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Clickety-click: e-mental health train on track

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Objective: *Experts forecast that the Internet will bring about radical change in healthcare. This paper aims to summarise evidence concerning the efficacy of Internet-based programs in the delivery of mental health care and its implications for mental health professionals. It also describes those Internet programs which are both of demonstrated effectiveness in the treatment of anxiety or depression and available without restriction or cost to the public.*

Conclusions: *There is evidence that Internet-based programs can improve a range of mental health conditions. Some of these programs could be used by psychiatrists and other mental health professionals as an adjunct to clinician-based treatment. However, clinicians need to know which programs work and how they can be accessed.*

Key words: *anxiety disorders, depression, Internet, self-help.*

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Experts forecast that the Internet will bring about radical change in medicine and health care, rating the Internet 7.8 on a scale of 0 (no change in healthcare) to 10 (radical change).[1] However, it is readily apparent that eHealth is already a significant factor in the lives of many consumers. As Forkner-Dunn[2] has noted: ''The eHealth care train has not only left the station but is rapidly moving down the track carrying tens of millions of e-patients and many possibilities for transforming patient self-management, improving health outcomes, and enhancing the patient-clinician relationship''.

But are these developments relevant to the provision of mental health care? Can a medium such as the Internet enhance or, in some cases, replace face-to-face mental health service delivery? The evidence to date suggests that the answer to these questions may well be ''yes''. In a recent systematic review of 15 randomised controlled trials of preventive or treatment Internet interventions for mental disorders and related conditions, the current authors found consistent evidence that such programs are effective.[3] In particular, Internet programs have been shown to be effective in reducing symptoms of depression, anxiety, stress, insomnia and encopresis, and to reduce risk factors for eating disorder. Details of the programs and associated findings are shown in Table 1, which is based on the systematic review and supplemented with additional new studies. Not only is there evidence that Internet interventions can be effective but research also suggests that users like mental health Internet interventions.[4] For example, in one study participants rated as positive the *lack* of eye contact involved in Internet interactions[5] and participants in another concluded that online 'chats were better ... than face-to-face conversations'.[6]

What does this mean for psychiatrists and other mental health professionals? Arguably, it suggests that it may be time for more mental health practitioners to board the e-health train, or at least help their patients/clients to do so. In particular, it is important for clinicians to guide their patients to the train that is most likely to take them to the right destination! Many people visit Internet sites without telling their

Table 1: A summary of randomised controlled trials of Internet interventions for mental disorders[a]

Program	URL	Disorder/problem	Description of online intervention	Publicly Available	Effective?
ODIN Internet Intervention[15,16]	http://www.feelbetter.org	Depression	Offers skills and training in cognitive restructuring techniques. The program is self-paced, and is organised into seven chapters. Each chapter is based on a different skill or technique, and includes interactive examples.	Yes (Free)	An initial trial found the program ineffective in reducing depression symptoms relative to a control group. However, positive results were obtained in a second trial in which ODIN participants were provided with telephone and postcard reminders.
MoodGYM[17,4]	http://moodgym.anu.edu.au	Depression	An interactive CBT program comprising 5 modules based on cognitive restructuring, relaxation, pleasant events, assertiveness training, and problem solving. Contains quizzes and exercises, and an interactive workbook for users to record their responses to exercises and quizzes.	Yes (Free)	In a large community-based trial, program found effective relative to attention control in reducing depressive symptoms and dysfunctional thoughts, and improving CBT literacy.
BluePages Depression Information[17,4]	http://bluepages.anu.edu.au	Depression	A comprehensive source of depression information containing information about the experience of depression, symptoms, evidence-based treatments, resources and sources of help, and depression and anxiety quizzes.	Yes (Free)	In a large community-based trial, BluePages was found to be effective in reducing depressive symptoms and stigma, and improving depression literacy, relative to a control group.
Not named[18]	–	Depression	Intervention comprising four modules covering cognitive restructuring techniques, activity levels, sleep hygiene and stimulus control, and alcohol consumption. The modules also contain interactive scenarios and quizzes.	No	Program not effective relative to a general depression information control condition.

