from the 1995 Department of Defence Survey of Health Related Behaviors Among Military Personnel. Regression models were used to predict factors associated with increased use of substances. Results indicated that there were higher rates of substances among those deployed compared to those not; in addition, the relationship between higher rates of heavy alcohol use among the deployed was even stronger for women.

Fikretoglu, D., Brunet, A., Guay, S., & Pedlar, D. (2007). Mental health treatment seeking by military members with posttraumatic stress disorder: Findings on rates, characteristics, and predictors from a nationally representative Canadian military sample. *The Canadian Journal of Psychiatry, 52*(2), 103-110.

Information on rates, characteristics, and predictors of mental health treatment among Canadian military personnel were presented based on data from the 2002 Canadian Community Health Survey – Canadian Forces Supplement – which is the first study of such a condition in the CF and includes 8,441 nationally representative CF members. Of those who met criteria for PTSD (549 participants), about two-thirds sought professional treatment for mental health concerns. Individuals experiencing PTSD comorbid with depression were more likely to seek treatment.

Fischer, S., Steward, T.E., Mehta, S., Wax, R., Lapinsky, S.E. (2003). Handheld medicine in computing. *Journal of the American Informatics Association. 10*(2), 139-149.

Handheld devices are becoming a part of the medical landscape; however, as their literature review indicates, there are only a small number of articles published on the use of handheld devices for medicine. This article raises awareness about the potential uses of handheld devices and encourages further evaluation on the tools.

Fortson, B. L., Scotti, J. R., Del Ben, K. S., & Chen, Y.-C. (2006). Reliability and validity of an internet traumatic stress survey with a college student sample. *Journal of Traumatic Stress, 19*(5), 709-720.

The reliability of internet and traditional paper and pencil based questionnaires (with an administrator present) on traumatic stress was tested in this paper using 411 undergraduate students (from 1,400 in an introductory psychology course). Authors hypothesized that people writing the internet versions would state that they had more events and symptoms than the paper ones; however they found that people responded similarly in both formats. The study suggests that, within that particular sample, trauma related psychological data can be collected via the internet.

Fraenkel, P. (2006). Of shiny boxes and complex processes: challenges, collaboration and creativity at the interface of technology and family systems health care. *Families, Systems & Health 24*(3), 299-301.

Fraenkel's article is a commentary that highlights the need for a collaborative approach in research and technical implementation. Factors to be considered include the race, class and age of the client as factors that could affect comfort levels with technology. The costs and benefits of technology use are also addressed.

Friedl, K. E., Grate, S. J., Proctor, S. P., Ness, J. W., Lukey, B. J., & Kane, R. L. (2007). Army research needs for automated neuropsychological tests: monitoring soldier health and performance. *U.S. Archives of clinical neuropsychology the official journal of the National Academy of Neuropsychologists*, 22, S7-14.

The authors note that, as a response to Gulf War Illness, soldiers undergo health assessments before and after deployment. However, they state that there is a need for passive and continuous on-duty measures of physical and mental health – the concept behind the Warfighter Psychological Status Monitoring (WPSM) system (wearable monitors) that gauges changes in glucose levels, records sleeping patterns, etc.

Friedman, M. (2006). *Post-traumatic and acute stress disorders: The latest assessment and treatment strategies*. Kansas City: Missouri, Compact Clinicals.

This book begins with an introduction to PTSD and describes its etiology, symptoms, and factors associated with it, including comorbidity. The author explains how assessment for PTSD is usually conducted through interviews with the patient, and that structured interviews can also be used, along with Trauma Exposure scales, and Symptom Severity Scales. One useful tool is the Clinician Administered PTSD Scale (CAPS). In addition, common forms of treatment are discussed, some as Cognitive Behavioural Therapy (CBT), Eye Movement Desensitization Reprocessing (EMDR), and Psychodynamic psychotherapy. Acute stress disorder is also discussed.

Frueh, B.C., Monnier, J., Grubaugh, A.L. et al. (2007). Therapist adherence and competence with manualized cognitive-behavioral therapy for PTSD delivered via videoconferencing technology. *Behavior Modification* 31(6), 856-866.

Article describes a randomized study wherein 38 veterans with PTSD were assigned to PTSD specific social skills training delivered either in person or via videoconference. Results indicated that therapist competence and adherence to a manualized group CBT procedure was similar in both treatment conditions indicating that mental health services can be delivered effectively via telehealth applications.

Frueh, B.C., Monnier, J., Yim, E., Grubaugh, A.L., Hamner, M.B., & Knapp, R.G. (2007). A Randomized trial of telepsychiatry for post-traumatic stress disorder. *Journal of Telemedicine and Telecare*, 13 (3), 142-147.

Comparison of same room treatment of combat related PTSD to telepsychiatry using CBT in 14 weekly 90 minute sessions. Clinical and process outcomes of 25 participants revealed no group differences in satisfaction, treatment ratings attendance or attrition. However, the same-room group reported more comfort in talking to their therapist and had better treatment adherence (i.e., completed homework). Both groups had follow-up sessions three months after the end of treatment. Videoconferencing was found to be an acceptable means of treating PTSD sufferers in rural or remote areas.

Garcia-Palacios, A., Botells, C., Hoffman, H., Fabregat, S. (2007) Comparing acceptance and refusal rates of virtual reality exposure vs. in vivo exposure by patients with specific phobias. *CyberPsychology & Behaviour* 10(5), 722-725.

The acceptability of VR exposure for treatment is explored in this short article. The authors surveyed 150 people suffering from phobias on their treatment preferences. Over three-quarters of the participants preferred VR over in vivo exposure.

Garritty, C., El Emam, K. (2006). Who's Using PDAs? Estimates of PDA Use by Health Care Providers: A Systematic Review of Surveys. *Journal Medical Internet Research* 8(2), 26p.

Garritty and Emam's article reviews published studies of PDA use by medical personnel in an attempt to summarize the data and present estimates of PDA use in health care. The authors estimate PDA use by health care workers, mainly physicians, from 45% to 85%, depending on age and geographic region.

Gilroy, L., Kirkby, K.C., Montgomery, I.M., Daniels, B.A. (1997). A controlled comparison of computer-aided vicarious exposure versus live exposure in the treatment of spider phobia. *Journal of Anxiety Disorders*, 11, 489-497.

This article details the use of computer-aided vicarious exposure therapy in the treatment of spider phobia wherein patients completed 3, 45 minute long computer programmes using a point-and-click method to guide a screen figure through a house and spider-related scenarios. Results included that computer-aided vicarious exposure was an effective treatment for spider phobia and was comparable with live exposure therapy in significantly reducing phobic symptoms.

Golkaramnay, V., Bauer, S., Haug, S., & Wolf, M. (2007). The exploration of the effectiveness of group therapy through an internet chat as aftercare: a controlled naturalistic study. *Psychotherapy & Psychosomatics*, 76(4), 219-225.

Article examines the effectiveness of group therapy delivered through an internet chat following inpatient treatment in order to reduce the loss of therapeutic gains achieved during the inpatient treatment. Findings indicate a lower risk for negative outcomes for treatment group (i.e., greater retention of therapeutic gains) whom met in virtual rooms where they communicated in synchronous real-time chats.

Gonzalez, G.M., Carter, C., Blanes, E. (2007) Bilingual Computerized Speech Recognition Screening for Depression Symptoms : Comparing Aural and Visual Methodologies. *Hispanic Journal of Behavioral Sciences*, 29(2), 156-180.

This article outlines the results of two studies on the Voice-Interactive Depression Assessment System (VIDAS). The authors note that participants rated the visual modality highly.

Gonzalez, G. M., Costello, C. R., Valenzuela, M., Chaidez, B., & Nunez Alvarez, A. (1995). Bilingual computerized speech-recognition screening for clinical depression: evaluating a cellular telephone prototype. *Behavior Research Methods, Instruments, and Computers*, 27(4), 476-482.

A prototype of a cell phone administered bilingual computerized speech-recognition system that employs the Center for Epidemiological Studies Depression scale (CED-D) was tested by the authors. The test group of 30 Spanish and 22 English speakers both gave positive ratings to the computer-telephone method – English speakers preferred the computer method. The computer-telephone method gave high consistencies, reliabilities and similar correlations to face-to-face methods. Authors conclude that using cell phones with computerized methods is a promising alternative to in-person screening for depression.

Gonzalez, G. M. and C. Shriver (2004). "A bilingual computerized voice-interactive system for screening depression symptoms." *Journal of Technology in Human Services*, 22(4): 1-20.

This article details studies of the voice-interactive depression assessment system-III (VIDAS-III), a tool for screening depression that uses a bilingual computerized speech recognition application. English and Spanish speakers participated, and both groups rated the system positively. The author's findings suggest the system can be used to interview people and detect depressive symptoms in both languages.

Gorini et al. (2007). Virtual worlds, real healing. *Science*, 318, 1549.

Article reviews recent evidence which indicates that patients using virtual worlds may experience a feeling of embodiment which may facilitate the clinical communication process and influence group cohesiveness. A hypothetical virtual environment wherein patients may interact with one another in imaginal exposure encounters is discussed.

Gorini, A., & Riva, G. (2008). Virtual reality in anxiety disorders: the past and the future. *Expert Review of Neurotherapeutics*, 8(2), 215-233.

Article reviews experimental studies from 1995 to present to examine the effect of VR exposure in the treatment of subclinical fears and anxiety disorders as well as suggests guidelines of the use of VR exposure for the treatment of anxious patients. Clear description of technological aspects of Virtual Reality systems as well as the review of issues that limit the use of VR in psychotherapy.

Grady, B. J., & Melcer, T. (2005). A retrospective evaluation of telemental healthcare services for remote military populations. *Telemedicine Journal and e Health*, 11(5), 551-558.

Grady and Melcer's study compares mental health care administered via videoconference to in-person care. The authors used the Global Assessment of Functioning Scale to assess current social, occupational and psychological functioning. The records of 44 patients who were treated in person and 63 patients who were treated by telehealth were examined. More patients treated via telehealth were compliant with the medication plan and they also faced shorter wait times for their follow-up appointments.

Greenburg, D. L., & Roy, M. J. (2007). In the shadow of Iraq: Posttraumatic stress disorder in 2007. *Society of General Internal Medicine*, 22, 888-889.

