

Evidence Check

Prevention and early intervention for adults with mild to moderate depression

An **Evidence Check** rapid review brokered by the Sax Institute for Beyond Blue. December 2018.

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This report was prepared by:

Frances Kay-Lambkin, Jayden Gilbert, Lauren Pedemont, Matthew Sunderland, Hazel Dalton, Tonelle Handley, Sally Chan, David Perkins, Brian Kelly.

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Prevention and early intervention for people aged 18 and over with, or at risk of, mild to moderate depression and anxiety: an Evidence Check rapid review

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1 Executive summary

Background

The purpose of the report is to review and summarise the evidence base for the effectiveness of interventions that prevent or manage mild to moderate depression and anxiety in adults.

The review makes judgements about the overall strength of evidence for policies, programs and services identified via the review, based on the National Health and Medical Research Council (NHMRC) Levels of Evidence criteria¹ and makes recommendations arising from an assessment of the quality of the evidence according to the NHMRC quality assessment matrix.¹ For the purposes of this report the term 'interventions' encompasses a broad range of programs, interventions, and approaches aimed at preventing or managing mild-moderate depression and anxiety.

This review was commissioned by Beyond Blue.

Review question

This review aimed to address the following question:

What policies, programs, or services have been effective at preventing and/or managing mild to moderate depression and anxiety in people aged 18 years and over?

Summary of methods

The Priority Research Centre for Brain and Mental Health at the University of Newcastle (and its partners) conducted the Evidence Check. Its aim was to identify services, programs and policies that described and evaluated interventions for the prevention or management of mild-moderate depression or anxiety in adults. The primary outcome of this review was to focus on recent evidence (between 2013–18) that included adults (18 years and older) and was written in English.

Search methods

Members of the research team conducted a systematic search of eleven electronic data bases (CINAHL, Cochrane – Economic Evaluations, Cochrane – Other Reviews, Cochrane Reviews, Cochrane Trials, Embase, Medline, Medline in Process, ProQuest, PsycEXTRA, and PsycINFO) to capture and review studies describing preventative and management interventions for mild-moderate depression and anxiety in adults. Grey literature sources were also searched to identify related initiatives underway in the community.

Key findings

Ninety-three publications were located that met the criteria of the Evidence Check. Of these, 68 reported on individual services and programs for mild-moderate depression and anxiety in adults, and 25 drew on a much larger body of work and synthesised them into systematic reviews and meta-analyses. The key findings of this Evidence Check reveal that:

- There are no identified services or programs that have the prevention of anxiety or depression in adults as their focus

- There are fewer services or programs addressing anxiety specifically in adults than there are for depression
- Of the anxiety-management programs identified, there is high quality, consistent evidence that internet- and mobile app-delivered interventions are effective, particularly when they use cognitive behaviour therapy (CBT)strategies. Many of these programs have been implemented without (or with very minimal) therapist guidance. The strongest effects were demonstrated when these interventions were compared to no treatment or wait-list controls, with smaller effects (and often little difference) observed between these interventions and high-quality usual care or active control groups. Hence, these interventions are best implemented in the community, outside of usual care settings, among people who are unlikely or unable to access usual care services
- Of the depression-management programs identified, there is also high quality, consistent evidence that internet- and mobile app-delivered interventions are effective, with little difference between cognitive behaviour therapy, positive psychology, problem solving therapy, mindfulness-based stress reduction, interpersonal therapy and psychodynamic therapy. Most internet programs for depression have only been trialled with concurrent therapist guidance and support, hence the safety and efficacy of these interventions without such support is currently unknown. There is also good evidence for text-based interventions (e.g. emails, SMS, writing a story, reading a book) in managing mild-moderate depression, with many studies implementing these interventions with lower levels of therapist guidance (maximum five minutes per module) or without any support. As with anxiety, these interventions have demonstrated the largest effects when compared with no treatment or wait-list controls. Thus, they will likely have the greatest impact when implemented with non treatment-seeking adults, or with those who are unable to access usual care. Peer-led interventions, designed to increase social connectedness, have strong potential to address mild-moderate depression, and can be offered online or via videoconference to increase accessibility. Exercise-based interventions are also highly effective in reducing mild–moderate depressive symptoms and can be implemented across the lifespan
- An emerging area of strength in Australian research is the development and testing of transdiagnostic internet interventions for depression and anxiety, mostly using cognitive behavioural strategies. These interventions have an impact on both depression and anxiety simultaneously. There is some evidence that transdiagnostic internet interventions are better for anxiety than a tailored cognitive behavioural therapy intervention, but this is not as clear for depression
- Given that many mindfulness interventions can be delivered without extensive therapist support (i.e. in a low intensity model), mindfulness provides a promising potential intervention for older adults with depression and anxiety.

Gaps in the evidence

Despite a significant volume of literature identified in this Evidence Check, many gaps remain in understanding what works for mild–moderate depression and anxiety for adults aged 18 years and over.

There was no evidence identified for:

- Interventions with a primary focus of preventing anxiety or depression in adults
- Interventions developed or adapted for people of Aboriginal and/or Torres Strait Islander descent
- Interventions developed or adapted for people identifying as lesbian, gay, bisexual, transgender, or intersex.

There was a very small body of evidence identified for:

- Interventions developed or adapted for people from culturally and linguistically diverse backgrounds
- Interventions developed or adapted for people from low socioeconomic backgrounds.

There was some promising evidence identified for:

- Internet- or mobile app-delivered interventions and peer-led interventions for people aged 18–25 years
- Internet- or mobile app-delivered interventions and peer-led interventions for people aged 65 years and over.

Conclusion

Several recommendations are possible based on the results of the review. While the body of evidence provides some support for these recommendations, care should be taken in their application. The key recommendations are that:

For managing depression:

It is recommended that internet-delivered and mobile app-delivered interventions are implemented to manage mild-moderate depression in adult Australians. The existing evidence can be trusted to guide practice in this case, provided service models titrate the level of therapist support provided alongside these programs against severity of depression. These interventions can be implemented with young people (18–25 years) and older aged populations (65 years and over). Some evidence suggests that, with input from the community and a native speaking clinician, these interventions can be directly translated into culturally and linguistically diverse groups. These interventions are best implemented in the community, outside of usual care settings, among people who are unlikely or unable to access usual care services.

It is recommended that peer support interventions, designed to increase social connectedness and reduce social isolation, are implemented for people at risk of or experiencing mild-moderate depression.

It is recommended that text-based interventions be implemented to support people with mild levels of depression and can be implemented without therapist guidance, provided a pathway to seeking more intensive help is built into these interventions if symptoms worsen.

It is also recommended that exercise-based interventions are implemented for people experiencing depressive symptoms, of light or vigorous intensity, three times per week for one-hour sessions. For older aged persons, consistency is important, with 15-minute sessions three times per week sufficient to offer an anti-depressant effect. These sessions are generally implemented under supervision of exercise professionals to ensure safety.

For managing anxiety:

It is highly recommended that internet- and mobile app-delivered interventions be implemented for people experiencing mild-moderate anxiety, and that these may be implementable without therapist guidance.

Exercise-based interventions are also effective for managing worry and anxiety.

For managing mixed depression and anxiety:

Given the significant co-occurrence of depression and anxiety, it is recommended that transdiagnostic internet interventions incorporating cognitive behaviour therapy are applied.

Given the complexities of the above recommendations, a final recommendation is that a framework is developed to guide the selection and implementation of text-, peer-, internet- and mobile app-delivered interventions for mild-moderate depression and anxiety that the community and health professionals can use to aid decision making about which programs to use and when. It is noted that although exercise-based interventions have been tested for managing depression and anxiety as they occur in isolation of each other, the impact of exercise on mixed depression and anxiety was not identified in any study included in this review.

2 Background

Prevention of depression and anxiety disorders is a public health priority

Depression and anxiety are the leading global causes of burden of disease in young people^{2,3} and considerable illness burden across the lifespan. Every year, these conditions conservatively cost the Australian \$12 billion⁴, with suicide costs at an extra \$1.7 billion annually.⁵ Suicide rates among young people are at their highest in more than a decade, accounting for more than one-third of all deaths in Australians aged 15–44 years.⁶

Effective prevention and early intervention can significantly reduce disease burden by halting, delaying and interrupting the onset and progression of depression and anxiety.⁷⁻¹² Researchers, policy makers and health service providers are turning their attention to the development, testing and implementation of programs that can promote better mental health and prevent mental ill-health. If implemented well, and in line with the evidence, these interventions may help avoid or reduce the substantial adverse individual, social and economic effects of depression and anxiety.

Low intensity interventions are critical in bridging the need–treatment gap for depression and anxiety disorders

Fewer than half of Australians with depression or anxiety seek help from a health professional, which means important opportunities for intervention are being missed.¹³ The costs of providing mental health services are increasing, providing the impetus to develop more efficient intervention modes of delivery that do not place more pressure on the existing systems of care. Rapid developments in treatment models employing low intensity support¹⁴ to people in earlier phases of illness show potential for meeting this need, particularly for depression and anxiety.

Implementation should be guided by available evidence

To optimise the finite resources in mental health prevention, early intervention and service delivery, and to realise the potential for low intensity interventions in this space, priority should be given to programs, models and strategies that demonstrate evidence of their effectiveness. However, building an evidence base is an incremental process. This review was commissioned to identify the extent and quality of the existing body of evidence for the prevention and management of mild–moderate depression and anxiety in adults in both scientific and grey literature.

Evidence Check: Evidence for the prevention and early intervention for people aged 18 years and over with, or at risk of, mild to moderate depression and anxiety

The present Evidence Check aimed to identify, describe and evaluate the existing evidence base for preventive and management interventions for mild–moderate depression and anxiety in adults aged 18 years and over. Preference was given to studies from Australia, NZ and the UK. Studies from other countries were also included. Published studies, case reports and grey literature were also included. The Evidence Check was designed to answer the following key question:

What policies, programs, or services have been effective at preventing and/or managing mild to moderate depression and anxiety in people aged 18 years and over?

The review aimed to identify the programs and services with a strong evidence base for their effectiveness (achieving their stated aim of preventing or managing mild–moderate depression and anxiety), and to also identify programs and services that show promise but are not yet evaluated (i.e. where the evidence base is not yet known or not strong). Emphasis was placed on programs with ‘real world’ information on implementation, rather than being broad and non-specific.

The term ‘interventions’ is used throughout this document as a broad term to refer to the range of education, prevention, treatment, support and other approaches identified via the review.

3 Methods

To examine the programs, services and policies effective for prevention and/or managing mild–moderate depression and anxiety in people aged 18 years or over, a systematic review protocol was employed. This review took a focus on guidelines, research papers and case studies where the following issues were described:

- Articles describing/evaluating or guidelines on the prevention of mild–moderate depression and anxiety
- Articles describing/evaluating or guidelines on the management of mild–moderate depression and anxiety.

The inclusion criteria were:

1. Study participants were 18 years and older
2. The study was published from 2013–18
3. The study was written in English.

A protocol for the systematic literature review was agreed on by the authors and commissioning agent and comprise four key aspects:

1. Anxiety or depression
2. Mild or moderate
3. Adults
4. Prevention or management.

These words were used as the initial search terms, and derivations of these terms were added using Boolean operators (e.g. depress*) to expand the search strategy. See Appendix A for an example search strategy and result using Medline.

Reference lists of identified systematic reviews and meta analyses were also hand–searched, and the studies from these reviews that fulfilled the Evidence Check criteria were included in the synthesis of evidence. Electronic databases (CINAHL, Cochrane – Economic Evaluations, Cochrane – Other Reviews, Cochrane Reviews, Cochrane Trials, Embase, Medline, Medline in Process, ProQuest, PsycEXTRA and PsycINFO) were searched for articles meeting the three key criteria. Grey literature sources were also searched (www.greylit.org/home, Google).

Details of the study selection procedure can be seen in Figure 1. Three authors (FKL, JG, LP) screened the titles and abstracts of the 16,239 studies identified via electronic searches and identified 187 potentially relevant articles. Of these, the full-text of 182 articles could be accessed within the timeframe of this rapid review. The lead author (FKL) assessed the eligibility of each article and co-authors (JG, LP) extracted the data for included articles. Studies meeting all entry criteria were included in this Evidence Check and are summarised in Table 3 (systematic reviews and meta analyses, see Appendix B) and Table 4 (individual programs and services, see Appendix C). Identified policies and guidelines are also described.

Data extracted from the studies included: country, study type, population/setting, number of studies/participants, program or service information, intervention/comparison group and outcomes. All

included studies and reviews were evaluated according to the NHMRC levels of evidence and given a quality rating (details below).

Where policies or guidelines were identified, descriptions of these were provided, including the process by which the guidelines were developed (expert opinion, literature review, etc.).

Study and intervention participants

This review focused on adults aged 18 years and over, who were at risk of, or experiencing, mild to moderate depression or anxiety. Specific populations of interest were Aboriginal and/or Torres Strait Islander peoples, people from culturally and linguistically diverse backgrounds, people identifying as lesbian, gay, bisexual, transgender, or intersex, and those from low socioeconomic backgrounds. Resulting studies were grouped according to the age of participants as follows: 18–35 years, 36–64 years, 65 years and over.

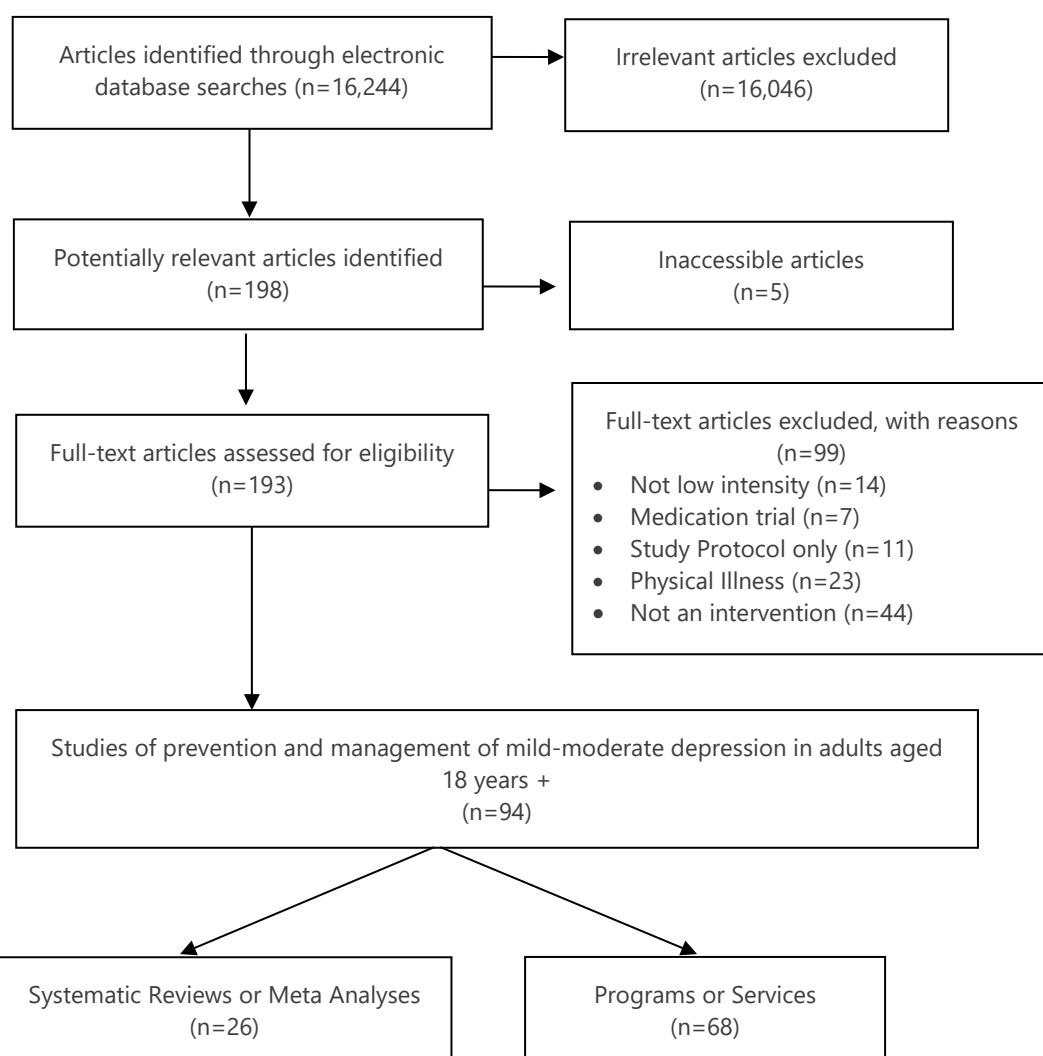


Figure 1. Publications identified in the Evidence Check that met study criteria

Types of intervention

To be included in this review, policies, programs and services that could be implemented at a population level were of interest, with a focus on low intensity service models and interventions. These included digital technologies, peer support, consumer champions, services that do not require referral, non-clinical support services and psychosocial support services. Public health campaigns, clinical treatments (medication), or one-on-one therapy provided by a clinician (e.g. psychologist, psychiatrist, general practitioner) were excluded from the review. Settings such as community, healthcare, aged care, employment (workplaces) and online were all of interest.

Evidence grading

Included articles were evaluated according to the National Health and Medical Research Council (NHMRC) Evidence Hierarchy¹⁵, with overall impressions of the available evidence summarised according to the NHMRC grading system for recommendations (see http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf for detailed information).

The first step in this process was to rate the quality of the evidence reported in each of the included studies according to the NHMRC. Table 1 was used to guide this evaluation, and each included study was given one of these evidence ratings.

Table 1. Levels of evidence used to classify the included studies in this Evidence Check*

Level of Evidence	Study design
I	A systematic review of Level II studies
II	A randomised controlled trial (RCT)
III-1	A pseudo-randomised controlled trial (i.e. alternate allocation or some other method)
III-2	A comparative study with concurrent controls (i.e. non-randomised experimental trials, cohort studies, case-control studies, interrupted time series studies with a control group)
III-3	A comparative study without concurrent controls (i.e. historical control study, two or more single arm studies, interrupted time series studies without a parallel control group)
IV	Case series with either post-test or pre-test/post-test outcomes

*As per http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf

The second step was to summarise the level of evidence for the five key components recommended by the NHMRC. The quality of the evidence rated was on a scale of A (Excellent) to D (Poor) for each of the five components. The five components are:

1. **The evidence base:** the level of evidence and the quantity of evidence in each of the individual included studies as described in Table
2. **Consistency:** the extent to which the body of evidence produced consistent findings in relation to interventions across the range of included studies
3. **Clinical impact:** the balance of risks and benefits, the duration of intervention and the relevance of the evidence to the target population for the review

4. **Generalisability:** how well they matched the aims and questions associated with this review
5. **Applicability:** the relevance of the included studies to the Australian health care setting.

An evidence matrix was applied, and each of the five key components was given a rating (A–D) for the available studies included in the Evidence Check. This evidence matrix and definitions for ratings A (excellent) to D (poor), are described in Table 2.

Table 2. The matrix employed to summarise the evidence base for prevention and early intervention for mild–moderate depression and anxiety in people aged 18 years and over*

Component	A	B	C	D
	Excellent	Good	Satisfactory	Poor
Evidence base¹	Several level I or II studies with low risk of bias	1 or 2 level II studies with low risk of bias or a systematic review or multiple level III studies with low risk of bias	Level III studies with low risk of bias, or level I or II studies with moderate risk of bias	Level IV studies, or level I to III studies with high risk of bias
Consistency²	All studies consistent	Most studies consistent and inconsistency may be explained	Some inconsistency reflecting genuine uncertainty around clinical question	Evidence is inconsistent
Clinical impact	Very large	Substantial	Moderate	Slight or restricted
Generalisability	Population/s studied in body of evidence are the same as the target population in question	Population/s studied in the body of evidence are similar to the target population in question	Population/s studied in body of evidence differ from target population in question but it is clinically sensible to apply this evidence to target population	Population/s studied in body of evidence differ from target population and hard to judge whether it is sensible to generalise to target population
Applicability	Directly applicable to Australian context	Applicable to Australian context with few caveats	Probably applicable to Australian context with some caveats	Not applicable to Australian context

*As per http://www.nhmrc.gov.au/files/nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf

¹ Level of evidence determined from the NHMRC evidence hierarchy as in Table 1.

