Environmental scan of digital mental health services

Bridget Bassilios, Maria Ftanou, Andrew Tan, Amy Morgan, Anna Machlin, Shaminka Mangelsdorf, Long Le, Michelle Banfield, Matthew Spittal, Cathy Mihalopoulos, Jane Pirkis

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List of acronyms and abbreviations

Abbreviation	Term
AI	Artificial Intelligence
CALD	Culturally and Linguistically Diverse
CBT	Cognitive Behavioural Therapy
DMH	Digital Mental Health
DMHI	Digital Mental Health Intervention
DMHS	Digital Mental Health Service
eMHPrac	e-Mental Health in Practice
ffCBT	Face-to-face CBT
GAD-7	Generalised Anxiety Disorder 7-Item Scale
iCBT	internet-delivered Cognitive Behavioural Therapy
ICT	Information Communication Technology
IPT	Interpersonal Therapy
iPMR	Internet-guided Progressive Relaxation Training
K-10	Kessler 10
LGBTQIA+	Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, and Asexual
MBS	Medicare Benefits Schedule
MOST	Moderated Online Social Therapy
OCD	Obsessive Compulsive Disorder
OTU	Online Therapy Unit (Canada)
PHQ-9	Patient Health Questionnaire 9-Item Scale
PTSD	Post Traumatic Stress Disorder
QALY	Quality-Adjusted Life Year
RE-AIM	Reach, Efficacy or Effectiveness, Adoption, Implementation, Maintenance
VR	Virtual Reality

Glossary

Term	Definition
Anxiety Online	Now known as Mental Health Online.
Chilled Out Online	Online interactive program for 13–17-year-olds to help learn strategies for managing anxiety, developed by Macquarie University.
Cool Kids Online	Online interactive program for 7–12-year-olds to help learn strategies for managing anxiety.
DMHS	Digital Mental Health Service. DMHSs are delivered online via desktops, mobile devices and applications; or via telephone crisis and counselling services. Some online DMHSs offer automated self-help programs, and others involve support or guidance, typically from clinicians.
eCouch	Internet based self-help and information for common mental health problems developed by Australian National University. There are five programs: depression, anxiety and worry, social anxiety, divorce and separation and loss and bereavement.
GAD-7	Generalised Anxiety Disorder 7-Item Scale. A measure of the level of worry and anxiety symptoms.
Just-In-Time Adaptive Intervention	Delivers personalised support when a person needs it most (primarily to bridge the time between longer intervention sessions).
K10	Kessler 10. A measure of psychological distress.
MoodGym	Interactive self-help program that provides CBT training to help users prevent and cope with depression and anxiety, developed by Australian National University.
MOST	Digital mental health platform offering continuous, integrated face-to-face and digital care to young people in Queensland and Victoria, developed by Orygen.
Mum2BmoodBooster	Free online program designed to help women recover from antenatal depression.
MumMoodBooster	Online treatment program for women experiencing postnatal depression.
MyDigitalHealth	Contains numerous consumer digital health programs and has various features that can enable healthcare practitioners to securely integrate digital health into their practice.
MyCompass	Online self-help tool to manage mild depression, anxiety and stress, developed by the Black Dog institute.
PHQ-9	Patient Health Questionnaire 9-Item Scale. A measure of the level of depression symptoms.
The Head to Health National Mental Health Gateway	An Australian Government website that lists trusted Australian DMHSs and provides related information and resources.
Virtual agent	Software program that uses scripted rules and, increasingly, artificial intelligence applications to provide automated service or guidance to humans.
Woebot	An intervention that uses Artificial Intelligence to deliver digital mental health care.

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Executive summary

Background

The Australian Government funds numerous digital mental health services (DMHSs), which are listed on the Head to Health digital mental health gateway (www.headtohealth.gov.au).[1] DMHSs are delivered online via desktops, mobile devices and applications; or via telephone crisis and counselling services. Some online DMHSs offer automated self-help programs, and others involve support or guidance, typically from clinicians.

The Productivity Commission Mental Health Inquiry Report noted the potential benefits of supported or guided DMHSs.[2] It is particularly important to understand how DMHSs work and sit in the broader Australian mental health service system in the context of the COVID-19 related quarantine, restrictions and lockdowns in which traditional face-to-face services may not be tenable.

Purpose of environmental scan

The Centre for Mental Health at the University of Melbourne was commissioned by the Department of Health to undertake this environmental scan, conducted as one component of an evaluation of supported DMH interventions (DMHIs) for mental disorders.[3] This environmental scan considers factors that impact on the successful real-world implementation of DMHSs that are delivered online (with or without support or guidance), excluding smartphone applications which are beyond the scope of the current evaluation. Throughout the report, the term DMHI refers to a specific intervention, typically delivered either in an experimental study or as one of several components of what a real-world DMHS offers (with other service offering examples including assessment and referral).

Our approach

Because of its focus on the effectiveness of interventions in the real world, we used the **RE-AIM framework**[4] to evaluate the impact of DMHSs across the following dimensions:

- **Reach:** The number and characteristics of people using DMHSs;
- **Efficacy or Effectiveness:** Positive and negative impacts of DMHSs on users (e.g., mental health outcomes, quality of life, satisfaction, cost-effectiveness);
- **Adoption:** Willingness of stakeholders to use DMHSs, including enablers and barriers;
- **Implementation:** Barriers and enablers that affect the implementation of DMHSs; and
- **Maintenance:** Process of maintaining DMHSs over time, including enablers and barriers.

We used systematic reviews, and peer-reviewed and grey literature sourced via Google searches to inform this environmental scan. We also used purpose-selected peer-reviewed publications and one report supplied by three key Australian supported DMHS providers to present case studies – Mental Health Online (Swinburne University), MindSpot (Macquarie University) and THIS WAY UP (St Vincent's Hospital and the University of New South Wales). We extracted data from included documents based on the RE-AIM constructs using a standard template. We also conducted a scan of current online DMHSs in Australia.

Findings

Reach

A recent e-Mental Health in Practice (eMHPrac) report indicated that 466,473 Australians used DMHIs between 1 June 2014 and 30 June 2020, of whom 35% (163,252) accessed supported DMHSs.[5] Over this period, there has been a steady increase in the overall number of users of DMHSs, particularly from 2017-18 which coincides with the launch of the Head to Health Digital Mental Health Gateway. There was also a 62% increase in the proportion of users who accessed supported DMHSs from 2019-20 (42,320 users) to 2020-21 (68,091 users), which probably related to distress associated with the COVID-19 pandemic.[5]

Users of DMHSs are typically English-speaking women, with an average age of between 33 to 43 years, and who reside in urban locations, although proportionally more users of DMHIs reside in rural locations compared to users of face-to-face mental health services. Users of DMHSs most commonly have diagnoses of depression and/or anxiety disorders, which is consistent with DMHIs typically targeting these conditions.

Users of DMHIs are typically not: those who lack the technology or access to the internet, from diverse cultural or minority groups, older adults, or those living in unsafe home environments (e.g., family violence).

Effectiveness

Efficacy from gold standard randomised controlled trials and effectiveness from real-world data are the most commonly reported outcomes of DMHIs and DMHSs respectively. Data from both trials and routine care indicate that DMHIs and DMHSs, particularly those involving cognitive behavioural therapy (CBT) and support or guidance, work and have the potential to be good value for money. The evidence is strongest for adults with depression and anxiety disorders.

Acceptability and satisfaction are the next most commonly reported outcomes. Overall (adult) users consider DMHSs and DMHIs to be acceptable, are satisfied with their experience and would recommend these services.

Although considerably less frequently examined or reported, health professionals seem to be highly satisfied with guided DMHIs.

Outcomes such as health system use (e.g., GP or emergency department visits, medication use, referral to specialists) and health system processes (e.g., cost, workflow, productivity, staffing, quality of care, waitlist reduction) are rarely reported.

Adoption

We identified barriers to widespread adoption of DMHSs at the consumer level and health professional or organisational level (e.g., health services).

Barriers for consumers include lack of awareness of DMHSs and how to access them; perceived lack of effectiveness; poor English literacy; low computer competency; inadequate internet connectivity; cultural appropriateness; and concerns about data privacy, safety and confidentiality.

Barriers for health professionals include lack of familiarity and awareness; lack of confidence and skills; perceptions that clients have poor internet or out-of-date device; lack of time and motivation to learn new ways of delivering services; concerns about workflow disruption and additional workload; low expectations about effectiveness; concerns about consent, risk management, confidentiality and data security; and perceived loss of therapeutic relationship.

At the organisational level, concerns that funding of DMHIs may lead to re-direction of funds from other underinvested (rural and remote) services acted as a barrier to adoption.

Implementation

Stakeholders willing to adopt DMHSs can experience barriers and enablers that affect adherence, satisfaction and outcomes. In broad terms, these barriers and enablers can relate to the users, interventions, or technology and other external factors.

User related enablers of successful implementation include client and provider acceptance of, and engagement with, DMHSs. Certain user characteristics are associated with increased engagement including being female; introverted; self-reliant and motivated; experiencing less severe symptomatology; and having good digital and technological skills.

Several intervention level factors can facilitate successful implementation of DMHSs. These include intervention appropriateness (perceived fit, relevance, or compatibility); suitability (accessibility and convenience, user ability to integrate it into their daily lives); usability (easy to use and understand, self-

paced, age appropriate, user-friendly); acceptability (engageable, relatable, personalised); flexibility; autonomy; functionality (reminders, and progress monitoring); and treatment fidelity. However, it should be noted that some of these factors can also act as barriers for some users. For example, the flip side of flexibility is that it can be experienced as lacking the structure, protected time and accountability available in face-to-face therapy.

The availability, amount and type of therapist support or guidance may influence client engagement. Clients value some form of human, responsive, personal support even if this support is not provided face to face. The level of support required is dependent on a range of personal and symptom characteristics. Personalising DMHIs may help with adherence and acceptance.

Successful implementation of DMHSs in routine care is reliant on several external factors. These include appropriate resources (human resources, equipment, funding, and other infrastructural aspects); leadership (directing and controlling working processes and organising activities that enable service implementation and delivery); and health care system enablers (e.g., policy, curricula and certification of mental health staff, technology and standardisation, community acceptance, resources, infrastructure).

Several reviews suggest that DMHSs and DMHIs are not utilising emerging technology to its fullest capacity. For example, only a minority of systems have a substantial number of functions that are responsive to input from the user and the technological capabilities of systems have not evolved or been re-tested over time. Additionally, artificial intelligence and machine learning provide ample opportunities to improve the identification and treatment of mental disorders, but only a few attempts have been made to provide DMHIs using conversational agents, virtual reality, or augmented reality apps.

Maintenance

We identified several barriers to the sustainability of DMHSs. One of the main factors that can hinder the maintenance of DMHSs is their lack of integration into the broader mental health system. DMHSs need to be embedded into routine care and be a central component of stepped-care models.

Funding constraints, concerns about privacy, data protection, storage, effectiveness of interventions and technology barriers (e.g., outdated technology, internet and connection problems, lack of access to technology, digital literacy) may impact on maintenance of DMHSs.

Limited appropriate workforce training in DMHSs may also impede maintenance of DMHSs. Training and education which focuses on how to use DMHSs and blending DMHSs with traditional care models will contribute to sustainability of DMHS over time.

The convenience of use and reductions in wait times for service, travel time, and costs are all factors that will encourage and promote the ongoing use of DMHS. Engagement of consumers from the design phase through to delivery and evaluation and implementation of DMHSs across different settings can improve the quality of DMHSs, promote their long-term use and ensure that they remain relevant and relatable.

Opportunities for DMHSs in Australia

This environmental scan highlighted a range of opportunities to improve the reach, effectiveness, adoption, implementation and maintenance of DMHSs in Australia.

Reach

- DMHSs are not reaching certain parts of the Australian population, including men, people not born in Australia and those over 55 years. Future development needs to focus on the broader inclusion of disadvantaged sub-populations and diverse cultural populations. This opportunity extends to mental health services more broadly.
- To ensure that DMHSs are reaching those who need them, a significant effort needs to be made by Government to ensure that users have access to the right equipment and tools and access to education to improve technical skills and digital literacy.

Effectiveness

- Although robust evidence exists for the efficacy and effectiveness of using DMHIs to treat depression and anxiety, further research is needed to explore the efficacy of these interventions with traditionally underserviced populations (e.g., CALD, Aboriginal and Torres Strait Islanders, LGBTQIA+ and older adults).
- There is an underdeveloped evidence base regarding the effectiveness and efficacy of using DMHIs for treating severe mental disorders. Continued research should examine whether DMHIs and DMHSs are efficacious in treating mental disorders such as psychosis, personality disorders, substance dependence or co-morbid conditions.
- Additional research is needed to determine how to best embed DMHIs in usual care and determine the feasibility and acceptability of models of care that integrate DMHIs with traditional face-to-face services (e.g., the use of DMHIs as a relatively less intensive service in stepped-care interventions or blended models of care).
- Across studies, this scan identified that impacts beyond clinical outcomes (e.g., user experience, satisfaction and other outcomes like psychosocial functioning and health system use) are not routinely assessed. Furthermore, there is variability in definitions and measurement of concepts such as acceptability and satisfaction, making it difficult to compare and draw firm conclusions about the effectiveness of DMHSs. Efforts need to be made to determine consistent definitions and outcome measures to be used across Australian DMHSs. Consistent use of terms and measures will improve understanding of the impacts of DMHIs and help identify risks and service gaps.
- Although the efficacy and effectiveness findings of this environmental scan are very promising, further work needs to be done by researchers and policymakers to promote and disseminate these findings across the mental health sector, consumers and clinicians. Broad dissemination of these results will help build trust and confidence in using DMHIs.