Table 1 (*Continued*)

Program	*URL*	*Disorder/ problem*	*Description of online intervention*	*Publicly Available*	*Effective?*
Panic Online[19,20]	http://www.med.monash. edu.au/mentalhealth/ paniconline/	Anxiety (Panic Disorder)	A CBT program comprising 2 modules: (1) psychoeducation (information about the nature, causes and effects of panic), and (2) cognitive restructuring (techniques for managing panic). Panic Online was updated after the 2001 study. The 2006 study also included a modified intervention in which Panic Online was supplemented with an online stress management component.	Yes (Part 1). Interview with researchers required for Part 2	Program effective in reducing anxiety symptoms (panic frequency, anticipatory fear and general anxiety) and body vigilance, and improving self-efficacy. No effects found for general depression symptoms or anxiety sensitivity. Recent trial showed reduction in general anxiety and panic disorder severity and greater short term improvement if intervention included a stress management component.
Not named[21]	–	Anxiety (Panic Disorder)	The program is based on material drawn from a self-help book, and then adapted for use online. The material is organised into 6 modules that include psychoeducation, breathing retraining, cognitive restructuring, interoceptive exposure, exposure in vivo, relapse prevention and assertiveness skills. Users are provided with individual feedback to questions at the end of each module.	No	Compared with a waitlist control, participants receiving the intervention improved on measures of daily anxiety, frequency, intensity and duration of panic attacks, and a range of other dimensions (depression, anxiety, avoidance, arousal, and catastrophic thoughts).
Interapy program[22–24]	http://www.interapy.nl	Anxiety (PTSD)	This program consists of structured writing assignments designed to enable habituation to traumatic experiences, cognitive reappraisal and social sharing. Onscreen psychoeducation is also incorporated into the program.	No	Evaluated in three trials. The first showed the program led to reduced symptoms of posttraumatic stress, depression, anxiety, somatisation and hostility. Similar results were obtained in a 2003 trial. A recent study[24] found the program more effective in reducing work related stress and burnout than a psychoeducation only control condition.

Table 1 (*Continued*)

Program	URL	Disorder/ problem	Description of online intervention	Publicly Available	Effective?
Online Anxiety Prevention Project (OAP)[25,26]	http://www2.psy.uq. edu.au/~jkweb	Anxiety	The program comprises 6 modules covering anxiety psychoeducation, relaxation training, interoceptive exposure, cognitive restructuring, and relapse prevention. Users practice their skills and record their progress as they work through the program.	Yes (Free)	In one study, the program was found to improve anxiety related cognitions and symptoms of depression, but not anxiety sensitivity. A follow-up study found that these outcomes were maintained at 6 months post treatment.
The Schizophrenia Guide[27]	–	Schizophrenia	This program contains 3 online therapy groups, a platform that allows users to ask questions directly of experts, a Q&A library, educational reading materials, and other news/events.	No	Compared to usual care, this online intervention was effective in reducing levels of perceived stress in participants with schizophrenia.
Online Self–Help Stress Management program[28]	–	Stress	Contains 6 modules divided into 3 sections: (1) relaxation, (2) additional exercises targeting problem-solving, time management, cognitive and behavioural restructuring and (3) information on a variety of stress-related topics including sleep problems, nutrition, exercise, work stress, social life and assertiveness.	No	Greater improvement in perceived stress was observed in completers of the program relative to a control group. The intervention group also showed a reduction in combined depression and anxiety scores, in an intention-to-treat analysis.
Student Bodies (SB)[29,30,6]	–	Eating Disorder	An 8-week psychoeducational and CBT-based program designed to reduce body dissatisfaction and weight concerns. Participants receive weekly feedback by e-mail, participate in a moderated online discussion group and are encouraged to keep an online journal.	No	This program has undergone three evaluations. All reported improvements in eating behaviours and two[29,30] reported improvement in body image.
My Student Body: Alcohol[31]	https://www. mystudentbody.com	Alcohol use/Binge drinking	This interactive site comprises drinking related articles, strategies and interactive tools. Includes a section called ''Rate Myself'', which provides users tailored feedback about their personal risk factors for alcohol misuse.	No	In women, the intervention reduced alcohol consumption during special occasions and led to fewer drinking-related negative consequences relative to a control website.

Table 1 (*Continued*)