² If there is only one study, rank this component as ‘not applicable’.

Recommendations were developed based on this evidence, including suggested treatment models, programs or services, for preventing and managing mild–moderate depression and anxiety in adults, including specific interventions that show promise.

4 Findings

Systematic literature reviews, meta-analyses, and literature reviews

The search resulted in the identification of 6 meta-analyses, 17 systematic reviews, and 2 Cochrane Reviews relevant to the Evidence Check. The main outcomes of these reviews are summarised here, details are provided in Table 3 (see Appendix B). A further report from the OECD was identified¹⁵ that provided an overview of programs in the prevention of mental illness. These results are integrated here. When considering the effectiveness of specific programs and interventions that were not part of systematic reviews, the findings from these reviews have been integrated into the quality ratings of evidence for a particular approach.

Prevention of mental illness in the workplace

The report by the OECD detailed actions to promote mental health and prevent mental ill-health across the lifespan.¹⁶ The section on workplace mental health promotion strategies was relevant, despite not being depression or anxiety focused. The review identified that cognitive behaviour therapy, relaxation techniques and changing work schedules have strong evidence for reducing stress and improving mental health. Workplace-wide measures (e.g. addressing issues of physical working environment, social relations at work, opportunities for career progression) showed promise, but less conclusive evidence was available to demonstrate the impact of these programs on prevention of mental ill-health or improving mental health. Workplace measures that promoted the awareness of mental health/ill-health for employees and managers, risk assessment and stress management showed promise for improving mental health and wellbeing among employees, however, the evidence base for these approaches remains limited. The report identified one systematic review on the impact of workplace programs on the health of employees, synthesising the health-related impacts of 39 organisational-level interventions on general health.¹⁷ The quality of evidence across these studies was low; however, favourable outcomes were reported for self-rated mental health (and general health and reduced injury rates) for comprehensive workplace programs that changed the work environment by using awareness raising material and adjusting organisational and work-time related conditions simultaneously.

A systematic review and meta-analysis was also identified examining the effectiveness of universal prevention programs for depression in workplaces.¹⁸ Universal workplace interventions were those provided to an entire workplace or workforce, regardless of risk of depression or presence of depressive symptoms. Nine randomised trials were included in the analysis, the majority of which employed cognitive behaviour therapy (CBT) techniques into workplace programs. Five studies used CBT (stressful situations encountered in the workplace or more general career management), one was aimed at increasing mental health literacy, one was an exercise-based intervention, and one included engaging the workplace employees in a shared stress reduction and goal setting intervention. All interventions were conducted face-to-face. Statistically significant benefits in favour of CBT interventions in the workplace were reported relative to control groups, although the size of the benefit was very small ($SMD=0.16$, 95% confidence interval (CI): 0.07, 0.24, $P=0.0002$).

Internet- and mobile app-delivered interventions

Although not a typical systematic review, Bennion and colleagues¹⁹ conducted a survey and review of all the apps and online interventions currently being used within the National Health System (NHS) in England, UK. Data for the review was obtained using a survey of NHS Mental Health Trusts across England, via Freedom of Information requests for Improving Access to Psychological Therapies (IAPT) services, and a systematic search of the NHS apps library. Results identified that 13 different web apps and 35 smartphone apps for depression, stress and anxiety were being used and made available through IAPT, NHS Apps Library and referral services. A list of these internet- and app-delivered interventions is contained in Appendix D, and where studies were available and accessible, and met inclusion criteria for the Evidence Check, these were included in 4.2 below. Of the 191 IAPT services included in the review, 89% (n=170) used and recommended internet- or app-delivered interventions for depression and anxiety, 39 (20%) indicated they were currently carrying out research or pilot testing of internet- or app-delivered interventions for depression and anxiety, and 12 (6%) indicated they were developing their own app at the time of review. Seventy percent of IAPT services supported self-referral of clients to these internet- or app-delivered interventions, with clients of the service empowered to seek these interventions for depression or anxiety as required (i.e. without clinician referral). Thirty-nine of the 51 Mental Health Trusts across England indicated they use and recommend apps and internet interventions to their clients for depression and anxiety. Seven Trusts indicated they were currently researching or piloting the apps they used with their clients, and eight were in the process of developing their own. Approximately half of the internet- and app-delivered interventions that were being used by services across England were recommended by the NHS; the remainder were not recommended, and these apps/internet-programs were not being routinely used for depression and anxiety across services and geographical locations. The apps and internet programs identified in the review were not tailored to any demographic, and none have been trialled (or were being used) with people aged 65 years and over. A pressing need for methods to facilitate access to apps/internet-delivered programs with a strong evidence base was identified for depression and anxiety.

Anxiety

A Cochrane review explored therapist-supported iCBT for anxiety disorders in adults²⁰, with reduction of anxiety symptoms as a key outcome. Thirty studies were included in the review, including 12 from Australia. Of relevance to the current Evidence Check was a comparison of unguided versus therapist-supported iCBT (four studies, 253 participants). Although the quality of evidence was rated as low, it consistently reported no clinically or statistically significant differences between guided and unguided iCBT in terms of improvement in anxiety symptoms post-treatment.

A second Cochrane review examined the effectiveness of media-delivered CBT interventions for anxiety disorders in adults.²¹ Included studies were those that compared a media-delivered CBT intervention for anxiety (excluding post-traumatic stress disorder) compared to no intervention or face-to-face therapy. 'Media-delivery' included internet-delivered CBT, along with books, audio programs and videos, or a combination of these. Treatment strategies included in these interventions included exposure, behavioural experiments, desensitisation, relaxation, problem solving skills and CBT. Interventions ran from one to 12 sessions, with support provided face-to-face (35 studies), email/phone (11), by telephone alone (12 studies), by email and SMS (one study), or by internet forum (one study). Amount of therapist support ranged from 10 minutes to six hours per participant. One hundred and one studies involving 8,403 participants were included in the review. For symptoms of anxiety, media-delivered interventions were significantly better than no intervention controls (including those that controlled for attention and matched for contact) and were not significantly inferior to face-to-face therapies for anxiety (although there was non-significant evidence that face-to-face therapies were associated with better anxiety outcomes). Improvements in

anxiety were larger for internet-delivered CBT over other media. Very little information was available on harms and safety issues associated with any interventions used in the review, and the authors concluded that, for people who would not otherwise access face-to-face services for anxiety, media-delivered CBT (and particularly internet-delivered CBT) is more effective than no treatment.

Depression

Barth et al.²² conducted a network meta-analysis of seven different psychotherapeutic interventions for depression. Eligible studies were those whose participants reported at least elevated levels of depressive symptoms. One hundred and ninety-eight studies were included in the review, across 15,118 participants, which compared the efficacy of interpersonal therapy, behavioural activation therapy, cognitive behaviour therapy, problem solving therapy, social skills training, psychodynamic therapy and supportive counselling. Each of these therapies was more effective than wait-list controls (moderate-large effect size differences were observed), or usual care (small-moderate effect size differences). All interventions, with the exception of social skills training, were statistically significantly superior to controls in reducing depression. There was little evidence for the superiority of any one of these therapies over another, with the exception of Interpersonal Therapy being significantly more effective than supportive therapy. There was no difference in effectiveness based on the format of delivery (individual or group) or treatment setting (face-to-face, telephone or internet), providing good evidence for the use of telephone and internet delivered (low intensity) approaches.

Bower and colleagues²³ conducted a meta-analysis of 16 patient health datasets drawn from international trials of low-intensity interventions for depression (2,470 patients with varying levels of severity of depression, recruited from community settings). This meta-analysis included studies of low intensity interventions that primarily used a 'health technology' (self-help books, videos, interactive internet- or app-delivered interventions) where support was not provided by a professional or paraprofessional (defined as less than three hours of contact). Self-help groups and interventions delivered as part of 'collaborative care' were excluded. Results of the meta-analysis indicated that low intensity interventions produced significantly greater reductions in depression over controls, of the order of 4–5 points on standard depression inventories (e.g. BDI-II or the CES-D). There was a non-significant trend for better depression outcomes for internet-delivered interventions to be more effective than those using written interventions. The main conclusions from this analysis was that low intensity interventions for depression should not be withheld from those with more severe symptoms, as this group reported more clinical benefit from low intensity interventions than mild–moderately depression individuals. This was interpreted as support for a stepped care model of intervention for depression, where every person receives a low intensity intervention as an initial step in treatment regardless of presenting levels of severity of symptoms.

This conclusion was supported by a more recent meta-analysis that synthesised data across 13 RCTs (3,876 participants) where self-guided iCBT was compared with a usual care, wait-list, or attention-control condition among people with depression.²⁴ Self-guided iCBT was significantly more effective in reducing depression than any control condition, and this treatment effect increased with increased adherence to the iCBT programs. The authors concluded that self-guided iCBT was an effective alternative for people who are experiencing depressive symptoms but do not want therapeutic contact. The authors suggest that this meta-analysis indicated that the number needed to treat with self-guided iCBT to produce a 50% symptoms reduction in depression was eight, which makes it a viable, scalable intervention approach.

So and colleagues²⁵ conducted a meta-analysis on studies involving computerised CBT for depression in adults, to determine implementation and service issues associated with these technologies. Fourteen trials (2,807 participants) were included in the review, all of which were completed by 2011. Overall, this review demonstrated that computerised CBT had significant effects on depression treatment, relative to treatment-

as-usual and no-treatment/wait-list controls at immediate post-intervention, but that this did not extend to long term follow up. Effects of computerised CBT were higher when comparing the interventions to wait-list than treatment-as-usual, because the latter represents a more intensive intervention. Thus, the recommendation was to avoid comparing computerised CBT interventions with wait-list or no-treatment controls given the tendency for them to inflate the effect of the active intervention. High dropout rates were noted in the available research, and treatment completion rates were low for over half of the included studies.

Ebert and colleagues²⁶ conducted a meta-analysis that focused on the potential negative effects of unguided iCBT for depression. Eighteen studies (2,079 participants) were included in the review, which revealed that deterioration in depression was significantly less in unguided iCBT than it was for control conditions. In general, however, deterioration following unguided iCBT was low. Of note was that, irrespective of treatment allocation (unguided iCBT versus control), people from lower educational backgrounds were at higher risk for a deterioration in depressive symptoms than were people with higher levels of education. This was still similar to that observed in face-to-face psychotherapy for depression.

Mixed anxiety and depression

Arnberg and colleagues²⁷ reviewed 40 randomised controlled trials (RCTs) of internet-delivered cognitive behaviour therapy programs (iCBT) for mood and anxiety problems that: (i) had to be based on sound psychological theory, (ii) were not conducted at a clinic, and (iii) any support had to also be remotely delivered (e.g. via email, messages, or telephone). Across the trials, participants were recruited via advertisements, provided remote therapist-guided iCBT, implemented iCBT programs over 8–12 sessions, and used a wait-list control. Therapist-guidance was delivered by telephone, email, or message, and was 10–20 minutes per iCBT session. The quality of evidence across these trials was moderate, with those programs delivering CBT via the internet associated with better outcomes for anxiety and depression than wait-list controls. One trial from this review was published in 2013²⁸, and is incorporated into the individual study analysis below. Three cost effectiveness studies were identified in the review, with one indicating iCBT for depression had a 70% probability of being more cost effective than treatment as usual, and another revealed that iCBT for social phobia had a 90% chance of being cost effective over group CBT, was US\$1,422 lower in cost to deliver, and resulted in 19% greater improvement in anxiety symptoms at six-month follow-up.

Of note was an additional review by Cuijpers et al.²⁹ which examined the impact of interventions focusing on Generalised Anxiety Disorder, Social Anxiety Disorder and Panic Disorder on depressive symptomatology. The review included 47 RCTs for anxiety and 34 RCTs for depressive conditions, across 5,486 participants. Levels of depression at entry to the anxiety RCTs were lower than for the depression RCTs (mild–moderate range) but confirmed the well-established finding across the treatment and epidemiological literature that comorbidity between depression and anxiety is high. Of interest is that the effects of cognitive behaviour therapy on anxiety extended to significant reductions in depressive symptoms, despite depression not being specifically targeted in the anxiety interventions. These effects were moderate to large, indicating a direct effect of anxiety treatments on mild–moderate depressive symptoms. There were no differences between specific anxiety treatments (e.g. GAD, SAD, Panic Disorder) in their impact on mild–moderate depressive symptoms. This lends support to the growing body of evidence that a transdiagnostic approach (one where the same intervention is given to people with different symptoms or conditions) for anxiety and mild–moderate depressive symptoms are effective. Two more recent meta-analyses identified reviewed iCBT interventions of transdiagnostic approaches for anxiety and depression. The first, by Newby and colleagues³⁰, synthesised outcomes across 117 RCTs involving transdiagnostic iCBT. Results indicated that transdiagnostic iCBT produced superior reductions in

depression compared to wait-list, active and usual-care control conditions (large effect sizes), and for anxiety compared to all types control conditions (medium effect sizes). The RCTs included in the review were of good quality and indicated that the treatment length and therapist experience (student versus qualified therapist; all iCBTs were guided by a therapist) did not affect anxiety or depression outcomes. Preliminary evidence was available comparing iCBTs that directly targeted depression or anxiety (tailored) or that took a transdiagnostic approach and suggested that transdiagnostic approaches produced small but superior outcomes to tailored interventions for both depression and anxiety outcomes. A more recent meta-analysis by Pasarelu et al.³¹ provided an update to the preceding review, focusing only on studies directly comparing transdiagnostic iCBT with iCBT tailored for either depression or anxiety. Nineteen trials across 2,952 participants were included in the review. Results for depression and anxiety over time indicated that no significant differences in outcomes for depression or anxiety existed for iCBTs that used experienced psychologists versus student therapists or for self-guided iCBTs, providing some of the first evidence for unguided iCBTs in this context. Treatment length did not affect outcomes for anxiety, however, longer treatments (more than 6 modules) were more effective for depression. A comparison of transdiagnostic versus tailored iCBT indicated that, for anxiety, there were no significant differences in anxiety outcomes for transdiagnostic/tailored iCBT. For depression, however, transdiagnostic iCBT was associated with superior depression outcomes over iCBT tailored to depression.

Bibliotherapy interventions

Gualano and colleagues³² systematically reviewed 10 studies using bibliotherapy to manage mild–moderate depression. In the short term, cognitive bibliotherapy (books such as 'Feeling Good') and behavioural bibliotherapy (books such as 'Control your Depression') produced similar effects on depression, with participants using these interventions significantly reducing their depressive symptoms relative to a control condition. The most robust effect was found in the general adult population (reducing symptoms over a two-year follow-up) but was not observed in younger adult populations. Only one study met inclusion criteria for the Evidence Check³³ and is included below.

Peer-delivered interventions

McColl and colleagues³⁴ attempted a literature review of the use of mobile apps in peer support models in healthcare settings, and could not identify one study regarding the efficacy of technology-based peer support. As a result, they broadened their review to incorporate the impact of including peer support models in mental health and the potential for technology to improve these outcomes. In the mental health arena, the review identified evidence that peer support provided by telephone, texting and online groups increases engagement in wellness activities, improves self-management of health in low-literacy minority groups, and increases social connectedness to a new community. Despite this, there is a lack of rigorously controlled evidence testing the benefits of technology-based peer support. At the time of the review, barriers to using mobile apps included low bandwidth, disengagement and loss of interest, concerns around privacy and data storage, and concerns about clinical risk and cybersafety of peers and participants interacting in this environment. Significant advances in technology and security have occurred since 2014, potentially increasing the potential of this technology in managing and delivering peer interventions for mental health problems.

Although focused on people with serious mental illness (not mild–moderate depression and anxiety), Cabassa et al.³⁵ conducted a systematic review on peer-based health interventions. Eighteen studies were included in the review, which revealed mixed quality evidence for peer-support and peer-led interventions in this area. However, the most promising peer support models included those that encouraged self-

management of symptoms and provided a 'navigation' role through available services and interventions and assisted participants to communicate with treatment providers.

People aged 18–35 years

A very recent systematic review examined the evidence for preventative interventions on depressive symptoms and depression incidence.³⁶ Twenty-six studies were included in the review, involving 2,865 participants aged 18–25 years. The content of the preventative interventions were CBT or mindfulness-based stress reduction; six studies used a trained non-professional to facilitate the intervention, and in nine studies the intervention was unguided. In one intervention, peers led and delivered the content. Seven interventions were provided online. The review was unable to determine the impact of the interventions on incidence of depression; however, some evidence was provided for reducing depressive symptoms. No differences in effectiveness were observed for type of support offered to participants (peer, self-help, professional) or delivery modality (internet, group, face-to-face, self-led). Studies relevant to the Evidence Check (that met the inclusion criteria) were extracted from this review and are incorporated below.

People aged 65 years and over

Apostolo and colleagues³⁷ conducted a systematic review of studies testing non-pharmacological interventions for people aged 65 years and over experiencing a range of physical conditions (cardiovascular disease) and non-clinical conditions. Depressive symptoms were measured across all included studies. Six studies were identified across 520 participants using cognitive behaviour therapy (12 sessions, attitude/beliefs about ageing, negative thoughts about physical illness), competitive memory training (seven sessions to manage ruminations), problem solving therapy (six sessions including education about signs and symptoms of depression, daily coping strategies, increasing daily pleasurable activities, improving problem-solving skills for problems identified by the person, medication adherence, using community services) and problem-adaptation therapy (to adapt to life), and reminiscence group therapy (delivered in a 'sanatorium' setting). These interventions were significantly more effective in reducing depressive symptoms in participants than were 'talking' controls, individual supportive interviews, supportive therapy, or education alone. All interventions were delivered by health professionals. This review has been included in this Evidence Check, as it provides some insight into which interventions work well in managing depressive symptoms in older aged adults. These results are not incorporated into the individual studies below but given many of these therapeutic techniques have translated well to online or app-based delivery (or low intensity delivery models), it is plausible that models of internet- and mobile app-delivered interventions incorporating these strategies might also be effective in people aged 65 years and over, but further research on effectiveness of these approaches with people aged 65 years and over is needed (see Gaps Analysis).

Kishita and colleagues³⁸ conducted a systematic review of mindfulness strategies in managing mild–moderate anxiety and depression in older aged adults. Ten studies met the inclusion criteria for depression and seven studies met the inclusion criteria for anxiety. 'Older age' was defined by the authors as participants aged 60 years and over, however, the mean age of participants across the trial was 70 years for 10 of the studies, and 64 years for 7 of the studies. Fifteen studies provided mindfulness therapy in a group-based format, with the remaining two providing individual interventions. Amendments were made to traditional mindfulness-based protocols to accommodate shortened session length, providing options to sit on a chair rather than lying on a floor and simplifying working meditations to avoid compromising balance. Large and positive effects were noted for depressive symptoms for participants engaged in mindfulness interventions relative to wait-list controls. The impact of mindfulness on anxiety was moderate, but still positive over wait-list controls. This review provides preliminary support for mindfulness interventions for

older aged persons with depression or anxiety. Given that many mindfulness interventions can be delivered without extensive therapist support (i.e. in a low intensity model), mindfulness provides a promising potential intervention for older aged adults with depression and anxiety.