Cost-effectiveness

- There is increasing evidence to support the cost-effectiveness of DMHSs, including both self-help and therapist-guided modalities. However, future development needs to explore whether costs of services impede access or whether costs are associated with greater commitment and completion rates of programs.
- Integrating DMHSs within existing health services and the forthcoming national digital mental health platform has the potential to lead to cost efficiencies.
- There is an underdeveloped evidence-base about what cost could be saved by early intervention through DMHIs.
- There is variability in definitions and measurement of costs making it difficult to compare and draw firm conclusions about the cost effectiveness of DMHSs. Efforts need to be made to determine consistent definitions and cost metrics to be used across Australian DMHSs. Consistent use of terms and measures will help better understand the cost impacts of DMHIs.

Adoption

- There is an underdeveloped evidence base on the perceived acceptability of DMHSs among the Australian public. Improving our understanding of how these services are perceived would enable targeted education materials to increase adoption.
- Brief, highly scalable educational videos about DMHSs may be a useful strategy to increase adoption by consumers. These could be developed and distributed through official health promotion channels to promote the value of DMHSs and reduce barriers related to perceived lack of effectiveness.
- There is a need to increase training opportunities in digital mental health in pre-service health professional training and professional development courses to increase adoption by health practitioners. Training should provide education about DMHI effectiveness and how and where to access them, as well as teach practical skills in delivering DMHIs.

- As reviews indicated that disruptions to workflows were a barrier to adoption by health professionals, the development of implementation resources and guidelines would help integrate DMHSs into routine care. These could include support to manage data security, manage client risk remotely, and develop reimbursement schedules if appropriate.

Implementation

- Some consumers are more likely to engage with, adhere to and benefit from DMHSs than others who are more suited to traditional face-to-face services. Comprehensive assessment and screening of consumers may help identify consumers suited to and most likely to benefit from DMHSs.
- Ensuring consumers interested in receiving DMHSs have the technological capability (e.g., offering training) to use them may facilitate successful implementation.
- It is important for consumers to be consulted in development, implementation, and review of DMHSs and for peer workers to also be involved in service delivery.
- Augmenting self-help treatments to include guided components has been identified as an important implementation strategy. However, technological advances allow for personalisation or tailoring of DMHS delivery and should be considered to as means of addressing differences in consumer needs, promoting adherence and positive outcomes; and potentially increasing efficiency.
- Therapists providing guidance in DMHSs need appropriate support and training to maximise treatment fidelity, which can affect adherence and effectiveness. Training can include workshops, provision of treatment manuals, referral pathways and clarification and examples on how to integrate of DMHSs with traditional models of care.
- It is important for DMHSs to expand and adapt in the face of technological innovation, which includes regular reviewing of their services, attention to Human-Computer Interaction design and staying up to date with technology (e.g., artificial intelligence, machine learning).
- Legal and regulatory framework (e.g., the National Digital Mental Health Framework and the National Digital Mental Health Standards) may be used to coordinate the implementation and ensure the quality of DMHSs.

Maintenance

- Although integration is central to the sustainability of DMHSs, there is an underdeveloped evidence base on how to integrate DMHSs with face-to-face mental health services. Further exploration is required to determine which models of care are feasible, acceptable and sustainable.
- Health care system enablers (e.g., policy, curricula and certification of mental health staff, technology and standardisation, community acceptance, resources, infrastructure) can be leveraged to promote the sustainability of DMHSs.
- Funding models may also need to be reviewed and take into account jurisdictional mental health priorities, operational costs, development costs, and education and training costs.
- Implementation of routine outcome and evaluation measures and the development of a DMHSs research strategy would help with ongoing monitoring of the quality of DMHSs, the identification of service gaps and future development opportunities, enabling DMHSs to meet the ongoing needs of consumers.
- Opportunities for co-developing DMHSs with consumers may lead to implementing DMHSs that are engaging, relevant and address consumer needs and enhance the overall sustainability of DMHSs.

Conclusion

DMHSs are an important part of the mental health service landscape but they are not for everyone (e.g., some people prefer, or for different reasons need, face-to-face service). DMHSs have been consistently reaching a substantial number of Australian consumers since at least 2014 and the number of consumers accessing them has been steadily increasing since the introduction of the Head to Health Mental Health

Digital Gateway in 2017. Demand for supported DMHSs, in particular, has increased during the COVID-19 pandemic. DMHIs and DMHSs, particularly those involving cognitive behavioural therapy (CBT) and support or guidance, lead to positive mental health outcomes and have the potential to be good value for money, particularly for adults with depression and anxiety disorders. Other outcomes (e.g., user satisfaction, quality of life, functional outcomes) are infrequently reported. There are ample opportunities to: improve reach and adoption; determine effectiveness in various sub-populations; apply different treatment characteristics including making optimal use of technology to efficiently produce desired outcomes; facilitate implementation; and maximise the maintenance of DMHSs in the mental health service system. These opportunities involve all stakeholder groups from consumers, health professionals (or other staff involved in delivering, or referring to, DMHSs), DMHSs themselves, and researchers to the broader mental health system including Government.

Background

The Australian Government funds numerous digital mental health services (DMHSs), ranging from those focusing on promotion and prevention to those focusing on treatment and recovery. The Government's digital mental health gateway, Head to Health (www.headtohealth.gov.au), lists these services.[1]

DMHSs are delivered online via desktops, mobile devices and applications; or via telephone crisis and counselling services. They can help improve access to mental health care or complement traditional face-to-face care[6] given their scalability and the ubiquity of desktop, mobile and telephone devices. DMHSs are low-cost for end-users and have the potential to reach people who do not or cannot access services (e.g., people in rural/remote and low-income regions) in a convenient setting (home, workplace, schools, through clinicians' workplaces). DMHSs are portable and have the added advantage of reducing the stigma associated with using mental health services by offering users anonymity and the ability to manage their mental health problems in real-time 24 hours a day, 7 days a week.[7]

Some DMHSs offer automated self-help programs, and others involve guidance from clinicians, volunteer crisis supporters, teachers, administrators or peers. Supported DMHSs are online programs that involve clinician/therapist support or guidance, usually occurring after consumers complete successive online modules.

The Productivity Commission Mental Health Inquiry Report noted the potential benefits of supported or guided DMHSs.[2] It recommended that the Australian Government fosters supported DMHSs as a treatment option by: increasing funding to expand their availability; commissioning an evaluation of their performance; and developing information campaigns for people with lived experience of mental illness and health professionals to increase the awareness of this treatment option.[2] It is particularly important to understand how DMHSs work and sit in the broader Australian mental health service system in the context of the COVID-19 related quarantine, restrictions and lockdowns in which traditional face-to-face services may not be tenable.

Purpose of the environmental scan

The Centre for Mental Health at the University of Melbourne was commissioned by the Department of Health to undertake the independent evaluation of Australian government funded supported DMHSs. The purpose of the overall evaluation is to inform Australian Government decisions related to future funding for supported DMHSs and activities to increase awareness and utilisation of these services by people with lived experience of mental illness and health professionals.

This environmental scan, conducted as one component of the evaluation, aims to complement the findings of our umbrella review (review of systematic reviews) on the effectiveness (and cost-effectiveness) of supported DMH interventions (DMHIs) for mental disorders.[3] Studies included in systematic reviews are typically randomised controlled trials, the results of which determine efficacy under controlled conditions. Specifically, this environmental scan considers factors that impact on the successful real-world implementation of DMHSs that are delivered online (with or without support or guidance), excluding smartphone applications which are beyond the scope of the current evaluation. Throughout the report, the term DMHI refers to a specific intervention, typically delivered either in an experimental study or as one of several components of what a real-world DMHS offers (with other service offering examples including assessment and referral).

Environmental scanning, originating in the business sector, is a tool used to collate and interpret information from an organisation's internal and external environment to inform strategic planning and improve performance.[8] Although environmental scanning is increasingly being used in the healthcare sector, there is considerable variation in how it is conducted, which is attributable to a lack of a conceptual framework and methodological guidance.[8] Because of its focus on the effectiveness of interventions in the real world, we used the **RE-AIM framework**[4] to evaluate the impact of DMHSs across the following dimensions:

- **Reach:** The number and characteristics of people using DMHSs;
- **Efficacy or Effectiveness:** Positive and negative impacts of DMHSs on users (e.g., mental health outcomes, quality of life, satisfaction, cost-effectiveness);
- **Adoption:** Willingness of stakeholders to use DMHSs, including enablers and barriers;
- **Implementation:** Barriers and enablers that affect the implementation of DMHSs; and
- **Maintenance:** Process of maintaining DMHSs over time, including enablers and barriers.

We used systematic reviews and peer-reviewed and grey literature sourced via Google searches to inform this environmental scan. We also used purpose-selected peer-reviewed publications and one report supplied by three key Australian supported DMHS providers to present case studies. These services are Mental Health Online (Swinburne University), MindSpot (Macquarie University) and THIS WAY UP (St Vincent's Hospital and the University of New South Wales), which are the focus of our broader evaluation of DMHSs. We extracted data from included documents based on the RE-AIM constructs using a standard template. We also conducted a scan of current online DMHSs in Australia. Details of our methods are provided in Appendix 1. An overview of the key documents informing the environmental scan is provided in Appendix 2.

We present findings from our environmental scan of DMHSs in the body of this report.

Scan of current online DMHSs in Australia

Appendix 3 provides a list of current DMHSs developed in Australia and their characteristics.

We included DMHSs that:

- Are delivered via the internet on a website (i.e., excluding mobile applications, email, exclusively phone or chat services);
- Include interactive activities or modules (i.e., not simply static written material); and
- Focus mainly on providing services to individuals with mental disorders or symptoms (i.e., not solely focused on wellbeing, prevention, substance use, domestic violence, parenting or physical health issues).

Both guided and self-guided DMHIs are included. Guided DMHIs are those with an element of human contact, typically from a therapist.

We excluded programs to which access is conditional on participation in a research study. The Head to Health National Mental Health Gateway[1] and the e-Mental Health in Practice[9] websites provide more exhaustive lists of Australian DMHSs.

We identified eight guided and four self-guided DMHIs, respectively. Many of the guided programs were launched in the last decade, and the self-guided programs originated more than 10 years ago. Two of the online guided programs we included also have an associated mobile application (MumMoodBooster/Mum2BmoodBooster and MyDigitalHealth). Almost all programs target a specific age range (e.g., individuals over 16 years for eCouch and MoodGym); one program (MumMoodBooster/Mum2BmoodBooster) focuses on one specific population (i.e., mothers experiencing post-natal or pre-natal depression).

All programs include self-guided modules to work through over a suggested number of weeks, ranging from 3 modules over 3 weeks (for the postnatal depression course by THIS WAY UP) to having access to the program for 12 weeks or more as long as the user remains active (for Moderated Online Social Therapy; MOST).

Support in the guided programs is offered in several ways including:

- As a standard part of the program (i.e., Chilled Out Online, Cool Kids Online, MindSpot, MOST);
- Optionally for those who opt-in or meet certain criteria (i.e., Chilled Out Online, Cool Kids Online, Mental Health Online, MindSpot, MumMoodBooster/Mum2BmoodBooster); or
- The consumer's own therapist using the site to provide support and/or monitoring (i.e., MOST, MyDigitalHealth, THIS WAY UP).

Some programs specify the frequency and type of support (e.g., 4 x 30min phone calls for Chilled Out Online and Cool Kids Online). Other programs allow for the option of support without specifying further (e.g., communication with your own health practitioner for THIS WAY UP and MyDigitalHealth). Support is typically provided by a therapist, although one program also offers support from peer workers and career consultants (MOST).

All programs include CBT approaches, and most target anxiety disorders and/or depression. Other common treatment approaches include mindfulness-based therapies (e.g., Mindfulness-Based Cognitive Therapy and Acceptance and Commitment Therapy for MOST) and a psychodynamic approach, Interpersonal Therapy (i.e., for e-Couch, MoodGym and MyCompass). Other treatments target bereavement, chronic pain, coping, general distress, insomnia, PTSD, psychosis, relationship issues, stress, substance abuse, Type 2 Diabetes and wellbeing.

Participants can access programs in a variety of ways; some programs require a referral from a health practitioner (i.e., MOST), some programs accept self-referral (i.e., Chilled Out Online, Cool Kids Online, e-Couch, MoodGym, MumMoodBooster/Mum2BmoodBooster), and others can be accessed via either self-referral or referral from a health practitioner (i.e., Mental Health Online, MindSpot, MyDigitalHealth, MyCompass, OnTrack, THIS WAY UP). The MyDigitalHealth program was not available to new users at the time of writing due to a new version of the platform being under development.

Several of the guided programs are designed to mimic face-to-face programs (e.g., Chilled Out Online offering an online version of a face-to-face program). Other programs intend to offer a distinct integrated service (e.g., MyDigitalHealth integration with smart watch tracking of biological factors like sleep and heart rate). All programs that receive government funding are free to the consumer, and two therapist-assisted programs that do not receive government funding require a fee (Chilled Out Online and Cool Kids Online).