Program	URL	Disorder/ problem	Description of online intervention	Publicly Available	Effective?
e-SBI[32]	http://ipru.otago.ac.nz/ sbi1demo/login.html (demonstration program)	Alcohol use/ hazardous drinking	The program involves a web-based assessment and personalised feedback about drinking behaviour.	No	Relative to control, the intervention resulted in lower total alcohol consumption, lower frequency of heavy drinking episodes, and fewer personal and academic problems related to drinking behaviour.
Internet Sleep Management Program[33]	–	Insomnia	Based on published self-help programs and treatment manuals, this 5-week program includes sleep restriction, stimulus control, information about sleep hygiene, cognitive restructuring, information about medication withdrawal, as well as an optional applied relaxation program.	No	Compared to a Wait List Control, the program improved some aspects of sleep (total sleep time, total wake time in bed, and sleep efficiency) but not others (sleep quality, early morning waking).
Self-help Internet Program for Headache[34,35]	–	Headache	This program is composed of 6 modules that incorporate applied relaxation and problem solving training (with e-mail support) extending over a period of 6 weeks.	No	The intervention decreased headache severity and frequency. A trial of the program supplemented by a stress management component[35] also reported reduced headache symptoms and disability.
U-CAN-POOP-TOO[36]	http://www.ucanpooptoo. com	Encopresis	Based on Enhanced Toilet Training techniques, the program includes demonstrations, interactive components, tutorials and quizzes. It incorporates 3 core and 27 optional modules. The program includes education and behavioural training, including information about anatomy and physiology, medication, and behavioural intervention.	No	A small trial demonstrated the intervention to be effective in reducing faecal soiling, and increasing bowel movements in the toilet and unprompted trips to the toilet. Relative to a control, the intervention groups did not improve knowledge about bowel function.

[a] Based on Griffiths & Christensen (2006). Note: Studies 16, 20, 24, 26, 27, 31, 32, and 35 were not included in the Griffiths & Christensen (2006) review as they were published after the review cut-off date.

Table 2:   The user-experience of effective and publicly available online interventions.

Program	The User Experience
ODIN Internet Intervention[15,16]	New users of the site are required to sign in by generating their own username and password. Once successfully registered, users can proceed to 'enrol' in the program, at which point they answer several demographic questions (age, gender, marital status, ethnicity, education). When existing registered users sign in, they are automatically taken to the last page of the program they visited. The program is navigated using a main page called the site 'guide'. The program is organised into 8 chapters that take approximately 5−10 minutes each to complete. The program recommends that users complete the chapters in chronological order, although the site guide contains a table of contents that allows users to skip directly to and between different chapters. The site guide also links to one depression resource: The National Institute of Mental Health. Using the site guide as a starting point, users can click through each chapter of the program. Sometimes text boxes appear with information relating to each chapter. In the first and last chapters, users can complete an automatically scored depression quiz and are provided with feedback about their score. In other chapters, users can click to view examples of a particular skill or technique, complete brief mood exercises, and click on interactive cartoons designed to reinforce key points. In the final chapter, users can review their responses to previous exercises and quizzes. The main interactive component of the program is the counter-thought 'Helper'. This tool allows users to view positive counter-thoughts that are automatically matched to their personal negative thoughts. Users enter a negative thought and then choose from a list of similar negative thoughts that the tool generates. The tool then offers a positive thought to counter the negative one. The site is largely text based, and mainly coloured in black and white. The language is uncomplicated and the site is extremely easy to navigate.
MoodGYM[17,4]	New users of the site are required to register with their own username and password, and a confirmation of these details is sent to their nominated e-mail address. Users are then guided through an animated flash introduction to the MoodGYM program and additional information about the terms and conditions of using the site. When registered users login, they are taken to a 'welcome' screen that allows them to return to the last page they were working on. MoodGYM is composed of five modules that contain information, pictures, quizzes, examples, and exercises. At the beginning of the program, users are introduced to a set of characters that appear throughout the program to illustrate different aspects of key skills and techniques (e.g. characters have different backgrounds, respond differently to life events, and exhibit different coping styles). A navigation toolbar along the right-hand side of the screen allows users to move back and forth between different screens and modules. The toolbar also contains a progress meter for users to track their movement through the program. MoodGYM uses colour, pictures, text and flash animation to deliver information. The program also contains a game and an interactive workbook in which users can record their responses to exercises and quizzes throughout the program. Users are provided with a certificate at the end to certify their completion of the program.

Table 2 (*Continued*)

Program	*The User Experience*
BluePages[17,4]	The BluePages homepage is organised into titled sections that link to the information provided on the site. Users of the site can access this information by clicking on these sections or clicking on navigation tabs listed across the top of the page. Information on BluePages covers the following areas: symptoms of depression, treatments for depression, resources about how and where to get help or further information, and information about preventing depression. The site also has a search function that visitors can use to search BluePages, and other depression sites within Australia and Worldwide. BluePages provides links to MoodGYM and a BlueBoard (an online mutual bulletin board support group). BluePages also contains automatically scored depression and anxiety quizzes. Users can also download a progressive muscle relaxation audio file. BluePages is colourful and easy to navigate, as all the information is available from a central homepage. BluePages also uses a mixture of graphics and text to deliver information. For example, a picture-based rating system is used to convey the effectiveness of various treatments for depression.
Online Anxiety Prevention Project (OAP)[25,26]	New users of the site are required to enter an e-mail address in order to receive a username and password. The main homepage contains a list of links including a rationale for and description of the program, an automatically scored 'pre-intervention' anxiety assessment, each of six program 'sessions' and a final 'post-intervention' anxiety assessment. Users are instructed to spend at least 5 days practicing the techniques outlined in each session, and not to read ahead to later sessions. Users can navigate through each of the sessions sequentially by clicking through screens, as well as accessing each session individually from the list of links on the front page. Users can also keep track of the number of days they have logged into the program. Step-by-step instructions are provided for various exercises (e.g. breathing and interoceptive exposure). Users are encouraged to track how often they practice these exercises in a daily practice schedule that is provided in the program. The program is mostly text based, but contains a few animations and pictures to illustrate key points. It is predominantly black and white and contains a vast amount of information that is well organised on the site. Descriptions of the exercises are broken down into discrete achievable steps that are easy to follow.