The OECD report on prevention of mental ill-health¹⁶ identified that interventions encouraging social interactions and building social networks of older people showed promise for promoting mentally healthy ageing. Although outside the timeframe of this review, the OECD report identified a stepped care model for preventing depression and anxiety among at-risk older people that reduced the incidence of anxiety and depression by 50% in the Netherlands.³⁹ The model comprised: (a) watchful waiting, (b) guided self-help using bibliotherapy, (c) problem solving therapy, and (d) referral to primary care as indicated. In addition, targeting 'high risk' groups of older people, such as those with chronic physical illness or the bereaved, also showed promise as a preventive approach for depression.⁴⁰

People from culturally and linguistically diverse backgrounds

Kalibatseva and colleagues⁴¹ conducted a critical review of the available literature on culturally adapted and culturally sensitive treatments for depression, providing some insight into how cultural adaptation models might best be implemented. The authors of this review documented how the process of cultural adaptation of depression treatments typically followed either a top-down, bottom-up, or integrative approach. Top-down approaches to cultural adaptations are considered 'surface adaptations' and largely involve translating an established treatment to make it look and sound more compatible to a population of interest (e.g. translating materials to the language of the client). A bottom-up approach also uses an evidence-based approach but is often referred to as a 'deeper adaptation', seeking to engage the potential recipients of the intervention, collaborating with them to understand (and then reflect in the intervention) the historical, political and sociocultural contexts, particularly of mental health issues that affect that particular cultural group. An Integrative approach incorporates both top-down and bottom-up methods. CBT interventions for depression were the most commonly adapted interventions. Based on this review, the authors suggest that future adaptations of interventions for depression are based on: (a) the adaptation of existing treatments by changing the process and content informed by research conducted with the target population, or (b) developing new treatments based on culturally appropriate frameworks and conceptualisations of depression across different cultural groups in our society. Both approaches hold promise.

Individual studies of programs and services

The systematic search of the literature for the Evidence Check yielded 68 studies of individual programs that met the inclusion criteria. These studies are summarised in Table 4 (see Appendix C), which includes the NHMRC Evidence Rating applied to each study.

Internet- or mobile-app delivered interventions

Box 1: Overview of studies on internet- and app-based programs for mild–moderate anxiety and/or depression in adults

Overall strength of evidence: Excellent

Number of studies: 37

Outcome measures: Depressive symptoms, anxiety symptoms, stress and worry, health complaints, work-health, cost-effectiveness, dysfunctional attitudes

Conclusion: There is excellent, consistent evidence that internet- and app-delivered programs are highly effective for anxiety, depression, and mixed anxiety and depression. This is particularly true for younger age groups (namely 18–25-year-olds), where outcomes are equivalent regardless of the amount of therapist support provided alongside these applications. This is less clear for groups aged 65 years and over, and for people of culturally and linguistically diverse backgrounds, where evidence is emerging to support the use of these interventions but with more therapist guidance to adapt, implement, and encourage engagement. Australia is leading the international effort in this area, producing excellent research evidence for programs targeting anxiety and depression simultaneously. Given the significant comorbidity between anxiety and depression, particularly at mild-moderate levels, this is an important development. Three studies reported on cost effectiveness of internet-based cognitive behaviour therapy for depression and reported a 70% probability that this was more cost effective than treatment as usual.

Barriers and facilitators: The perceptions of internet- and app-based programs by health professionals and end users is varied. A barrier to uptake of these programs is the credibility ascribed by professionals/end users to the benefits of these programs over traditional approaches, and issues of trust, data security and privacy, and access to technology, will need to be addressed. However, clinical champions in services (e.g. health service professionals) are a key way to overcome hesitation and concern about these highly effective programs.

Workforce requirements: Whilst internet- and app-based interventions without therapist guidance had strong evidence for efficacy for anxiety and mild depression, very few models of implementation were tested for moderate depression that did not include therapist support. All studies in moderate depression implemented these technology-based interventions with at least some therapist support, by telephone, email, SMS, and on average for about 10–20 minutes duration per session of internet/app intervention and focused on monitoring for exacerbations in symptoms and suicidality. Regardless of the implementation model (guided or unguided) health professionals will require training and support in how to work alongside these programs, how to enhance engagement, how to start conversations with clients about these interventions, and how to determine which internet- and app-based programs are the best to implement.

Programs with potential for scalability:

Stress and Worry: GET.ON Stress (7 sessions, stress management, Germany⁴²)

Anxiety: Oroshja€lpen (translated “The worry help”) (7 sessions, therapist guidance, mindfulness, Sweden⁴³) **Destressify** (mindfulness 5 days/week for 4 weeks, University students, Canada⁴⁴). Younger people (18–25 years) – **BlueWatch** (increase wellbeing and resilience⁴⁵).

Depression: Help4Mood (self-monitoring of mood, sleep, thoughts, behaviours, speech acoustics, virtual ‘coach’⁴⁶), **Living to the Full** (9 sessions of mindfulness and acceptance therapy, with weekly emails⁴⁷), **Optimism** (3 weeks, at-risk of depression⁴⁸), **iCBT** (7 sessions, therapist guidance, Sweden⁴⁹), **HelpID** (12-sessions of CBT, mindfulness, email/phone therapist guidance⁵⁰). Older people (65 years +) **MoodGYM**.⁵¹ **iCBT** (5 weekly session on sleep, mood, health, and wellbeing, moderated discussion forum, and weekly telephone or email therapist guidance⁵²). Younger people (18–25 years) **iiPT4** (4 online sessions of interpersonal therapy focusing on roles and interpersonal difficulties⁵¹), **ThisWayUp** (6 online treatment sessions⁵³).

Mixed anxiety and depression: Mindspot Clinic (8 weeks, 5 modules transdiagnostic or tailored iCBT^{54, 55, 56}), **Transdiagnostic iCBT** (6 sessions over 10 weeks²⁸), **MyCompass** (7 weeks, 12 modules of CBT, interpersonal therapy, problem solving therapy, tailor own program⁵⁷).

Evidence base

Of the 58 included individual studies, 37 evaluated or described interventions for the prevention or management of mild–moderate anxiety or depression using internet or mobile app technologies. Of these, five focused on stress, worry or anxiety. Of the remainder, seven addressed both anxiety and depressive symptoms simultaneously, and 15 focused on depressive symptoms alone.

Anxiety-focused studies: Five programs were identified across five randomised controlled trials. This was in addition to the Cochrane review noted above.²⁰ A range of primary outcomes was measured across these trials, including: stress, worry, anxiety symptoms and anxiety disorder (e.g. panic disorder, agoraphobia, generalised anxiety disorder). Other outcomes included depressive symptoms, workplace health, health complaints, positive and negative affective symptoms. Overall, the evidence base for the included studies was rated A (Excellent) in line with the NHMRC evidence matrix. Table 5 contains a description of this rating.

Depression-focused studies: 15 different internet or app-delivered programs were identified across 16 RCTs (Level II evidence), one pseudo-randomised trial (randomisation based on participant preference, rated III-1), and one comparative study (rated III-3), along with two systematic reviews specifically on work with depression incorporating internet or mobile technologies (Level I evidence). Importantly, a range of outcomes were measured across these studies, primarily depressive symptoms. Secondary outcomes included dysfunctional attitudes (one RCT), anxiety symptoms (two RCTs), treatment preference (one RCT), depression-free years (one RCT), wellbeing (one RCT), cost effectiveness (three RCTs, one systematic review) and general health (one RCT). This provides an excellent body of evidence from which to draw information about the effectiveness of internet and app-delivered interventions for mild–moderate depression in adults. Thus, the overall evidence-base for the included studies focusing on depression is A (Excellent, see Table 5).

Studies with mixed depression and anxiety interventions: Seven programs were identified from the search strategy that addressed both anxiety and depression within the one intervention. This is important, given the significant overlap and co-occurrence of these symptoms and conditions in the real world. Of these, six were RCTs, one was an uncontrolled, naturalistic evaluation of people registering for an online clinic (Level IV evidence), and one of the RCTs included an evaluation of a naturalistic service model incorporating primary care referrals to the iCBT program (Level IV evidence). Two meta-analyses were identified that specifically examined the evidence for ‘transdiagnostic’ versus tailored interventions for depression and anxiety (Level I evidence). Thus, the standard of evidence for mixed mild–moderate anxiety and depression intervention programs identified by this Evidence Check is Excellent (rated A, see Table 5).

People aged 18–35 years: Six studies were identified in the review that specifically focused on internet- or mobile app-delivered interventions for younger populations to the exclusion of people over the age of 25. Four of these studies were RCTs (Level II evidence), and two were uncontrolled pilot studies (Level IV Evidence). The six identified studies involving young people targeted depression specifically⁵⁸, anxiety, stress and wellbeing^{44, 59}, depressive and anxiety symptoms simultaneously^{60, 61}, and appeal of the intervention.⁴⁵ One systematic review on young people and the prevention of depression was also identified (Level I evidence). Overall, the level of evidence on which to make recommendations about prevention/management of mild–moderate anxiety and depression in young people (particularly aged 18–25 years) is Excellent (Rating A, see Table 5).

People aged 65 years and over: No studies in this Evidence Check focused on internet- or app-delivered interventions for mild–moderate depression in people aged 65 years and over. This represents a significant gap in evidence on the applicability of these technologies for a fast-growing age-group in the Australian community. One study was identified⁵³ that attempted to address this gap, and reported on the outcomes

for people accessing the 'ThisWayUp' online clinic for anxiety and depression according to different age groups (18–24 years, 25–34 years, 35–44 years, 45–54 years, 55–64 years, 65 years and over). One additional study targeted people aged 60 years and over, using an uncontrolled, open trial design, that tested the feasibility of Managing your Mood, an iCBT for depression, among 20 Australians aged 60 years and over.⁵² Outcomes targeted across both of these studies included anxiety and depression symptoms, and acceptability of the interventions. This evidence was classified as Level IV evidence and, whilst promising, represents a 'Poor' (Rating D) evidence base for the use of internet/app-delivered interventions in older aged persons.

People from culturally and linguistically diverse backgrounds: Two studies identified in the search applied internet- or app-delivered interventions to people with a culturally diverse background, whose first language was not English.^{62, 63} The first study was carried out in Canada among people of Iranian background, and provided access to an iCBT program for depression, along with PowerPoint slides that explained the particular strategy/skill that was the focus of that lesson in the person's native language to provide some background to that lesson. Iranian therapists then interacted with the participants via email throughout the 12-week period in the person's native language (person sent homework, therapist sent feedback on homework). Depression was measured as the primary outcome of this trial, and participants were randomised into the iCBT intervention versus wait-list control. The second study was a trial comparing a range of mobile (gaming) and iCBT interventions among people of Hispanic/Latino backgrounds in the US, some of whom spoke English and some Spanish.⁶³ Participants were provided with the study interventions in either English or Spanish, with the Spanish translation provided by both native Spanish speakers associated with the research, and the 'Babble-on' resource. Depression was also a primary outcome of this trial. People nominated their top two preferred iCBT and mobile apps from a list provided by the study team and were randomised to receive one of these preferences for the study period. They were compared with English speakers from the same cultural group who received the same interventions in English (Level III-3 evidence). The evidence rating for internet- and mobile app-delivered interventions for depression and anxiety in groups from culturally and linguistically diverse backgrounds is C (Satisfactory), given only two studies were located for two cultural groups.

Consistency

This component of the available evidence assessed the results of the included studies and attempted to rate the consistency with which different studies and programs reported impacts on the same set of outcomes.

For the anxiety-focused studies:

1. **Stress and worry:** Two RCTs examined self-reported stress over time, according to intervention allocation, with both consistently reporting significant reductions in self-reported stress levels relative to controls amongst employees of a health insurance company exposed to a seven-session self-guided internet-based stress management intervention⁴² and adults in the general community receiving a four-week online relaxation program.⁶⁴ Two additional RCTs reported on worry as a key outcome and target of online interventions for anxiety. The first of these recruited people from the general population and asked them to record their worries in an online 'worry log' for a 6-day period.⁶⁵ Half of the 361 participants were additionally randomised to 'postpone' their worries over this time period to a designated '30-minute worry period' at the end of each day. The second RCT recruited 103 people with generalised anxiety disorder to a comparison of a 7-session therapist-guided internet-delivered treatment using mindfulness and acceptance-based strategies versus wait-list control.⁴³ Postponing worry did not have any additional benefit on number and severity of worry symptoms, however,

compared to wait-list control, the therapist-guided internet intervention produced significantly greater reductions in worrying severity and frequency.

2. **Anxiety symptoms and disorders:** Two RCTs reported on anxiety symptoms and anxiety disorders as key outcomes of the internet-delivered interventions under evaluation. In the Dahlin et al.⁴³ trial comparing seven sessions of online mindfulness and acceptance-based behaviour therapy with a wait-list control, moderate to large effect size reductions in generalised anxiety disorder were reported for those participants receiving the internet-delivered intervention at six months post-baseline. In an RCT of ‘transdiagnostic’ internet-delivered CBT (psychoeducation, cognitive restructuring, exposure to feared stimuli, how symptoms affect key relationships), participants with panic symptoms or phobias received 30–50-minute online sessions delivered once a week for four weeks. The comparison group was a wait-list control. Participants in the internet intervention group reported significantly greater reductions in anxiety symptoms, and significantly fewer met criteria for panic and phobic disorders at post-treatment assessment.
3. **Secondary outcomes:** All RCTs reported on outcomes for secondary symptoms and issues that largely reinforced the patterns observed for the anxiety-related outcomes. For example, significant reductions in depressive symptoms (including positive and negative affect) were observed for three RCTs^{42, 65, 66}, as were reductions in health complaints^{65, 66}, work-health.⁴² The one RCT reporting on quality of life, however, showed no effect of the internet-intervention versus wait-list control.⁴³

Based on the NHMRC evidence matrix (see Table 2) the overall consistency for anxiety-focused internet/app-delivered interventions is rated as A (Excellent), averaged across worry, stress, anxiety symptoms and anxiety disorders. Thus, the identified evidence for internet or mobile app-delivered intervention for anxiety, stress and worry, is highly consistent (achieving an A rating or ‘excellent’), indicating that programs targeting these outcomes and delivering 4–7 session interventions comprising relaxation strategies, stress management, CBT and acceptance-based therapies is highly effective. See Table 5 for a summary of this rating.

For the depression-focused studies:

1. **Depressive symptoms:** All studies identified in the Evidence Check as depression-focused reported on depressive symptoms as the primary outcome. All recruited participants were currently reporting mild-moderate depressive symptomatology at baseline, however, some eligibility criteria also required participants to meet a major depressive disorder diagnosis (n=4).

Two studies compared internet interventions to treatment as usual; one reported no difference between 8 sessions of iCBT+weekly emails from a therapist+3 telephone support calls and usual primary care consisting of antidepressant medication, other interventions,⁶⁷ whilst another reported superior reductions in depressive symptoms for Help4Mood (self-monitoring of mood, sleep, thoughts, behaviours, speech acoustics, virtual ‘coach’) plus usual care versus usual care alone.⁴⁶

Six studies compared their online intervention for mild–moderate depression to a wait-list control, and consistently reported superiority of internet/mobile interventions in reducing symptoms of depression.^{47, 68–72}

The remaining studies compared their internet/mobile delivered intervention for depression with active control groups. For example, Pots and colleagues⁴⁷ demonstrated that their ‘Living to the Full’ online intervention (nine modules of mindfulness and acceptance therapy with weekly emails from non-specialist coaches to encourage daily practice) was superior in reducing depression to an expressive writing online intervention. A 3-week online intervention targeting optimism in people at risk for depression comprising online positive psychology approach to increase self-efficacy and optimistic

outlook, cognitive bias training towards positive attitudes, viewing goals and achievement as worthwhile,⁴⁸ was superior to writing about daily activities for the same 3-week period. Seven modules of therapist-guided iCBT produced superior reductions in depressive symptoms over group-delivered CBT in mild–moderate depression participants.⁴⁹ A similar effect was found for ‘HelpID’, 12 sessions of CBT, mindfulness, social skills training with email/phone therapist guidance versus psychoeducation for depression⁵⁰, and adding 8 telephone calls from a trained psychologist significantly improved the impact of the 6-session online behavioural intervention MoodGYM in terms of depressive symptom reduction and depression-free years.⁷³ In contrast, low-intensity CBT (self-help resources+20–30-minute phone calls per week over 8 weeks) produced equivalent reductions in depression to an 8-week face-to-face supportive counselling intervention.⁷⁴ One additional RCT⁵¹ compared MoodGYM (4 online sessions of behavioural intervention) with iCBT (4 online sessions of cognitive and behavioural interventions), with iIPT (4 online sessions of interpersonal therapy focusing on roles and interpersonal difficulties). Older participants (aged over 25 years) reported better outcomes for depression from participating in the MoodGYM and iCBT interventions, whilst younger participants (18–25 years) reported better outcomes from the iIPT intervention. One further study (non-randomised, no control group) reported reductions in depressive symptoms pre- and post-intervention for their ePSTTM program, which offered 6 30–60-minute sessions of online problem solving skill building with therapist guidance available on request.⁷⁵

2. **Cost effectiveness:** Three RCTs reported a cost effectiveness analysis alongside the main outcomes of the trials. One of these reported that a 6-session online CBT+problem solving intervention (with email support provided by trained therapists) was 99% likely to be cost effective for gaining a depression-free year over usual care, and 64% likely to be cost effective for gaining a quality adjusted life year over usual care.⁷⁶ A second RCT reported that adding a telephone-based phone component (8 sessions with a therapist) to an automated online intervention (MoodGYM, 6 sessions behavioural therapy) was 55% likely to be more cost effective than MoodGYM alone.⁷³ The third study was somewhat inconsistent with these results, indicating that PsyFit (6 sessions unguided online intervention) was only 22% likely to be more cost effective than usual care;⁷⁷ however, this model assumed that people would not be willing to pay for either the PsyFit intervention or usual care. Of note is the systematic review by Arnberg and colleagues²⁷, which identified a cost effectiveness study iCBT for depression. This study reported a 70% probability of being more cost effective than treatment as usual.
3. **Secondary outcomes:** All studies reported a consistent impact on the secondary outcomes of dysfunctional attitudes⁴⁸, depression-free years⁷⁸, wellbeing⁷² and general health⁷² that supported the primary findings for depression, in favour of internet/mobile delivered interventions. This was across the control comparison groups that included wait-lists, usual care and active controls. The exception to this was anxiety symptoms, with one RCT reporting no difference between 8 sessions of iCBT and usual care in a primary care setting among people with mild–moderate depression⁶⁷, one study reporting small, but non-significant reductions in anxiety for the ‘Deprexis’ intervention⁶⁹, whilst another reported improved anxiety symptoms for an unguided intervention, PsyFit, over a wait-list control at 6 months.⁷² One study reported on participant preference for interventions⁷⁹, with participants asked which internet-delivered intervention they preferred to engage with; one employing a psychodynamic approach (iPDT) versus a CBT approach (iCBT). Preferences were in favour of iPDT, however, outcomes for depression and other secondary outcomes were in favour of iCBT. This is in contrast to the Barth et al.²² meta-analysis of different psychological therapies for depression, which reported no difference in effectiveness based on the theoretical orientation of treatment (interpersonal therapy, behavioural activation therapy, cognitive behaviour therapy, problem solving therapy, psychodynamic therapy and supportive counselling).

Bringing this together for the depression-focused studies identified in the Evidence Check, there is consistency in the reported effects of internet/app delivered interventions in: (a) reducing depressive symptoms (rated B, Good), (b) demonstrating cost effectiveness over usual care (rated B, Good), and (c) improving secondary outcomes not targeted by the interventions (rated B, Good). Thus, the overall quality rating for internet/mobile interventions to reduce depression is Good (B rating, see Table 5).

For studies with mixed depression and anxiety interventions:

- 1. Depressive symptoms:** All seven studies included depressive symptomatology as an outcome in their trials.

Two studies by the same research group compared 'transdiagnostic' versus 'tailored' iCBT; one recruited people with social anxiety disorder and measured depressive symptoms, symptoms of panic disorder and generalised anxiety disorder⁵⁴, and the other implemented the same protocol, but recruited people with major depressive disorder and measured anxiety symptoms.⁵⁵ These studies also compared the impact of guided versus unguided iCBT on key outcomes. In both studies, the treatment period was 8 weeks, over which time participants completed five modules of 'transdiagnostic' or 'tailored' iCBT. Where therapist support was provided, it was done remotely (email/telephone) and weekly. Unguided iCBT participants in both studies were provided with the option to contact a clinician if needed. For both studies, significant improvements in depressive symptomatology were reported across all intervention conditions, with no significant differences in depressive symptoms evident between guided/unguided iCBT, or 'transdiagnostic'/'tailored' iCBT. Another RCT²⁸ compared 'transdiagnostic' iCBT (6 sessions over 10 weeks, with fictional characters providing learning and skill building opportunities to better manage mood and worry) with a wait-list control; therapist support was provided to all iCBT participants on a weekly basis via email or telephone (as per participant preference). Significant improvements were reported in depression scores over time for iCBT wait-list.