Reach of DMHSs

One of the most reported benefits of DMHSs is that they can reach a wide range of people with diverse backgrounds. This section of the environmental scan provides information on how many Australians use DMHSs, describes their socio-demographic and clinical characteristics and reviews the literature on whether costs of services impact the reach of DMHSs.

Data were extracted from: two literature reviews, one that explored the reach of DMHSs in a real-world setting;[10] and one which was a rapid review of DMHIs available to support Canadians during the COVID-19 pandemic;[11] three reports from the grey literature;[5, 12] one of which was supplied by THIS WAY UP,[13] one of the key Australian supported DMHS providers mentioned in the background section; and two peer-reviewed publications.[14, 15] Nine non-peer-reviewed documents were reviewed to determine if costs of services impacted on reach[2, 16-21] including two rapid reviews.[12, 22]

Number of people using DMHSs in Australia

DMHSs are being used broadly across the globe and have been incorporated into routine care in several places, including the United Kingdom (UK), Western Europe, Australia, New Zealand, Scandinavian countries, the United States of America (USA) and Canada.[10, 12]

A recent e-Mental Health in Practice (eMHPrac) report indicated that 466,473 Australians used DMHSs between 1 June 2014 and 30 June 2020, of whom 35% (163,252) accessed supported DMHSs.[5] Over the same period, 7,526,228 Australians accessed Medicare-subsidised mental health specific services (excluding psychiatry and general practitioner services).[23] However, it's possible a portion of users of Medicare-subsidised services are counted in more than one year in this period, and data on the number of DMHS users represent new registrations to programs (i.e., continuing users and people accessing the service websites for advice or information are not included). Therefore, comparing data on the numbers of users across mental health services should be done with caution as there may be significant differences in the criteria used to define access and uptake.

Figure 1 illustrates how many Australians used DMHSs overall and supported DMHSs each financial year over the past seven years. Figure 1 demonstrates a steady increase in the overall number of users of DMHSs, particularly from 2017-18 which coincides with the launch of the Head to Health Digital Mental Health Gateway. Additionally, there is a 62% increase in the proportion of users who accessed supported DMHSs from 2019/20 (42,320 users) to 2020/21 (68,091 users). This increase is likely related to distress associated with the COVID-19 pandemic.[5]

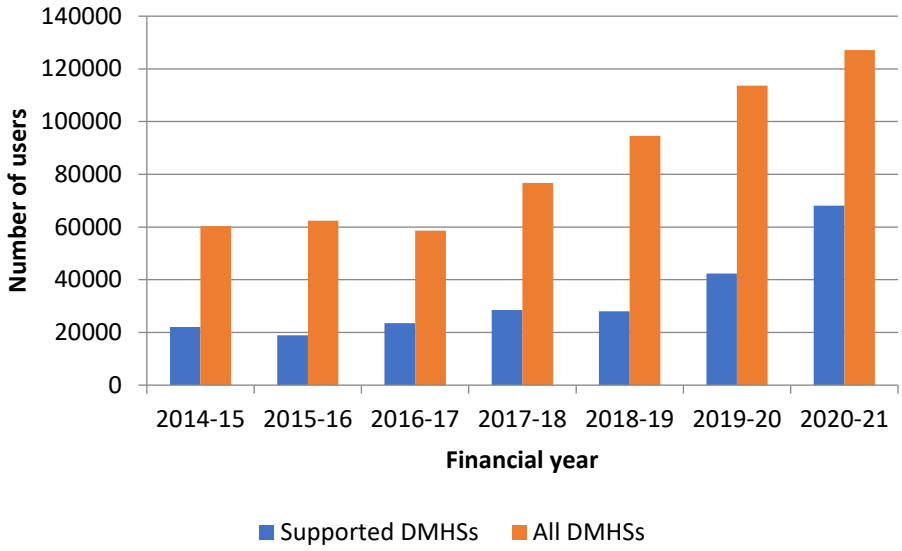

Figure 1: Total number of users of all and supported DMHSs by year

Socio-demographic characteristics

The identified international studies (some of which include Australian samples) suggest that the most common users of DMHIs tend to be English speaking women, with an average age of between 33 to 43 years, and living in urban localities in middle to high-income countries.[10, 12] Others have also indicated that specific populations might be disadvantaged or have reduced access to DMHIs, including those who: lack the technology or access to the internet, are non-English speaking, are older adults, and live in unsafe home environments (e.g., family violence).[11] These user characteristics are based on both real-world users and those participating in experimental studies.

A comprehensive Australian study described the characteristics of 121,652 Australian users (of whom 21,745 used supported DMHIs) of MindSpot between 2013 and 2019.[15] It showed that, in 2019, a total of 20,284 Australians used MindSpot, of whom 88% were under the age of 55 years (mean age 35.4 years, SD =13.8), 73% were women, 78% were born in Australia, 81% were living in major cities or urban localities, and 4% were Aboriginal or Torres Strait Islanders.[15]

These user characteristics are broadly similar to consumers who received Medicare-subsidised mental health specific services for the same year in which 84% were under the age of 55 years, and 63% were female.[23] Importantly, proportionally more consumers from regional and rural areas used MindSpot compared to accessing Medicare-subsidised mental health specific services (19% vs 6%).[15, 23]

These findings highlight that DMHSs have a limited reach to diverse cultural and minority groups.[11]

Clinical characteristics

In terms of clinical characteristics of international experimental study participants, the environmental scan indicated that most commonly, DMHIs primarily target depression and anxiety disorders.[12] Etzelmueller et al. (2020) conducted an international systematic review and found that 40% of real-world internet-delivered cognitive behavioural therapy (iCBT) interventions specified that users had to be diagnosed with clinical depression and/or anxiety disorder to take part. They also found that studies targeting depression included participants with severe depression symptom severity, but 73% indicated that suicidal ideation or intent was a reason to exclude users from engaging with the DMHSs.[10]

In the Australian context, one study showed that 35% of MindSpot users had never previously accessed mental health support.[15] The most common diagnoses among users were depression and anxiety. For example, 82% of MindSpot users have anxiety and 73% depression, either comorbid or alone. Another Australian study indicated that users who accessed THIS WAY UP presented with depression (75%) and generalised anxiety disorder (67%).[24] Scores on mental health screening measures (e.g., the Patient Health Questionnaire-9 [PHQ-9], Generalised Anxiety Disorder 7-Item Scale [GAD-7] and the Kessler-10 [K-10]) suggest that users of both MindSpot and THIS WAY UP experience moderate to severe clinical levels of symptoms.[15, 24]

Cost of service

None of the nine documents reviewed reported any analysis of the impact of different costs of service (e.g., free vs paid) on consumers' access or use of services. The findings of our previous pragmatic literature review of the cost-effectiveness of supported DMHIs suggest that cost-effective services were predominantly delivered from the healthcare sector perspective and involved little to no cost to the consumers.[3] Therefore, services with a higher cost to consumers may have implications for reach.

Efficacy and effectiveness of DMHSs

This section aims to provide a narrative synthesis of whether DMHSs work and other impacts, including both positive and negative effects of interventions. Where possible, we distinguish between 'efficacy' findings from gold standard randomised controlled trials (or other experimental designs) and 'effectiveness' findings based on real-world service provision (routine care); both of which are important. It also aims to describe outcomes of DMHSs or interventions beyond whether they work, such as stakeholder experiences of using DMHSs or interventions, including satisfaction, usability and other outcomes beyond the clinical improvement of symptoms (e.g., functioning and quality of life). The content is based on five systematic reviews,[10, 25-28] two rapid reviews (not peer-reviewed),[12, 22] one commissioned report[19] and our own umbrella review.[3] Case studies are based on six peer reviewed publications[15, 24, 29-32] and one organisation's internal report[13] supplied by the three key Australian supported DMHS providers mentioned in the background section.

Efficacy and effectiveness

Our umbrella review on the **efficacy** (and cost-effectiveness) of supported DMHIs for mental disorders found that DMHIs, particularly those involving some form of support or guidance, are efficacious for treating depression, anxiety disorders, and binge eating disorder.[3] The effects are larger for adults than youth and are similar to those resulting from face-to-face therapy.[3] More support or guidance might be necessary for youth. We also found that supported DMHIs have the potential to be good value for money.[3]

We identified one systematic review that examined the **effectiveness** of iCBT for the treatment of depression and anxiety as part of routine care.[10] It included 17 studies (30 samples) conducted in 9 countries, including Australia; and a total of 12,000+ participants (>5,000 from MindSpot). The average professional guidance time per participant was 133.49 minutes over the treatment duration. This review confirmed that real-world clinical outcomes are large, albeit with high heterogeneity, and deterioration rates are low (across 14 studies: average 2.9%, range 1-16.6%).

Efficacy and effectiveness are the most commonly reported outcomes based on the data sources included in this environmental scan (and our umbrella review[3]). For example, a rapid review[12] of broadly defined DMHIs, either self or clinician guided, found that of 261 studies published in 2010-2016:

- 98% reported clinical outcomes (symptomatology, functioning, diagnosis and quality of life);
- 30% satisfaction (preferences, enjoyment, satisfaction, usefulness);
- 25% usage metrics (number of logins, number of modules/activities completed); and
- 17% psychosocial measures (self-efficacy, normative beliefs, stages of change).

Only 5% of studies reported on health system use (e.g., physician or emergency department visits, medication use, referral to specialists) and only 6% examined the impact on health system processes (cost, workflow, productivity, staffing, quality of care, waitlist reduction).[12] Findings in relation to clinical outcomes were largely consistent with our umbrella review indicating significant positive change on a range of mental health outcomes in 83% of studies and mixed outcomes in 8% of studies.[12] Only 4% of studies reported clinician outcomes (e.g., satisfaction).[12] The studies mostly tested DMHIs (88%) with only 2% focusing on public health promotion (2%), prevention (8%) and relapse prevention (5%).[12] The authors did not describe findings related to satisfaction, usage, psychosocial measures, health system use or health system processes.[12]

Acceptability and satisfaction

Five systematic reviews have focused on the **acceptability** of DMHIs and DMHSs. Of these, one was an umbrella review covering 151 unique studies of iCBT;[27] three were based on experimental studies,[25, 26, 28] and one on routine care.[10] Overall, these reviews indicate that guided and unguided DMHIs and DMHSs are acceptable to users, and users are highly satisfied and would recommend iCBT. Users included adults with depression and anxiety disorders.[10, 26, 27] Two reviews indicated that DMHIs are largely acceptable to children and adolescents with depression and anxiety disorders,[25, 28] with somewhat more mixed results

reported in one of these reviews.[28] Only two primary studies in one of the reviews[26] examined health professionals' satisfaction with guided DMHIs and it was found to be high.

Acceptability was variably defined across the reviews. For example, Treanor et al. (2021)[27] examined enablers and barriers to uptake, adherence, and completion or that contribute to attrition and satisfaction. One of the reviews focusing on children and adolescents examined technology acceptability, satisfaction, recommendations for use; and ease of use among children, parents, and healthcare providers.[28] The second review focusing on young people reported a range of positive experiences (e.g., a sense of enjoyment and fun, meaningfulness, feeling motivated, feeling safe, hopefulness, flexibility) and young people experienced technology as easier to engage with than speaking with adults, which was attributed to the ability to control the pace and disliking talking.[25]

Case study – Mental Health Online

A study comparing outcomes of two therapist-guided online interventions, including a 12-module iCBT (Mental Health Online, n = 89) and an internet-guided progressive relaxation training (iPMR, n = 90) found that both interventions had high completion rates and reduced OCD symptoms.[29] However, the magnitude of the effect was larger for iCBT. Therapist guidance for both interventions involved therapists sending one email per week irrespective of the number of emails they received from participants.

An earlier study examined the effectiveness of five self-guided programs for anxiety disorders delivered to 225 participants as part of routine care by Anxiety Online (now known as Mental Health Online).[30] The average total time across the five different programs was 6.59 hours over 12 weeks. Several outcomes were reported including reduced disorder severity, increased confidence in managing mental health care, decreases in number of clinical diagnoses (apart from those in the panic disorder group), improvements in quality of life (apart from those in the panic disorder group), and reduced general psychological distress. Furthermore, treatment satisfaction was rated as moderately high (72% satisfaction overall) and around two-thirds of participants indicated they liked the intervention 'somewhat' or 'quite a lot'.

Case study – MindSpot

A recently published peer-reviewed paper reported treatment outcomes for clients over MindSpot's first 7 years of its operation.[15] They reported improvements in depression (PHQ-9), anxiety (GAD-7), and general distress and disability (K10+) at post treatment and at 3 months follow up. Effect sizes and percentage changes were large for estimated mean scores on the PHQ-9 and GAD-7 from assessment to post-treatment and 3-month follow-up. Among 13,058 clients, the proportion with reliable symptom deterioration was low post-treatment. They found small improvements in disability following treatment as measured by days out of role. Finally, they reported high client satisfaction with 12,452 (96.6%) of 12,895 respondents indicating they would recommend the course and 12,433 (96.7%) of 12,860 reporting the course was worthwhile.

An observational cohort study of clients registered with MindSpot linked to the National Death Index is the first in the world to examine suicide rates of former clients of a DMHS.[31] It found that 64 (0.11%) of 59,033 clients registered between 1 January 2013 and 31 December 2016 died from suicide within two years of last contact, which is consistent with the suicide rate observed in clients of traditional face-to-face services. The study confirmed that people using DMH services are at higher risk of suicide than the general population and that MindSpot's safety protocols are relatively effective.