The authors discuss how the environment that soldiers are subjected to in Iraq facilitates the development of operational stress injuries, and how often because of how these patients present in primary care settings (e.g. often somatic complaints) their symptoms may go unrecognized and untreated. The authors discuss common assessment methods and compare and contrast their features and validity. Treatment modalities – including exposure therapy identified as the "best-evidenced therapy for PTSD" by expert panels, are discussed.

Gregg, N., & Tarrier, N. (2007). Virtual reality in mental health – A review of the literature. *Social Psychiatry and Psychiatric Epidemiology*, 42(5), 343-354.

Meta-analytical review and methodological critique of 16 between-group studies of VR therapeutic treatment of anxiety disorders. Results indicate that although VR based therapies are superior to no treatment, the effectiveness of VR therapy compared to traditional therapeutic approaches is not supported. Two studies using participants with PTSD diagnoses found both clinician and client reported reduction in PTSD symptoms as a result of using VR exposure techniques.

Grenier, G. Operational Stress Injuries (OSI): A New Way to Look at an Old Problem. Retrieved July 1 2008 from http://www.cfpsa.com/en/psp/dmfs/resources/osiss_e.asp

This website outlines a communication from Major Stephanie Grenier on OSI and PTSD. Statistics on OSI are given and the services provided by and related to Veterans Affairs Canada is discussed.

Griffiths, F., Lindenmeyer, A., Powell, J., Lowe, P., Thorogood, M. (2006). Why are health care interventions delivered over the internet? A systematic review of the published literature. *J Med Internet Res*, 8(2), 2-16.

Griffiths et al. performed a peer-reviewed literature search on articles related to the use of internet networking for health. In this article they note the benefits of internet interventions as outlined in the literature to investigate why health care is being delivered over the internet.

Grubaugh, A. L., Cain, G. D., Elhai, J. D., Patrick, S. L., & Frueh, B. C. (2008). Attitudes toward medical and mental health care delivered via telehealth applications among rural and urban primary care patients. *The Journal of nervous and mental disease*, 196(2), 166-170.

The authors examined attitudes towards telehealth care in a group of 190 primary care patients, with a subset of patients with PTSD in order to investigate perceptions of service by those who have not yet used telehealth services. Both rural and urban patients had average ratings of comfort and confidence in telehealth. Rural respondents felt more comfortable using telepsychiatry if it saved them an hours drive (or more) to the clinic. Almost half of all the people surveyed would be "quite a bit" or "extremely" likely to use telepsychiatry instead of driving two hours. Younger patients were more positive than older patients, and higher education correlated with more positive attitudes in the overall sample. More than half of the participants felt that telepsychiatry would not be as helpful as an in-person intervention; however it is important not to compare telepsychiatry to traditional methods of intervention – instead telepsychiatry needs to be compared to no-care or limited traditional care.

Gryfe, C.I. (2006). Physician resistance to new information technology. *Canadian Medical Association Journal*, 176(5), 659.

This is a letter to the editor in response to Lapointe and Rivard's article on the acceptance of technologies by physicians. Gryfe notes that technologies with a universal feature may be accepted easier than trying to overpower physician resistance to the implementation of new technologies.

Hagerman, V., McIntyre, J. (2007). Telemental Health Program Expands to all ERs at River Valley Health. *Canadian Healthcare Technology*, October, 2pgs.

This short article details the history and current state of the emergency room telemental health program at RVH. The authors note the high levels of patient acceptance and satisfaction with the telemental health program.

Hardre, P.L., Crowson, H.M., Xie, K., Ly, C. (2007). Testing differential effects of computer-based, web-based and paper-based administration of questionnaire research instruments. *British Journal of Educational Technology*. 38 (1), 5-22.

In the study the research administered 16 questionnaires across three different administration conditions – paper, computer and the internet. Their findings suggest that participants favoured the paper-based administration format.

Harvey, V.S. & Carlson, J.F. (2003) Ethical and professional issues with computer-related technology. *School Psychology Review* 32(1), 92-107.

Harvey and Carlson's article examines the professional ethics related to computer use by school psychologists. They mention many factors that psychologists need to consider when working with computers, including issues of confidentiality and quality of service.

Haug, S., Sedway, J., Kordy, H. (2008a) Group Processes and Process Evaluations in a New Treatment Setting: Inpatient Group Psychotherapy Followed by Internet-Chat Aftercare Groups. *International Journal of Group Psychotherapy* 58(1), 35-53.

In this article researchers Haug et al. sample the Activity and Emotional Reactivity scores of 121 patients participating in therapeutic internet-chat groups and in person inpatient groups. Outcomes were not significantly different between the two groups and participants in the study followed a constant upward change during the in person group sessions and the online chat aftercare. Their findings support the theory that internet-based group therapy is an effective supplement to in person methods.

Haug, S., Strauss, B., Gallas, C., Kordy, H. (2008b) New Prospects for Process Research in Group Therapy: Text-based Process Variables in Psychotherapeutic Internet Chat Groups. *Psychotherapy Research* 18(1): 88-96.

Text-based chat groups are new spaces where group psychotherapy is enabled. Haug, et al explore group interaction from the Internet-Bridge project in this article, studying 1,046 session transcripts from 130 participants and report on the clinical implications in this article.

Health Canada (1996). Anxiety Disorders: Future Directions for Research and Treatment - A Discussion Paper. Retrieved June 1 2008 from <http://www.phac-aspc.gc.ca/mh-sm/pubs/anxiety-anxieux/index-eng.php#tc>.

A thorough review of all of the various anxiety disorders and their etiology is discussed. A section outlining possible treatments and directions for future research is included. In addition, one section focuses on the cost of health care and treatment for anxiety disorders in Canada.

Heapy, A., Sellinger, J., Higgans, D. Chatkoff, D., Bennett, T.C., Kerns, R.D. (2007) Using interactive voice response to measure pain and quality of life. *Pain Medicine*. 8(53), 145-155.

This study examines the use of Interactive Voice Response (IVR) over the telephone to collect data concerning quality of life. They note that IVR can be easily accessed, but that the client's level of education and comfort with technology could affect how they use the system. The article concludes with author recommendations for daily monitoring of the system, pilot testing, and the implementation of parameters for numerical answers entered via the telephone keypad.

Herrero, J., & Meneses, J. (2006). Short web-based versions of the perceived stress (PSS) and Center for Epidemiological Studies-Depression (CESD) Scales: a comparison to pencil and paper responses among Internet users. *Computers in Human Behavior*, 22(5), 830-846.

This study examined validation measures of internet-based and pen and paper questionnaires administered to 530 frequent internet users. They found that both types of administrative techniques are virtually equal when given to people who are familiar with the technology.

Hildebrandt, A. (April 19 2008). Canada's military suicide rate doubled in a year, documents show. *Canadian Broadcasting Corporation*.

This article notes how the 2007 suicide rate among members of the CF is the highest it has been in decades. In addition, the military's suicide rate is compared to that of the general Canadian population. Explanations for the high suicide rate are discussed.

Hilty, D. M., Marks, S. L., Urness, D., Yellowlees, P. M., & Nesbitt, T. S. (2004). Clinical and Educational Telepsychiatry Applications: A Review. *Canadian Journal of Psychiatry*, 49(1), 12-23.

Hilty et al conducted a literature review on telepsychiatry of articles published between 1965 and 2003. They found that interactive videoconferencing was used for nearly all telepsychiatric services. Internet was used to a lesser degree due to bandwidth QoS and security issues. The reviewed articles emphasized the benefits to rural care (providing access) and noted that telepsychiatry was highly satisfactory for consultations and reliable for diagnosis. Modes with visual cues were preferred over just the use of telephone services. Overall telepsychiatry appears effective although there is the need for more studies on effectiveness. The authors predict a promising future for the integration of videoconferencing with other digital technologies for client care, education, communication and medical records

Hilty, D. M. (2006). Models of Telepsychiatric Consultational Liaison Service to Rural Primary Care. *Psychosomatics*, 47(2), 152-157.

Hilty's article reviews the different models of psychiatric intervention including videoconferencing, telephone and computer-based systems. Successful attributes of telepsychiatric consultation include self-management encouragement for those with chronic illness, the means to provide emotional support and mental-health treatment monitoring. The literature shows that adoption of these technologies is quite high for patients and providers, with 10% being zealous adopters, 80% participating if there is need, and a 10% avoidance rate. These technologies are very useful in rural and suburban settings and "telemedicine, in the form of video, secure e-mail, and phone consultation, is one strategy to improve the accessibility of mental-health care."

Hodges, L.F., Anderson, P., et al. (2001). Treating psychological and physical disorders with VR. *IEEE Computer Graphics & Applications*, 21(6), 25.

Article discusses the uses of Virtual Reality in treating psychological (i.e. anxiety) and physiological disorders. Discussion includes the potential market for VR, and successful clinical VR applications in psychological disorders as well as pain management.

Hoge, C. W., McGurk, D., Thomas, J. L., Cox, A. L., Engel, C. C., & Castro, C. A. (2008). Mild Traumatic Brain Injury in U.S. Soldiers Returning from Iraq. *The New England Journal of Medicine*, 358(5), 453-463.

This study included over 2,500 US Army soldiers who had returned from deployment. Soldiers were surveyed on the experience of mild traumatic brain injury (TBI) and compared to soldiers who had not experienced a TBI. It was found that mild TBI is associated with PTSD and physical health problems.

Hyer, L., Summers, M. N., Boyd, S., Litaker, M., & Boudewyns, P. (1996). Assessment of older combat veterans with the clinician-administered PTSD scale. *Journal of traumatic stress*, 9(3), 587-593.

Authors note the importance of assessing older populations for PTSD – according to estimates 25% of men over the age of 65 (in 1996) have seen combat and are at potential risk for PTSD. Stress related to aging could potentially trigger PTSD after years with symptoms. Misdiagnosis in this age bracket is common – resulting from inappropriate use of tests. This study examined a group of 125 WWII and Korean veterans using the CAPS-1 – Clinician- Administered PTSD Scale as well as SCID-DTREEE (computer-assisted diagnostic instrument). The two measures were 93% efficient – making the two measures comparable.

Institute of Medicine. (2008) *Treatment of Posttraumatic Stress Disorder: An Assessment of the evidence*. Washington: The National Academies Press.

This report was commissioned by the US Department of Veterans Affairs to assess the evidence for PTSD treatment modalities by reviewing the PTSD literature from 1980 to the present day. The outcomes in the literature are not judged on laboratory tests or imaging but on self-reporting methods. The Report Review Committee recommends more strategic research methods for designing and executing research study protocols, and following up with study participants afterwards.