therapist.[7] Given the variable quality of mental health information on the web,[8,9] patients may need assistance to choose the right sites. Currently, 16% of registrants on the Australian online cognitive behaviour therapy program MoodGYM (see Table 1) indicate that they have been referred to the site by a health professional, a figure which suggests that Internet programs are gaining some credibility among clinicians. However, other evidence indicates that self-help on the Internet is yet to achieve the profile among practitioners of bibliotherapy (self help via books). For example, whereas the majority of therapists recommend bibliotherapy to their clients,[10] only one-third of psychologists recommend websites to clients.[11] With the emergence of Internet efficacy data, this situation is likely to change rapidly. However, clinicians need to know what programs work and how they can be accessed.

Although a number of the programs described in Table 1 are of demonstrated efficacy, only four are both effective and available to the public without financial cost or restriction. For the benefit of the interested clinician, Table 2 describes the user experience of these four programs: ODIN, MoodGYM, BluePages and the Online Anxiety Prevention Program (OAP). More details about MoodGYM are available in the MoodGYM manual for clinicians.[12] This handbook provides a step-by-step guide to the use of MoodGYM in a clinical context and includes detailed information about the assessment tools and normative data used in the program.

The e-mental health train does appear to be on track. However, there are still many questions to be answered. What are the merits of Internet alone compared to Internet programs used as an adjunct to

face-to-face therapy and how are Internet interventions best delivered to clients? Attrition rates can be high for web-based interventions.[13] Monitoring client usage and providing minimal feedback to facilitate client engagement appears to be effective but we need to know more about methods for engaging clients in real life. We also need to understand who is most likely to benefit from Internet programs and under what conditions Internet programs are contra-indicated. For example, Barlow and colleagues[14] have suggested a stepped care model where the Internet is used for those with milder symptoms. Psychiatrists often focus on benefits and costs at the level of the individual. But what are the public health as opposed to the individual consequences of Internet self-help? The majority of people with mental disorders do not currently receive treatment. Is it better to reduce overall burden of mental illness in the community through Internet self-help programs which may or may not be as effective at an individual level as face-to-face therapy or to provide intensive traditional therapy to a very much smaller number of people? We would argue that it is appropriate to do both. In the end, of course, the public will vote with their 'mouses'. Currently, there are more than 20,000 visitors to MoodGYM per month (and 1.3 million hits). Over 90,000 people registered to undertake the program in the 16 month period between September 2003 and the end of 2005.

Independently of any concerns about the appropriateness of such interventions, a minority of clinicians may see the encroachment of mental health Internet programs into their domain as a threat. However, this technology can be viewed as an opportunity for clinicians. Not only can it serve as a means of empowering clients and providing them with additional and convenient services, it has the potential to free up clinician time to allow them to focus on the more complex and creative aspects of their practice. Technology has provided other areas of medicine with powerful treatment tools. There is no reason why mental health services should not similarly capitalise on the benefits available from technological progress.

From a research perspective, Internet programs represent an unprecedented opportunity to study the impact and outcomes of a service on large numbers of members of the community who might otherwise not receive help. MoodGYM is underpinned by infrastructure that permits the automatic implementation of randomised controlled trials in community users of the site. The site simultaneously provides a service to users and collects data that is analysed to improve the service. Thus, the most recent MoodGYM trial has involved an investigation of the relative efficacy of different combinations and numbers of modules. Arguably, this is an ideal model for ensuring that research is translated into practice in an appropriate and timely fashion.

Perhaps the final, inevitable question relates to how we are to fuel the e-mental health train now that it has left the station. There are currently no convincing large-scale sustainable models of e-mental health. Self evidently, whether an Internet service is research based or not, someone must pay for the service. One of the major challenges for the future will be to work out who will pay for the ticket on the e-mental health train.

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