Case study – THIS WAY UP

A consumer engagement and user experience report by THIS WAY UP described findings related to clinical outcomes, engagement and satisfaction.[13] Data from 31 randomised controlled trials suggest that THIS WAY UP produces significant improvements in mental health, which are maintained 1-6 months post treatment. In terms of course engagement, 75% of participants completed all their course lessons. From 17 RCTs, 87% of participants said they were mostly or very satisfied with their treatment course. Surveys from >15,000 users indicated that more than 80% are likely to recommend the program to others.

A recent study examined the uptake and effectiveness of iCBT (THIS WAY UP) for anxiety and depression during the first eight months of the COVID-19 pandemic compared to 12 months prior.[14] It found a

significant increase in demand for psychological support during the COVID-19 pandemic in Australia and demonstrated the effectiveness and scalability of iCBT for symptoms of anxiety and depression. Baseline anxiety and depression symptom severity were similar for the COVID and pre-COVID groups. iCBT was associated with large effect size reductions in anxiety (g = 0.94–1.18), depression (g = 0.92–1.12) and psychological distress (g = 1.08–1.35) both before and during the pandemic.

Cost-effectiveness

As previously mentioned, our umbrella review concluded that supported DMHIs are good value for money. Findings from documents reviewed as part of this environmental scan confirmed that there is evidence of cost-effectiveness. For example, in a rapid literature review of low intensity mental health services by Dalton et al. (2017),[22] the authors noted that iCBT interventions targeted at adults were cost-effective, based on cost per quality-adjusted life year (QALY) estimates that were below the standard threshold. However, the authors also cautioned that their results, based on a combination of trial and modelling data, should not be extrapolated to the real-world setting as there were elements of uncertainty, including the choice of comparators. A rapid review on DMHIs by Wozney et al. (2017) concluded that very few studies reported cost-effectiveness outcomes and mainly reported cost-outcome or simple costing analyses.[12]

A report commissioned by Mental Health Australia and prepared by KPMG[19] found DMHIs have a short-term ROI of $1.60 for every dollar invested. However, it is not clear in this KPMG report whether the DMHIs were preventive, treatment or a combination of both. Several reports have indicated the need to increase the evidence base around the value for money of online DMHSs and modelling longer term benefits and costs, particularly from the societal perspective.[12, 22]

Case study – Mental Health Online

A recent study conducted by Mental Health Online evaluated the cost-effectiveness of supported iCBT for obsessive-compulsive disorder.[32] The study suggested that iCBT was more cost-effective when compared to internet-based progressive relaxation therapy (iPRT) and face-to-face CBT (ffCBT). For example, the iCBT treatment delivered a net benefit ratio (or cost per unit of effectiveness) of $724 per reduction in the Yale-Brown Obsessive Compulsive Scale score as opposed to $1,583 and $1,627 estimated for iPRT and ffCBT, respectively. In addition, the study conducted a cost-benefit analysis to assess the benefits accrued by society resulting from improved access to treatment. All three modes of delivery (iCBT, iPRT and ffCBT) produced significant societal benefits in terms of productivity gains. Among the three modes, however, iCBT provided significantly greater benefit with cost-benefit ratios ranging from 6 to 35 times the cost of treatment compared to 5-28 times for iPRT and 4-26 times for ffCBT. Overall, the findings of the study provide further evidence of digital DMH services being cost-effective due to increased effectiveness of treatment programs and reductions in costs of implementing online programs.

Adoption of DMHSs

This section of the environmental scan focuses on barriers to widespread adoption of DMHSs by consumers, individual health professionals and organisations (e.g., health services). We extracted data from five literature reviews;[33-37] nine other peer-reviewed publications[15, 38-43] including one supplied by MindSpot[44] and one by THIS WAY UP;[45] and one internal report supplied by THIS WAY UP.[13]

Barriers for consumers

Lack of awareness of DMHSs and how to find them has been identified as a key barrier by Australian and international experts in the field.[33, 38] Several portals or directories have been established to help address this problem, including the Australian Government's *Head to Health Digital Mental Health Gateway*,[1] a website that lists trusted Australian DMHSs and provides related information and resources.

Another barrier is the perceived lack of effectiveness of DMHSs, particularly compared to face-to-face treatments. A review of the public acceptability of DMHSs found four studies which assessed the perceived efficacy of DMHSs among members of the general public in Australia, the UK and Germany.[34] Survey findings showed that traditional therapy services were perceived as more helpful than DMHSs, and supported DMHSs were preferred to services without therapist assistance. Accordingly, most respondents indicated being more likely to use face-to-face psychotherapy than DMHSs, though, in an Australian study, one-third of respondents were more likely to use DMHSs. It is noteworthy that these studies are comparatively old (the most recent was published in 2014), and the two Australian-based studies included small convenience samples, so it is not clear how accurate these findings are for the wider Australian public. A potential enabler to overcome this barrier is the use of so-called 'acceptance-facilitating interventions', which are brief, highly scalable educational videos about DMHSs. These have been shown to enhance the acceptability of DMHSs in clinical practice internationally.[33]

Other barriers identified in the literature include poor English literacy, low computer competency, and inadequate internet connectivity.[39] While the 'digital divide' was previously seen in uneven access to fast broadband, with the widespread use of smartphones, the 'digital divide' now reflects differences in technical skills, online literacy, and usage patterns.[40, 41]

The cultural appropriateness of DMHSs has been identified as a potential barrier to adoption by consumers. This is seen as especially important for Indigenous Australians, as interventions need to be based on the more holistic social and emotional wellbeing framework and be co-designed in consultation with the community.[42]

Concerns about data privacy, safety and confidentiality are also listed as barriers in the literature.[34, 38, 43]

Barriers to adoption by health professionals or organisations

Implementing DMHSs into routine care relies on health professionals' willingness to recommend and use these services with their clients. Two recent papers have reviewed the evidence on barriers to the adoption of DMHSs by health professionals.[35, 36] Ganapathy et al.(2021)[36] reviewed 40 papers on barriers to adoption of DMHSs by mental health professionals and Davies et al. (2020)[35] reviewed 29 studies on health care professionals' perceptions of the barriers to and facilitators of adopting DMHSs in routine care of adults in health care settings.

Both reviews identified health professionals' lack of familiarity and awareness of the different DMHSs available as a barrier, similar to consumers as discussed above. Ganapathy et al. (2021)[36] noted evidence from two studies of low 'visibility' of DMHSs within the mental health profession, with little observation of other professionals using it or discussions of use in team meetings, which was correlated with future use intentions.

Even when there was awareness of DMHSs, professionals did not necessarily have the detailed information, confidence, and skills required to adopt them. Training health professionals in DMHSs is required to facilitate adoption. Ganapathy et al. (2021)[36] found that the training content requires consideration, so that practical skills are included (such as how to communicate therapeutically in written form), rather than just information about different DMHSs.

Both reviews identified barriers related to the perceived needs of clients. Ganapathy et al. (2021)[36] noted that adoption was impeded by perceptions of poor internet connections of clients, or clients with out-of-date devices. Davies et al. (2020)[35] found that health professionals supported DMHSs only for clients with relatively straightforward, low-risk diagnoses, strong motivation and engagement, high computer literacy and access, and low need for tailored content.

Both reviews identified disruptions to workflows and additional workloads as a barrier to adopting DMHSs. These barriers are related to the lack of time and motivation to learn new ways of delivering services. Others have noted that this lack of motivation may stem from low expectations about effectiveness versus a high effort expectancy.[37] Organisational support, targeted training, and implementation resources to help DMHSs smoothly integrate with existing workflows and technology practices were identified as facilitators of adoption.

There were consistent barriers related to health professional concerns about the confidentiality and security of client data for web-based programs. Davies et al. (2020)[35] suggested that clear and transparent protocols need to be in place to reassure health professionals before they will be willing to refer. Ganapathy et al. (2021)[36] also found that concerns about gaining consent or managing crises when clients may be anonymous as a barrier to adopting DMHSs.

The nature of the therapy delivered in DMHSs was also noted by Davies et al. (2020)[35] as a potential barrier to adoption. Health professionals believed some types of therapy to be less appropriate for digital formats, such as psychoanalytic, interpersonal therapy or schema therapies. The structured nature of DMHSs was both a barrier and enabler of uptake, as professionals desired more flexibility in tailoring content, and some wished to see more transdiagnostic options. Furthermore, a perceived loss of the therapeutic relationship between client and professional was seen as a potential barrier to uptake. Across studies, health professionals experienced in DMHSs held more positive views of the potential for a therapeutic relationship in web-based therapy. Among qualitative studies, health professionals perceived the therapeutic relationship as different from that in face-to-face therapy but not necessarily worse. Health professionals perceived flexibility with timing and location as advantages of DMHSs, but preferred blended therapy to facilitate rapport and allow active monitoring and follow-up of clients. Overall, health professionals showed a preference to use DMHSs flexibly, possibly as an adjunct to face-to-face treatment, as an option to support those on a waiting list for treatment or as part of a stepped-care model.

A final barrier identified by Ganapathy et al. (2021)[36] was funding issues related to organisational-level concerns that funding of DMHSs may reduce funding for other services, particularly in rural and remote areas.

Case study – MindSpot

Enablers of adopting DMHSs have been reported by a study of 86,128 consumers of MindSpot. The main reason for choosing MindSpot over traditional services was convenience and absence of cost (reported by 33.7%), and another third (33.1%) reported privacy and anonymity, with other reasons provided by the remaining users.[15] MindSpot has also identified barriers to adoption by health professionals that reflect those reviewed above.[44] Namely, that therapists working in DMHSs require specialised training and supervision to acquire and maintain skills that are different to those used in face-to-face models of care. This training may overcome skill deficits in using clinical software platforms and text-based communication, as well as address misconception about the efficacy of DMHSs and poorer therapeutic alliances. Furthermore, they identified that additional expertise and resources were required to operate MindSpot safely and effectively, including establishing organisational and clinical governance systems. This requirement for additional funding has been identified as an organisational barrier to adopting DMHSs elsewhere (as noted above).

Case study – THIS WAY UP

A survey of 401 consumers of THIS WAY UP found that convenience and low cost were key enablers of adopting the service, along with a recommendation from a health professional.[13] It is possible this latter

enabler overcame barriers related to lack of awareness of DMHSs and beliefs about their lack of effectiveness reviewed above.

Newby et al. (2021)[45] identified the lack of Medicare or private insurance rebates for supervising DMHSs as a potential barrier to adoption by health professionals. For example, clinicians adopting THIS WAY UP into their private practice need to establish separate reimbursement schedules for phone contact that occurs with the client outside of face-to-face sessions. THIS WAY UP clinicians also report familiarity with many of the same beliefs about DMHSs reviewed above that serve as barriers to adoption by other health professionals. These include fears about data security and managing client risk remotely, beliefs about poor therapeutic alliance in DMHSs and a lack of effectiveness, and increased workloads related to supervising clients remotely.

Implementation of DMHSs

An umbrella review of DMHIs including 151 unique studies reported wide variation in the proportions of participants who took up (1-97%), completed an entire program (10-100%) and dropped out (at various points) of DMHIs.[27] These variations may be attributable to factors that facilitate or impede the implementation of DMHSs. Therefore, this section focuses on implementation enablers and barriers, which can affect not only uptake, adherence and completion or attrition, but also contribute to satisfaction and efficacy. The content is based on 15 systematic, rapid and narrative reviews,[10, 28, 33, 37, 46-56] one other publication from the peer-reviewed literature,[45] and an internal organisational report[13] supplied by THIS WAY UP; a rapid review report to the Mental Health Commission of Canada;[12] and four other relevant Australian government reports.[57-60]

Before describing implementation barriers and enablers, we need to understand the characteristics, or the nature, of the services delivered via DMHIs. DMHIs can be delivered as standalone self-help interventions, blended with face-to-face therapy or as stepped and matched care approaches.[33] Stepped care adjusts the extent of therapeutic support based on previous intervention effects, and matched care matches clients based on pre-treatment characteristics (e.g., symptom severity, comorbidity) to specific treatments (self-help, guided self-help or blended care).[33] Support or guidance can be synchronous (chat or video) or, more commonly, asynchronous (e.g., via e-mail).[33] Asynchronous communication increases flexibility and autonomy for clients and therapists.[33]

A rapid review of 261 studies of DMHIs conducted by Wozney et al. (2017) reported the average number of sessions or interactions offered is eight (range 1-60) and the average duration of DMHIs is 10 weeks (range < 1-52 weeks).[12] Support or guidance is most commonly provided by psychologists or psychiatrists (58%).[12] Peers (15%), nurses (3%), family doctors (2%), social workers (1%) and teachers (1%) are less often involved in guiding the delivery of DMHIs.[12]

Implementation barriers or enablers can relate to users, organisations, programs or technical issues.[12, 46] Many of these barriers were rapidly overcome during the COVID-19 pandemic both in Australia and internationally, through increased public health campaigns, funding opportunities and an urgency to up-skill both clinicians and patients,[60, 61] although a need for appropriate monitoring and quality assurance of DMHSs in the short- and long-term was revealed.[60]

User-related factors

Wozney et al. (2017) found that across 261 studies, barriers relating to users (clients or providers) were the most common (11%).[12]

Vis et al. (2018) reviewed scientific literature on DMHSs for mood disorders in routine practice and reported that client and provider acceptance of, and engagement with, DMHIs are essential for successful implementation.[49] Acceptance was conceptualised as client and health provider perception that using DMHSs is 'agreeable, congenial, or satisfactory'.[49] Engagement was considered to involve continuing implementing, delivering, and receiving DMHIs based on concrete treatment plans.[49]