Proudfoot and colleagues⁵⁷ compared their 7-week 'MyCompass' mobile and online intervention (with no human guidance) with an attentional control (7-weekly fact sheets about depression and anxiety), and a wait-list control. MyCompass included 12 modules of CBT, interpersonal therapy, problem solving therapy, and positive psychology from which users can choose and tailor their own program. Users can also schedule messages/emails to remind them to monitor three key thoughts/behaviours (e.g. irritability, worry, confidence, etc.) and receive automated feedback from the program based on these results. Results indicate that significant reductions in depressive symptoms occurred for MyCompass participants, and these were superior to attention control and wait-list conditions.

An additional RCT from the Netherlands⁸⁰ compared 5-weekly lessons of online problem-solving therapy (iPST) among people with mild–moderate anxiety and/or depression. Comparison groups were: iPST without therapist support, iPST with weekly active support from a therapist (one email per week, 25 minutes of time, active approach), with iPST plus support on request, with chat/email support alone (active, one email per week, 25 minutes of time), and a wait-list control. Support was provided by Masters level psychology students who received around 6 hours of training in the support model. Results indicated the superiority of iPST+active therapist support for depressive symptoms over wait-list control, with no other evidence of group differences observed.

The uncontrolled evaluation of the MindSpot Clinic⁵⁶ indicated that improvements in depressive symptoms occurred for participants registering for each of four online iCBT programs in the order of 47–51% over baseline levels. Data from the meta-analyses in this area are somewhat consistent with these findings^{30, 31}, particularly when comparing transdiagnostic and tailored interventions to a wait-list control; significant improvements in depression are noted relative to wait-list. However, when

comparing transdiagnostic to tailored approaches for mixed depressive and anxiety symptoms, depressive symptoms responded better to tailored iCBT

Another RCT from Ireland⁸¹ compared a transdiagnostic program, 'Mindwise 2.0' (4 modules of CBT-based strategies designed to increase psychological and behavioural flexibility by changing patterns of learned helplessness, decreasing avoidance and decreasing fear of failure), with a wait-list control. No therapist support was provided. Study results indicated that no change in depressive symptoms occurred for MindWise 2.0 participants compared to wait-list participants.

Thus, for depressive symptoms, with one exception, there are consistent improvements in depression evident when comparing transdiagnostic iCBT to wait-list control, therapist-guidance improves these results in some cases but not others, and there are inconsistent results for the benefits of transdiagnostic iCBT over iCBT tailored to depressive symptoms. Thus, the consistency rating for depression is Satisfactory (C rating, see Table 5).

2. **Anxiety symptoms:** Studies included in the Evidence Check are more consistent for anxiety outcomes than for depression. With one exception⁸⁰, all studies reported significant improvements in symptoms of anxiety relative to wait-list control. For the Kleiboer et al.⁸⁰ study, the results were consistent with the other RCTs in this area but did not reach statistical significance. Transdiagnostic versus tailored iCBT results for anxiety were also consistent, with the identified RCTs and meta-analyses in this area consistently demonstrating improvements in anxiety symptoms for both iCBT approaches, with no difference between iCBT that is tailored to anxiety versus transdiagnostic. Consistency ratings for anxiety outcomes for mixed depression and anxiety programs was A (Excellent, see Table 5).

Overall, the consistency of outcomes for mixed internet/mobile app interventions for depression and anxiety is very strong for anxiety outcomes, and less strong for depression. On average, the consistency is rated as a B (Good), however, given these differences, a rating for each outcome (depression and anxiety) has been included in summary Table 5.

People aged 18–35 years:

1. **Depression:** One Level IV Australian study carried out an evaluation of an online decision aid to enable young people to make appropriate and timely decisions about help seeking for depressive symptoms.⁵⁸ Depression was a key outcome of this study, with results indicating that young people who engaged with the tool reported reductions in depressive symptoms, and significantly improved decision making around depression help-seeking that was more in line with treatment guidelines for depression. The identified systematic review in young people focused on the prevention and management of depression in 18–25-year-olds. Results from the review were inconclusive about the prevention of depression (usually due to short follow-up time frames of included studies) but provided evidence of interventions that were effective in reducing depressive symptoms relative to wait-list controls or usual care. Interventions that were internet-delivered were equally as effective for reducing depression as face-to-face and group interventions, as were guided and unguided internet interventions. Thus, although drawn from a very small body of evidence, there is consistent evidence (A, Excellent) that internet and app-delivered interventions are effective in reducing depression in young people.
2. **Anxiety and stress:** Two RCTs focused on anxiety and stress symptoms as key outcomes for their trials. The first of these⁴⁴ tested the impact of 'Destressify', an app delivering mindfulness-based stress reduction five days per week for four weeks. The app was tested in a University undergraduate student population in Canada and compared with a wait-list control. Results demonstrated that significantly greater reductions in trait anxiety were associated with 'Destressify' than wait-list participants, along

with significantly greater increases in general health, energy and emotional wellbeing. The second RCT compared a 'present control' online intervention with an online stress reduction intervention among College students in the US.⁵⁹ The 'present control' intervention comprised four modules, completed over a two-week period (60 minutes in total). Content included video presentations from experts, exercises designed to increase past, present and future control, and to teach a focus on present control as a means of stress reduction. Stress logs were also kept as part of this information. By comparison, the stress reduction online intervention provided participants with information about common stressors experienced by College students. 'Present control' students reported significant decreases in perceived stress and symptoms of stress compared to the stress reduction students. Thus, the evidence is consistent (A, Excellent) for the impact of these interventions on anxiety and stress symptoms, relative to wait-list controls, in young people.

3. **Depression and anxiety together:** Most studies among younger populations measured depression and anxiety as co-primary outcomes or reported the impact on both depression and anxiety as secondary outcomes. A Canadian RCT among university students compared an online self-help program for mild–moderate anxiety, depression and stress with a wait-list control.⁶⁰ This online intervention offered students five modules of CBT-focused strategies to manage stress, reduce depression and anxiety, with therapist guidance provided alongside (trained undergraduate or postgraduate students, one telephone call (15–20 minutes) or email (1–2 page) per week – as per participant preference, no therapeutic advice). Significant reductions in symptoms of depression, anxiety, and stress were observed in the intervention group over wait-list controls. The Frazier et al.⁵⁹ study also reported significant reductions in depression and anxiety for the 'present control' intervention participants over the stress reduction condition. A US-based study with first year university students⁶¹, compared internet-delivered acceptance and commitment therapy (two lessons, the first exploring values and the second exploring and managing barriers, no therapist support) versus a wait-list control. Students in the intervention condition reported significant reductions in depression and anxiety compared to wait-list controls. Thus, the evidence is consistent (A, Excellent) for internet interventions that reduce depression and anxiety simultaneously in young people with mild–moderate depression and anxiety symptoms, relative to wait-list controls
4. **Appeal:** One Australian study examined the mobile app 'BlueWatch' designed to increase wellbeing and resilience in young people aged 18–25 years.⁴⁵ This intervention offered audio-based activities, journaling, self-monitoring and CBT-based strategies. The study was an end user/expert stakeholder assessment of the utility and appeal of 'BlueWatch', rather than providing any measurement of mental health outcomes or impacts of the intervention. Feedback from young people in the target population for the intervention indicated very high endorsement of the app features, functionality and scope. Interestingly, mental health professionals, who were also surveyed for their feedback on the tool, expressed concerns about young people self-navigating through the intervention, and indeed providing the app as a self-directed tool without therapist support. It is important to note that these concerns were not expressed at all by the young people themselves.

Thus, overall, the evidence is consistent that internet/app-delivered interventions are effective among younger people (18–25 years) in reducing depression, reducing anxiety/stress, and reducing both depression and anxiety simultaneously compared to wait-list controls. There is also emerging evidence that an app-based intervention providing a range of strategies and features is appealing to a younger audience.

People aged 65 years and over:

1. **Depression:** One Australian study evaluated the use of an iCBT program among 20 Australians aged 60 years and over.⁵² This intervention provided 5 weekly educational lessons and homework activities for participants around sleep, mood, health and wellbeing, access to a moderated discussion forum and

weekly telephone or email contact from a clinical psychologist (average 74 minutes per participant). Follow-up assessment indicated significant reductions in depression were made by participants who used the iCBT package. In the other Australian study, depression outcomes for participants aged 65 years and over were compared to their younger aged counterparts as they completed the 'ThisWayUp' iCBT course for depression.⁵³ This iCBT program comprised six online treatment sessions, fully automated with no therapist support and using psychoeducation about depression, behavioural activation, maintaining factors for depression, challenging thoughts, problem solving, graded exposure, assertiveness and relapse prevention. Results indicated that participants aged 65 years and over reported significant reductions in depression, similar to those made by younger aged participants. Thus, the small body of evidence suggests that iCBT is effective in reducing depression among people aged 65 years and over.

2. **Anxiety:** Dear and colleagues⁵² also measured anxiety as a secondary outcome in their cohort of participants aged 60 years and over. Significant reductions were reported between baseline and follow-up assessment in anxiety symptoms by participants in the study.
3. **Acceptability:** the iCBT interventions across both studies were rated as highly acceptable to participants, providing promising endorsement of technology-based approaches in older-aged populations.

Although based on a very small body of evidence, the available evidence is consistent that iCBT approaches are effective in reducing anxiety and depression in people aged 65 years and over and is rated as acceptable to this specific age group (A, Excellent).

People from culturally and linguistically diverse backgrounds: One study of people with an Iranian background indicated that depression scores were significantly reduced for people using the iCBT program (with tailoring provided by Iranian therapists) compared to a wait-list control.⁶² The same results were reported for another study of people from Hispanic/Latino backgrounds in the US, where people completing a mobile app-delivered game or an iCBT program reported significant reductions in depression for a Spanish-translated version of these resources, compared to the same programs implemented with English speaking participants from the same cultural background.

Clinical impact

For the anxiety-focused studies: No RCT was identified that compared guided with unguided internet-delivered interventions for anxiety, although four of the five identified RCTs were unguided interventions (⁴³ Dahlin et al employed a therapist-guided internet program, using a clinical psychology graduate student to provide monitoring and trouble shooting up to 15 minutes each week per participant). It is also of note that the Cochrane review in this area reported no significant difference in outcomes between guided and unguided online interventions for anxiety in adults, albeit that the quality of the studies contributing to this part of the review was low.

The identified RCTs for the Evidence Check recruited participants from the general community, online forums, online advertising and via workplaces. Of interest is that, despite all but one RCT specifically seeking people with identified generalised anxiety disorder, people with a range of severity of anxiety, worry and stress sought participation in these studies, indicating the clinical utility of these approaches to assist people with anxiety-related concerns.

Overall, according to the NHMRC body of evidence matrix (Table 2), the clinical impact of the included studies for the Evidence Check in relation to interventions to reduce worry, stress, anxiety symptoms and

anxiety disorder, and to improve depressive symptoms, along with workplace and general health is rated as a B (Good). More work is required to explore the impact of guided versus unguided approaches in this population. See Table 5 for a description of this rating.

For the depression-focused studies: No study in this Evidence Check compared guided and unguided internet-delivered interventions for depression. The Barth et al.²² meta-analysis of different psychological therapies for depression reported no difference in effectiveness based on the format of delivery (individual or group) or treatment setting (face-to-face, telephone, or internet), providing good evidence for the use of telephone and internet delivered (low intensity) approaches. Only three of the 15 programs identified in this review offered their internet/mobile interventions without therapist guidance 3-week online optimism intervention; 4-session iCBT, iIPT, or MoodGYM; and PsyFit;^{48, 51, 77} These studies recruited people at the milder end of the depressive severity spectrum, such as those 'wanting to feel happier', those who spontaneously accessed an online chat room for concerns about depression, or mild–moderately depressed community members. The remaining 12 programs/studies targeted people who were experiencing moderate depressive symptoms at study entry, including some who met criteria for lifetime major depressive disorder. Of these, six programs provided 'therapist guidance' via once weekly emails by trained clinical psychology masters students or coaches and encouraged engagement with the online program. Two programs provided a combination of email and phone-based support throughout the intervention period; weekly emails as per the email-only studies plus telephone calls of between 15–30 minutes duration at the commencement of the treatment period, mid-treatment and treatment end. Two further programs provided email or phone support at the request of the participants (i.e. no proactive, scheduled support, but support made available when initiated by the participant), however, no information was provided on the uptake of this support. Two final studies provided extensive telephone support alongside their online interventions, one targeting people with persistent sub-threshold depressive symptoms (8 20-30 minute calls alongside 8 online modules⁷⁴) and another recruiting people with a minimum experience of current, moderate depressive symptoms (one 30-40 minute initial phone call, six 10-20 minute weekly phone calls, one 10-20 minute treatment cessation phone call alongside six sessions of MoodGYM⁷³). This reflects the evidence from the identified systematic reviews in this area. The RCTs included in the Arnberg et al.²⁷ review reported that remote therapist support for online internet programs was generally provided via emails, messages, or telephone, and was of the order of 10–20 minutes duration each week.

One interesting model of therapist support was provided in a series of iCBT models testing the 'Deprexis' intervention.⁶⁸⁻⁷⁰ 'Deprexis' is a US-based intervention, incorporating 10 modules of iCBT of 10–60 minutes duration, depending on the speed of reading or motivation of the program user. Daily messages are automatically sent from the program to encourage engagement. This model of iCBT offered optional, participant-initiated therapist support for those scoring below 10 on the Patient Health Questionnaire PHQ-9,⁸² indicating mild depression, with email-based therapist support built in only for those people scoring higher on the PHQ-9 at entry to the study/program. This model of 'stepped' therapist support has potential clinical utility, offering more intense levels of monitoring and proactive intervention from clinicians titrated against symptom severity. It is noted that 'Deprexis' recorded a significant impact on depressive symptoms, and whilst an impact was noted on anxiety symptoms in the same direction, this was not statistically significant.

Like the anxiety-focused programs, participants were all living in the community. Recruitment was usually via online advertisements, and participants accessed the programs from their preferred port of internet/mobile access, in devices provided in the waiting rooms of primary care settings, or via provided terminals in public healthcare settings. Given the high association between depressive symptoms and suicidal thoughts and behaviours, it is important that no adverse events or negative safety implications

were reported for any of the programs identified in this Evidence Check. Effect size differences between intervention and control groups were moderate in size, indicating substantial clinical impact.

Thus, the overall clinical impact of internet and app-delivered interventions for mild–moderate depression identified in this Evidence Check is rated as B (Good, see Table 5). More work is required to understand the impact of guided versus unguided interventions on depression outcomes in this population.

For studies with mixed depression and anxiety interventions: The clinical approach in the identified studies addressing mixed anxiety and depression was to offer people experiencing a mix of symptoms ‘transdiagnostic’ interventions that target the shared factors between anxiety and depression and provide people with the same intervention regardless of severity of either anxiety or depressive symptoms. This is an important clinical approach, given the significant overlap and co-occurrence of these symptoms and conditions in the real world. Public health interventions are needed that reduce the risk of these conditions⁵⁷, thus internet-interventions that can address anxiety and depressive symptoms as they co-occur, and at mild–moderate levels of severity, have the potential to significantly improve work and social disability, quality of life and wellbeing. Of further note is that two studies^{54, 55} used the same methodology to test the impact of a depression-focused versus a transdiagnostic iCBT program on symptoms of anxiety, and an anxiety-focused versus transdiagnostic iCBT program on symptoms of depression. These studies additionally compared therapist-supported interventions (with trained clinicians providing phone and email contact on a weekly basis throughout each 5-week intervention period that focused on problem solving, progress reinforcement and troubleshooting) with unsupported interventions (with an option to contact a clinician if needed). Across both studies, the transdiagnostic iCBT (which provided no condition-specific information or strategies but provided generic training in CBT skills/strategies) produced similar results to iCBT focused on anxiety or depression for both reductions in depressive and anxious symptoms, and no significant differences were observed for supported versus unsupported versions of the internet interventions. Thus, this body of work provides some of the first specific evidence for the utility of unguided, transdiagnostic internet interventions (involving CBT) for people with mixed depressive and anxious symptoms. The same research group provided an evaluation of their MindSpot virtual clinic service which was also picked up by the Evidence Check.⁵⁶ Although the study was a naturalistic, uncontrolled evaluation of service users of their online clinic, results indicated 47–51% improvement in anxiety and depressive symptoms occurred for Australians registering for their programs. This improvement was made with an average therapist input of 112 minutes per person registering for the program (manualised weekly emails and phone calls offered to all). Although no comparisons of guided versus unguided iCBT interventions were made in this particular study, it is possible that similar gains might have been made without clinician input.

Another Australian study examined therapist-assisted iCBT in both a randomised trial, and then in a clinical translation framework (non-randomised) into a primary care setting.²⁸ In this service model, general practitioners were able to ‘prescribe’ the therapist-supported iCBT intervention to patients attending their clinics, which was accessible via the ‘ThisWayUp’ online clinic. Although the results of the translational study were similar to the RCT in terms of the impact of the iCBT program on anxiety and depressive symptoms, adherence to the iCBT program was significantly lower than in the RCT. This is quite a common finding in the internet/mobile app field, however evidence is presented here that this has not had an impact on outcomes.

Of particular interest is the Australian ‘myCompass’ study, which offered a suite of online modules and monitoring tools to people with depression and anxiety symptoms without any therapist support. The intervention produced very rapid reductions in depression, anxiety and stress (particularly for depression)

and produced significant improvements in work and social adjustment. It was particularly effective in managing depression. This is an intervention that is in the Australian public domain, is effective, addresses mild-moderate symptoms of both depression and anxiety, can be implemented without therapist assistance, and has very high clinical utility.

Across the Australian and international studies/programs included in the Evidence Check, the identified evidence for programs addressing mixed anxiety and depressive symptoms indicates excellent clinical utility for unsupported iCBT interventions (3 of 7 studies), with three studies only offering supported iCBT interventions, and one international study (the Netherlands) providing evidence for supported iCBT over unsupported models of implementation.⁸⁰ Clinical utility is rated as A (Excellent, see Table 5).

People aged 18–35 years: It is interesting to note that, in contrast to samples involving a wider age range, those studies testing programs for people with an upper age limit of 25 years did not offer extensive therapist support or guidance alongside the internet- or app-delivered interventions. One Australian study in fact noted that mental health professionals engaged in a review of the 'BlueWatch' app identified this as a concern⁴⁵, although the target population for the app (young people) did not see this as a barrier or deterrent. It is not clear why therapist support was not a central feature of the interventions offered to young people in the Evidence Check, however, it is generally accepted that young people do not seek real-time, live therapist support in the way that older age groups might, and that young people are generally more accustomed to interacting entirely online. It is also possible that the studies in this Evidence Check targeted young people with the assumption that they were experiencing milder forms of depression and anxiety that perhaps did not require extensive therapist monitoring or support. Certainly, the targeting of the interventions towards wellbeing, resilience and help-seeking are suggestive of this. Thus, the clinical utility of offering young people internet- or app-delivered interventions for depression and anxiety is very large (A, Excellent), particularly if they are aimed at preventing a progression to depression/anxiety or help to manage some of the pre-cursors to these disorders.

People aged 65 years and over: One study identified in this Evidence Check provided no therapist guidance alongside an iCBT intervention for depression, whilst the second study provided weekly phone calls or emails and an online moderate forum. Both interventions demonstrated strong reductions in depression for participants aged 65 years and over who engaged with these programs, with large effect sizes from pre- to post-treatment. Note there were no control groups in either of these studies with which to compare change. Of note is that in the Hobbs et al.⁵³ study, general practitioners more frequently referred people aged 65 years and over to iCBT than they did people aged 55–64 years. No reasons behind this were explored. It is also important that participation rates in both studies of iCBT indicated that people aged 65 years and over can and will engage with technology for depression management, and that they rated acceptability of the iCBT interventions (with and without therapist guidance) highly. Thus, the clinical impact of iCBT among people aged 65 years and over is very large (A, Excellent).