Jones, S.R., Fernyhough, C., de-Wit, L., Meins, E. (2007). A message in the medium? Assessing the reliability of psychopathology e-questionnaires. *Personality and Individual Differences*, 44, 349-359.

In this article the authors compare e-questionnaires on hallucination proneness to their paper administered equivalents. They conclude that e-questionnaire are a valid form of data collection because of the internal reliability of both formats.

Jones, E., Fear, N. T., & Wessely, S. Shell Shock and Mild Traumatic Brain Injury: A Historical Review. *American Journal of Psychiatry*, 164, 1641-1645.

This article discusses how mild TBI is very prevalent in the Iraq and Afghanistan conflicts, and how it seems to be the signature injury. The historical context of TBI is reviewed. A discussion on "shell shock" is also provided.

Kamel Boulos, M.N., Hetherington, L., Wheeler, S. (2007) Second Life: An Overview of the Potential of 3-D Virtual Worlds in Medicinal and Health Education. *Health Information and Libraries Journal*, 24, 233-245.

This study gives a general overview of the virtual world of Second Life with a particular emphasis on social interaction and health. The authors discuss medical and health education on Second Life, focusing specifically on HealthInfo Island. The authors then discuss the pedagogical implications of Second Life and other virtual worlds.

Kessler R.C., McGonagle K.A., Zhao S., Nelson, C. B., Hughes, M., Eshleman, S., et al. (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry*, 51, 8-19.

The researchers present data from the first study to administer a structured clinical interview to a national probability sample in the United States. Estimates of lifetime and 12-month prevalence data for 14 psychiatric disorders is presented. Results showed that the most common disorders were major depressive episode, alcohol dependence, social phobia, and simple phobia.

Kessler R.C., Sonnega A., Bromet E., Hughes M. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry*, 52, 1048-1060.

PTSD and its prevalence along with most commonly associated traumas are discussed. The comorbidity of PTSD with other disorders is explored. PTSD is noted as being potentially chronic. Future research possibilities are discussed.

Kittler, A. F., Pizziferri, L., Volk, L. A., Jagannath, Y., Wald, S. J., Bates, D.W. (2004) Primary Care Physician Attitudes Towards Using a Secure web-based Portal Designed to Facilitate Electronic Communication with Patients. *Informatics in Primary Care*, 12(3), 129-138.

Kittler et al. note that patient demand for e-mail contact with medical professionals is high; however, physicians are reluctant to use this model of communication. The authors investigate physician attitudes to e-mail communication after implementing a patient portal called Patient Gateway and surveying 24 physicians. They note that while the physicians responded positively to the system there was still some hesitation by physicians to increase communication with patients.

Klein, R. (2007). Internet-based patient-physician electronic communication applications: patient acceptance and trust. *e-Service Journal*, 5(2), 27-51.

Empirical examination of patient's acceptance of an internet-based patient-physician communication application. The analysis of 143 first time users of the application revealed that perceived ease of use impacts perceived usefulness which influences behavioural intentions which shape behaviours. Also, that perceived ease of use influences user beliefs in the web vendor which shapes behavioural intentions.

Knaevelsrud, C. & Maercker, A. (2007). Internet-based treatment for PTSD reduces distress and facilitates the development of a strong therapeutic alliance: a randomized controlled clinical trial. *BMC Psychiatry*, 13, 1-10.

Evaluation of the efficacy of an internet-based therapy for PTSD. 96 patients with PTSD were assigned to 10 sessions of Internet-based CBT modules; 2 weekly 45-minute writing assignments (i.e., self confrontation, cognitive restructuring and social sharing). PTSD severity, depression and anxiety were reduced for the treatment group. The therapeutic alliance improved during treatment and was inversely related to PTSD symptoms suggesting a positive and stable therapeutic relationship is possible through internet-based therapy.

Knaevelsrud, C., Wagner, B., et al. (2007). New treatment approaches: integrating new media in the treatment of war and torture victims. *Torture*, 17(2), 67-78.

Overview of three different approaches on how new media can be integrated into treatment of survivors of torture and war in Iraq. MultiCASI (Multilingual computer assisted self-

interview) an audiovisual tool to help illiterate people to answer standardized questions without an interpreter; 'Interapy' (internet therapy) used in virtual treatment center in Arab speaking countries; and biofeedback techniques. Interapy consists of two weekly 45 minute writing assignments over 5 weeks. In pilot study in Berlin, significant improvement with regard to pain levels and coping behaviour was found and maintained during a 3 month follow up period (n= 11).

Kobak, K. A., Greist, J. H., Jefferson, J. W., Mundt, J. C., & Katzelnick, D. J. (1999). Computerized assessment of depression and anxiety over the telephone using interactive voice response. *M D computing computers in medical practice*, 16(3), 64-68.

The validity and reliability of computer administered versions of the Hamilton Depression and Anxiety rating scales administered over the phone by an interactive voice response system was tested. The depression scale was tested by 113 subjects and the anxiety rating by 72 subjects. Patients rated the IVR and clinician administered test as similar in comfort and understanding, but most preferred the in -person interview, while only 7.1% and 9.6% disliked the IVR specifically. Subjects felt less embarrassed in the IVR interviews than with the clinician. The overall reaction to the IVR was positive.

Koivunen, M., Hatonen, H., Valimaki, M. (2008) Barriers and facilitators influencing the implementation of an interactive Internet-portal application for patient education in psychiatric hospitals. *Patient Education and Counselling*, 70(3), 412-419.

The study identified barriers and facilitators that influence the implementation of a internet-based portal developed for use by nursing staff in Finnish psychiatric hospitals with patients suffering from schizophrenia and related psychosis. The portal is called Mieli.Net (Mental.Net in English). The study is based on analysis of a questionnaire administered to 89 nurses who were randomly assigned to the intervention group using the portal. Four main categories of facilitators and barriers were found: organizational resources, nurses' individual characteristics, patient-related factors, and portal-related factors. The study concluded that a range of factors are barriers or facilitators in the implementation of patient portals. A specific challenge is to ensure that staff have adequate technological resources and that they are motivated to use computers and implement change.

Koivunen, M., Valimaki, M., Pitkanen, A. Kuosmanen, L. (2007) A preliminary usability evaluation of Internet-based portal applications for patients with schizophrenia. *Journal of Psychiatric and Mental Health Nursing*, 14(5), 462-469.

The study evaluated the usability of a internet-based portal developed for use by nursing staff in Finnish psychiatric hospitals with patients suffering from schizophrenia and related psychosis. The portal is called Mieli.Net (Mental.Net in English). The study is based on analysis of a questionnaire administered to 76 nurses who were randomly assigned to the intervention group using the portal. The study found the portal was user-friendly, and the content was interesting, understandable and easy to read. Some nurses were concerned about the effects of the portal on patients' care and well being, or on personal contacts between staff and patients. The study recommends that when developing portals, emphasis should be placed on the motivation and concerns of the nurses who will be using it, because their level of acceptability will influence future implementation.

Kovera, C. A., Anger, W. K., Campbell, K. A., & Binder, L. M. (1996). Computer-administration of questionnaires: A Health Screening System (HSS) developed for veterans. *Neurotoxicology and Teratology*, 18(4), 511-518.

The Kovera, et al. article details the trial run of a computerized system for administering questionnaires. The authors' Health Screening System (HSS) is described as well as a study involving the health screening of 22 veterans of the Gulf War to assess PTSD. Although the on-line questionnaires took slightly longer to complete, reactions from the veterans to the computerized HSS were positive.

Krystal, H. (1993). Beyond the DSM-III-R: Therapeutic considerations in posttraumatic stress disorder. In J. P. W. B. R. (Eds.), *International handbook of traumatic stress syndromes* (pp. 841-854). New York: Plenum Press.

This book explores in detail treatment of PTSD. This section specifically discusses different factors associated with treating PTSD and potential complicating factors.

Lange, A., van de Ven, J., Schrieken, B. (2003). Interapy : Treatment of Post-Traumatic Stress via the Internet: A Controlled Trial. *Cognitive Behaviour Therapy and Experimental Psychiatry*, 32 (3), 110-124.

In this article Lange and colleagues investigate the results of 3 internet based treatment studies. The first two studies were conducted from student populations, the third from traumatized people within the general public. Participants were assigned either Interapy or to the waiting list control group. In the third group over half of the participants receiving internet treatment showed significant improvements.

Lapointe, L. & Rivard, S. (2006). Getting physicians to accept new information technology: insights from case studies. *Canadian Medical Association Journal*, 174(11), 1573-8.

In this study the authors collected data from interviews and observations during computer information system implementations. They found that the interaction between the implementers and the resisting physicians played a critical role in the process of implementing new technologies. The authors state that the success or failure of the system depends on the level which physicians accept or reject its implementation.

Lichtenberger, E. O. (2006). Computer utilization and clinical judgment in psychological assessment reports. *Journal of Clinical Psychology*, 62(1), 19-32.

Lichtenberger's literature review examines the benefits and problems of computer use in clinical assessment. He notes that computer data is important, valuable, and fairly accurate but should be designed to facilitate (not replace) the clinician's interaction with the client. Computers can not account for nonverbal cues during assessment or data from multiple sources (clinical history, other assessment tests) therefore computer data must be supplemented. Article also calls for better evaluation if the automated assessment software (prevention of bias).

Lievrouw, L.A., Livingstone, S. (2006). *The Handbook of New Media: Student Edition*. Thousand Oaks California: Sage Publications.

This text provides a comprehensive overview of the history, function, roles, implications and meanings of new media. The contributors of the book examine new media technologies from a variety of cultural, social and institutional settings.

Lin, C., Bai, Y., Liu, C., Hsiao, M., Chen, J. (2007). Web-based tools can be used reliably to detect patients with major depressive disorder and subsyndromal depressive symptoms. *BMC Psychiatry*, 7(12), 1-9.

The validity of the Internet-based Self-assessment Program for Depression (ISP-D) was tested comparing on-line results to in person interviews. Although further tests are needed, the authors note that the ISP-D is a valid online tool for assessment.

Lin, C., Li, Y., Bai, Y., Hsiao, M., Tsai, S., Wu, C., Ou-Yang, W., Liu, C. (2002). Test-Retest Reliability of an Internet-based Self-assessment Program for Depression. *AMIA Annual Symposium Proceedings*, 1083.

The article details an Internet-based Self-Assessment Program for Depression (ISPD). Of the 599 subjects who completed the initial self-administered interview, 184 also filled out the retest. The authors found the reliability measures of the Internet-based self-assessment program to be excellent.