Patel et al. (2020) systematically reviewed 24 studies of guided and unguided DMHIs for depression, anxiety and somatoform disorders.[47] This review reported that people who approached the DMHI with the view that it might be helpful and who had an active, committed approach to completing treatment had more positive experiences of treatment and reported greater benefits than those who were initially more sceptical and passively approached their engagement with DMHIs.[47]

In a systematic review of 208 articles, Borghouts et al. (2021) identified several user factors that affected engagement with DMHIs for depression, anxiety, wellbeing, stress, distress in adults.[46] These included:

- Demographics – women are more likely to engage;
- Personality – extraversion is associated with lower engagement;
- Mental health status – symptom severity increases interest in DMHIs, but symptoms are a barrier to actual engagement;

- Beliefs about help-seeking and technology facilitation – positive attitudes towards help-seeking and technology are associated with increased engagement; and
- Experience and skills with technology and the mental health system – greater digital and mental health literacy are associated with increased engagement.[46]

Similarly, Liverpool et al. (2020) systematically reviewed 83 studies (irrespective of study design) involving guided and unguided DMHIs, most commonly CBT-based, for youth depression, anxiety and suicidality.[48] They found that engagement in DMHIs is affected by user motivation (curiosity, perceived need, perceived usefulness of intervention); connectedness to others; trusted brand names; intervention credibility; anonymity; and capability to use DMHIs (affected by physical, environmental, and mental health stressors).[48]

One review by Arnold et al. (2021) synthesised findings from 60 studies focusing on the impact of psychosis on engaging with DMHIs.[50] The review identified four key domains, which affected engagement and broadly supported the findings by Borghouts et al. (2021)[46] and Liverpool et al. (2020)[48] including:

- The direct impact of psychotic symptoms and illness (symptoms, cognition, insight, functioning, duration of illness);
- Individuals' response to psychosis (recovery style and self-stigma);
- The extent of prior and current day-to-day exposure and integration of technology (computer literacy and internet access); and
- Intervention aspects (adjunct support and program design).

However, due to the limited number of studies, small sample sizes and presence of non-significant findings,[50] these findings should be considered tentative.

Case study – THIS WAY UP

Consistent with these findings, a practical guide for clinicians on integrating iCBT into clinical practice identified user characteristics and situations in which DMHIs should not be implemented on their own:

- *Suicidal clients at imminent risk of harm;*
- *Clients with active symptoms of bipolar disorder or psychotic disorders (the evidence base is lacking for these disorders);*
- *Chaotic life or difficult situations that require immediate attention (e.g., domestic violence situations);*
- *When specific features of client's clinical problem could be potentially exacerbated through the use of DMHIs (e.g., compulsive reading);*
- *When there is evidence of repeated disengagement from self-study or self-help;*
- *Cognitive impairment, specific learning difficulties, or language barriers that would prevent the client from being able to understand and/or retain the information in the program.*
- *Visual impairment that would prevent the client from reading the content of the programs (since most programs have written content).[45]*

THIS WAY UP reports implementing various strategies to facilitate clinician engagement, which is likely to impact client engagement and adherence. These strategies include providing telephone and email support to clinicians, integrating digital tools into routine care, problem solving implementation barriers, seeking access guidance from clinicians and developing new professional capabilities into digital mental health.[13]

Program- or intervention-related factors

Vis et al. (2018) highlighted that appropriateness (perceived fit, relevance, or compatibility) for addressing the client's mental disorder and work processes in service delivery and all other service organisation roles, are essential for successful implementation of DMHIs in routine care.[49]

Another review identified three DMHI-related factors that can influence implementation positively or negatively, including flexibility and autonomy, stigma and privacy, and functionality.[47]

The flexibility and convenience of DMHIs increased their accessibility and engaged some participants in treatment in a way that traditional approaches could not. However, for others, the lack of structure,

protected time and accountability present in more formal face-to-face therapy, meant that they forgot to complete sessions or disengaged from DMHIs. The anonymity of DMHIs engendered trust and offered a safe platform to access support; for others, the lack of a separate, private space to discuss difficult issues felt unsafe. This review also reported that content simplicity, reminders, and progress monitoring were very important aspects of functionality, the absence of which impacted treatment completion and satisfaction. Accessibility on a range of platforms, content relevance, ease of navigation, readability, and inclusion of interactive elements impacted user acceptability and engagement with DMHIs.

Similarly, Borghouts et al. (2020)[46] reported that user engagement is influenced by type of content (credible and an appropriate length); perceived fit to users' needs and values; perceived usefulness of intervention; social connectedness (being able to connect with others through the intervention); and impact of the intervention (improvement in symptoms).[46]

Liverpool et al. (2020) found that utilisation and implementation are affected by the DMHI's suitability (accessibility and convenience, user ability to integrate it into their daily lives, not using emails or desktop computers); usability (easy to use and understand, such as being self-paced, age appropriate, simple, user-friendly); and acceptability (liked features such as videos, less text, ability to personalise or create a profile, and connect with others or receive reminders to use the intervention).[48]

The degree to which DMHIs are delivered as intended is likely to affect adherence and outcomes. In a review of DMHIs for children and adolescents, four studies examining fidelity of DMHIs for depression reported mixed findings, particularly regarding healthcare provider adherence to the program.[28]

Additionally, user involvement in the development of the intervention (for schizophrenia spectrum disorders) is associated with greater adherence.[51] However, the current state assessment report in preparation for the National Digital Mental Health Framework suggested that the inclusion of peer workers and consultation with consumers is poorly integrated in DMHSs.[58] According to the National Safety and Quality Digital Mental Health Standards,[57] regular consultation with service users is recommended and peer workers are acknowledged as an important part of the workforce of DMHSs.

In their review of DMHIs in routine care, Etzemueller et al. (2020) found that longer treatment duration in depression studies was positively associated with a larger effect.[10] This effect was not found in anxiety studies.[10]

Therapist support or guidance

Several reviews have focused on the role of therapist support as an element of DMHIs.

Different models have been proposed to conceptualise and optimise human support in DMHIs. For example, the supportive accountability model posits that human support can increase adherence by providing accountability through a coach who is viewed as caring, trustworthy, and competent (Mohr et al., 2011 as cited in Ebert et al. 2019).[33] Client motivation to use DMHIs is vital in determining the extent of guidance – intrinsically motivated clients require less feedback and guidance whereas clients who are not intrinsically motivated need more human support to foster extrinsic motivation to remain engaged. By contrast, the efficiency model of support might be a valuable framework to guide researchers in developing optimally tailored, efficient support systems for DMHIs (Schueller et al., 2016 as cited in Ebert et al., 2019).[33]

Twenty-four of 25 studies reviewed by Patel et al. (2020) reported that participants valued some form of human, responsive, personal support even if this support was not provided face to face.[47] Two reviews reported that higher guidance or support was associated with more engagement with, or adherence to DMHIs.[46, 54]

However, a systematic review of 20 studies involving therapist guided DMHIs in adults with mainly depression or anxiety (N=1167) reported the effect size for the relationship between client-rated therapeutic alliance and outcome was small (r=0.20 [0.14,0.26]).[52] Frequency of contact and format of contact (written vs phone/videoconferencing) did not impact on the relationship between therapeutic alliance and outcome, although therapist guidance in these studies was typically by email and occurred once weekly.[52]

The type of training and support given to the staff providing guidance as part of DMHIs influences effectiveness findings.[10] Etzelmueller et al.'s (2020) review of DMHIs in routine care found that for depression only, studies solely involving guides not trained in CBT, showed a significantly lower effect size than all other studies, including specifically trained professionals. Depression studies that reported having provided supervision to their coaches, trained their professionals, and provided an intervention manual reported a significantly higher effect size compared with studies that did not report providing these supports. For anxiety studies, they found similar effects for the reporting of training and providing an intervention manual, but not for supervision. Clarification of the role of DMHSs in blended care models is particularly warranted in order to support best practice in integrating digital and face-to-face care.[58]

Technology and other external factors

Vis et al. (2018) report that in addition to user- and intervention-related enablers (described above), successful implementation of DMHSs in routine care for mood disorders relies on several external factors. These include: appropriate resources (human resources, equipment, funding, and other infrastructural aspects); leadership (directing and controlling working processes and organising activities that enable service implementation and delivery); and health care system enablers (e.g., policy, curricula and certification of mental health staff, technology and standardisation, community acceptance, resources, infrastructure).[49]

Other external factors that can affect implementation of DMHIs include technology (technical issues, usability); social influence to use the intervention (from family, friends, or health workers); and other implementation factors, especially availability of user training.[46] However, in their rapid review of 261 studies, Wozney et al. (2017) found that technical problems and/or organisational issues (e.g., lack of staffing) were only reported in 4% of the studies.[12] They also reported that most studies (94%) did not report cost considerations when detailing implementation.[12]

Shared barriers to implementation across six European countries were identified via a narrative review and 52 expert interviews. The barriers identified included limited awareness of DMHSs at policy, organisational and end-user levels; lack of a legal and regulatory framework; an absence of a coordinated implementation approach; and lack of comprehensive reimbursement schemes.[37] The Fifth National Mental Health and Suicide Prevention Plan[59] addressed this gap by committing to the development of a National Digital Mental Health framework (which is currently under development).[58]

Several reviews suggest that DMHSs and DMHIs are not utilising emerging technology to its fullest capacity.

Apart from sustaining motivation and improving engagement via therapist support, Mukhiya et al. (2020) reviewed 31 studies and found that personalisation – tailoring DMHIs according to clients' needs and preferences – generally has a positive effect on user adherence.[53] In these studies, personalisation occurred using a variety of human or computer-based elements, including therapists, artificial intelligence or machine learning. The authors argue that personalisation is critical because users have different cognitive skills, educational backgrounds, content format preferences, and comprehension capabilities. Personalisation was reported to have increased user adherence in 12 studies of interventions and three studies of assessments.[53] However, two studies found no significant difference between tailored and static intervention versions in the effectiveness of treatment or adherence.[53] Further research is needed to determine the impact of personalisation on adherence and effectiveness.

Related to personalisation, another review reported that computer tailoring to supplement the delivery of individualised feedback and interactive features (i.e., thought helper, electronic journaling, simulations, interactive activities, text messaging, etc.) can supplement psychoeducation, self-tracking and monitoring and skills building.[54] These features can reduce clinician burden without negatively affecting treatment outcomes.[54] The same review reported that greater use of communication tools and interactive features facilitate clinician involvement and treatment compliance.[54]

In a review of 220 studies of DMHIs, Burger et al. (2020) reported that the average DMHI system falls between a purely informational system and one that allows for data entry but without automatically processing or interpreting user data.[55] Only about one-fifth of systems have a substantial amount of

functions that are responsive to input from the user. Moreover, there was no clear increase in the technological capabilities of systems in the field, between 2000 and 2017, despite a marked growth in system quantity. The findings indicate that when developers create systems, there is a greater focus on implementing therapeutic treatment than adherence support. Despite often proving effective in RCTs, two-thirds of the systems are not evolved and retested.

Of 30 studies included in another review, most studies did not describe how their system design principles (Human-Computer Interaction and user-centredness) are applied in the context of a DMHI.[56] Attention to Human-Computer Interaction design is an essential component for ensuring the safe administration and navigation of DMHIs.

A narrative review of DMHIs notes they are also well suited for applications of artificial intelligence and machine learning, which provide ample opportunities to improve the identification and treatment of mental disorders.[33] DMHIs easily allow for the collection of unprecedented amounts of fine-grained client and process data, which can be used to optimise intervention approaches. For example, Just-In-Time Adaptive Interventions can be developed to deliver personalised support when a person needs it most (primarily to bridge the time between longer intervention sessions). Virtual agents could be used to provide human-like guidance and support efficiently (as human support is usually highly standardised and adherence-focused communication). Potentially, such communication patterns could also be emulated by Artificial Intelligence (e.g., Woebot) to provide clients with a feeling of accountability and assistance and thus promote adherence. Only tentative steps have been made to study this potential so far. Data can also inform prediction of high-risk situations for symptom deterioration and relapse (e.g., with the use of wearables/portable sensors and smartphones). Another application of machine learning is predicting who is likely to be a non-responder or the most promising intervention for individual clients based on their presenting symptomatology.

Mukhiya et al. (2020) also found that information architecture and system adaptiveness plays a role in nonadherence in DMHIs.[53] Of the DMHIs that report information architecture, most use tunnel-based design, where users navigate sequentially to search for information. This design is easiest to implement and is less likely to overwhelm users with information and options. Comparatively, hierarchical or hybrid systems offer richer opportunities for promoting personalisation. Rule-based adaptive strategies are most common (a mechanism to present the right content to the right people based on their needs and preferences), but machine learning strategies are becoming prevalent. However, only a few attempts have been made to provide DMHIs using conversational agents, virtual reality, or augmented reality apps.