People from culturally and linguistically diverse backgrounds: The clinical impact of the two studies identified using cultural adaptations to iCBT is rated as D (Poor) given it only relates to two cultural groups, and two methods of cultural adaptation. These models rely heavily on having access to a native speaker who is also a trained clinician (psychiatrist or psychologist) to provide the cultural adaptation for people who are engaging with the iCBT program. In lieu of other evidence, however, this does provide some guidance as to how email interaction and online translation services can be used to overcome language barriers with an English iCBT or mobile app-delivered program, with one study providing evidence of good clinical impact relative to a wait-list control. Much more work needs to be carried out in this area.

Generalisability

For the anxiety-focused studies: All of the included studies met all key criteria of interest to the Evidence Check. This included the desired age range (18 years and older) and target population (people at risk of, or experiencing, mild–moderate depression or anxiety). This translated to an overall NHMRC evidence matrix rating (see Table 2) for the generalisability of the included studies of A (excellent, see Table 5). It is noted, however, that no programs were identified for the prevention of anxiety in adults.

For the depression-focused studies: Like anxiety, the studies identified in the Evidence Check all recruited participants with mild–moderate depressive symptoms and met all key criteria of interest. Thus, the rating of generalisability of the included studies is A (Excellent, see Table 5).

For studies with mixed depression and anxiety interventions: All studies met the key criteria of relevance for the current Evidence Check and focused on the target population for the review. Generalisability is rated as A (Excellent, see Table 5).

People aged 18–35 years: As a distinct age group, 18–25 year-olds were generally targeted by the studies identified in this review, in addition to being part of studies that recruited a wider age range. No studies focused exclusively on 18–35 year-olds, rather these age groups were often included as part of lifespan-wide recruitment strategies reported in the above studies. The main difference between interventions offered to 18–25-year-olds was the reduced inclusion of therapist support (discussed in Clinical Impact above). It is unclear whether any specific modifications or considerations are necessary for 25–35 year-olds, who themselves are often going through important life transitions in this decade (e.g. first house, first children, marriage/long-term relationships, first job). However, given the results of the studies across the lifespan, it is likely that interventions helpful for other age groups will also be of assistance in the 25–35 year age group. Thus, the generalisability to the 18–35 year age group is Good (B, see Table 5).

People aged 65 years and over: The two available studies included people aged 65 years and over as a subset of a larger group recruited to: (a) a naturalistic evaluation of the online 'ThisWayUp' clinic, or (b) a feasibility study of iCBT in people aged 60 years and over. Results are promising in this area, given people in these age groups engaged with and responded to internet interventions for depression as well as other age groups. However, little is known about what additional support or strategies might be required to appropriately respond to mild–moderate depression and anxiety in people aged 65 years and over. Thus, the generalisability rating for this evidence is Poor (D, see Table 5).

People from culturally and linguistically diverse backgrounds: It is likely that the results of these studies, if the intervention and cultural adaptation were carried out in the same way, would result in the same outcomes for people of Iranian backgrounds and those with Hispanic/Latino backgrounds. Thus, in this sense, generalisability is good. However, these are the only cultural groups for which an adaptation has been reported/identified in this Evidence Check, and it is uncertain whether a similar approach to adapt other English iCBT programs for depression or anxiety would translate well to populations with other cultural backgrounds. Generalisability is rated as D (Poor).

Applicability

For the anxiety-focused studies: Importantly, none of the included studies were conducted in an Australian setting. Two RCTs were conducted in Germany, two were based in Sweden and one was in the Netherlands. This is not surprising given, internationally, this is where much of the work in this area is being conducted. Although many of the interventions described were provided in German or Swedish (the native language of

the country), the concepts employed in these interventions are standard inclusions in many face-to-face anxiety interventions. Given these studies recruited from the general community, using online advertising methods, it is plausible that these interventions could be applicable to the Australian context. It is also highly plausible that the results reported in these studies would be replicated in Australian settings; however, further studies are required to confirm these observations.

Overall, according to the NHMRC body of evidence matrix (Table 2), the applicability of the identified studies to the Australian setting was rated as C (Satisfactory, See Table 5 for a description of this rating).

For the depression-focused studies: None of the included studies were conducted in an Australian setting. Two RCTs were conducted in Germany, two were based in England, three each were based in Sweden and the US, and one was in the Netherlands. One study came from Ireland, Canada and Scotland. Similar to the anxiety-focused programs and studies, it is likely that much of the content and delivery of the identified programs could be translated into an Australian context, however, more research is required to confirm this is the case. More work to understand these important translational questions is required, and thus Applicability was rated as C (Satisfactory, see Table 5).

For studies with mixed depression and anxiety interventions: Unlike the single-focused programs, five out of the seven programs identified through the search strategy were developed and tested in Australia. One came from the Netherlands and the other from Ireland. Three studies came from the one research group in Australia and included real world evaluations of an online clinic (service model evaluation) and programs offered within the clinic. Applicability is rated as A (Excellent, see Table 5).

People aged 18–35 years: The identified studies among young people were from Australia (two), Canada (two) and the US (two). It is thus highly likely that the results reported in this Evidence Check are directly applicable to the Australian context. It is noted that the majority of the studies recruited young people from university campuses and first year university degrees. It is not known whether young people outside of these settings would respond to these interventions in a similar way to those studying at university or College. This does limit the applicability somewhat to a B (Good).

People aged 65 years and over: Both studies were carried out in Australian settings and are thus highly applicable to the Australian context (A, Excellent).

People from culturally and linguistically diverse backgrounds: The studies were carried out in Canada, using an English iCBT or mobile app-delivered program, with emails, PowerPoint slides, and direct Spanish translations used to convey key treatment messages and support in the participant's native language. It is likely that a similar model would translate well to Australia, provided native Iranian/Spanish therapists were available to assist with the translation efforts. It is unknown whether this applies to other cultural groups within Australia. Thus, the Applicability rating for people from culturally and linguistically diverse backgrounds is given a C (Satisfactory).

Summary of availability and quality of studies exploring internet- and mobile app-delivered interventions for mild–moderate depression and anxiety in adults

Table 5 displays the overall evaluation of each component of the evidence drawn from the included studies in the rapid review that met all key criteria for inclusion. In summary, based on the above analysis and Table 5, the findings of the review of all included studies is promising and consistent in support of internet- and mobile app-delivered interventions to manage anxiety and depression (alone or in combination) in adults. Note that no studies on prevention were identified.

Studies that focused exclusively on young people (aged 18–25 years) supported the findings of those that did not place any age limits on participation or intervention content/development. It is of note, though, that interventions involving young people up to 25 years tended to target 'wellbeing', 'stress reduction', 'help-seeking' and 'mood' rather than depression and anxiety per se. These trials did measure depression and anxiety and reported good outcomes in relation to these symptoms. Interventions for young people also did not generally offer therapist guidance alongside the internet and app-delivered interventions, perhaps indicative of a different preference for those aged under 25 years in terms of engagement with healthcare providers. Note that no studies targeted 25–35 year-olds as a specific age group. No RCTs were identified for people aged 65 years and over, although promising evidence from Level IV studies indicates the potential acceptability and effectiveness of iCBT in this age cohort. One RCT and one Level III-3 study reported on cultural adaptations of an English iCBT program using Iranian or Spanish clinicians (and an online translation service) to provide translation and email support. This intervention and model showed promise (significant reductions in depression relative to wait-list control) but it is unclear whether this model of cultural adaptation extends to members of other communities. No studies were found reporting on internet- or app-delivered interventions for people of Aboriginal and/or Torres Strait Islander descent, or on people identifying as lesbian, gay, bisexual, transgender or intersex.

Table 5. Overall evaluation of the studies utilising internet-delivered interventions for the prevention and management of mild-moderate depression and anxiety in adults*

Component	Rating	Description
ANXIETY		
<i>Evidence base</i>	A	Excellent: several level II studies with low risk of bias and systematic reviews with low risk of bias
<i>Consistency</i>	A	Excellent: RCTs consistently reported superior reductions in stress, worry and anxiety when internet-delivered or mobile app-delivered interventions were compared to no treatment, employed between 4–7 sessions of relaxation strategies, worry logs, mindfulness, acceptance-based behaviour therapies and cognitive behaviour therapies. This was true for both people with and without anxiety disorders
<i>Clinical impact</i>	B	Good – the clinical impact is substantial, given all interventions were associated with significant reductions in key outcomes relative to comparison groups, and emerging evidence to suggest that guided and unguided internet interventions, when employing cognitive behaviour therapy, are no different in affecting change in anxiety
<i>Generalisability</i>	A	Excellent: the populations included in the review are the same as the target population in question
<i>Applicability</i>	C	Satisfactory: probably applicable to Australian context with some caveats
DEPRESSION		
<i>Evidence base</i>	A	Excellent: numerous level II studies and several systematic reviews with low risk of bias
<i>Consistency</i>	B	Good: most studies are consistent in demonstrating reductions in depressive symptoms, cost effectiveness relative to usual care, and secondary outcomes not targeted by the intervention. Inconsistencies may be explained in choice of comparison groups (e.g. treatment as usual versus wait list versus active control)
<i>Clinical impact</i>	B	Good: most studies reported an impact of the internet/mobile app intervention relative to control of moderate effect size
<i>Generalisability</i>	A	Excellent: populations in identified studies are the same as the target group for the review
<i>Applicability</i>	C	Satisfactory: probably applicable to Australian context with some caveats
MIXED ANXIETY AND DEPRESSION		
<i>Evidence base</i>	A	Excellent: numerous level II studies and two systematic reviews with low risk of bias
<i>Consistency</i>	A	Excellent: anxiety outcomes consistently improve for internet/mobile app interventions employing both tailored and transdiagnostic interventions
	C	Satisfactory: depression outcomes – some inconsistencies in evidence for transdiagnostic interventions for depression, reflecting genuine clinical uncertainty about this approach
<i>Clinical impact</i>	A	Excellent: very large impact noted in studies included in the Evidence Check, with high quality evidence for models that use unsupported interventions as well as therapist-supported models

Component	Rating	Description
<i>Generalisability</i>	A	Excellent: populations in the included studies are the same as the target population for the review
<i>Applicability</i>	A	Excellent: most studies were conducted in Australia and are thus directly applicable to the Australian context

YOUNG PEOPLE (AGED 18–35 years)

<i>Evidence base</i>	A	Excellent: numerous level II studies and one systematic review with low risk of bias
<i>Consistency</i>	A	Excellent: studies support the impact of internet/app-delivered interventions among young people for depression reduction, anxiety/stress reduction, depression and anxiety simultaneous reduction
<i>Clinical impact</i>	A	Excellent: studies did not generally provide therapist guidance alongside internet or mobile app-delivered interventions in this age group, without any loss of impact on depression and anxiety
<i>Generalisability</i>	B	Good: studies focused on 18–25-year age groups and reported consistent results. No studies specifically targeted 25–35-year age groups, so it is unclear whether these results extend beyond 25 years of age
<i>Applicability</i>	B	Good: two studies were conducted in Australia, along with others from culturally similar countries such as Canada and the US. Most samples targeted university students, so a caveat is raised in relation to applicability to young people not at university

PEOPLE AGED 65 YEARS AND OVER

<i>Evidence base</i>	D	Poor: Level IV studies only examining the impact of internet- and app-delivered interventions on older aged cohorts (65 years and over)
<i>Consistency</i>	A	Excellent: available evidence is small, low quality, but consistent in demonstrating reductions in depression and anxiety associated with iCBT interventions among people aged 65 years and over.
<i>Clinical impact</i>	A	Excellent: the available evidence demonstrates very large effect size changes in depression and anxiety occur when people aged 65 years and over engage with internet- and app-delivered interventions
<i>Generalisability</i>	D	Poor: the populations studied in the available evidence are broadly the target of this review, however, no RCT exists to examine the impact of iCBT or other technologies in age groups 65 years and over
<i>Applicability</i>	A	Excellent: available studies were conducted in Australia

PEOPLE FROM CULTURALLY AND LINGUISTICALLY DIVERSE BACKGROUNDS

<i>Evidence base</i>	C	Satisfactory: one level II study and one Level III-3 study was identified with moderate risk of bias, involving people of Iranian background or those from Hispanic/Latino background
<i>Consistency</i>	A	Excellent: the one available RCT demonstrated important reductions in depression were made relative to wait-list control. The Level III-3 study was also associated with significant decreases in depression over time
<i>Clinical impact</i>	D	Poor: the model of cultural adaptation tested well in the two cultural groups targeted for each identified study, however, it is now known how this model

Component	Rating	Description
<i>Generalisability</i>	D	translates to other cultures and relies on having access to native speaking clinicians Poor: it is unclear how well these models will translate to people from other cultural backgrounds
<i>Applicability</i>	C	Satisfactory: these models of cultural adaptation are probably applicable to the Australian context

*As per http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf

Peer- and clinician-based interventions

Box 2: Overview of studies on peer-led interventions for mild–moderate anxiety and/or depression in adults

Overall strength of evidence: Satisfactory

Number of studies: 11

Outcome measures: depressive symptoms, anxiety symptoms, stigma, help-seeking, attitudes, social connectedness.

Conclusion: Interventions where the role of the peer leader was to build social connectedness through shared lived experiences, encourage self-management of symptoms, and provide navigation advice for service engaged were most effective across the outcomes measured. Interventions providing formal, time limited support and informal, ongoing (not time-limited) support showed promise. Peer support provided by telephone, texting, and online groups increases engagement in wellness activities, improves self-management of health in low-literacy minority groups, and increases social connectedness to a new community.

Barriers and Facilitators: Education for potential participants will be required regarding the focus of the peer-led intervention being on social connection, rules for participating and engaging with the intervention, and limits/boundaries for the group. Access to technology, security of data, disengagement, and cybersafety are additional risks to interacting in peer-led groups online. Face-to-face groups will be restricted to settings that have adequate space and resources to support these groups (and potentially access to catering and other strategies to encourage group attendance). Peer groups (online, in person) can be open access, not time limited, available all year around, and are less stigmatising than those run by professionals.

Workforce requirements: Any formal peer-led or supported intervention needs to be embedded within a network of support and supervision for those leaders, with adequate training provided around limits to support, managing distress, and encouraging help seeking and self-awareness of impact of the helping/support role on own symptoms. Informal, online groups may require less workforce support. Formal peer support leaders may need remuneration, depending on the nature and structure of the program.

Programs with potential for scalability: Reclink (Australian⁸³)

Evidence base

Eleven studies were identified during the Evidence Check that described peer- or clinician-led group programs for people experiencing depression or anxiety. Of these, five examined clinician-led groups (1 Level II, 3 Level III-3, 1 Level IV), five examined peer-led interventions (2 Level II, 3 Level IV), and one compared the experiences of men accessing both peer- and clinician- led interventions (Level IV). A range of outcomes was reported across the studies, including depression, anxiety, social connectedness and attitudes towards help-seeking.

Four of the 11 studies focused on older aged populations (1 clinician-led, 4 peer-supported). One study reported on an RCT of peer support training for university students (18–25 years). One study was conducted in a geographic area characterised by a diverse cultural background and low socioeconomic status (Australian study, clinician-led).

The quality of evidence across these studies was moderate, and lower for peer-led interventions. Thus, the Evidence Base for peer- and clinician-based interventions in this context is rated as C (Satisfactory).

Consistency

There was general consistency in results across the studies indicating the benefits of peer support (with limitations) and on clinician-led group interventions.

1. **Depression and anxiety:** The one clinician-led RCT identified in the review⁸⁴ compared group-delivered mindfulness-based stress reduction (MBSR, 8–10 sessions) with CBT (9 sessions) in US Veterans. Results indicated that at mild levels of depression at study entry, CBT outperformed MBSR for depressive symptom reductions, whilst at moderate-severe levels of depression, MBSR was superior to CBT. A Level III-3 trial conducted in Canada⁸⁵ compared videoconference-delivered group CBT with face-to-face group CBT, with participants allocated to their preferred mode of delivery. Thirteen weekly sessions were delivered to each group, which included adults with depressive and/or anxiety symptoms. The facilitator was a trained clinical psychologist. The videoconference CBT condition also offered participants the opportunity to connect online outside of the group, and to access additional resources and homework sheets online. No differences were recorded in adherence or reductions in depression between the two modalities. In an evaluation study (with no control group, Level IV) conducted in Canada, Hawley and colleagues⁸⁶ reported pre- and post-depressive outcomes for people who received 14 two-hour group sessions of the 'MindOverMood' intervention. Two group leaders provided the intervention (one experienced and one student clinical psychologist). Behavioural activation strategies produced the greatest reductions in depression for people with mild–moderate depression at study entry. Cognitive restructuring strategies had a significant impact on depression regardless of initial symptom severity. Core belief work, offered in this group format, was associated with increases in depression. Survey data across two Australian longitudinal studies were compared, in a region characterised by high levels of cultural and linguistic diversity and low socioeconomic status Level III-3.⁸³ Of the survey participants, a proportion were at risk of depression, were experiencing a range of socioeconomic difficulties (homelessness, disability, economic hardship), and had participated in a social worker-led community recreation group, 'Reclink', designed to increase access to social and recreational activities for disadvantaged persons. Over time, there were marginal decreases in depression observed. The other group of participants had been exposed to a clinical psychologist-led group (two 3.5-hour sessions) and reported significant reductions in both depression and anxiety. The final clinician-supported intervention was conducted in older aged Australians and in a residential aged care facility.⁸⁷ Group-based CBT was delivered by a postgraduate psychology student over 10

weekly sessions and compared to usual care. At post-treatment assessment, participants in the group CBT reported significant reductions in anxiety symptoms and depression symptoms (as measured by the Depression Anxiety Stress Scale) relative to usual care, but equivalent depression reductions as measured by the Geriatric Depression Scale. Thus, for clinician-supported interventions, there is consistent support for reductions in anxiety and depression, with some differential effects of intervention evidence based on initial severity of depression (B, Good). One RCT of peer-facilitated CBT in the US⁸⁸ compared 10 sessions of individual, peer-supported Overcoming Depression treatment with a wait-list control among adults aged 55–96 years. Peer supporters were mainly women, aged 47–85 years, who received 30 hours of training in the intervention prior to delivery. Peer supporters and participants would work through each session together, with the peer supporter helping the person to 'navigate' through the relevant information in each session. Reductions in depression were noted for participants in the peer-supported group relative to wait-list, however, this was not statistically significant.