Lin, M., Moyle, W., Chang, H., Chou, M. H., Hsu, M. (2008). Effect of an interactive computerized psycho-education system on patients suffering from depression. *Journal of Clinical Nursing*, 17(5), 667-676.

Study compared the effect of an interactive computerized psycho-education system to traditional pamphlet education approach in patients suffering from depression. Results suggest the interactive computerized psycho-education system is acceptable and may be more effective than a traditional education approach to achieve adherence to medications for depression.

Linehan, M. (2003) Dialectical Behavior Therapy (DBT) for Borderline Personality Disorder. *The Journal of the NAMI California*, Vol. 8, 1.

Marsha Linehan created Dialectical behavioral therapy to treat individuals who had borderline personality disorder (BPD) and who had self-harm tendencies and were suicidal. The theory is based on the premise that BPD develops due to emotional vulnerability, poor skills for managing emotions and distress, and a difficult and unsupportive interpersonal environment. DBT involves individual therapy, group work, and weekly telephone calls.

Litz, B. T. (2004). Telehealth interventions- a therapist-assisted internet self-help program for traumatic stress. *Professional Psychology- Research and Practice*, 628.

Description of a therapist-assisted, internet-based, self-help intervention to treat PTSD through internet delivered Stress Inoculation Training (SIT) which includes anxiety reduction techniques, teaching coping skills and correcting maladaptive cognitions related to the trauma. Treatment included initial face-to-face interview; patient contact with the therapeutic website daily for up to 8 weeks. In initial pilot study, participants did not log on daily but spent an average of 3.4 hours accessing the website with an average of 8 minutes per visit.

Litz, B.T., Williams, L., Wang, J., Bryant, R., & Engel, C.C. (2004). A therapist-assisted internet self-help program for traumatic stress. *Professional Psychology: Research and Practice*, 35(6), 628-634.

Article describes a self-help program for stress inoculation training for clients with PTSD which consists of an initial period of self-monitoring followed by a therapist assisted stage of

exposure therapy. A website is used to collect daily symptom ratings, provide instructions for homework and facilitate contact with therapist (via email).

Litz, B. T., Engel, C. C., Bryant, R. A., & Papa, A. (2007). A Randomized, Controlled Proof-of-Concept Trial of an Internet-based, Therapist-Assisted Self-Management Treatment for Posttraumatic Stress Disorder. *American Journal of Psychiatry*, 164(11), 1676-1683.

Article describes an 8-week randomized, controlled study wherein a therapist-assisted, internet-based, self-management Cognitive Behavioural therapy was compared to an internet based supportive counselling intervention for PTSD. Results indicate the self-management cognitive behavioural therapy was more effective in reducing symptoms. However, small group size is noted.

Lui, S., Molyneaux, H., & Matthews, B. (2008) A Technical Implementation Guide for Multi-site Videoconferencing. *Proceedings of the IEEE International Symposium on Technology and Society (IEEE ISTAS 08)*.

This paper provides a basic technical implementation guide for those involved in setting up videoconferencing in an organization. It outlines a list of required technical components and potential issues that need to be addressed when setting up a multisite videoconference system. The paper starts with a checklist of requirements, a description of the types of systems and issues related to the selection and implementation of multisite videoconferencing systems.

Mackinnon, A., Griffiths, K.M. et al.(2008). Comparative randomized trial of online cognitive behavioral therapy and an information website for depression: 12 month outcomes. *British Journal of Psychiatry*, 192 (2), 130-134.

Follow-up article of a study which showed positive outcomes (i.e., reduction of depressive symptoms) immediately following access to a cognitive-behavioural therapy internet intervention and a depression information website. Follow-up analyses indicate that, although both conditions remained significantly superior to the control condition, the CBT group was significantly superior to the information website in the reduction of symptoms of depression.

Maheu, M. M. (2001). Exposing the risk, yet moving forward: A behavioural e-health model. *Journal of Computer Mediated Communication*, 6(4).

In this article Maheu discusses how psychological treatment first became popular on the internet, and describes common ethical challenges associated with it (e.g. related to duty to warn and not having information on clients, etc.), and real-life issues that confront the practitioner operating in this modality. Maheu suggests that psychotherapists should seek training in the use of technologies before employing them, but that communication through ICT can sometimes augment therapy.

Maheu, M.M., Pulier, M.L., Wilhelm, F.H., McMenamine, J.P., Brown-Connolly, N.E. (2004). *The Mental Health Professional and the New Technologies: A Handbook for Practice Today*. London: Routledge.

The Mental Health Professional and the New Technologies is a handbooks written by five experts for mental health professionals. It is a guide to practical, ethical, legal and financial issues that can arise in the health field with the use of new technologies like videoconferencing, website and virtual reality.

Mann, J.J. (2002). A current perspective of suicide and attempted suicide. *Annals of Internal Medicine*, 136, 302-311.

Suicide is a worldwide societal problem, and although it has a high rate amongst individuals suffering from psychiatric disorders, there are certain variables which are associated with increased risk, since not all patients who are depressed, for example, will commit suicide. A stress-diathesis model is proposed, and treatment implications are discussed.

Martin, S. (2002). MDs' computer, PDA use on the upswing. *Canadian Medical Association Journal*, 167(7), 794.

Martin analyzes the data from the 2002 CMA Physician Resource Questionnaire in this short article and finds almost a 50% increase in PDA use within one year.

May, C., Gask, L., Atkinson, T., Ellis, N., Mair, F., & Esmail, A. (2001). Resisting and promoting new technologies in clinical practice: the case of telepsychiatry. *Social Science & Medicine*, 52(12), 1889-1901.

May, et al. present an ethnographic study of a videophone telemedicine system to a community mental health care team, which would enable patients to be assessed at a distance. While the program was intended for use by a wide range of health professionals, it was only used by GPs for psychiatry referrals. Some professionals resisted the system because they felt it undermined therapeutic intervention by making the computer and not the clinician more important. Overall medical professionals did not want to use the system because they couldn't adapt their own models of practice into it.

McGinty, K. L., Saeed, S. A., Simmons, S. C., & Yildirim, Y. (2006). Telepsychiatry and e-mental health services: Potential for improving access to mental health care. *Psychiatric Quarterly*, 77(4), 335-342.

This article identifies the technology, benefits, common applications and barriers for implementing telepsychiatry and eMental health services, especially for rural and remote areas. Notes that computer assisted assessment, histories, diagnosis interviews, education and some forms of behaviour modification are widely used, however the efficiency of computer systems has not been studied to the same degree as videoconferencing applications for mental health assessment and treatment. The authors note that there are higher rates of satisfaction with telepsychiatry in rural areas than suburban or urban. Providers also need to be "trained regarding the storage and retrieval of data; medico-legal and ethical issues related to maintaining patient privacy." Issue: costs of infrastructure development and maintenance.

Mellman, T., & Lydlard, R. B. (2008). Posttraumatic stress disorder: Characteristics and treatment. *Journal of Clinical Psychiatry*, 69(1), E2.

PTSD and its different treatment options are discussed. The authors discuss how both pharmacotherapy and psychotherapy have been found to be efficacious. U.S. Medications used to treat PTSD include: medications for trauma-related nightmares, atypical antipsychotics, mood stabilizers, monoamine oxidase inhibitors, tricyclic antidepressants, and selective serotonin reuptake inhibitors.

Molyneaux, H., O'Donnell, S., Liu, S., Hagerman, V., Gibson, K., Matthews, B. et al. (2007). *Good Practice Guidelines for Participatory Multi-Site Videoconferencing*. Fredericton: National Research Council.

This report analyzes recent literature and contributes expertise from researchers and practitioners in the field to develop good practice guidelines for multi-site videoconferencing

- linking people in multiple sites with videoconferencing. The goal was to develop effective, empowering and contextually-sensitive good practice guidelines that encourage participation in multi-site videoconferencing.

Molyneaux, H., O'Donnell, S., Fournier, H., and Gibson, K. (2008) Participatory Videoconferencing for Groups. *Proceedings of the IEEE International Symposium on Technology and Society (IEEE ISTAS 08)*.

Group videoconferencing does not necessarily lead to participation and knowledge retention; for this to occur it must be used thoughtfully and strategically. Based on the work of researchers and practitioners in the field and an analysis of participatory videoconferencing literature, this paper suggests potential good practices for increasing participation during group videoconferences.

Morland, L.A., Pierce, K., & Wong, M.Y. (2004). Telemedicine and coping skill groups for Pacific Island veterans with post-traumatic stress disorder: A pilot study. *Journal of Telemedicine and Telecare*, 10 (5), 286-289.

While investigating videoconferencing as a potential assessment and treatment tool, the authors found that telemedicine may even be better than in-person sessions because avoidance is a core feature of PTSD. There was a high acceptance rate for the use of videoconferencing in the group of Pacific Island war veterans the authors were studying.

Mrdeza, S., & Pandzic, I.S. (2003). Analysis of virtual reality contribution to treatment of patients with post-traumatic stress disorder. *Telecommunications*, 2, 729-731.

Survey of existing Virtual Reality applications and proposition of a Virtual Reality exposure method to be used for PTSD treatment for Croatians who had experienced homeland war. Proposed system includes potential traumatic content and varying anxiety levels wherein the patient uses a head mounted display and is immersed in the virtual world while communicating with the therapist verbally. Therapist will monitor the anxiety via subjective and objective (e.g., EEG, heart rate monitor etc.). Potentially suitable hardware is outlined.

National Defense (2006). Statistics Canada CF Mental Health Survey: A "Milestone". Retrieved June 10th, 2008, from http://www.forces.gc.ca/health/information/op_health/stats_can/engraph/MH_Survey_e.asp

This article highlights data obtained from a survey of Canadian CF and indicates prevalence rates of mental health issues. The mental health of CF members is compared to those in the general population. It is interesting to note that depression is the most common issue faced by CF, followed by alcohol dependency, and then social phobia and PTSD. One year and lifetime prevalence rates are 2.8% and 7.2% for members of the regular force, and 1.2% and 4.7% for reservists.

National Institute of Neurological Disorders and Stroke (NINDS) (2008). NINDS Traumatic Brain Injury Information Page. Retrieved July 1 2008, from <http://www.ninds.nih.gov/disorders/tbi/tbi.htm>

The various types of traumatic brain injury (TBI) are explained. Causal factors and the potential for treatment and prognosis are discussed. Links are provided to additional resources.