Maintenance of DMHSs

This section provides a narrative synthesis of how DMHSs can be embedded and sustained in the broader mental health system. It discusses factors that may both hinder and enable the long-term maintenance of DMHSs. The content is based on data extraction from three systematic reviews,[37, 46, 49] four articles from the peer review literature,[38, 42, 62] including one supplied by MindSpot[44] and six grey literature documents[58, 59 63 2, 57] including a rapid review by Wozney et al.[12] Consistent with previous research, maintenance was the least reported dimension of the RE AIM framework.[12]

One of the main factors that can hinder the maintenance of DMHSs is their lack of integration into the broader mental health system. DMHSs and face-to-face mental health services nationally and internationally appear to operate in parallel.[58, 59, 63] Consumers use or are referred to DMHSs in an ad-hoc manner. The DMHSs used by consumers tend not to be included in clinical or mental health care plans, and DMHSs rarely communicate or provide feedback to face-to-face services about user outcomes. Several policy documents have recommended pathways for better integration of DMHSs into the broader mental health system. The Fifth National Mental Health and Suicide Prevention Plan advocates for DMHSs to be embedded in routine coordinated consumer care and be a legitimate component of stepped-care models.[59] To improve system integration, the Productivity Commission Report endorsed the development of a national digital mental health platform that offers assessment and referral pathways to digital, low-intensity evidence-based services that could be incorporated in GP management of mental health problems.[2] Other models of integrating DMHSs are being used, including using DMHSs for waitlist management, to complement face-to-face interventions and as blended care models.

Funding is another commonly reported hindrance to the sustainability of DMHSs by both developers and providers of DMHSs.[37, 49, 58] In Australia, multiple Commonwealth level agencies fund and regulate DMHSs, with funding primarily focused on service delivery. Limited funds are available for research and evaluation, development of DMHSs, updating and maintaining programs, system integration, up-skilling of and training for the workforce and consumers.[58] Limited funding of DMHSs may risk the usability, uptake and quality of services, which may compromise the overall sustainability of DMHSs. Funding contracts of short duration can also limit future planning and development of services. A recent Australian review of DMHSs recommended more significant and better-coordinated investment for DMHSs, better alignment with mental health jurisdictional priorities and the avoidance of duplication of services.[58]

The quality of DMHSs may impact consumer and clinician levels of trust in services and, in turn, affect the long-term maintenance of DMHS.[63] Consumers and clinicians have raised concerns about privacy, data protection, storage and effectiveness of interventions. Implementation of standards and guidelines such as the National Safety and Quality Digital Mental Health standards provide a national and consistent quality assurance framework and may help improve the safety, reliability and quality of DMHSs.[57] Ongoing rigorous evaluation of DMHSs can help customise DMHSs, identify service gaps and priority areas, and improve the effectiveness, function and overall quality of interventions.[49]

Several technology barriers can impact the sustainability of DMHSs.[46] These barriers can include outdated DMHSs, internet and connection problems, and a lack of access to technology and knowledge about how to use DMHSs.[38, 46, 62] Improving access to technology (e.g., accessing DMHSs at GP clinics) and improving digital health literacy can potentially contribute to the sustainability of DMHSs.[12]

A lack of an appropriately trained workforce may also limit the sustainability of DMHSs.[58 49] Mental health work environments may encourage the ongoing practice of traditional face-to-face care and promote inaccurate views that DMHSs are less effective than face-to-face care. Implementing training programs that upskill and educate the workforce may help develop workforce competence and confidence.[37, 59] In particular, training and education should focus on how to use DMHSs and blending DMHSs with traditional care models; and provide accurate effectiveness data, decision tools, risk management protocols and referral pathways.[37, 59] Additional training pathways for the non-professional workforce (e.g., peer-support workers, care navigators and those with a lived experience) may help build

their skills and competence and may help enable DMHSs to be used across the mental health workforce.[58]

The convenience of use and reductions in wait times for service, travel time and costs are all factors that will encourage and promote the ongoing use of DMHSs, however, for services to be maintained, they need to remain relevant and person-centred.[58] To ensure that DMHSs are engaging, address the consumer's mental health needs and promote broad access and adoption, several policy documents recommend that consumers be involved in all aspects of DMHSs from designing, producing, developing, implementing, delivering and evaluating services.[42, 58]

As described in the reach section, DMHSs have been primarily used to treat depression and anxiety. Integrating DMHSs in other areas such as workplaces, universities and schools may increase the maintenance of the DMHSs across the community.[37]

Case study – MindSpot

In a discussion of lessons learnt from delivering Mindspot, maintenance of DMHS was seen as involving change management, adaptability, online marketing and an organisational culture which supports innovation and change.[44] Within the summary of lessons learnt it was highlighted that a key difference between usual care and DMHSs is that providers needed to be able to interpret measures of patient outcomes and experiences collated during an online intervention as well as how to manage a large volume of DMHS users.

Opportunities for DMHSs in Australia

This environmental scan highlighted a range of opportunities to improve the reach, effectiveness, adoption, implementation and maintenance of DMHSs in Australia.

Reach

- DMHSs are not reaching certain parts of the Australian population, including men, people not born in Australia and those over 55 years. Future development needs to focus on the broader inclusion of disadvantaged sub-populations and diverse cultural populations. This opportunity extends to mental health services more broadly.
- To ensure that DMHSs are reaching those who need them, a significant effort needs to be made by Government to ensure that users have access to the right equipment and tools and access to education to improve technical skills and digital literacy.

Effectiveness

- Although robust evidence exists for the efficacy and effectiveness of using DMHIs to treat depression and anxiety, further research is needed to explore the efficacy of these interventions with traditionally underserviced populations (e.g., CALD , Aboriginal and Torres Strait Islanders, LGBTQIA+ and older adults).
- There is an underdeveloped evidence base regarding the effectiveness and efficacy of using DMHIs for treating severe mental disorders. Continued research should examine whether DMHIs and DMHSs are efficacious in treating mental disorders such as psychosis, personality disorders, substance dependence or co-morbid conditions.
- Additional research is needed to determine how to best embed DMHIs in usual care and determine the feasibility and acceptability of models of care that integrate DMHIs with traditional face-to-face services (e.g., the use of DMHIs as a relatively less intensive service in stepped-care interventions or blended models of care).
- Across studies, this scan identified that impacts beyond clinical outcomes (e.g., user experience, satisfaction and other outcomes like psychosocial functioning and health system use) are not routinely assessed. Furthermore, there is variability in definitions and measurement of concepts such as acceptability and satisfaction, making it difficult to compare and draw firm conclusions about the effectiveness of DMHSs. Efforts need to be made to determine consistent definitions and outcome measures to be used across Australian DMHSs. Consistent use of terms and measures will help better understand the impacts of DMHIs and help identify risks and service gaps.
- Although the efficacy and effectiveness findings of this environmental scan are very promising, further work needs to be done by researchers and policymakers to promote and disseminate these findings across the mental health sector, consumers and clinicians. Broad dissemination of these results will help build trust and confidence in using DMHIs.

Cost-effectiveness

- There is increasing evidence to support the cost-effectiveness of DMHSs, including both self-help and therapist-guided modalities. However, future development needs to explore whether costs of services impede access or whether costs are associated with greater commitment and completion rates of programs.
- Integrating DMHSs within existing health services and the forthcoming national digital mental health platform has the potential to lead to cost efficiencies.
- There is an underdeveloped evidence-base about what cost could be saved by early intervention through DMHIs.
- There is variability in definitions and measurement of costs making it difficult to compare and draw firm conclusions about the cost effectiveness of DMHSs. Efforts need to be made to determine consistent definitions and cost metrics to be used across Australian DMHSs. Consistent use of terms and measures will help better understand the cost impacts of DMHIs.

Adoption

- There is an underdeveloped evidence base on the perceived acceptability of DMHSs among the Australian public. Improving our understanding of how these services are perceived would enable targeted education materials to increase adoption.
- Brief, highly scalable educational videos about DMHSs may be a useful strategy to increase adoption by consumers. These could be developed and distributed through official health promotion channels to promote the value of DMHSs and reduce barriers related to perceived lack of effectiveness.
- Increase training opportunities in digital mental health in pre-service health professional training and professional development courses to increase adoption by health practitioners. Training should provide education about DMHI effectiveness and how and where to access them, as well as teach practical skills in delivering DMHIs.
- As reviews indicated that disruptions to workflows were a barrier to adoption by health professionals, the development of implementation resources and guidelines would help integrate DMHSs into routine care. These could include support to manage data security, manage client risk remotely, and develop reimbursement schedules if appropriate.

Implementation

- Some consumers are more likely to engage with, adhere to and benefit from DMHSs than others who are more suited to traditional face-to-face services. Comprehensive assessment and screening of consumers may help identify consumers suited to and most likely to benefit from DMHSs.
- Ensuring consumers interested in receiving DMHSs have the technological capability (e.g., offering training) to use them may facilitate successful implementation.
- It is important for consumers to be consulted in development, implementation, and review of DMHSs and for peer workers to also be involved in service delivery.
- Augmenting self-help treatments to include guided components has been identified as an important implementation strategy. However, technological advances allow for personalisation or tailoring of DMHS delivery and should be considered as means of addressing differences in consumer needs, promoting adherence and positive outcomes; and potentially increasing efficiency.
- Therapists providing guidance in DMHSs need appropriate support and training to maximise treatment fidelity, which can affect adherence and effectiveness. Training can include workshops, provision of treatment manuals, referral pathways and clarification and examples on how to integrate of DMHSs with traditional models of care.
- It is important for DMHSs to expand and adapt in the face of technological innovation, which includes regular reviewing of their services, attention to Human-Computer Interaction design and staying up-to-date with technology (e.g., artificial intelligence, machine learning).
- Legal and regulatory framework (e.g., the National Digital Mental Health Framework and the National Digital Mental Health Standards) may be used to coordinate the implementation and ensure the quality of DMHSs.

Maintenance

- Although integration is central to the sustainability of DMHSs, there is an underdeveloped evidence base on how to integrate DMHSs with face-to-face mental health services. Further exploration is required to determine which models of care are feasible, acceptable and sustainable while avoiding service duplication.
- Health care system enablers (e.g., policy, curricula and certification of mental health staff, technology and standardisation, community acceptance, resources, infrastructure) can be leveraged to promote the sustainability of DMHSs.

- Funding models may also need to be reviewed including considering jurisdictional mental health priorities, operational costs, development costs, and education and training costs.
- Implementation of routine outcome and evaluation measures and the development of a DMHSs research strategy would help with ongoing monitoring of the quality of DMHSs, the identification of service gaps and future development opportunities, enabling DMHSs to meet the ongoing needs of consumers.
- Opportunities for co-developing DMHSs with consumers may lead to implementing DMHSs that are engaging, relevant and address consumer needs and enhance the overall sustainability of DMHSs.

Conclusion

DMHSs are an important part of the mental health service landscape but they are not for everyone (e.g., some people prefer, or for different reasons need, face-to-face service). DMHSs have been consistently reaching a substantial number of Australian consumers since at least 2014 and the number of consumers accessing them has been steadily increasing since the introduction of the Head to Health Mental Health Digital Gateway in 2017. Demand for supported DMHSs, in particular, has increased during the COVID-19 pandemic. DMHIs and DMHSs, particularly those involving cognitive behavioural therapy (CBT) and support or guidance, lead to positive mental health outcomes and have the potential to be good value for money, particularly for adults with depression and anxiety disorders. Other outcomes (e.g., user satisfaction, quality of life, functional outcomes) are infrequently reported. There are ample opportunities to: improve reach and adoption; determine effectiveness in various sub-populations; apply different treatment characteristics including making optimal use of technology to efficiently produce desired outcomes; facilitate implementation; and maximise the maintenance of DMHSs in the mental health service system. These opportunities involve all stakeholder groups from consumers, health professionals (or other staff involved in delivering, or referring to, DMHSs), DMHSs themselves, and researchers to the broader mental health system including Government.

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Appendix 1: Our approach

We searched for peer-reviewed and grey literature on DMH services. We then extracted data from included documents relating to RE-AIM constructs using a standard template.

We also conducted a scan of online DMH services in Australia.

Literature search

Our data sources included: systematic reviews, literature sourced via Google search and documents supplied by each of three key digital mental health service providers.

Systematic reviews

We used systematic reviews with a focus on issues related to implementing DMH services (other than effectiveness and cost-effectiveness) e.g., user experience, engagement, adherence, barriers, enablers etc. We identified these systematic reviews while conducting our umbrella review (review of systematic reviews) on the effectiveness (and cost-effectiveness) of supported DMH interventions for mental disorders. Details for the methodology for conducting the umbrella review are described elsewhere.[3] The systematic reviews that informed this environmental scan did not inform the umbrella review.

We also selectively sourced additional systematic reviews from the citation lists of the initial list of systematic reviews. We focused on reviews published from 2017 onwards because using a Google search (described below), we found a rapid review report on DMH interventions that had appraised peer-reviewed primary studies using the RE-AIM framework.[4]

Google search

We performed a grey literature search using Google to obtain documents on DMH services. Unlike academic database searches, Google search does not accept truncation, has a limit of 32 words per search string, and nesting of keywords of similar phrases. Similar keywords from our umbrella review literature search were used with some terms excluded to meet the requirement of 32 keyword limit. Table A1 presents further details of the keywords used.

Table A1: Grey Literature Search Strategy

Concept 1	Mental health	"mental health" OR "mental disorders" OR "mental health intervention" OR depression OR anxiety
Concept 2	Digital	digital OR online OR Internet OR electronic OR technology OR computer
Concept 3	Cost effectiveness	"cost effectiveness" OR "value for money" OR "economic evaluation" OR "cost utility" OR "cost consequence" OR "cost benefit" OR "budget" OR cost OR "ROI" OR "return on investment"

We used the Google Advanced search option to search for Concepts 1 and 2 in three separate searches as follows:

- International literature (unrestricted search);
- Domestic literature (search restricted to pages published in Australia); and
- Australian government publications (search restricted to pages published by the domain gov.au).