2. **Attitudes, help-seeking, stigma:** One RCT conducted with university students in Sweden⁸⁹ compared the impact of training peer volunteers in DORA (depression outreach alliance) versus fire safety training as control. DORA trains peers to provide crisis support to distressed students. No changes were observed in peer depression or suicide knowledge, or self-stigma about help seeking relative to control. However, DORA-trained peers reported significantly improved crisis response skills, reduced social distance from a distressed peer, and reductions in social stigma for help-seeking.
3. **Social connectedness:** There was consistent evidence that, regardless of clinician versus peer support, social connectedness served to improve outcomes for depression and anxiety, and in some cases buffer against its impact. For example, in the Australian survey by Cruwys et al. Level III-3,⁸³ recovery from depressive symptoms increased for those in the 'Reclink' group who identified more closely with the group on a social level. This was also true for the clinician-led group in the same study, with reductions in both depression and anxiety, which increased the more participants were socially connected to the group. Two surveys among people aged 65 years and over support the role of social connection (as a form of peer support) in ameliorating depression. One US-based survey⁹⁰ conducted a longitudinal follow-up of older aged persons as part of the Health and Retirement Survey. These participants experienced a range of chronic physical health problems that placed them at high risk for depression (e.g. diabetes, heart disease, hypertension, cancer, etc.). Results indicated that positive spousal support (characterised by warm, emotional connection) weakened the impact of the physical health condition on the development of depression. However, negative social support from spouse, children, other family/friends served to increase the impact of the physical health condition on the development of depression. An Australian survey on online social connectedness among those aged 65 years and over⁹¹ revealed firstly that 84% of people surveyed in this age group engage in online activities between daily and 1–2 times per week. The most frequent online activity for this age group is connecting with friends online. Increased online social connectedness was correlated with significantly lower levels of depression. Survey respondents were also dichotomised into two groups: those still driving and those who had transitioned to non-driving. Among the non-drivers, levels of depression were higher than for current drivers. However, those non-drivers with high online social connectedness reported lower levels of depression, suggestive of a buffering effect of online social connection in this key transition phase of older age.
4. **Role of peer supporter:** Only one peer-supported intervention was identified that focused on the general population (as distinct from young people or older aged persons). This was a qualitative evaluation of the experiences of peer workers delivering and supporting the 'Partners in Recovery' program for people with depression.⁹² Peer workers in this study reported that a lack of role clarity and

low perceived worth by others about their roles increased the stress associated with peer work and had an impact on their personal recovery journey. Peer supporters felt that a key role for them is the development of consumer groups (the establishment and maintenance of people coming together to share a lived experience of depression), and that this would be possible with increasing recognition of the importance of peer work in mental health. A second study conducted interviews with males in England about barriers and facilitators to attending groups to support anxiety and depression.⁹³ Those with mild–moderate depression and anxiety more frequently accessed peer-led support groups, mainly due to feeling isolated and unable (or unwilling) to discuss problems with close family/friends. Those in the study who were unemployed and had greater mental health needs more frequently accessed professional-led groups. However, attendance at these groups needed much more encouragement from general practitioners and the therapists running the program (food provided, avoid the use of ‘counselling’ to describe the group). There was some reluctance to engage in professional-led groups because they were often time limited in nature, whereas peer-led groups operated year-round. The DORA study among peer volunteers at university also indicated that a key outcome for their trainees was engagement with the social aspects of support.⁸⁹

Across the available research, there is consistent evidence that clinician-led groups are associated with reductions in depression and anxiety, and when peers are trained to support CBT interventions, similar results are reported. There is also consistent evidence that social connection to a group (whether peer or clinician-led) is associated with a greater impact on depression and anxiety. There is some evidence that peer-led groups, which focus more on building social connections through shared experiences (rather than delivery of therapeutic skills) may be more successful at this. There is also consistent evidence that social support is a key and valued role for peers supporting others through their depression and anxiety journey. Only one study examined attitudes, particularly towards help-seeking, as a function of peer training (the DORA study) and indicated that training peer workers in the DORA protocol did not result in increased help seeking recommendations to mental health professionals. Thus, overall, the consistency of results for clinician and peer-led interventions for mild–moderate anxiety and depression is B (Good).

Clinical impact

The programs identified in the Evidence Check support the larger body of work indicating the benefits of clinician-led group-based interventions for depression and anxiety. The recent evidence reported above also suggests that for mild depression, CBT approaches are more effective than MBSR. The reverse is true for moderate–severe depression. There is some evidence that at mild–moderate levels of depression, group-based behavioural activation strategies are more effective than at severe levels of depression, and cognitive restructuring strategies are effective at any level of severity. When peer workers are trained in structured intervention delivery (e.g. ‘OvercomingDepression’), similar improvements in depression are reported. However, although lower intensity than individually-delivered therapy, these group-based treatments still required significant clinician input. This was ameliorated somewhat when peers were trained in the ‘OvercomingDepression’ intervention; however, the clinical utility of group-based interventions, when offered in face-to-face modality is restricted to services or settings that have adequate space and resources to support these groups (and potentially access to catering and other strategies to encourage group attendance). One study identified in this Evidence Check demonstrated similar rates of attendance and efficacy for group-based CBT delivered via videoconference versus face-to-face delivery. This represents a promising area of work, as it improves the potential clinical utility of groups in the management of mild–moderate depression and anxiety.

Peer support is a concept that also has historical significance, with peer workers integrated into service delivery across many healthcare settings. This has been slower to occur in mental health services. The studies identified in this Evidence Check suggest a key role for peer support and peer networks in buffering against the impact of depression and anxiety, particularly through key life transition phases. The evidence presented here suggests that the social connectedness that can be encouraged through peers with a shared lived experience can reduce depression and social isolation. The clinical utility of this approach is very large, given peer groups (online, in person) are generally not time limited, are available all year around, are potentially less stigmatising than those run by professionals, and thus are potentially easier to access. Even informal positive social support from spouses can offset the impact of major physical illness highlighting a potential role for family/carer-based support programs to facilitate this kind of support. Thus, peer support has high clinical utility in mild–moderate depression, and has demonstrated consistent impact across age groups, cultural groups and socioeconomic backgrounds.

Generalisability

All of the studies identified in the Evidence Check were carried out with people experiencing mild–moderate depression or anxiety (or a combination) making them highly generalisable (A, Excellent).

Applicability

Four of the 11 studies identified in the Evidence Check were conducted in Australia, three in the US, two in Canada, and one each in England and Sweden. Thus, the evidence is highly applicable to the Australian context (A, Excellent).

Summary of availability and quality of evidence for peer-supported interventions to prevent or manage depression and anxiety in adults

Table 6 displays the overall evaluation of each component of the evidence drawn from the included studies in the Evidence Check for peer- and clinician-supported groups for people experiencing mild–moderate depression and anxiety.

Table 6. Overall evaluation of the 11 included studies exploring the impact of peer-supported interventions for mild–moderate depression and anxiety in adults*

Component	Rating	Description
Evidence base	C	Satisfactory: several Level II and III studies exist but are subject to moderate risk of bias.
Consistency	B	Good: most studies consistent in reports that structure clinician/peer led interventions that lead to improvements in depression and anxiety; social connectedness to group (most common in peer-led interventions) increases the impact.
Clinical impact	C	Satisfactory (moderate) – clinician-led groups, and peers trained to deliver structure programs have some clinical utility, but limited by human and financial resources, unless integrated with technology.
	B	Good (substantial) – peer support, when emphasising social connectedness, has high utility and potential to buffer against the impact of depression and anxiety at mild–moderate levels.

Generalisability	A	Excellent: the populations included in the review are the same as the target population in question.
Applicability	A	Excellent: directly applicable to the Australian context with several Australian studies identified.

*As per http://www.nhmrc.gov.au/files_nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf

Email and text-based interventions

Box 3: Overview of studies on email and text-based intervention for mild–moderate anxiety and/or depression in adults

Overall strength of evidence: Excellent

Number of studies: 6

Outcome measures: Depressive symptoms, anxiety symptoms.

Conclusion: Interventions that provided automated, regular messages of support and help seeking were effective in reducing depression, anxiety, and the combination of both, in people at the mild–moderate end of the spectrum of severity for these conditions.

Barriers and Facilitators: Cultural adaptations required much more therapist support and specialist input from native speaking therapists or paid translators. Evidence from trials comparing supported and unsupported versions of interventions suggested both versions are equally effective in reducing depression and anxiety. This is a key advantage in taking these interventions to scale.

Workforce requirements: Some programs were implemented with brief therapist support (from five-minute weekly telephone contact through to weekly 30–40-minute phone sessions). However, there was no evidence of additional benefit in terms of depression or anxiety for those programs that included brief therapist support. Thus, these interventions could be incorporated relatively easily into primary and specialist healthcare settings with little additional workforce training or time required.

Programs with potential for scalability: **MoodMemo** (Australia⁹⁴), 10 weekly messages (12-25 years, New Zealand⁹⁵), **Manage your life online** (University students, England⁹⁶), **FeelingGood** (University students, USA³³), **Life Story** (60 years and over, Chinese adaptation⁹⁷), **GoodMoodGuide** (Adapted from English to Mandarin⁹⁸).

Evidence base

All six studies were RCTs, providing Excellent (A) evidence for the use of email/text-based interventions to manage mild–moderate depression and anxiety in adults. Four of these used depression as the primary outcome measure, and two had co-primary outcomes of depression and anxiety. Two interventions were trialled in culturally and linguistically diverse populations (Thai, Chinese), three targeted young people, and two targeted people aged 60 years and over.

Consistency

1. **Depression and Anxiety:** One of the six RCTs measured both depression and anxiety outcomes and was conducted in England.⁹⁶ This study compared the 'Eliza' intervention (a supportive counselling

intervention delivered via text-based interactions) with a newer version of Eliza called 'Manage your life online' (simulates questioning via a website that prompts thinking differently about one's problems). First year psychology students were randomised to one of these conditions and interacted with these programs for a period of two weeks. Equal reductions in depression, anxiety and problem distress were observed for both conditions, with no significant differences between the two programs observed. An NZ RCT⁹⁵ recruited young people aged 12–25 years (average age 19 years) to a study evaluating a text-message intervention. The intervention delivered three text messages per week for 10 weeks providing weekly challenges and inspirational thoughts to young people with mild-moderate depression and anxiety. Half of the sample was randomly selected to receive follow-up phone calls each week from trained family support counsellors, youth workers, or family/friends in addition to the text-message based intervention. Results indicated both groups significantly reduced their anxiety and depression over time, with no added benefit for symptoms reduction associated with the phone call support condition. One Australian RCT compared 'MoodMemo' emails (2 per week, advocating self-help, suggestions about how to implement self-help strategies) with control emails (2 per week, information about depression) among people with depressive symptoms.⁹⁴ No therapist support was provided alongside these interventions. At post-treatment assessment, both groups reported equal reductions in depressive symptoms, with no statistically significant differences between groups observed. A US-based RCT compared the 'FeelingGood' book (bibliotherapy) + a 5-minute weekly phone call from a therapist with a delayed treatment, placebo treatment (book on home organisation+5-minute weekly calls) with a no-treatment control among first year psychology students studying at university.³³ Results indicated that 'FeelingGood'+phone call was significantly more effective at reducing depression than the delayed treatment group and the no treatment group. No significant differences were observed between 'FeelingGood'+phone call and the placebo control, suggesting a likely effective approach with depression in this age group may be short, regular phone calls. An additional RCT was conducted in Singapore, among English-speaking participants aged 60 years and over.⁹⁷ Participants were randomly allocated to a 'life story' intervention (where health workers visited them in their homes 5 times over 8 weeks and interviewed participants about their life story, creating a journal of their lives, presented to them at week 8, or to a control group (who received the same visit but to just measure depression). At follow-up assessment, significantly greater reductions in depression were reported by the intervention group over controls. Importantly, this RCT was replicated in a Chinese population in Singapore (with Mandarin/English speaking health workers), with the intervention group reporting significantly greater improvements in depression over controls.⁹⁹ The sixth RCT in this area was conducted in Thailand, using a self-help manual (GoodMoodGuide) from Australia that was translated into Thai.⁹⁸ Several additional adaptations were also made from the Australian version of the manual (images, graphics, cultural references). The manual comprised 8 modules, taking approximately 1–2 hours each to complete, over an 8-week period. The Thai-GoodMoodGuide+weekly 5-minute phonecalls+standard care was compared with standard care+weekly 5-minute phonecalls. The GoodMoodGuide condition was associated with increased resilience compared to active control at follow-up assessment, and those with higher resilience reported lower depression and lower psychological distress. It is difficult to tell from the results whether any direct group difference existed in depression.

Overall, there is consistent evidence that text/email-based interventions (including bibliotherapy) lead to superior reductions in depression and anxiety for people experiencing mild-moderate depression/anxiety when compared to no treatment or usual care alone. When comparing these interventions to active (placebo) controls (e.g. supplemental phone calls, attention controls) there are no differences observed between groups for depression or anxiety. Consistent with the behavioural approach to managing mood and worry, it is likely that depressive and anxious symptoms, when in the mild-moderate range of severity,

respond well and quickly to regular, structured activities (phone calls, 'doing' tasks). However, duration of these treatment effects over the longer term are unclear. Thus, the consistency rating for this body of research is Excellent (A).

Clinical impact

Four of the six identified studies in this Evidence Check provided some form of therapist contact alongside the text/email/bibliotherapy intervention. For the 'life story' intervention, this was extensive, as therapists (healthcare workers) conducted interviews with participants over 8 weeks (5 30-40 minute sessions) to construct and develop the life story of each participant. Although this translated well to a Chinese population, this may not be practical to implement in Australian healthcare settings. Two RCTs, both implemented with young people at university, provided a 5-minute weekly phone call alongside the bibliotherapy or text message interventions, which may be more manageable in the Australian healthcare context. Of interest is that for one of these RCTs, conducted in NZ, there was no added benefit for depression reduction provided by the addition of these phone calls.⁹⁵ Like the remaining two RCTs, when compared to no treatment (including wait-list controls) email/text message interventions were effective at reducing depression without additional therapist support. This makes the clinical utility of these interventions very large, given there is evidence of effectiveness without therapist support. Also, the provision of a self-help manual or book is a strategy that could relatively easily be incorporated into usual care across primary and specialist settings. Thus, clinical utility is rated as B (Good).

Generalisability

Generalisability of these studies is rated as A (Excellent) as they all included the target population for the Evidence Check, with additional evidence available for young people, older people and people from culturally and linguistically diverse backgrounds.

Applicability

One Australian study was identified, along with a Thai adaptation of an Australian intervention. One study was from NZ, another from the US, one from England and two from Singapore. These are similar to the Australian context and thus applicability is rated as Excellent (A).

Summary of availability and quality of evidence for email/text-based or bibliotherapy interventions to prevent or manage depression and anxiety in adults

Table 7 displays the overall evaluation of each component of the evidence drawn from the included studies in the Evidence Check for email/text/bibliotherapy interventions for people experiencing mild–moderate depression and anxiety.

Table 7. Overall evaluation of the six included studies exploring the impact of text/email/bibliotherapy interventions for mild–moderate depression and anxiety in adults*

Component	Rating	Description
Evidence base	A	Excellent: several Level II studies and a Level I systematic review in this area
Consistency	A	Excellent: text/email/bibliotherapy is effective in reducing depression and anxiety relative to no treatment controls. Text/email/bibliotherapy is no more effective than placebo/active control conditions in reducing depression/anxiety

Clinical impact	B	Good (substantial): some interventions were implemented with therapist support. Evidence that, among young people, the addition of therapist support did not improve outcomes. Evidence that interventions implemented without support are also effective
Generalisability	A	Excellent: the populations included in the review are the same as the target population in question
Applicability	A	Excellent: directly applicable to the Australian context with several Australian studies identified

*As per http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf

Exercise-based interventions

Box 4: Overview of studies on exercise-based interventions for mild–moderate anxiety and/or depression in adults

Overall strength of evidence: Excellent

Number of studies: 14

Outcome measures: depressive symptoms, anxiety symptoms, worry, negative emotions.

Conclusion: Interventions comprising a range of intensity levels of exercise produced benefits for depression, anxiety and worry/distress over time for men, women, young people and older aged populations. Those interventions that were of light intensity (e.g. yoga) or high intensity (75% of maximum heart rate) showed the largest benefit for depression, provided they were engaged with three times per week for one-hour sessions. For older aged groups, consistency was more important than length of exercise session; three times per week for 15 minutes each had important anti-depressant effects.

Barriers and Facilitators: Given the supervision required to ensure safety and compliance with these exercise regimes, scaling up exercise-based interventions may be a challenge. Most gyms will offer access to personal trainers and/or exercise professionals; however, this comes at a cost which may also pose a barrier to access. For people with experience in yoga and related stretching (light intensity) exercise, instructional videos may facilitate access to these interventions, and can be accessed on YouTube for example. Walking is highly accessible and may be an accessible starting point.

Workforce requirements: All exercise programs were carried out under supervision to ensure the physical safety of participants. This was generally done by exercise professionals. Prior to commencing any physical activity regime, clearance from a general practitioner is recommended.

Programs with potential for scalability:

Exercise sessions of one hours' duration three times per week show the most benefits for depression. These sessions need to be either light intensity (e.g. yoga) or vigorous-high intensity (75% of maximum heart rate) for maximum benefit.

Young people – one 30-minute session of vigorous physical activity (65–86% maximum heart rate, e.g. running on a treadmill) has immediate impact on worry.

Older aged people – at least moderate physical activity, consistently has largest benefit for depression and negative emotions (e.g. 15-minute sessions, three times per week).

Evidence Base

Fourteen individual studies identified during the Evidence Check implemented some form of physical activity intervention as a means of managing or reducing depression and anxiety in adults. All fourteen studies were randomised controlled trials, providing an Excellent (A) evidence-base from which to evaluate the impact of exercise-based interventions on depression and anxiety. Of the included studies, three recruited people aged 65 years and over, and one focused specifically on younger people (university students). One study was conducted amongst a female sample characterised as low socioeconomic status.

Consistency

1. **Anxiety and Worry:** One of the identified studies measured worry and state anxiety as outcomes following an exercise intervention among 18–35-year old women with anxiety symptoms.¹⁰⁰ This study compared the impact of one-off acute aerobic exercise session (30 minutes running on a treadmill at 65–85% of maximum heart rate) with a control condition that asked participants to sit upright in a chair for 30 minutes. Significant reductions in worry and state anxiety were observed in the exercise condition.
2. **Negative Emotions:** One study conducted a trial amongst students and staff at Harvard University that tested the relative efficacy of a 30-minute aerobic exercise session versus a 30-minute stretching session.¹⁰¹ Results indicated that aerobic exercise significantly reduced negative emotions relative to stretching immediately post-exercise session. In an older aged cohort, Awick and colleagues¹⁰² randomised people to 1 hour 3*weekly sessions of exercise over 24 weeks, comprising either dance, walking, or strengthening/stretching/stability. All sessions were supervised by a trained exercise leader. There were no group differences observed at 6-month follow-up; however, those participants who increased their levels of moderate–vigorous physical activity reported significantly greater reductions in psychological distress at follow-up assessment.
3. **Depression:** The remaining studies examining exercise interventions focused on depressive symptoms.^{103, 104} In a large-scale study in Sweden, Helgadottir and team^{105–107} recruited 620 people to a long-term study of exercise interventions in depression. Participants were randomised to: (a) yoga-based stretching and balance, (b) moderate exercise akin to intermediate level aerobics, or (c) vigorous exercise, and were asked to attend three 55-minute classes per week for 12 weeks within their allocation. These groups were compared with a no-intervention control. At 12-month follow-up, those in the yoga condition (light exercise) reported the largest reductions in depression over no-treatment and moderate activity groups. The next largest effect was noted for those in the vigorous activity intervention, who reduced depression by a smaller but significant extent. All three exercise conditions reported superior reductions in depression to no-intervention, but light-intensity exercise produced significantly greater effects over other levels of activity. Hallgren and colleagues¹⁰⁸ compared an exercise intervention with an internet-delivered CBT intervention on depression scores over time. Treatment groups included: (a) yoga/stretching, (b) moderate exercise as per^{105–107}, (c) vigorous exercise as per^{105–107}, and (d) internet-based CBT supported by a psychologist, or (e) usual care (standard treatment for depression). All active treatment groups attended sessions with a qualified personal trainer (exercise) or psychologist (iCBT) and were asked to attend three 60-minute sessions per week for 12 weeks of their allocated intervention. Results indicated that all exercise sessions and iCBT reported significantly greater benefits for depression than did usual care. All exercise sessions and iCBT were equivalent in the reported reductions in depression, indicating that the magnitude of reduction in depression for exercise

was similar to that for iCBT. Chang and colleagues¹⁰⁹ compared depression outcomes for across four different schedules of activity; 15 minutes 3 times per week, 30 minutes 3 times per week, 15 minutes 6 times per week, and 30 minutes 6 times per week. All participants reported significantly reduced depressive symptoms at follow-up assessment, highlighting the very positive benefits of consistent exercise on depression at small 15-minute doses. For those studies targeting older aged persons^{110, 111}, results indicated a significant benefit of exercise/activity for depressive symptoms. For Bernard et al.¹¹⁰, participants aged 55–75 years allocated to a walking intervention (40 minutes per session, 3 times per week for 6 months) reported significantly lower depressive symptoms than a wait-list control group at 6-month follow-up assessment. Bonura and colleagues¹¹¹ compared chair-based yoga, chair-based exercise and wait-list control among 98 participants aged 65–92 years. Results indicated that depression scores reduced the most for people in the chair-based yoga sessions, highlighting the potential for movement and activity in the management of depressive symptoms in this age group. One study specifically focused on women from low socioeconomic backgrounds¹¹², and randomised them to receive exercise and psychoeducation versus wait-list control. Those who received exercise reported superior reductions in depression and increases in wellbeing relative to an exercise alone or psychoeducation alone condition. A final study¹¹³ focused on men aged 18–42 years, and randomised them to receive high intensity exercise (exercising at 70–75% of maximum heart rate), moderate intensity (45–50% of maximum heart rate), or control (exercising but keeping heart rate below 120 beats per minute by walking or light cycling). Participants were asked to exercise at their allocated intensity for 6 weeks, one hour per day, three days per week. Those allocated to the high intensity intervention reported the greatest improvement in depression, following by moderate intensity participants.