Neal, L.A., Busuttil, W., Herapth, R., and Strike, P.W. (1994) development and validation of the computerized clinician administered post-traumatic stress disorder scale-1-revised. *Psychological Medicine*, 24, 701-706.

The article tests a computer administered version of the post-traumatic stress disorder (PTSD) scale compared to an in-person clinician administered version. Inter-observed reliability and correlation was found between the two methods, suggesting that the computer version is a valid way to measure PTSD.

Newman, M.G., Kenardy, J., Herman, S., & Taylor, C.B. (1996). The use of hand-held computers as an adjunct to cognitive-behavior therapy. *Computers in Human Behavior*, 12, 135-143.

In this article the authors discuss their development of a four-session cognitive behavioral intervention for clients with panic disorder to be used on a hand held Casio PB-1000 computer. The program included a diary mode, which allowed patients to rate their anxiety symptoms, and therapy mode which included exercises to assist patients through exposure sessions. The authors found no significant differences between the traditional CBT condition and the handheld condition on anxiety and panic reduction rates.

Nguyen, H.Q., Cuenco, D, Wolpin, S., Benditt, J., & Carrieri-Kohlman, V. (2007). Methodological considerations in evaluating ehealth interventions. *Canadian Journal of Nursing Research*, 39(1), 116-134.

Article reviews issues related to study design, treatment implementation and outcome measurement in eHealth trials.

Norman, S. (2006). The use of telemedicine in psychiatry. *Journal of Psychiatric and Mental Health Nursing*, 13, 771-777.

Norman's study investigates the ways in which telemedicine is used in psychiatry. In particular, he examines videoconferencing technology, noting that over time clients using videoconference equipment feel more comfortable, less inhibited and even less scrutinized than when they are in-person meetings.

O'Donnell, S., Perley, S., & Simms, D (2008) Challenges for Video Communications in Remote and Rural Communities. *Proceedings of the IEEE International Symposium on Technology and Society (IEEE ISTAS 08)*.

For Canada's remote and rural communities, video communications provide a vital lifeline. This study explores the challenges for video communications in remote and rural First Nation (Indigenous) communities. Central to the analysis are social and technical issues as well as the ICT experiences of community-based organizations and community members. The authors use an analytical framework to identify challenges in four categories: technical infrastructure, the interactions of the users with the technical infrastructure, the production and reception of audio-visual content, and the organizational and social relations.

Oquendo, M.A., Friend, J.M., Halberstam, B., Brodsky, B.S., Burke, A.K., Grunebaum, M.F., Mallone, K.M. & Mann, J.J. (2003) Association of Comorbid Posttraumatic Stress Disorder and Major Depression With Greater Risk for Suicidal Behavior. *American Journal of Psychiatry*, 160(3), 580-582.

PTSD and major depression have both been found to increase the risk for suicidal behavior. This study investigates the impact of comorbid PTSD and major depression on risk for

suicide. The results indicated that those with the two comorbid disorders were at greater risk, and women were at an even greater risk for men.

Pair, J., Allen, B., Dautricoutr, M., Treskunov, A., Liewer, M. (2006). A virtual reality exposure therapy application for Iraq war post traumatic stress disorder. *Proceedings IEEE Virtual Reality*, 235-250.

Article chronicles the development of a series of customizable virtual scenarios to be used in VR therapy specifically for Iraq war veterans. New developments include the use of graphics from an X-Box game *Full Spectrum Warrior*, and tactile and olfactory stimulation which can be imbedded in the VR program.

Palmqvist, B., Caerlbring, P., & Andersson, G. (2007). Internet-delivered treatments with or without therapist input: does the therapist factor have implications for efficacy and cost? *Expert Review of Pharmacoeconomics and Outcomes Research*, 7(3), 291-297.

Review article of internet-delivered treatments for mood and anxiety disorders found a strong correlation between therapist input and positive outcomes, however, could not conclusively state cost-effectiveness of the treatment. Therapies with therapist support (e.g., emails, telephone calls etc.) had better treatment outcomes (e.g., reduction of symptoms) than those without support.

Peters, L., Clark, D., & Carroll, F. (1998). Are computerized interviews equivalent to human interviewers? CIDI-Auto versus CIDI in anxiety and depressive disorders. *Psychological medicine*, 28(4), 893-901.

The Composite International Diagnostic Interview was tested using in-person interviews and computerized versions in this article. 80 patients, 40 from an anxiety disorders clinic and 40 from a general medical practice, were administered the tests. Overall subjects were comfortable with both methods of administration, and the computerized version was considered acceptable to respondents. The authors deemed the computerized self-interview the equivalent of the test administered by a clinician.

Popovic, S., Slamic, M., Cosic, K. (2006) Scenario self-adaptation in VR exposure therapy for PTSD. *Novel Approaches to the Diagnosis and Treatment of Posttraumatic Stress Disorder*. Roy, M.J. IOS Press, 135-147,

Description of software that allows clinician to measure patient's arousal (via physiological cues) and manipulate the user interface to adjust the trigger stimuli in the VR environment based on the client's level of arousal.

Price, M. & Anderson, P. (2007). The role of presence in virtual reality exposure therapy. *Journal of Anxiety Disorders*, 21(5), 742-751.

Examination of the relationship between presence (i.e., interpretation of artificial stimulus as if it were real) to inducing anxiety in VR therapy. Results of study including anxious participants showed that presence contributes to and enables the experience of anxiety in VR sessions, but is not related to treatment outcome - that is it is a necessary but not sufficient requirement for successful VR exposure therapy.

Recupero, P.R., Rainey, S.E. (2006). Characteristics of E-Therapy Web Sites. *Journal of Clinical Psychiatry*, 67, 1435-1440.

In this article Recupero and Rainey publish the results of their investigation of online eTherapy websites. Using popular search engines Yahoo! And Google with various eTherapy

terms the authors compiled a list of 55 websites offering eTherapy in order to review the services offered.

Rees, C.S., & Haythornthwaite, S. (2004). Telepsychology and videoconferencing: Issues, opportunities and guidelines for psychologists. *Australian Psychologist*, 39(3), 212-219.

Although telehealth applications are used extensively for mental health, the authors argue that telepsychology has not developed as quickly as telepsychiatry. They list the reasons for this implementation delay, while offering guidelines to overcome potential challenges.

Ritterband, L.M., & Thorndike, F. (2006). Internet interventions or patient education websites? *Journal of Medical Internet Research*, 8(3), 66-67.

This critique of the paper "Internet interventions for long-term conditions: Patient and caregiver quality criteria" asserts that conclusions drawn from the paper are limited because of, small sample size, inaccurate terminology or classification of websites under examination, generalization across interventions, general statements and unclear criterion measures. Authors suggest an authoritative body is needed to provide information about and rate the quality of internet interventions.

River Valley Health. (2006). Benefits evaluation and future planning strategies for the River Valley Health Tanberg multi-conference unit. Fredericton NB: Park Consulting Group: for River Valley Health.

This report details the findings of a 2006 user impact study of videoconference users.

River Valley Health (2006). *Telemental health and Teleaddictions partnership project – Mawi Wolakomiksultine Evaluation Report*. Fredericton, NB: River Valley Health.

The Upper River Valley area of Health Region 3 has limited resources for mental health treatment and so with the goal of improving access to treatment for First Nations individuals, the Mawi Wolakomiksultine – which stands for "together, let's have good healthy minds" in Maliseet - was initiated. An evaluation of the project included data from interviews and focus groups, an administrative and utilization database, evaluation forms, and a review of documents related to the project. Participants reported positive experiences with the treatment they received as part of the project –96% were satisfied with their telehealth session and many preferred it to travelling to Fredericton.

Rizzo, A., Rothbaum, B.O., Graap, K. "Virtual Reality Applications for the Treatment of Combat-Related PTSD." In Figley, C.R. and Nash, W.P. eds. *Combat Stress Injury: Theory, Research, and Management*. New York: Routledge, 2007.

This article reviews the use of virtual reality tools for PTSD treatment. The authors note that VR may promote treatment-seeking by young military personnel who are more attracted to and more comfortable with new technologies.

Rizzo, A.A., Schultheis, M.T., Rothbaum, B.O. (2002). Ethical Issues for the use of Virtual Reality in the Psychological Sciences. *Ethical Issues in Clinical Neuropsychology*, S.S. Bush & M.L. Drexler, 243-279.

This chapter provides an introduction to the use of virtual reality in rehabilitation medicine. The authors also provide additional information on the ethical issues, including cybersickness and other virtual reality side effects including the potential danger of increased anxiety or even vulnerability to escapism. In particular the authors state that

virtual reality tools should be employed to enhance therapeutic sessions rather than replacing clinical sessions.

Rizzo, A. A., Wiederhold, M., & Buckwalter, J. G. (1998). Basic issues in the use of virtual environments for mental health applications. In G. Riva, B. K. Wiederhold & E. Molinari (Eds.), *Virtual Environments in Clinical Psychology and Neuroscience* (pp. 1-23). Amsterdam: IOS Press.

The use of virtual environments has shown promise in reducing fears in clients with phobias, in reducing pain for burn clients, and reducing stress in cancer patients. Questions addressed include – can the same objective be accomplished using a simpler approach, how well do the current attributes of a VE fit the needs of the psychological approach or target, how does a VE approach match the characteristics of the target clinical population, what is the optimal level of presence necessary for the application, will the target users be able to learn to navigate in and interact with the environment in an effective manner, what is the potential for side-effects, will assessment results and treatment effects generalize to the “real world” and how should VE studies be designed and how will the data be analyzed?

Robinson, J., Sareen, J., Cox, B. J., & Bolton, J. (2008). Self-medication of anxiety disorders with alcohol and drugs: Results from a nationally representative sample. *Journal of Anxiety Disorders* (*In Press, Corrected Proof, Available online 22 March 2008*).

The self-medication theory, of how individuals use substances to soothe their anxiety symptoms, is discussed and empirical evidence is reviewed. The high rate of comorbidity of anxiety and substance use disorders is considered as support for this theory. Self-medication as a marker of the severity of mental health issues is also discussed.

Rothbaum, B. O., Hodges, L., Alarcon, R., Ready, D., Shahar, F., Graap, K., et al. (1999). Virtual reality exposure therapy for PTSD Vietnam Veterans: a case study. *Journal of Traumatic Stress*, 12(2), 263-271.