We repeated the three separate searches using all three concepts to identify grey literature that focussed on cost-effectiveness.

The screening process for each search was limited to the first 10 pages of Google search results. To be included, documents needed to be:

(i) About mental health conditions and digital-based interventions with/without any form of economic evaluation (e.g., cost-minimisation, cost-effectiveness, cost-utility, cost-consequence or cost-benefit analyses) or narrower return on investment (e.g., only costs and cost offsets described); and

(ii) Able to be downloaded in .pdf or .docx formats.

Documents from key Australian DMHS providers

We also requested three documents each from three key Australian DMH service providers that are of interest for the overall independent evaluation of Australian government funded supported DMH services. These providers included Mental Health Online (Swinburne University), THIS WAY UP (St Vincent's Hospital and the University of New South Wales) and MindSpot (Macquarie University). Eight of the nine documents supplied were peer-reviewed publications and one was an internal report. We used these documents as case studies to illustrate key issues in DMH service delivery using the RE-AIM model.

Scan of online DMHSs in Australia

We also compiled a list of current online DMHSs in Australia for which we used an ecosystem scan of DMH conducted by MindSpot, a resource list compiled by eMental Health Practice,[64] and a list of Commonwealth funded DMH programs given to us by the Department of Health. We obtained further details on the programs included in our scan from each program's website.

Appendix 2: Summary of literature informing environmental scan

Peer-reviewed systematic, rapid and narrative literature reviews

Publication	Aim	Details and extent of support or guidance (if available)	RE-AIM dimensions extracted
Apolinario-Hagen et al., 2017	To determine international public acceptability of DMHSs across different health care systems. Based on previous work, both (1) perceived helpfulness and (2) intentions to use in case of future mental health problems (likelihood of future use) used as potential indicators for public acceptability of DMHSs.	Four articles from Europe and Australia were included in this scoping review. Sample sizes ranged from 217 to 2411 participants of ages 14-95 years. All included studies used cross-sectional designs and self-developed measures for outcomes related to both indicators of public acceptability. Three surveys used observational study designs and one study was conducted as an experiment investigating the impact of brief educational information on attitudes. Both guided and unguided interventions included (not clear how many).	Adoption
Arnold et al., 2021	To synthesise existing data from relevant literature to develop a working model of potential variables that may impact on engagement with online interventions for psychosis.	60 studies included which could be studies directly reporting on patterns of engagement with Internet or mobile-based interventions for psychosis; or studies on predictors of engagement in non-digital, psychosocial interventions for psychosis.	Implementation
Borghouts et al., 2021	To identify common barriers and facilitators that influence user engagement in DMHIs.	208 qualitative and quantitative studies focusing on engagement with DMHIs for depression, anxiety, wellbeing, stress, and distress in adult samples (over 16 years). Combination of studies of needs and attitudes related to DMHI and evaluation studies that assessed user experience. Variety of populations and intervention types (most common iCBT). Inductive thematic analysis used to identify common themes. Both guided and unguided interventions included (not clear how many).	Implementation Maintenance
Burger et al., 2020	To review types of information communication technology (ICT) systems in DMHIs for depression, how technologically advanced these systems are, and changes between 2000 and 2017.	270 studies included focusing on DMHIs for the prevention or treatment of depression in adults. 47.5% were unguided systems, 24.3% had therapist support, 12.4% professional support, 9.3% adjunct, 5.4% admin, 1.2% lay person.	Implementation
Davies et al., 2020	To summarise what is known about health care professionals' perceptions of barriers to and facilitators of implementation of web-based psychological treatments in routine care of adults in health care settings.	29 studies (14 qualitative, 11 quantitative, 4 mixed methods).	Adoption
Ebert et al., 2019	To introduce core features of DMHIs, describe areas of application, present evidence on the efficacy of DMHIs as well as potential effect mechanisms, and delineate how Artificial Intelligence combined with DMHIs may improve current practices in the prevention and treatment of mental disorders in adults.	Narrative review so selection process is not described. Paper focuses on both guided and unguided DMHIs and discusses the differences between them.	Adoption Implementation
Etzelmueller et al., 2020	To examine effects of guided iCBT for treatment of depression and anxiety in routine care on symptom change, acceptability (uptake, participants' characteristics, adherence, satisfaction), and predictors of negative effects (deterioration and side effects).	17 studies including 30 samples. 8 on depression, 17 on anxiety, 5 on both. 14 studies had guidance focused mainly on motivational and 5 studies on administrative aspects. All included studies provided feedback on the content of participants who completed the sessions. The average professional guidance time per participant was 133.49 min over the treatment duration.	Reach Effectiveness Implementation
Gaebel et al., 2021	To report on the status of DMHI implementation in North West Europe and provide policy recommendations to support implementation.	Narrative review on DMHIs in 6 European countries (scientific and grey literature), plus 52 expert interviews.	Adoption Implementation Maintenance

Publication	Aim	Details and extent of support or guidance (if available)	RE-AIM dimensions extracted
Ganapathy et al., 2021	To examine concerns of mental health professionals that have resulted in slow adoption of DMHSs.	Narrative review of 40 papers to identify barriers to adoption of DMHSs at the organisational and policy level. The article presents strategies to overcome barriers with reference to the type of stakeholder (e.g., researchers), and type of barrier (e.g., information needs).	Adoption
Kaiser et al., 2021	To summarise the association between therapeutic alliance and outcome in therapist-assisted online interventions.	20 studies involving therapist-assisted DMHIs in adults with mainly depression or anxiety (N=1167). Support most commonly delivered by email and occurred once a week.	Implementation
Killikelly et al., 2017	To present a systematic review of rates of adherence, dropout, and approaches to analysing adherence to newly developed mobile and web-based interventions for people with psychosis. Specific predictors of adherence were also explored.	20 studies of DMHIs included for 656 adults with a diagnosis of schizophrenia spectrum disorder. Interventions could include mobile interfaces and some were focused on medication adherence. 6 were RCTs, 7 were feasibility studies, 7 were observational studies.	Implementation
Liverpool et al., 2020	To identify modes of delivery, explore factors influencing usage and implementation, and investigate ways in which the interventions have been evaluated and whether children and young people engage in DMHIs.	83 articles included overall (24 on engagement factors), which included participants with a mean age less than 25. All study designs included. Range of interventions but most commonly based on CBT and most commonly for anxiety, depression or suicidality. Thematic analysis used to identify common engagement factors. Both guided and unguided interventions included (numbers unclear).	Implementation
McCashin et al., 2019	To identify and synthesise the qualitative literature concerning the experiences of young people who have used tech-assisted CBT.	14 studies in children aged 6-18 mainly targeting low mood or anxiety, but also trauma, self-harm or physical difficulties. These studies investigated 9 different interventions across 289 young people. Level of support/guidance unclear.	Efficacy
Mukhiya et al., 2020	To understand the role of information architecture and system adaptiveness in nonadherence in DMHIs.	31 studies included focusing on depression (11), anxiety disorder (7), general mental health issues (8), and other. Level of support/guidance not reported.	Implementation
Patel et al., 2020	To synthesise the qualitative literature available on service users' views and experiences regarding the acceptability and usability of DMHIs for depression, anxiety, and somatoform disorders.	24 studies included, 15 of which were part of an RCT. All focused on depression or anxiety. 13 provided support via email, phone or SMS. 6 studies provided some form of face-to-face support. 5 studies were purely self-guided.	Implementation
Simon et al., 2019	To review the available evidence to understand the acceptability of iCBT for PTSD.	10 studies with 720 adults (aged 16+) included, all RCTs. 2 studies had no guidance and the other 8 had some form of guidance (1 had face to face, and the remainder reported limited email/phone check-in contact).	Efficacy
Søgaard Neilsen et al., 2019	To investigate how adequately Human-Computer Interaction (HCI) and user-centred design is incorporated in the development of DMHIs for depression and anxiety, and which HCIs have been recognised as beneficial.	30 articles both quantitative and qualitative of DMHIs for people with anxiety and depression conditions.	Implementation
Strudwick et al., 2021	To identify DMHIs that could be used to support the mental health of the Canadian general population during the COVID-19 pandemic.	Cochrane Rapid Review of 31 mobile applications and 114 web-based resources.	Reach
Treanor et al., 2021	To critically appraise published reviews about the acceptability of iCBT for adults (factors that facilitate or impede uptake, adherence, and completion or that contribute to attrition and satisfaction).	Umbrella review included 9 reviews covering 151 unique studies. Most studies were comprised of service users with depression or anxiety disorder. Both guided and unguided interventions included but unclear for all studies (53 guided, 50 unguided, 25 had technical support provided).	Efficacy
Vis et al., 2018	To review the scientific literature identifying those determinants of practices relevant to implementing DMHIs for mood disorders in routine practice.	48 included studies focusing on adults. However, 26 were via videoconferencing technologies and only 20 were internet-based interventions. 3 were purely self-help interventions. Thematic analysis used to identify the most important determinants that facilitate or hinder implementation of DMHIs in routine practice.	Implementation Maintenance
Wozney et al., 2018	To examine and describe how the implementation of DMHIs for anxiety disorders and depression in children and adolescents has been studied.	46 studies included. 23 for anxiety, 18 for depression, 5 for both.	Efficacy Implementation

Publication	Aim	Details and extent of support or guidance (if available)	RE-AIM dimensions extracted
Zhao et al., 2017	To examine the ICT features of psychoeducational interventions for depression delivered via the internet or via mobile technology. Explored levels of automation, levels of clinician involvement, patterns between the use of ICTs and adherence (or compliance), and how ICTs support therapeutic goals.	55 efficacy studies included of interventions for people with depression (adults or adolescents) where at least 50% of interactions were technology-mediated. 25 of the studies reviewed still reported high or medium levels of human (or therapist) support.	Implementation

DMHI, Digital Mental Health Intervention; **DMHS**, Digital Mental Health Service; **HCI**, Human-Computer Interaction; **iCBT**, internet-delivered Cognitive Behaviour Therapy; **ICT**, information communication technology; **PTSD**, Posttraumatic Stress Disorder.

Other peer-reviewed publications

Publication	Aim	Details and extent of support or guidance (if available)	RE-AIM dimensions extracted
Aboujaoude et al., 2020	Editorial to introduce the challenges and opportunities of DMHIs.	Broad definition of DMHIs including VR, AI, supported DMHIs and electronic health records.	Maintenance
Batterham et al., 2019	To understand stakeholder perspectives on evidence for DMHIs.	Key stakeholder group of researcher, clinician, consumer and policymaker representatives discussed different types of evidence. Empirical evidence from randomised controlled trials was identified as ideal evidence. "However, information on the safety of users, data security, user ratings, and fidelity to clinical guidelines, along with data from routine care including adherence, engagement and clinical outcomes, were also identified as important considerations when evaluating an intervention" (see Abstract).	Adoption Maintenance
Bennett-Levy et al., 2021	"The aim of this paper is to present a case study of the first 6 years (2013–2019) of an Australian Federal Government-funded digital mental health project" (p. 1).	The paper is not specifically about an intervention, but rather how through community partnerships a government funded project was culturally adapted for and by an Indigenous community in NSW. They mention that they had input into the design and development of R U Appy and Ur Mobile for Wellbeing training programs, as well as the WellMob website, and a culturally-appropriate online MH intervention created by MindSpot.	Maintenance
Klein et al., 2011	To examine posttreatment effectiveness of Anxiety Online (AKA Mental Health Online).	Anxiety Online provides 5 online self-help programs for anxiety disorders including GAD, OCD, PTSD, panic disorder (with or without agoraphobia), and social anxiety disorder. The article outlines the demographic profile of users, as well as treatment outcomes, user satisfaction and cost-effectiveness.	Efficacy
Kyrios et al., 2018	To compare OCD symptom severity following either 12-module iCBT (Mental Health Online intervention) or internet-based progressive relaxation training (control).	Both arms of the study are therapist-assisted, with therapists sending 1 email per week regardless of how many times the participants sent emails.	Efficacy
Mahoney et al., 2021	To examine the uptake and effectiveness of iCBT (THIS WAY UP) for anxiety and depression for the first 8 months of the COVID-19 pandemic compared to 12 months prior.	THIS WAY UP includes both self-guided and guided services. During the first 8 months of the COVID-19 pandemic, the service was promoted nationally and provided at no cost to service users.	Reach Efficacy

Publication	Aim	Details and extent of support or guidance (if available)	RE-AIM dimensions extracted
Newby et al., 2021	To provide clinicians with practical guidelines on integrating CBT-based DMHS THIS WAY UP into their practice and adopting a blended care model.	The article discusses various iCBT programs, including differences between iCBT and telehealth CBT, common barriers to adoption and methods of overcoming barriers and presents the lived experiences of 'real-world' clinicians using iCBT in their private practices and specialist clinics. The article also discusses the role of funding, flexible models of care and risk management.	Adoption Implementation
Nielssen et al., 2021	To describe the rate of suicide following contact with MindSpot within a 4 year period of service (2013-2016).	Users may self-refer to the MindSpot program and complete an initial online assessment to determine if they meet clinical thresholds. They complete a self-guided online program with optional clinician support. The article uses data from online assessments and clinician notes to develop a model to predict suicide risk and assess the relationship between referral to crisis services and subsequent suicide.	Effectiveness
Osborne et al., 2020	To provide a cost-benefit analysis of iCBT compared to internet-based progressive relaxation training.	The article assesses and compares the cost effectiveness of three options for treatment of OCD – iCBT, face-to-face CBT, and internet-based progressive relaxation training. iCBT is determined to be a cost-effective option, compared to the face-to-face version.	Cost effectiveness
Titov et al., 2019	To describe 10 lessons MindSpot and Online Therapy Unit (OTU) Canada learnt in the implementation and delivery of their DMHS.	MindSpot includes weekly contact via email/phone from therapists while the user completes a 5 module program over 8 weeks. Therapists are registered/provisionally registered mental health professionals with caseloads of around 50. The OTU in Canada is similar to MindSpot in terms of the online content and type and frequency of contact from therapists.	Adoption Maintenance
Titov et al., 2020	To summarise demographics, service preferences, baseline symptoms and treatment outcomes for patients over first 7 years of MindSpot's operation.	See above for description of the MindSpot service.	Reach Adoption Effectiveness

DMHI, Digital Mental Health Intervention; **DMHS**, Digital Mental Health Service; **GAD**, Generalised Anxiety Disorder; **iCBT**, internet-delivered Cognitive Behaviour Therapy; **OCD**, Obsessive-Compulsive Disorder; **OTU**, Online Therapy Unit; **PTSD**, Posttraumatic Stress Disorder.