Overall, there is highly consistent evidence that exercise-based interventions lead to superior reductions in depression, worry and negative emotions when compared to wait-list controls. Thus, the consistency rating for this body of research is Excellent (A).

Clinical impact

All studies employing exercise-based interventions provided some form of expert oversight to encourage adherence with the program, and to troubleshoot any issues in completing the activities. These exercise professionals also provided guidance about increasing the intensity of exercise sessions as participants progressed through the prescribed programs. Given these activities are largely available at any publicly accessible gym, clinical utility of these interventions is very large. However, people wanting to access these activities in a gym-based setting will need to have the finances to support membership at these clubs. This might pose a barrier to accessibility. Guided exercise sessions (e.g. yoga) are available using technology (e.g. YouTube videos), and walking sessions are available to everybody, but consultation with a general practitioner is likely required for people embarking on physical activity for the first time. Thus, clinical utility is rated as B (Good).

Generalisability

Generalisability of these studies is rated as A (Excellent) as they all included the target populations for the Evidence Check, with additional evidence available for young people, older people and women from low socioeconomic backgrounds.

Applicability

No Australian studies were identified. Five studies were from the US, two were from Sweden, with one each from South Africa, the Netherlands, Ireland, Iran, France and Taiwan. The exercise interventions are relatively

generic in content, and thus applicability to the Australian context is rated as Good (B) with perhaps some minor adaptations required.

Summary of availability and quality of evidence for exercise-based interventions to prevent or manage depression and anxiety in adults

Table 8 displays the overall evaluation of each component of the evidence drawn from the included studies in the Evidence Check for exercise interventions for people experiencing mild–moderate depression and anxiety.

Table 8. Overall evaluation of the included studies of exercise-based interventions for mild–moderate depression and anxiety in adults*

Component	Rating	Description
Evidence base	A	Excellent: several Level II studies and Level I systematic reviews in this area.
Consistency	A	Excellent: exercise-based interventions are effective in reducing depressive symptoms, anxiety, worry and negative emotions relative to no treatment controls. Consistent exercise sessions (as small as 15 minutes 3 times/week) were effective for older aged persons, and reductions in depression in exercise interventions were equivalent in magnitude to an iCBT intervention for depression
Clinical impact	B	Good (substantial): all exercise interventions were implemented with professional support. It is likely that this support can be accessed in alternative ways
Generalisability	A	Excellent: the populations included in the review are the same as the target population in question
Applicability	B	Good: applicable to the Australian context.

*As per http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf

5 Discussion

This Evidence Check set out to identify, evaluate and summarise effective models of prevention and management of services, policies and programs for mild–moderate depression and anxiety in adults aged 18 years and over. Eighty studies were identified that met all key inclusion criteria for the Evidence Check, including 19 systematic reviews and meta-analyses and 58 studies of individual programs. In general, these studies reported consistent evidence for low intensity interventions in the management of mild–moderate depression and anxiety, particularly for those delivered by internet or mobile applications. Peer- and clinician-led groups were also an emerging area of strength in this field, as were text-based interventions (delivered by SMS, email, book) and phone-based support and exercise-based interventions.

What policies, programs, or services have been effective at prevention and/or managing mild–moderate depression and anxiety in people aged 18 years and over?

A significant body of research was identified as part of this Evidence Check, indicating this is an area of intense activity internationally in the years 2013–18. Many more studies or programs were identified for depression than for anxiety, but what was available was of good quality and reported consistent results. Interventions used a range of therapeutic approaches in their design, including cognitive behaviour therapy, interpersonal therapy, problem solving therapy, positive psychology and psychodynamic therapy. There were no observable differences in the magnitude of changes in anxiety or depression across these different psychosocial treatments, and a systematic review in this area confirmed this observation.

Preventing mild–moderate depression and anxiety in adults

No study identified in this Evidence Check reported on the prevention of anxiety or depression in adults aged 18 years and over. Some interventions were focused on preventing future episodes of depression. These are incorporated into the ‘Managing mild–moderate depression and anxiety in adults’ below. An OECD report was identified that provided an overview of effective models of prevention of mental ill-health and promotion of mental health across the lifespan. The studies informing this report were outside the timeframe of this Evidence Check, but key concepts related to workplace mental health and healthy ageing in older populations provided support for the interventions described below in “Managing mild–moderate depression and anxiety in adults”.

Managing mild–moderate depression and anxiety in adults

Anxiety

- Good, consistent evidence that managing anxiety using guided or unguided internet/mobile app-delivered cognitive behaviour therapy is highly effective
- Good, consistent evidence that managing worry and distress using exercise-based interventions is highly effective
- No evidence was located for managing anxiety using peer-led models
- No evidence was located for managing anxiety using clinician-led groups

- No evidence was located for managing anxiety via text-based approaches, although programs addressing both depression and anxiety were located
- No evidence for what works in managing anxiety specifically in 18–35-year olds, people aged 65 years and over, people of Aboriginal and Torres Strait Islander descent, people of culturally and linguistically diverse backgrounds and people identifying as lesbian, gay, bisexual, transgender, or intersex.

Depression

- Good, consistent evidence that managing depression using internet/mobile app-delivered interventions is highly effective. No difference observed between problem solving therapy, cognitive behaviour therapy, positive psychology and psychodynamic therapy when delivered via these technologies to treat depression
- Good evidence that mild depression can be managed without therapist guidance using internet/mobile app-delivered interventions
- Insufficient evidence about the role of therapist guidance in managing moderate depression using internet/mobile app-delivered interventions. All studies implemented these technology-based interventions with at least some therapist support, by telephone, email, SMS, and on average for about 10–20 minutes duration per session of internet/app intervention
- Good evidence that internet/mobile app-delivered interventions for depression have a high probability of being cost effective compared to usual care
- Good evidence that internet/mobile app-delivered interventions translate well to those aged 18–25 years (no evidence for 25–35-year-olds as a specific age group). Good evidence to indicate a preference for and equivalent response to internet/mobile app-delivered interventions by young people with minimal or no therapist contact
- Emerging evidence for good translation of internet/mobile app-delivered interventions into populations aged 65 years and over. Unclear about the role of therapist guidance
- Emerging evidence for how existing internet/mobile app-delivered interventions could be adapted for different cultural groups. Current models rely heavily on access to native language speaking clinicians. More work needs to engage communities in this effort
- Group-based cognitive behaviour therapy is highly effective for managing depression in adults. This is true for face-to-face delivered interventions, with emerging evidence to support virtual groups, using videoconference facilities. Emerging evidence that when peers are trained to deliver structured group CBT programs, outcomes are good for reduced depression. Both integrating technology and peer workers in this space will lower intensity of intervention, with some evidence to suggest no negative impact on outcomes
- Emerging evidence that, for mild depression, group-based CBT is more effective than group-based mindfulness-based stress reduction (MBSR). Emerging evidence that group-based MBSR is more effective than group-based CBT for moderate-severe depression. For group-based CBT, emerging evidence that mild–moderate depression responds best to group-based behavioural activation and cognitive restructuring techniques
- Clinician-led group-CBT programs report better outcomes when people feel socially connected to the group. Peers are an important mechanism in this process

- Strong evidence that peer-led interventions (individual, online, group, formal, informal) increase social connectedness and reduce social isolation. This occurs even when informal social support is provided, by, for example, a spouse. Decreased social isolation and increased social connectedness have a direct impact on depression outcomes
- Strong evidence that peers value a role in which they are encouraged to enhance social connectedness and can contribute to the establishment and maintenance of a peer support community
- Strong clinical utility for peer-supported interventions given usually no time limits to groups, and males in particular will seek them out at mild–moderate levels of depression over professional help
- Evidence of translation of results for clinician- and peer-led interventions into younger age groups (university students) and older age groups (60 years and over). Evidence of clinician-led group-based CBT for people from culturally and linguistically diverse backgrounds
- Good evidence for text-based interventions (e.g. emails, SMS, writing a story, reading a book) in managing mild–moderate depression relative to no treatment. No evidence of impact of text-based interventions over usual care or active controls. Text-based interventions were implemented with lower levels of therapist guidance (maximum five minutes per module) or without any support
- Good evidence for use of text-based interventions for managing mild–moderate depression in culturally and linguistically diverse groups, young people and those over 60 years of age
- Good evidence that exercise-based interventions are effective in reducing depression in young people, older aged cohorts, men, women and people from low socioeconomic backgrounds
- No studies or programs were identified for people identifying as lesbian, gay, bisexual, transgender, or intersex. One study protocol describes a planned program in this area using a seven-session CBT-based internet/mobile app-delivered intervention targeting mental health and wellbeing (Australian)
- No studies or programs were identified for people of Aboriginal and/or Torres Strait Islander Descent.

Mixed anxiety and depression

- Excellent Australian research indicating evidence for internet-delivered CBT programs addressing both depression and anxiety simultaneously ('transdiagnostic') without compromising improvements in anxiety or depression
- Strong evidence that transdiagnostic internet-delivered CBT is as effective as a tailored intervention for anxiety
- Mixed evidence that transdiagnostic internet-delivered CBT is as effective as a tailored intervention for depression
- No evidence for what works in managing anxiety and depression specifically in people aged 18–35 , people aged 65 and over, people of Aboriginal and Torres Strait Islander descent, people of culturally and linguistically diverse backgrounds, and people identifying as lesbian, gay, bisexual, transgender, or intersex.

Limitations of the review

Several limitations of the current review should be mentioned. The restricted date range set for the review (2013–18) opens it to a risk that it failed to include studies of relevance to the Evidence Check published before this time. Significant gaps in the existing evidence exist, and in the absence of quality and considered research in these areas, it cannot be assumed that these results will translate to these areas. A

gaps analysis is provided below. Finally, the scope of this review reflects the content that was identified in the context of a rapid review and may have resulted in the omission of some other relevant studies or prevention ventures.

6 Gaps in the evidence

This Evidence Check set out to identify and evaluate policies, programs and services for the prevention and management of mild–moderate depression and anxiety in adults aged 18 years and over. Table 9 presents a summary of the specific aims of this Evidence Check, and whether it achieved its aim.

Table 9. Gaps analysis for the Evidence Check on programs, policies and services for mild–moderate depression and anxiety in adults.

Condition	Identified Goal of Evidence Check	Achieved?
ANXIETY	Prevention programs or services	Somewhat
	Management programs or services – general	Yes
	Management programs or services – 18–35 years	Somewhat
	Management programs or services – 65 years and over	No
	Management programs or services – Transition to retirement	No
	Management programs or services – Cost effectiveness	No
	Management programs or services – Aboriginal and/or Torres Strait Islanders	No
	Management programs or services – people from culturally and linguistically diverse populations	No
	Management programs or services – people identifying as lesbian, gay, bisexual, transgender, or intersex	No
	Management programs or services – people with low socioeconomic backgrounds	No
DEPRESSION	Prevention programs or services	Somewhat
	Management programs or services – general	Yes
	Management programs or services – 18–35 years	Somewhat
	Management programs or services – 65 years and over	Somewhat
	Management programs or services – Transition to retirement	No
	Management programs or services – Cost effectiveness	Somewhat
	Management programs or services – Aboriginal and/or Torres Strait Islanders	No
	Management programs or services – people from culturally and linguistically diverse populations	Somewhat
	Management programs or services – people identifying as lesbian, gay, bisexual, transgender, or intersex	No
	Management programs or services – people with low socioeconomic backgrounds	Somewhat

Despite a significant volume of literature being identified in this Evidence Check, many gaps remain in understanding what works for mild–moderate depression and anxiety for adults aged 18 years and over.

A critical gap in knowledge about reducing the burden of disease borne by depression and anxiety is a lack of any programs or services aimed at preventing the incidence of these conditions in adults. This could be in part a definitional issue, in that clinicians and researchers may assume that (a) preventing depression or anxiety completely is impossible, or (b) that by adulthood, opportunities for **prevention** of depression or anxiety have been missed. The studies included in the OECD report identified in this broad area of relevance¹⁶ focused on mental health and wellbeing more broadly, rather than on depression and anxiety prevention specifically, although promoting mental health will likely have an impact on depression and anxiety. Based on the Evidence Check, all that can be concluded is that the answers to these two questions are unknown. Effort needs to focus on understanding these issues and fast tracking the development and testing of programs and services with the express purpose of prevention of these conditions.

Conceptualisations of prevention need to be expanded to methods to prevent occurrence (incidence) of depression and anxiety, to prevent progression (from mild to moderate to severe to clinical disorders), and to prevent relapse to acute states. Some evidence identified in this Evidence Check will likely be effective in some of these endeavours, but more research is required to test the impact of these interventions on these prevention outcomes. In addition, a broader perspective is required on prevention efforts for depression and anxiety, as these symptoms and disorders can emerge across the lifespan, not just in adolescence and early adulthood. Key life transition points can place people at high risk of depression and anxiety (e.g. into and out of education, into and out of work, into and out of parenthood, into and out of relationships) and thus opportunities to prevent and manage depression and anxiety at these critical life transition points should be identified and acted upon. Significantly more work is needed in this important area.

It is also surprising that no programs or services were identified in this Evidence Check that described approaches appropriate for **people of Aboriginal and Torres Strait Islander descent**. That is not to say that the identified programs should be withheld from Aboriginal and Torres Strait Islander peoples, rather the cultural adaptations required to sensitively and effectively translate these programs for this important group in our community are not known. Preventing and managing depression and anxiety in Aboriginal and Torres Strait Islander Australians is a critical priority, and active steps should be taken to engage these communities to identify appropriate methods to respond to these issues.

The same is also true for **people identifying as lesbian, gay, bisexual, transgender, or intersex**. Based on the identified programs in this Evidence Check, it is not known how best to adapt these programs for this population group. One study protocol was identified as a first step in this process, but much more work remains. Active engagement and input from this community is essential.

Some programs identified in the Evidence Check included cultural adaptations for **people from culturally and linguistically diverse backgrounds**, but these were very few in number. An ‘integrative’ model of adapting existing, effective programs for mild–moderate anxiety and depression is suggested, based on using both top-down and bottom-up approaches to develop culturally meaningful and effective interventions for different cultural groups in the community.

Some programs and services were identified for **older age groups (65 years and over)** providing preliminary support for the use of exercise, internet- and app-delivered interventions and peer-social support to reduce depression and depression vulnerability. Much more work needs to focus on this group, one of the fastest growing age groups in Australia. No programs were identified for anxiety in this age cohort, suggesting this might be an area of immediate focus. Given the significant physical health

comorbidities common amongst people aged 65 years and over, interventions that can be implemented in this context will be important.

Generally, less evidence was available for mild–moderate **anxiety** than for mild–moderate depression, suggesting that, overall, effort might need to prioritise this condition in the near future.

The identified evidence did not specifically target **people from low socioeconomic backgrounds** and used methods of recruitment (e.g. online advertising) that might have excluded this group from accessing many of the identified studies. It is likely that, particularly exercise, digitally-delivered interventions would translate into this population, but consideration again needs to be given to the impact on their resources and capacity to engage with technology.

Lastly, although many studies were identified in this Evidence Check, particularly for depression, there are some critical gaps in knowledge about how best to implement these programs outside of research projects. In particular, questions remain about the role and nature of therapist support provided to technology-based interventions, the impact of transdiagnostic versus tailored interventions, and how best to provide access to technology-based interventions if people are not engaged with services. Given the abundance of evidence suggesting that these approaches are effective compared to no-treatment control groups, in order to progress the field in this area, it is recommended that implementation trials be conducted that compare these interventions to more relevant, active control groups.

7 Conclusions and recommendations

The NHMRC provides a grading system, based on the accumulation and evaluation of available evidence, on which to base the strength of recommendations for a range of clinical and other interventions. The definition of these recommendations is contained in Table 10.

Table 10. Definition of NHMRC grades of recommendations for practice*

Grade of recommendation	Description
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution.

*As per http://www.nhmrc.gov.au/files_nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf

What policies, programs or services are effective at preventing depression and/or anxiety in adults?

Based on the Evidence Check, the body of evidence for preventing depression and/or anxiety in adults is weak (D) and at present, no recommendations can be made aside from focusing efforts in this neglected area.

What policies, programs, or services are effective at managing depression and/or anxiety in adults?

Anxiety

It is highly recommended that internet- and mobile app-delivered interventions be implemented for people experiencing mild–moderate anxiety (**A**). There is some evidence that unguided interventions are effective for anxiety, but more research needs to explore the role of therapist support in this context (**C**). As with depression, it is recommended that these interventions be implemented among non treatment-seeking populations, or those who are otherwise unable to engage with usual, high-quality care in order to maximise the impact of these interventions on anxiety symptoms (**B**). Exercise-based interventions are also recommended for young people wanting to reduce worry (**B**).

Depression

It is highly recommended that internet-delivered and mobile app-delivered interventions are implemented to manage mild–moderate depression in adult Australians. The content of these interventions should be cognitive behaviour therapy (**A**), with some evidence for problem solving therapy (**B**), positive psychology (**C**), interpersonal therapy (**C**), and mindfulness-based stress reduction (**C**). Synthesising the evidence for internet- and mobile app-delivered interventions with clinician-delivered group-based evidence, it is

recommended that for mild–moderate depression, CBT programs using behavioural activation and cognitive restructuring are prioritised (**B**). There is also some evidence that mild depression responds better to CBT (than mindfulness-based stress reduction (MBSR, **C**) and that moderate depression responds better than CBT to MBSR (**C**). The existing evidence can be trusted to guide practice in this case (**A**), provided service models titrate the level of therapist support provided alongside these programs against severity of depression. It is recommended that, in most situations, the evidence supports the use of unguided internet- and mobile app-delivered interventions at mild levels of depression (**B**). For moderate levels of depression, there is some support for the effectiveness of unguided cognitive behaviour therapy delivered via internet or mobile applications; however, the majority of research has only tested models of supported internet/mobile app-delivered interventions (**C**). Thus, care should be taken in implementing unsupported internet- and mobile app-delivered interventions in people with moderate depression. These interventions can be implemented with young people (18–25 years, **A**) and older populations (aged 65 years and over, **C**). Some evidence suggests that, with input from the community and a native speaking clinician, these interventions can be directly translated into culturally and linguistically diverse groups (**C**). These interventions have demonstrated the largest effects when compared to no-treatment or wait-list control conditions, with smaller effects when compared to active treatment and high-quality usual care. Hence, these interventions are best implemented in the community, outside of usual care settings, among people who are unlikely or unable to access usual care services (**B**).

It is highly recommended that peer support interventions, designed to increase social connectedness and reduce social isolation, are implemented for people at risk of or experiencing mild–moderate depression (**C**). However, more research is required to test the potential and limitations to peer support in this context.

It is highly recommended that text-based interventions be implemented to support people with mild levels of depression and can be implemented without therapist guidance (**B**). A caveat is required here, given that some pathway to seeking more intensive help is built into these interventions to facilitate more immediate help if symptoms worsen.