Case study of the first Vietnam veteran to be treated for PTSD with VR exposure (VRE). Because the benefits of standard imaginal exposure in this population are modest, the client was exposed to two virtual environments. Results indicated that although intrusive symptoms did initially increase, the client experienced a reduction in self and clinician reported PTSD symptoms (however no statistical analysis was performed).

Rothbaum, B.O., Ruff, A.M., Litz, B.T., Han, H., Hodges, L. (2004) “Virtual reality exposure therapy of combat-related PTSD: A case using psychophysiological indicators of outcome.” In Taylor, S. ed. *Advances in The Treatment of Posttraumatic Stress Disorder: Cognitive-Behavioral Perspectives*. New York: Springer.

This research study details the treatment of a male Vietnam veteran with PTSD undergoing virtual reality exposure therapy. The patient’s physiological systems were monitored during sessions and remained high throughout all sessions. Researchers concluded that the patient did well in therapy, although the cognitive therapy discussions that took place after the exposure therapy played a critical role in the decrease of symptoms 6 months after treatment.

Ruuwaard, J., Lange, A., Bouwman, M., Broeksteeg, J., & Schrieken, B. (2007). E-mailed standardized cognitive behavioral treatment of work-related stress: a randomized controlled trial. *Cognitive Behaviour Therapy, 36* (3), 179-192.

Article assesses the effects of a 7 week cognitive behavioural treatment of work-related stress conducted via email. Participants (N = 177) underwent 7 weekly phases of treatment. All modules were delivered by therapists, completed and submitted by participants via email. Despite high attrition rates, findings demonstrated that treatment group improved significantly more on measures of stress, anxiety and emotional exhaustion (not depression) which were existent at follow-up 3 years later. Participants rated client-therapist relationship as positive, and indicated they did not miss face-to-face contact.

Ruskin, P. E., Reed, S., Kumar, R., Kling, M. A., Siegel, E., Rosen, M., et al. (1998). Reliability and acceptability of psychiatric diagnosis via telecommunication and audiovisual technology. *Psychiatric Services, 49*(8), 1086-1088.

This article tested the Structured Clinical Interview for DSM-III-R with 30 psychiatric inpatients, diagnosing 15 via in-person interview and 15 via both in-person and videoconference interview. Interrater reliability was almost identical for both conditions, which suggests that videoconferencing systems can be used for reliable psychiatric diagnosis. While 10 out of 15 subjects interviewed by both methods preferred the face to face interview over the videoconference, 12 out of 15 stated that they would rather see a psychiatrist via videoconference than travel two hours or more. Given the choice between seeing a general practitioner face to face or a specialist over videoconference, 12 subjects stated they would choose to interact over video.

Sappington, R. (2008). Leading Radiology Services in the Age of Teleradiology, Wikinomics, and Online Medical Information. *Radiology Management, 30*(3), 34-43.

Sappington's article discusses healthcare trends and their impact on radiology services. In particular he discusses patient centred care in the age of Web 2.0, mentioning various networking sites specific to healthcare.

Sciencedaily (2007). Biomarker for PTSD and Why PTSD is so Difficult to treat. Retrieved June 1 2008 from <http://www.sciencedaily.com/releases/2007/11/071107211450.htm>.

The difficulty of treating PTSD in veterans is discussed. Potential physiological reasons for why PTSD treatment is complicated are discussed, such as how learning and memory are affected in the cases of trauma, and how behavior learned during a trauma is more difficult to address than typical learning.

Schnurr, P. P., & Green, B. L. (Eds.) (2004). *Trauma and health: Physical health consequences of exposure to extreme stress*. Washington, DC: American Psychological Association.

This book highlights how individuals with PTSD or who have been exposed to trauma are likely to experience not only psychological but also physical health consequences because of it. For example, individuals who experience traumas are at risk for developing problems related to their gastrointestinal, cardiovascular, endocrinological, and musculoskeletal systems, among other things.

Schottenbauer, M. A., Glass, C. R., Arnkoff, D. B., & Gray, S. H., (2008). Contributions of Psychodynamic Approaches to Treatment of PTSD and Trauma: A Review of the Empirical Treatment and Psychopathology Literature. *Psychiatry: Interpersonal and Biological Processes, 71*(1), 13-34.

The use of psychodynamic approaches for the treatment of PTSD is discussed. The benefits of using a psychodynamic approach include improved interpersonal functioning, use of more mature defense mechanisms and coping strategies, healthier understandings of relationships and the self in relation to them, and improved reflective functioning.

Schulenberg, S.E., Yutzenka, B.A. (2004). Ethical issues in the use of computerized assessment. *Computers in Human Behavior, 20*, 477-490.

Computerized test administration has significant ethical implications for clients and clinicians. This article examines the strengths and limitations of computerized tests in order to increase clinician understanding. The authors hope that increased awareness will aid clinicians in navigating ethical dilemmas.

Shapiro, F. (2001). Eye movement desensitization and reprocessing: Basic principles, protocols and procedures (2nd ed.). New York: Guilford Press.

Here Shapiro explains the underlying mechanisms for how Eye movement desensitization and reprocessing treatment works. This is a treatment commonly used with individuals who have experienced trauma. Part of the treatment process involves attempting to fully re-process memories which were not initially fully processed because of their high emotional content and factors related to the traumatic situation in which it occurred.

Shore, J. H., Savin, D., Orton, H., Beals, J., & Manson, S. M. (2007a). Diagnostic Reliability of Telepsychiatry in American Indian Veterans, *American Journal of Psychiatry, Vol. 164*, 115-118.

Shore et al examine the reliability of in person Structured Clinical Interview for DSM-III-R (SCID) compared to real-time videoconference assessment for PTSD within a rural American Indian population of military veterans. 53 subjects were interviewed by videoconference and in person (in random order). There were no significant differences between the two modalities.

Shore, J.H., Manson, S. (2004). Telepsychiatric care of American Indian veterans with post-traumatic stress disorder: Bridging gaps in geography, organizations, and culture. *Telemedicine Journal and eHealth, 10*, 64-69.

Paper describes a weekly telepsychiatric clinic treating PTSD in northern Northern Plains American Indian Veterans. Results indicate a high degree of patient satisfaction and comfort with the clinic which suggests that multi-site videoconferencing may be a viable means for providing psychiatric care to rural, isolated populations such as American Indians.

Shore, J. H., & Manson, S. M. (2005). A Developmental Model for Rural Telepsychiatry. *Psychiatric Services, 56*(8), 976-980.

Shore and Manson note both benefits and limitations of telepsychiatry for rural and underserved populations. The article discusses the American Indian Vietnam Veterans Project, which examines American Indian Vietnam Veterans for PTSD via the University of Colorado Health Services Center's American Indian and Alaska Native Programs (AIANP) telepsychiatry service's five clinics. The clinics provided medication and case management as

well as individual and group psychotherapy via videoconferencing, focusing on education, PTSD skills training and supportive therapy. The article then presents a model of a development planning process for rural telepsychiatry clinics.

Shore, J. H., Brooks, E., Savin, D. M., Manson, S. M., & Libby, A. M. (2007b). An economic evaluation of telehealth data collection with rural populations. *Psychiatric Services* 58(6), 830-835.

The authors compare costs of in-person interviews and telehealth interviews conducted over videoconferencing, noting that videoconferencing is of particular importance to American Indians living in rural areas. As conferencing configuration changed and port fees were eliminated the telehealth interviews became cost-saving measures, reducing the need for travel and increasing ease and convenience. The authors note the difficulties recruiting health professionals to rural communities, and also state that videoconference interviews are easy and less expensive to arrange.

Shore, J.H., Hilty, D.M., Yellowless, P. (2007c) Emergency management guidelines for telepsychiatry. *General Hospital Psychiatry*, 29, 199-206.

The literature on the use of emergency telepsychiatry is limited. The authors, drawing on their own experience and the available literature review administrative, legal, ethical and clinical issues related to emergency telepsychiatry and present an initial set of guidelines.

Short, J., Williams, E., Christie, B. (1976). *The Social Psychology of Telecommunications*. London: Wiley.

Short's 1978 publication was one of the first to discuss social presence, the extent to which a technology can provide a social or personable feeling to the interaction.

Silver, S. M., Rogers, S., & Russell, M. (2008). Eye movement desensitization and reprocessing (EMDR) in the treatment of war veterans. *Journal of Clinical Psychology*, 64(8), 947-957.

EMDR has been touted as a first-line of treatment for trauma. This article describes how EMDR would be administered, following an eight-step approach, and uses case-studies as examples. EMDR focuses on the traumas experienced, current triggers of anxiety, and the development of new coping strategies.

Skinner, A. E. G., & Latchford, G. (2006). Attitudes to counselling via the internet: A comparison between in-person counselling clients and internet support group users. *Counselling & Psychotherapy Research*, 6(3), 92-97.

Investigation of self-disclosures style and attitudes towards e-therapy in; users of internet mental health support groups and current face to face clients. Although there were no differences in self-disclosure styles of the groups, face to face clients had a higher tendency to self disclose and internet support group users were more positive about communicating with a therapist via computer. Experience of using the internet and therapy predicted positive attitudes towards e-therapy.

Smiley, P.A., & VandeCreek, L. (2005). *Problems and Solutions with Online therapy. Innovations in clinical practice: Focus on health & wellness*. Sarasota, FL, Professional Resource Press/Professional Resource Exchange: 187-197.

Article reviews the clinical evidence for the effectiveness of online therapy practices then lists potential problems with this mode of therapy (e.g., confidentiality, loss of nonverbal

communication) and offers potential solutions to these problems. This article also includes a condensed list regarding solutions to problems with online therapy.

Smith, B., Wingard, D. L., Ryan, M. A. K., Macera, C. A., Patterson, T. L., & Slymen, D. J. (2007). U.S. military deployment during 2001-2006: Comparison of subjective and objective data sources in a large prospective health study. *AEP*, 17(12), 976-982.

Authors introduce the Millennium Cohort Study which began in 2001 and is considered to be the largest longitudinal study ever conducted by the Department of Defense. A major goal of this study is to evaluate risk factors related to serving in the military which are associated with long-term health outcomes. Participants were from a stratified random sample of the 2 million U.S. military personnel serving actively or in the Reserves or National Guard since 2000.