Grey literature

Publication	Aim	Brief description	RE-AIM dimensions extracted
Australian Commission on Safety and Quality in Health Care, 2020	The National Safety and Quality Digital Mental Health Standards.	The first set of standards to encourage safety and quality of DMHSs in Australia. Standards are optional for DMHS to adopt and cover three areas: Clinical and Technical Governance, Partnering with Consumers, and Model of Care.	Implementation Maintenance
Australian Government, 2017	The Fifth National Mental Health and Suicide Prevention Plan.	"Over the next five years, the Fifth Plan will establish a national approach for collaborative government action to improve the provision of better integrated mental health and related services in Australia." (p. v)	Implementation Maintenance
Australian Government, 2020	National Mental Health and Wellbeing Pandemic Response Plan.	Response plan outlining action points to manage population mental health in the context of the COVID-19 pandemic.	Implementation
Bassilios et al., 2021	A literature review of effectiveness of supported DMHIs.	An umbrella review of 12 meta-analyses outlining the effectiveness; and 8 systematic reviews (updated with 6 primary studies) on and cost-effectiveness of supported DMHIs for specific mental health disorders.	Efficacy Cost effectiveness

Publication	Aim	Brief description	RE-AIM dimensions extracted
Dalton et al., 2017	"A rapid overview of the literature on the implementation of low intensity mental health interventions, assesses the quality of the evidence, effectiveness of interventions and moderating factors influencing successful implementation." (p. 7).	Low intensity mental health services but may include programs with and without support and delivered offline or online.	Reach Cost effectiveness
eMHPrac, 2021	Report to Government.	Unpublished report to government on uptake of DMHSs.	Reach
Mental Health Australia, 2018	A report presenting the economic case for continued mental health reform.	General discussion of e-health intervention - no distinction made between self-help and supported services.	Reach Cost effectiveness
Mental Health Reference Group, 2019	A review of the 5,700 items on the MBS to align clinical evidence and improve health outcomes.	The awareness of digital mental health and other low-intensity treatment options integrated with therapist support needs further promotion.	Reach Cost effectiveness
National Mental Health Commission, 2020a	Modelled economic evaluation of MoodGYM, an e-health intervention to reduce symptoms of anxiety disorder.	Five online modules based on cognitive behavioural therapy principles delivered in schools, with classroom teachers as supervisors.	Reach
National Mental Health Commission, 2020b	"This project looks at the potential benefits of ten specific interventions, both in terms of improved mental health, and their impact on the Australian economy, through levels of improved productivity and health system cost savings." (p. 2)	Only 2 of 10 interventions were e-health interventions. Only one of these is guided (eSMI) while the other is not guided (MoodGYM).	Reach
PricewaterhouseCoopers, 2020	Unpublished report to Department of Health.	The current state assessment report in preparation for the National Digital Mental Health Framework	Implementation Maintenance
ReachOut Australia, 2019	"A program of research and series of reports that explore the social and financial costs of mental ill-health; consider cost-effective solutions for system reform through online service delivery; and that help better understand young people's mental health and service needs." (p. 2)	ReachOut is predominantly a self-help and peer support tool.	Reach
The Productivity Commission, 2020	An Australian government inquiry into the economic impacts of mental health.	The report is a holistic view of the mental health services available in Australia and includes supported online treatment services.	Reach Maintenance
THIS WAY UP	Consumer engagement and user experience report for THIS WAY UP.	Methods of engagement/feedback opportunities/data sources for report: embedded course feedback and evaluation; consumer and clinician surveys; focus groups and semi structured interviews; 'personalised collaboration' (informal/daily feedback); communications and social media	Reach Adoption Effectiveness
Triple P International, 2020	A submission proposal of digital-based family mental health and parenting support.	Triple P Online is an entirely self-guided program.	Reach
World Economic Forum & Deloitte, 2021	A toolkit for global governance of digital mental health.	Providing ethical and regulatory standards for the implementation and delivery of DMHSs globally.	Maintenance
Wozney et al., 2017	To map recent research on DMHIs and describe factors that catalyse or deter implementation.	Conducted a rapid review of 261 relevant articles using RE-AIM framework. DMHIs involved use of email (86%), web-based platform (portals, videoconferencing, online learning system) (67%), social media (8%), instant messaging (7%), and mobile applications (6%). DMHIs used in 22% studies involved the combination of two or more of these technologies.	Reach Efficacy Cost effectiveness Implementation Maintenance

DMHI, Digital Mental Health Intervention; **DMHS**, Digital Mental Health Service; **MBS,** Medicare Benefits Schedule; **RE-AIM framework**, Reach, Effectiveness/Efficacy, Adoption, Implementation and Maintenance framework.

Appendix 3: Characteristics of Australian online DMHSs

Characteristics of 8 guided online DMHSs

Program	Brief description	Launched (approx)	Demographic	Conditions	Government funding	Cost to Consumer	Psychology
Chilled Out Online	Interactive online program teaching teenagers strategies to manage anxiety. Based on the Chilled (Cool Kids for teens) face-to-face program which has been running at Macquarie University since 1993. The Chilled program is a structured, skills-based program. 8 online modules completed over 10 weeks. Parents provided with downloadable Mentor Workbook. 4 x 30 mins phone sessions with psychologist and optional additional phone sessions.	2012	Youth (13-17 years)	Anxiety	No	Yes	CBT
Cool Kids Online	Interactive online program for parents and children to work together to learn strategies to help manage anxiety. Based on the Cool Kids face-to-face program which has been running at Macquarie University since 1993. 8 online modules for parents and children to complete together over 10 weeks. 4 x 30 mins phone sessions with psychologist and optional additional phone sessions.	2015	Children (7-12 years)	Anxiety	No	Yes	CBT
Mental Health Online	Offers services to help people experiencing mental health difficulties, including anxiety, panic attacks and depression. Includes comprehensive online psychological assessment program (e-PASS) to assess the type and severity of difficulties, and to suggest treatments, including Mental Health Online programs and therapist support. 7 x 12-week programs offered with optional access to therapist via email (or video or instant messaging).	2009	Adults (18+ years)	Depression, GAD, OCD, Panic, PTSD, Social Anxiety	Yes	No	CBT
MindSpot	Assessment and treatment for adults experiencing stress, anxiety, depression, OCD, PTSD, and chronic pain. Each course has up to 5 online modules delivered over 8 weeks and choice of weekly or as needed contact with therapist via phone or email.	2012	Adults 18+ years (18-25, 26-65, 60+)	Anxiety, Chronic Pain, Depression, Emotional wellbeing, General distress, OCD, PTSD, Panic, Resilience, Stress	Yes	No	CBT
Moderated Online Social Therapy (MOST)	Online platforms for 12-25 year olds that include a peer work-moderated community news feed, online therapy "journey" content and access to clinician, peer and vocational support via asynchronous chat messaging, phone calls and SMS. Referrals made through eligible Headspace	2020	Adolescents and young adults (12-14 years, 15-25 years)	Anxiety, Depression, General distress, Insomnia,	Yes	No	CBT, MBCT, ACT, rumination-focussed, meta-cognitive, mindfulness, self-

Program	Brief description	Launched (approx)	Demographic	Conditions	Government funding	Cost to Consumer	Psychology
	and CAMHS services before, during and after face-to-face care. Users complete an initial online questionnaire to determine which therapy "journey" they start with. MOST Clinicians support engagement on platform for first 12 weeks on a weekly or fortnightly basis, account deactivates only after several months of inactivity.			Psychosis, Social anxiety			compassion and social cognitive approaches
MumMoodBooster/Mum2BMoodBooster[1]	Mum2BMoodBooster and MumMoodBooster are evidence-based online programs for pregnant (antenatal) or new (postnatal) mothers experiencing depression and anxiety. The program involves 6 sessions designed to mimic face-to-face CBT over 6 weeks, along with SMS reminders and encouragements to continue in the program. Optional weekly phone coach (30min) for mothers with more serious symptoms. Includes video material, case examples, a host for each session, and moving diagrams. Symptom monitoring occurs throughout the program with the option of graphing the relationship between symptoms and pleasant events.	2018	Pregnant or new mothers	Antenatal depression, Anxiety, Postnatal depression	Yes	No	CBT
My Digital Health[1]	My Digital Health integrates online programs for anxiety, depression, PTSD, insomnia and benzodiazepine dependence with the option of connecting with their own health practitioner through the site, as well as passive and active monitoring of mood and biological factors. Programs are based on biopsychosocial, compassion, mindfulness and CBT-based frameworks.	2016	Adults (18+ years)	Anxiety, Depression, PTSD, Insomnia, Substance Abuse, Wellbeing	Yes	No	Biopsychosocial, Compassion, Neuroplasticity, Suicide Prevention, Mindfulness, CBT for insomnia
This Way Up	Not-for-profit and joint initiative of St Vincent's Hospital and the University of New South Wales. iCBT for anxiety disorders, depression and other mental health conditions. Range of self-guided courses, 3-6 modules, with or without support from consumer's own mental health professional.	2012	Adults (18+ years), Teens (12-17 years)	Chronic pain, Depression GAD, Health anxiety, OCD, PTSD, Panic, Mixed depression and anxiety, Insomnia, Pregnancy anxiety and depression, Postnatal anxiety and depression, Social anxiety, Student wellbeing, Stress	Yes	Yes, if self-referred. No, if referred by registered clinician.	CBT, mindfulness

[1]Also available as mobile applications; **ACT**, Acceptance and Commitment Therapy; **CBT**, Cognitive Behaviour Therapy; **GAD**, Generalised Anxiety Disorder; **MBCT**, Mindfulness-Based Cognitive Therapy; **OCD**, Obsessive-Compulsive Disorder; **PTSD**, Posttraumatic Stress Disorder.

Characteristics of 4 self-guided online DMHSs

Program	Brief description	Launched (approx)	Demographic	Conditions	Government funding	Cost to Consumer	Psychology
e-Couch	eCouch offers 5 self-selected CBT-based online programs, including Depression, Anxiety & Worry, Social Anxiety, Divorce & Separation and Loss & Bereavement. Each program contains text modules, exercises designed to help users practice self-help strategies and quizzes with the intention of helping users understand themselves and/or their symptoms.	2007	Individuals aged 16+ (US and Canadian applications must be 18+ years)	Anxiety & Worry, Bereavement, Depression, Relationship issues, Social anxiety	Yes	No	CBT, IPT
MoodGym	Online evidence-based program designed to reduce depression and anxiety symptoms in young people. Program includes 5 modules: Feelings, Thoughts, Unwarping, Destressing, Relationships. Provides evidence-based information, includes a workbook, quizzes, a diary and teaches self-help skills. Users need to register in order to access content.	2001	Individuals aged 16+ (US and Canadian applications must be 18+ years)	Anxiety, Depression	Yes	No	CBT, IPT
MyCompass	MyCompass is a free online self-help program for people with mild to moderate depression, anxiety and stress. Users take an online self-assessment before choosing up to 14 activities to complete. The site encourages at least 7 weeks of use.	2011	Adults (18-75 years)	Anxiety, Depression, Stress	Yes	No	CBT, Positive psychology, IPT, SMART goal setting
On Track	OnTrack offers several self-paced psychoeducational online programs including GetReal (aimed at young people with emerging psychotic symptoms), OnTrack Families and Friends (for those supporting someone with a mental illness), OnTrack Alcohol and Depression (for mood improvement and reduction of alcohol use), OnTrack Depression (for depression and relapse prevention), OnTrack Alcohol (to reduce alcohol consumption), OnTrack Diabetes (to support the overall mood and health of those with Type 2 Diabetes), and OnTrack Flood and Storm Recovery (to develop a post-disaster recovery plan). The programs include psychoeducation, interactive activities, a diary, personal stories and symptom tracking.	2009	Adults (18+ years), Ages 14+ (GetReal), 18-17 years (OnTrack Diabetes)	Coping, Depression, Psychosis, Substance Abuse, Type 2 Diabetes	Yes	No	CBT, meditation

CBT, Cognitive Behaviour Therapy; **IPT**, Interpersonal Therapy.