**Smith, T. C., Ryan, M. A. K., Wingard, D. L., Slymen, D. J., Sallis, J. F., & Silverstein, D. K. (2008). New onset and persistent symptoms of post-traumatic stress disorder self reported after deployment and combat exposures: Prospective population based US military cohort study. *British Medical Journal*, 336, 366-371.
<http://www.bmj.com/cgi/content/full/bmj.39430.638241.AEv1>.**

This article describes the prevalence of new onset and persistent PTSD symptoms in a large population-based military cohort. Data was based on surveys completed by participants in the Millennium Cohort, and the posttraumatic stress disorder checklist-civilian version was utilized. Individuals who had been deployed were at least three times more likely to self-report PTSD symptoms.

Sorvaniemi, M., Ojanen, E., Santamaki, O. (2005). Telepsychiatry in Emergency Consultations : A Follow-Up Study of Sixty Patients. *Telemedicine and e-Health*, 11(4), 439-441.

In rural and remote areas videoconferencing is used for emergency assessments and consultations. In this short article the authors report the findings of a survey administered to sixty patients who were assessed by psychiatrists over videoconference. They conclude that there is a strong preference for videoconference when the alternative involves waiting or travelling for mental health care.

Spek, V., Cuijpers, P., Nykicek, I., Riper, H., Keyzer, J., Pop, V. (2007). Internet-based Cognitive Behaviour Therapy for Symptoms of Depression and Anxiety: A Meta-analysis. *Psychological Medicine*, 37, 319-328.

Internet-based cognitive behavioural therapy is often used for the online treatment of psychological disorders. In this literature review article the authors explore the effectiveness of internet-therapy for symptoms of depression and anxiety. The authors conclude that online therapies work best when supplemented with auxiliary contact with clinicians, such as weekly telephone calls, e-mail etc.

Spira, J.L., Pyne, J.M. (2007). *Experiential methods in the treatment of combat PTSD. Combat stress injury: Theory, research, and management*. New York, Routledge, 205-218.

This chapter examines the role of experiential therapies in treating combat PTSD. In particular, the authors focus on the use of virtual reality systems.

Spira, J.L., Pyne, J.M., Wiederhold, B., Wiederhold, M., Graap, K. et al (2006). *Virtual Reality and other Experiential Therapies for Combat-Related Posttraumatic Stress Disorder. Primary Psychiatry, 13(2): 58-64.*

Spira's article was written for primary care physicians and psychiatrists as an accredited educational activity for the Mount Sinai School of Medicine. The article provides an overview of PTSD treatments as well as a more focused examination of experiential psychotherapies and virtual reality assisted exposure therapy.

Statistics Canada (2002). *Canadian Community Health Survey: Canadian Forces supplement on mental health.* Retrieved June 1 2008 from <http://www.statcan.ca/Daily/English/030905/d030905b.htm>

This survey focused on full-time members of the Canadian Forces. The prevalence of five mental disorders: major depression, social phobia, post-traumatic stress disorder, panic disorder, and general anxiety, as well as substance dependence, were measured. Differences based on rank and gender are also discussed. Major depression was the most commonly reported disorder.

Subcommittee on Posttraumatic Stress Disorder of the Institute of Medicine of the National Academies (2006). *Posttraumatic stress disorder: Diagnosis and assessment.* Washington, DC: The National Academies press.

The committee begins by introducing PTSD and describing the three main symptoms – re-experiencing, avoidance or numbing, and hyperarousal. Next follows the diagnostic criteria and then the most common methods of assessment are described – including interviews (e.g. the Clinician-Administered PTSD Scale, the SCID, the PTSD Symptom-Scale Interview Version, the Structured Interview for PTSD, the Diagnostic Interview Schedule IV, and the Composite International Diagnostic Interview) which are ideally conducted face-to-face. Optimal assessment procedures are described, and challenges to reaching them are listed.

Tanielian, T. & Jaycox, L. H. (Eds). (2008). *Invisible wounds of war: Psychological and cognitive injuries, their consequences, and services to assist recovery.* Santa Monica: the Rand Corporation.

The authors discuss how since 2001 approximately 1.64 million US troops have been deployed in Afghanistan and Iraq. Specific challenges associated with these deployments include: they are typically longer than ever before, breaks are less frequent, and redeployment is more common. The study addressed the questions: What is the scope of mental health and cognitive conditions that troops face when returning from deployment to Afghanistan and Iraq, what are the costs of these conditions (treatment costs and lost productive costs and other consequences), what are the existing programs and services offered to these individuals, what gaps are there in the programs, and what recommendations exist to help address these concerns better. This study includes a literature review and survey data from 1965 service members.

Todder, D., Kaplan, Z. (2007). *Rapid Eye Movements for Acute Stress Disorder Using Video Conference Communication. Telemedicine and eHealth, 13(4), 461-463.*

Eye movement desensitization and reprocessing is one way in which acute stress disorder is treated. This requires rapid eye movement. In order to treat acute stress disorder from a distance Todder administered psychiatric consultation via videoconference, employing rapid eye movement techniques. Todder notes that there is currently a demand for additional studies on the topic.

Todder, D., Matar, M., Kaplan, Z. (2007). Acute-Phase Trauma Intervention Using Videoconference Link Circumvents Compromised Access to Expert Trauma Care. *Telemedicine and e-Health*, 13(1), 65-67.

In this brief report the authors describe two case studies of civilians using videoconference links for ASD and PTSD assessments and CBT interventions. In one case the videoconference sessions were recorded, with patient permission, and used during a consultation. The first patient, diagnosed with ASD noted no significant symptoms after a 3 month follow-up while the second patient, diagnosed with PTSD, followed up at 6 months, noting a decrease in dissociative episodes and an increase in general functioning.

Tryon, W. W. (1999). A bidirectional associative memory explanation of posttraumatic stress disorder. *Clinical Psychology Review*, 19(7), 789-818. Network and connectionist theories are put forth as PTSD models. The models help explain memory impairments and dysfunctions in PTSD, and empirical evidence associated with these models is reviewed.

Turvey, C. L., Willyard, D., Hickman, D. H., Klein, D. M., & Kukoyi, O. (2007). Telehealth screen for depression in a chronic illness care management program. *Telemedicine Journal and e Health*, 13(1), 51-56.

This article describes an interactive voice recording monitoring program implemented through the telephone. It was used for quarterly screens for depression, for the management of co morbid depression and chronic illness of 118 patients in a telehealth heart failure program., The authors note the need for suicide ideation screening, stating that "the key to the successful management of a suicidal patient who is geographically remote lies in elaborating an emergency plan before the screen began." Risk associated in assessing suicidality in remote populations is no different that the remote assessment of other potentially life- threatening health issues (there is a time lag too) but it does serve to improve communication, compared to having assessments only during office visits. The authors conclude that "It is likely that co morbid depression screening would work in computer-based or in-house text messaging-based home monitoring as well."

Valimaki, M., Anttila, M., Hatonen, H. Koivunen M., Jakobsson T., Pitkanen, A., Herrala, J., Kuosmanen L.(2008) Design and development process of patient-centred computer-based supported system for patients with schizophrenia spectrum psychosis. *Informatics for Health & Social Care*, 33(2), 113-123.

The study describes the process of designing and implementing a internet-based portal developed for use by nursing staff in Finnish psychiatric hospitals with patients suffering from schizophrenia and related psychosis. The portal is called Mieli.Net (Mental.Net in English). The study is based on analysis of the information needs of mental health workers and people suffering from mental illness. The methods included a survey of 55 psychiatric hospitals, a survey of patients discharged from acute hospital wards (n=316), interviews with patients (n=51), and interviews with relatives (n=50). Based on the analysis of users' needs, five general informational areas were identified: illness, treatment, well-being, daily activities, and patients' rights. Next, the portal developers conducted 10 focus groups with a multi-disciplinary team of mental health professionals. The article describes a process to produce high-quality health information for websites for individuals suffering from mental illness.

Veterans Affairs Canada (2003). Program guidelines for Operational Stress Injury Clinics: Providing services to Canadian Forces members, veterans, and their families suffering from Operational Stress Injuries (OSI) (Draft)

This document outlines how the clinics are established, how programs are structured and staffed, how the referral process works, the assessment standards (e.g. triage, nursing evaluation, psychological assessment, feedback, preparation of a report), treatment, outreach, and research, among other things.

Veterans Affairs Canada (2004). What is an Operational Stress Injury? Retrieved June 1 2008 from <http://www.vac-acc.gc.ca/clients/sub.cfm?source=mhealth/definition>.

The VAC website defines their conceptualization of the OSI as any persistent psychological distress that results from operations performed while in the Canadian Military. OSI may include various psychological disorders, and is not limited to diagnosable ones.

Veterans Affairs Canada (2005). Tele-mental health handbook: Standards and protocols (a working document).

In 2002 the Minister of Veterans Affairs launched an initiative on PTSD and other OSI experienced by CF – the goal was to increase timely access to treatment. Rural clients experience unique challenges in accessing services including having to travel. Telemental health has been proposed as a way of addressing these concerns. Professional skills needed to facilitate telemental health sessions are discussed, along with other procedural and treatment recommendations.

Veterans Affairs Canada (2007). Operational stress injury clinics. Retrieved June 10, 2008, from: <http://www.vac-acc.gc.ca/clients/sub.cfm?source=mhealth/osic>

This document defines OSI and discusses trauma and typical responses to it. In addition, links to the various OSI clinics are provided, along with information on how to access services.

Veterans Affairs Canada (2008). Veterans Affairs Canada Assistance Services. Retrieved June 1 2008 from <http://www.vac-acc.gc.ca/clients/sub.cfm?source=mhealth/help>.

This VAC website describes the steps that an individual would follow to seek various types of treatment for their OSI. Twenty-four hour hotlines are provided. A discussion of the various ways that OSI affects daily living is given.

Vieweg WV, Julius DA, Fernandez A, Beatty-Brooks M, Hettema JM, & AK., P. (2006). Posttraumatic Stress Disorder: Clinical Features, Pathophysiology, and Treatment. *American Journal of Medicine*, 2006 (119), 383-390.

PTSD is described in detail - starting from a description of its symptoms and features, to theoretical formulations for it, and potential treatment approaches. Prevalence statistics are also provided.

Weber, B., Schneider, B., Fritze, J., Gille, B., Hornung, S., Kuhner, T., et al. (2003). Acceptance of computerized compared to paper-and-pencil assessment in psychiatric inpatients. *Computers in Human Behavior*, 19(1), 81-93.

This trial involved a questionnaire filled out by 78 psychiatric patients using conventional pen and paper as well as by a computer. The computerized assessment was well accepted by the patients, and there were few differences between the two methods of administering the questionnaires.

Wilson, J. P., & Tang, C. S.-k. (2007). The lens of culture: Theoretical and conceptual perspectives in Wilson, J. P., & Tang, C. S.-k. eds. *Cross-cultural assessment of psychological trauma and PTSD*. (pp. 3-30). New York: Springer.

Wilson's book chapter addresses the different ways that cultures approach trauma, including counselling, treatments and traditional practices. Wilson notes that we cannot assume that Western methods can be transplanted to non-Western cultures because of culturally-specific healing practices. The article gives a brief overview of a few different cultures and their healing practices before detailing Western assumptions about trauma, including the idea that distress needs to be "medicalized." Wilson states that grief is not pathological and that people respond in different ways.

Yarvis, J. S., Bordnick, P. S., Spivey, C. A., & Pedlar, D. (2005). Subthreshold PTSD: A Comparison of Alcohol, Depression, and Health Problems in Canadian Peacekeepers with Different Levels of Traumatic Stress. *Stress, Trauma, and Crisis*, 8(2/3), 195-213.

Despite the fact that some individuals may experience PTSD symptoms without them reaching criteria for diagnosis in the DSM-IV-TR, significant impairment can still exist. In this study male peacekeepers who were previously deployed completed questionnaires on their mental health. Statistically significant differences were found between groups (no PTSD, sub PTSD, and PTSD) on certain symptoms and disorders.

Yu, F., Chang, E., Xi, Y., Shun, H. (2001). Emotion detection from speech to enrich multimedia content. *Advances in Multimedia Information Processing*. Berlin, Springer, 550-557.

This paper describes how complex emotions are need for expression in the virtual world. The authors discuss how they trained support vector machines to recognize and express four emotions: anger, happiness, sadness and a neutral, unemotional state.

Zeman, L.L., Johnson, D., Arfken, C., Smith, T., Opoku, P. (2006). Lessons learned: Challenges implementing a personal digital assistant (PDA) to assess behavioural health in primary care. *Families, Systems & Health*, 24(2): 286-298.

A clinical trial of PDAs to assess behavioural health is presented by the authors in this article, as well as a discussion of clinician acceptance of the system. The authors note that lack of physician motivation and interest is an important barrier to implement technology, even when the technology is easy to use and patient acceptance is high.

Zetterqvist, K., Maanmies, J., Strom, L., Andersson, G. (2003). Randomized controlled trial of internet-based stress management. *Cognitive Behaviour Therapy*, 32(2), 151-160.

Stress is an important issue for many people. In this 2003 study of an internet-based self-help stress management program 63 participants took part in either the treatment or the

waiting list control group. The Perceived Stress Scale and the Hospital Anxiety and Depression Scale were used to evaluate the results. According to the study the self- help group experienced greater improvements than the control group.

Zivin, K., Kim, M., McCarthy, J. F., Austin, K. L., Hoggatt, K. J., Walters, H., et al. (2007). Association of comorbid posttraumatic stress disorder and major depression with greater risk for suicidal behavior *American Journal of Public Health*, 97(12), 2193-2198.

Clinical and demographic factors associated with increased risk for suicide among veterans are identified. The researchers used nationally representative longitudinal data from 1999-2004 to determine the suicide rates among depressed veterans. A variety of factors were related to increased risk, including being either an older or younger veteran, having had a recent inpatient psychiatric hospitalization, and other variables.

8. Glossary

Anxiety Disorders - Anxiety disorders are the most prevalent category of mental disorder, comprising several distinct disorders including panic disorder, agoraphobia, generalized anxiety disorder and posttraumatic stress disorder.

Assessment - OSI assessments are typically conducted in-person with a health professional – a psychiatrist, psychologist, clinical social worker, or a psychiatric nurse. Clients are interviewed for symptoms, frequency of symptoms and a history of traumatic events in order to determine if the patient meets the DSM-IV criteria for PTSD. The health professional also determines if there are any co-morbid psychiatric or medical conditions. Assessments can be as brief as one hour, but can also take many hours, depending on the likelihood of co-morbidity and/or additional medical conditions.

Cognitive-Behavioural Therapy (CBT) - Cognitive Behavioural Therapy (CBT) is based on principles of learning and cognitive theories and works to reduce symptoms of PTSD by evoking, challenging and altering erroneous, anxiety-inducing thoughts. Techniques of this therapeutic intervention include prolonged exposure therapy, cognitive restructuring, biofeedback and relaxation training and dialectical behaviour therapy.

Co-morbidity – In relation to OSI, co-morbidity is the co-occurrence of two or more mental health issues.

Computer-based - Computer-based assessments and treatments are self-contained software systems where the software is loaded onto a computer and run on a desktop.

Dialectical behavioural therapy (DBT) - is a modification of CBT and has wide applications, and is specifically useful for individuals who have self-harm tendencies or substance use problems. It is a form of treatment which aims to increase the client's ability to tolerate distress, help them develop new and healthy coping strategies, help improve interpersonal interactions, and help with the healthier experience of emotions, among other things.

Information and Communication Technologies (ICT) – a term that refers to any communication device(s) as well as its associated content, form, features, services and applications. In this report ICT refers to computers, the internet, telephones, videoconferencing, virtual reality (VR), Personal Digital Assistants (PDAs), mobile phones, and other mobile devices. Many ICT platforms are used for mental health including computers (personal and handheld), virtual reality devices, audio and visual media (CD ROMs), and even handheld devices for empirical (evidence-based practices) research and clinical expertise.

Internet-based – Internet-based assessments and treatments are accessible through a computer with an internet connection and a variety of means, including websites, patient portals, social networking sites, chat programs, etc.

ISDN - Integrated services digital network - Information sent over a wide area network (WAN), often offered by regional telephone carriers, involves the transmission of information over pre-existing telephone lines.

Facebook - Facebook is a social networking website where users join networks, add friends, send messages, and update personal profiles. Users can chat with others asynchronously by leaving private messages or posting on people's "walls" – a space on individual sites that can be seen by all their friends. Facebook also introduced a synchronous method of communication to allow users to chat with their friends who are online, and has an option to create and join groups.

Mood Disorders – Mood disorders is a diagnostic category in the DSM that includes several disorders including mild to severe depression, cyclothymia and dysthymia.

Operational Stress Injury (OSI) – a term used by Veterans Affairs Canada to describe a host of persistent psychological difficulties that can arise from operational duties carried out while serving with the Canadian Military or the Royal Canadian Mounted Police (Veterans Affairs Canada, 2003). OSI encompasses a range of mental health problems including anxiety disorders (e.g., posttraumatic stress disorder - PTSD), mood disorders (e.g., depression), substance abuse and dependence, as well as other problems that interfere with the individual's daily functioning.

Patient Portal - Patient portals are health delivery systems that utilize facilitate electronic communication between medical staff and patients via secure we-based entry points. Many patient portals are starting to evolve into secure sites containing personal records with individualized information on medications, medical appointments and other personalized health care information.

Posttraumatic Stress Disorder (PTSD) – PTSD is diagnosed after the client has been exposed to a traumatic event and experienced intense fear, horror or a sense of helplessness, and re-experiences the traumatic event. Symptoms include nightmares, reminder stimuli, hyper-vigilance and over-arousal that occur for at least a month.

River Valley Health (RVH) – River Valley Health is a regional health board, an integrated network of hospitals, health centres and speciality care programs located in west-central New Brunswick.

Second Life - Second Life is a virtual world, a computer-based environment running over the web in which users interact with each other in real time through the use of avatars, usually cartoon-like images that the user created to represent themselves. The Second Life program also uses multimedia content – music and video – and allows users to browse document collections, visit virtual worlds, attend live events like concerts and even support groups, play multi-player games, including educational and health related games, and develop social skills by socializing and interacting with other avatars through text message or voice chat

Social Networking Websites – These websites focus on community building around shared interests.

TCP/IP Internet Protocol – Information sent over the Local Area Network (LAN).

Traumatic Brain Injury (TBI) – TBI is also known as acquired brain injury and occurs when a sudden trauma causes damage or injury to the brain.

Videoconferencing - Videoconferencing occurs when people at geographically dispersed sites communicate with each other by transmitting audio and visual data through videoconferencing systems.

Virtual Reality – Virtual reality is an advanced human-computer interface made possible by the capability of computers to synthesize a 3D graphical environment from data that allows people to see, manipulate and interact with their virtual environment.

Appendix: ICT Tools for PTSD Treatment

ICT	Intervention	Technical Infrastructure	Attributes	Issues
Computer Programs	<ul style="list-style-type: none"> • CBT • Educational • Self-help therapy 	<ul style="list-style-type: none"> • Computer system • Software 	<ul style="list-style-type: none"> • Cost-effect • Usually located in clinic 	<ul style="list-style-type: none"> • Better outcomes if used to supplement in-person treatment • Potential stigmatization
Web-based	<ul style="list-style-type: none"> • CBT • Educational • Self-help therapy • Group therapy 	<ul style="list-style-type: none"> • Computer system • Internet access 	<ul style="list-style-type: none"> • Can be done in various places where there is a computer/internet access • Variety of types including: Websites; Patient portals; Social networking sites 	<ul style="list-style-type: none"> • Anonymity and credibility • Patient confidentiality • Potential for misunderstanding • Privacy concerns
Videoconferencing	<ul style="list-style-type: none"> • CBT • Group therapy • Family counselling • Education • Skills training 	<ul style="list-style-type: none"> • Videoconferencing system: Tandberg/Polycom • Microphone • Camera • ISDN/IP 	<ul style="list-style-type: none"> • One unit located in the clinic and the client's unit located in the hospital, or in another health care professional's office 	<ul style="list-style-type: none"> • Recommendations for an on-site health care worker to be present with the client
Virtual Reality	<ul style="list-style-type: none"> • Effective Imaginal Exposure Therapy 	<ul style="list-style-type: none"> • Head-mounted display • Joy-stick • Vibration platforms • Haptic feedback devices (gloves) • Scents • Software 	<ul style="list-style-type: none"> • Located in the clinic • High client acceptance rates, especially younger clients • Important for clients who have difficulty verbalizing their traumatic experience 	<ul style="list-style-type: none"> • Simulation/ cybersickness • Potentially distracting • Expensive
Handheld/mobile	<ul style="list-style-type: none"> • CBT • Homework • Monitoring 	<ul style="list-style-type: none"> • Various options, including palm pilots, cell phones, iPhone, software, Blackberries 	<ul style="list-style-type: none"> • Treatment can be done anywhere, anytime 	<ul style="list-style-type: none"> • Privacy concerns