It is highly recommended that light or vigorous-intensity exercise-based interventions be implemented to support people to reduce depressive symptoms (**A**). These sessions are recommended to be one hour in length and engaged in three times per week to maximise impact on depression (**A**). For older people, consistency of sessions is most important; three times per week for 15 minutes provides good benefits for depression (**A**).

Mixed anxiety and depression

Given the significant co-occurrence of depression and anxiety, transdiagnostic interventions that can be applied across both conditions are recommended. There is a strong body of evidence that transdiagnostic internet-delivered cognitive behaviour therapy is effective for both anxiety and depression (**A**) in unguided (**B**) and guided (**B**) formats. There is strong evidence that transdiagnostic online interventions are more effective than tailored interventions for anxiety (**B**), with less evidence that this is the case for depression (**C**). There is evidence that transdiagnostic online interventions still produce reductions in depression, but not at the same magnitude as tailored online cognitive behaviour therapy (**C**). Again, these interventions will have the greatest impact when implemented outside of usual, high-quality care settings (**B**).

General Recommendation

Given the complexities of the above recommendations, a final recommendation is that a framework is developed to guide the selection and implementation of text-, peer-, internet- and mobile app-delivered interventions for mild–moderate depression and anxiety that community and health professionals can use

to aid decision making about which programs to use and when. Within this framework, strategies to translate interventions to different cultural groups should be provided, along with strategies to adapt interventions for use in younger and older populations. Going forward, this framework could provide direction about how to better engage Aboriginal and Torres Strait Islander peoples in these efforts, along with people identifying as lesbian, gay, bisexual, transgender, or intersex. Given the rapid advances in technology-based healthcare, this framework is important to ensure that newly available technologies can be adopted safely and credibly into the management of mild–moderate depression and anxiety in adults. Bennion and colleagues¹⁹ reported that a similar framework is under development for the NHS in England.

In addition, implementing a stepped model of care along the following lines shows promise as a framework for incorporating prevention and management interventions across the lifespan for depression and anxiety, and across workplace and community settings:

1. Awareness raising about signs and symptoms of anxiety and depression, and promoting appropriate help seeking at different levels of symptomatology
2. Development of a system of monitoring and intervention that incorporates:
 - a. Watchful waiting (including screening for concerns and early signs)
 - b. Unguided self-help (cognitive behaviour therapy for anxiety and mild depression, light intensity exercise interventions – walking, yoga, for young people aged 18–25 years)
 - c. Guided self-help (cognitive behaviour therapy and behavioural activation for moderate depression, exercise interventions of light or vigorous intensity under supervision)
 - d. For people aged 65 years and over, social support and networking interventions to reduce isolation, mindfulness-based stress reduction and exercise interventions
 - e. Mechanisms to facilitate referral to primary care as indicated and/or referral to crisis or tertiary mental health services as indicated.

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Appendix A - Search terms

Table S1. Search strategy for MEDLINE (adapted from MacArthur et al. 2016)

1	Depressive Disorder/ or depress*.mp. or Depression/	493131
2	Anxiety/ or Depressive Disorder, Major/ or Anxiety Disorders/ or Depression/ or anx*.mp.	314917
3	1 or 2	619842
4	mild*.mp.	349291
5	moderate*.mp.	490479
6	4 or 5	748292
7	Aged/ or ADULT/ or adult*.mp. or Middle Aged/	7187161
8	prevent*.mp.	2153448
9	SECONDARY PREVENTION/ or PRIMARY PREVENTION/ or Prevention*.mp.	1506867
10	Treatment or therapeutics	4340669
11	intervention.mp.	524086
12	PATIENT CARE MANAGEMENT/ or management.mp. or DISEASE MANAGEMENT/ or SAFETY MANAGEMENT/ or SELF-MANAGEMENT/	1122235
13	(Intervention* or treatment* or therap* or program* or Counsel or psychotherapy or self help or etherap* or ehealth).ti,ab,kw.	6401707
14	Self-Help Groups/ or Internet/ or self-help.mp. or Self Care/ or Cognitive Therapy/	131009
15	low intensity*.mp.	13465
16	Social Support/ or Peer Group/ or peer support*.mp.	82378
17	Peer worker.mp.	36
18	8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17	8537577
20	3 and 6 and 7 and 18	14931
21	Limit 20 to (English language and humans and yr="2013–Current")	5135

Appendix B – Table 3

Table 3 – List of included systematic reviews and meta-analyses for the Evidence Check on prevention and early intervention programs for people aged 18 years and over with mild–moderate depression and anxiety

Source	Study type	Population	Sample	Intervention	Outcomes	Differential outcomes	Comment
37	Systematic review	Adults aged over 65 years, with any type of depressive disorder Only English, Spanish and Portuguese language articles were included	6 studies, 520 participants	Cognitive behaviour therapy, competitive memory training, reminiscence group therapy, problem-adaptation therapy, and problem-solving therapy in home care	Evidence suggests that all interventions reduced depressive symptoms	Nil	Non-pharmacological interventions decreased depressive symptomatology, were more effective than treatment as usual, treatment as usual plus talking control, individual supportive interviews, supportive therapy or usual care plus education
114	Systematic review and meta-analysis	Randomised controlled trials of physical activity interventions targeting adolescents and/or young adults (mean age ≥ 12 and < 26 years) experiencing depression English language only	16 studies, 771 participants	Most trials used aerobic-based physical activity (n=12) Intervention periods ranged from 5 to 12 weeks with one to five activity sessions per week	Fifteen trials used self-report measures, most commonly the Beck Depression Inventory (BDI) (n=9), and three reported observer-rated depression symptom measures A large effect on depressive symptoms was reported in favour of physical activity over control (SMD = -0.82,	Nil	Physical activity appears to show efficacy for improving depression symptoms in adolescents and young adults experiencing a diagnosis or threshold symptoms of depression

Source	Study type	Population	Sample	Intervention	Outcomes	Differential outcomes	Comment
				Session duration ranged from 30 to 90 minutes	95% CI=−1.02, to −0.61, p < 0.05, I ² =38%)		
22	Network Meta-analysis	Randomised controlled trials among adults with depressive disorders, or with elevated levels of depressive symptoms Comparison of outcomes across seven different psychotherapeutic interventions for depression versus control (i.e. wait-list, usual care, or placebo), or to another psychotherapeutic treatment	198 studies, 15,118 participants	The seven interventions were: interpersonal therapy, behavioural activation, cognitive-behavioural therapy, problem solving therapy, social skills training, psychodynamic therapy and supportive counselling	Relative effects of different psychotherapeutic interventions on depressive symptoms were absent to small (range d=0.01 to d=20.30) Interpersonal therapy was significantly more effective than supportive therapy (d=20.30, 95% credibility interval [CrI] [20.54 to 20.05])	Moderator analysis showed that patient characteristics had no influence on treatment effects	All seven psychotherapies were effective for depressive symptom reduction Supportive counselling, social skills training, problem solving, cognitive behavioural therapy, and behavioural activation were more effective than wait-list
36	Systematic review and meta-analysis	Randomised controlled trials examining effect of a preventative intervention on depressive symptoms or incidence of depression among 18–25 year-olds	26 studies, 2,865 participants	Most interventions offered Mindfulness-based stress reductions and were delivered by a professional The average length of interventions was 7.3 weeks	The pooled effect size of the interventions versus control at post-intervention was g=0.37 (95% CI: 0.28–0.47, NNT=9)	There were no differential effects of type of delivery, focus of study, type of control, or type of support within the interventions	Some evidence was found for the effectiveness of preventative interventions in reducing depressive symptoms in young adults

Source	Study type	Population	Sample	Intervention	Outcomes	Differential outcomes	Comment
32	Systematic review	Adults	8 studies, 1,347 participants	Bibliotherapy (self-help books about depression) compared to control groups (no treatment or delayed treatment)	Bibliotherapy was associated with significantly greater reductions in depression relative to a control condition The most robust effect was found in the general adult population (reducing symptoms over a 2-year follow-up)	Effects not observed in younger populations	Bibliotherapy appears to be effective in reducing depressive symptoms in adults over the longer term, relative to control
23	Meta-analysis	Adults	16 datasets, 2470 participants	Low-intensity interventions for depression delivered in community settings that used a technology focus (self help, books, videos, internet, apps) Only those programs with less than 3 hours of contact by a therapist were included (unguided)	Low intensity interventions are associated with significantly better depression outcomes over controls by 4-5 standard deviation across a range of depression self-report inventories	Trend towards internet-delivered interventions leading to better depression outcomes over written interventions	Low intensity interventions for depression should not be withheld from those with more severe symptoms, as this group reported more clinical benefit than did those with lower levels of severity
19	App and online program review	Review of apps and online programs used by IAPT service	191 IAPT services, 51 Mental Health Trusts	Apps and web programs recommended for	13 web apps and 35 smartphone apps identified (see Appendix D)	Approximately half of apps that were being used by services were	A library of apps and online interventions was developed for services wishing to use

Source	Study type	Population	Sample	Intervention	Outcomes	Differential outcomes	Comment
		providers in the UK's National Health Service		stress, anxiety or depression Service providers commented on involvement in research, piloting, or development of apps	170/191 IAPT services used and recommend apps for depression and anxiety 39/51 Mental Health Trusts use and recommend apps for depression and anxiety	recommended by the National Health Service, the remainder were not Same apps/internet-programs are not being routinely used for depression and anxiety across services and geographical locations	or recommend technology-based interventions for depression and anxiety
35	Systematic review	Studies describing a health intervention delivered by peer specialists (peer-led) or co-facilitated by peer specialists and health professionals for people with severe mental illness (schizophrenia, bipolar disorder, major depression, and schizoaffective disorder)	18 articles, 1,026 participants	Five different types of health interventions: self-management interventions, smoking cessation programs, peer navigator programs, healthy lifestyle interventions, and multi-faceted programs that included more than one type of intervention	Mixed evidence for peer-support and peer-led interventions. Most impact was for programs that encouraged self-management of symptoms and provided a 'navigation' role through available services	Nil	Peer-supported and peer-led interventions show promise for helping people to self-manage symptoms and communicate with treatment providers in severe mental illness
115	Systematic review	Randomised controlled trials in which exercise was compared to standard treatment, no treatment or a placebo	39 studies, 2,326 participants		For the 35 trials (1356 participants) comparing exercise with no treatment or a control intervention, the pooled SMD for the	Twenty-nine trials reported acceptability of treatment, three trials reported quality	

Source	Study type	Population	Sample	Intervention	Outcomes	Differential outcomes	Comment
		treatment, pharmacological treatment, psychological treatment or other active treatment in adults (aged 18 and over) with depression			<p>primary outcome of depression at the end of treatment was -0.62 (95% confidence interval (CI) -0.81 to -0.42), indicating a moderate clinical effect</p> <p>Seven trials compared exercise with psychological therapy (189 participants), and found no significant difference (SMD -0.03, 95% CI -0.32 to 0.26)</p> <p>Four trials (n=300) compared exercise with pharmacological treatment and found no significant difference (SMD -0.11, -0.34, 0.12).</p> <p>One trial (n=18) reported that exercise was more effective than bright light therapy (MD -6.40, 95% CI -10.20 to -2.60).</p> <p>Six trials (464 participants) with adequate allocation concealment, intention-to-treat analysis and blinded outcome assessment, the pooled SMD for this outcome was not</p>	<p>of life, none reported cost, and six reported adverse events</p>	

Source	Study type	Population	Sample	Intervention	Outcomes	Differential outcomes	Comment
					statistically significant (-0.18, 95% CI -0.47 to 0.11)		
29	Meta-analysis	Randomised Controlled Trials using cognitive behavior therapy for anxiety disorders and major depressive disorders	81 studies, 5,486 participants	Cognitive Behaviour Therapy for Anxiety Disorders versus Cognitive Behaviour Therapy for Major Depressive Disorders Comparing impact of these interventions on depressive symptoms over time	Baseline depression severity lower but moderate in trials for Anxiety Disorders compared to Major Depressive Disorders Effect sizes for depression symptom reduction in trials focusing on Anxiety Disorders ranged from $g=0.47$ for Panic Disorder, $g=0.68$ for Generalised Anxiety Disorder, and $g=0.69$ for Social Anxiety Disorder Differences between these effect sizes and those found in the treatment of MDD ($g=0.81$) were not significant	Nil	Depression symptom reduction in response to interventions for Anxiety Disorders is similar in magnitude to interventions targeting depression directly Few indications that the effects differed across Anxiety Disorders
26	Meta-analysis	Randomised controlled trials of Internet-based guided self-help versus control or comparison group (waiting list, care-as-usual, other) in adults with depression Exclusion –	18 studies, 2,079 participants	Randomised trials in which the effects of an Internet-based guided self-help treatment were compared with a control or comparison group	Risk for a reliable deterioration from baseline to post-treatment was significantly lower in the intervention v. control conditions (3.36 v. 7.60; relative risk 0.47, 95%	Participants with low education were at higher risk for deterioration than participants with higher education	Internet-based guided self-help is associated with a mean reduced risk for a symptom deterioration in depression

Source	Study type	Population	Sample	Intervention	Outcomes	Differential outcomes	Comment
		interventions provided without guidance (i.e. without support from a therapist or other healthcare professional)		(waiting list, care-as-usual, other) in adults (aged ≥18 years) with depression (established by diagnostic interview or elevated levels of depressive symptoms based on self-report measures. CBT, ACT, PST, PD	confidence interval 0.29–0.75)		
116	Systematic review	Randomised controlled trials (RCTs) of exercise for anxiety disorders	8 studies	RCTs with following interventions were considered: 1. Exercise versus no intervention 2. Exercise versus other interventions 3. Exercise versus placebo pills 4. Exercise versus medication 5. Exercise versus cognitive behavioural therapy (CBT) 6. Exercise in combination with treatments versus other interventions 7. Exercise + occupational therapy + life style changes versus	For panic disorder: exercise appears to reduce anxiety symptoms but it is less effective than antidepressant medication (1 RCT); exercise combined with antidepressant medication improves the Clinical Global Impression outcomes (1 RCT) with both seeming to reduce anxiety symptoms (1 RCT) There was a significant reduction in anxiety symptoms following structured exercise (running) for participants with panic disorder with or without agoraphobia in comparison with placebo pill treatment.	Running exercise induces prolonged exposure to feared agoraphobic situations which might act as a graded exposure technique	Exercise is an effective adjunctive treatment for anxiety disorders, but it is less effective compared with antidepressant treatment Both aerobic and non-aerobic exercise seems to reduce anxiety symptoms.

				standard general practitioner care 8. Exercise + group CBT versus relaxation+group CBT 9. Exercise + antidepressant medication versus relaxation +placebo 10. Comparing different forms of exercise			
24	Meta-analysis	Randomised clinical trials in which self-guided iCBT was compared with a control (usual care, waiting list or attention control) in individuals with symptoms of depression	16 studies, 1,885 participants	Studies were included if the participants were adults (aged >18 years) with elevated symptoms of depression based on any diagnosis or any self-report scale of depression. Only those RCTs in which self-guided iCBT was compared with a control condition (usual care, waiting list, or attention control) were included	Self-guided iCBT was significantly more effective than controls on depressive symptoms severity ($\beta = -0.21$; Hedges $g = 0.27$) and treatment response ($\beta = 0.53$; odds ratio, 1.95; 95% CI, 1.52-2.50; number needed to treat, 8) Adherence to treatment was associated with lower depressive symptoms ($\beta = -0.19$; $P = .001$) and greater response to treatment ($\beta = 0.90$; $P < .001$).	None of the examined participant and study-level variables moderated treatment outcomes	Self-guided iCBT is effective in treating depressive symptoms. Self-guided iCBT can be considered as an evidence-based first-step approach in treating symptoms of depression.
38	Meta-analysis	Studies examining manualised mindfulness-based CBT (i.e. ACT and MBCT) for depressive or anxiety symptoms with a wide range of physical and	10 studies	Studies that (i) examined the pre-post or controlled effects of a manualised mindfulness-based CBT (i.e. ACT and	Effect-size estimates suggested that mindfulness-based CBT is moderately effective on depressive symptoms in older adults ($g = 0.55$) A similar level of overall effect size for anxiety	Nil	Mindfulness-based CBT may be particularly effective for treating depression in older adults.

		psychological conditions. Participants aged 60 and older		MBCT) for depressive or anxiety symptoms (ii) recruited participants aged 60 and older	symptoms and mindfulness-based CBT was also reported ($g = 0.58$)		
Source	Study type	Population	Sample	Intervention	Outcomes	Differential outcomes	Comment
21	Cochrane review	Randomised controlled trials of media-delivered behavioural or cognitive behavioural therapy in adults with anxiety disorders (other than post-traumatic stress disorder)	101 studies, 8,403 participants	Interventions must have delivered CBT or BT using printed materials, audio recordings, video recordings, or computers (including Internet), or via some combination of media. Interventions must have been used as stand-alone interventions (i.e. without a therapist). Interventions that encouraged users to enlist the help of a spouse or a friend were included. Control interventions included attention/relaxation placebos or face-to-face therapy	For the primary outcome of symptoms of anxiety, moderate-quality evidence showed medium effects of media-delivered BT or CBT compared with no intervention (standardised mean difference (SMD) 0.67, 95% confidence interval (CI) 0.55 to 0.80; 72 studies, 4537 participants), and low-quality evidence of small effects favoured face-to-face therapy (SMD -0.23, 95% CI -0.36 to -0.09; 24 studies, 1360 participants)	Nil	Self-help may be useful for people who are not able or are not willing to use other services for anxiety disorders; for people who can access it
30	Meta-analysis	Studies of participants seeking treatment for anxiety/depression delivered over the	17 studies, 2,290 participants	Transdiagnostic computerised CBT (TD-CCBT)	Computerised TD-cCBT outperformed control conditions on all outcome measures at post-	Treatment length, symptom target (mixed versus anxiety only), treatment	The effects of transdiagnostic computerised CBT is relatively similar to

		internet or via computer. Self-help and clinician-guided interventions were included, along with interventions that were delivered solely via mobile phone application.		Disorder-specific computerised CBT (DS-cCBT) Comparisons: waiting list (delayed treatment control groups), treatment-as-usual or usual care control groups (TAU), disorder-specific interventions, or psychological treatment placebo control groups	treatment, with large effect sizes for depression, and medium effect sizes for anxiety, and QOL. Studies comparing TD-cCBT to waitlist controls had the largest differences on anxiety outcomes, but there was no influence of control group subtype on depression outcomes	design (standardised versus tailored), and therapist experience (students versus qualified therapists) did not influence the results	disorder-specific computerised CBT for depression/anxiety
117	Meta-analysis	Randomised controlled trials using exercise as a treatment for depression Older adults (60 years and over) with a primary diagnosis of major depressive disorder	8 studies, 267 participants	RCTs of exercise interventions in older people with depression (≥ 60 years) comparing exercise vs. control	Exercise had a large and significant effect on depression (SMD=-0.90 [95%CI -0.29 to -1.51]) Significant effects were found for 1) mixed aerobic and anaerobic interventions, 2) at moderate intensity, 3) that were group-based, 4) that utilized mixed supervised and unsupervised formats, and 5) in people without other clinical comorbidities	Nil	Exercise should be considered as a routine component of the management of depression in older adults
25	Meta-analysis	Randomised controlled trials comparing the effects of guided and unguided computerised CBT for depression	14 studies, 2807 participants	All RCTs with proper concealment and blinding of outcome assessment for the clinical effectiveness of cCBT in adults with depression.	The pooled SMD was -0.48 [95% IC -0.63 to -0.33], suggesting similar effect of computerised CBT for depression relative to control as found in previous reviews.	Nil	Despite a short-term reduction in depression at post-treatment for people receiving computerise CBT, the effect at long follow-up and the functional

					No significant clinical effect at long follow-up and no improvement of function found A significantly higher drop-out rate was found for computerised CBT than for controls		improvement were not significant, with significantly high drop-out The clinical usefulness of current computerised CBT for adult depression may need to be reconsidered
20	Cochrane review	Therapist-supported iCBT for anxiety disorders in adults	38 studies, 3214 participants	Internet-delivered CBT	Although the quality of evidence was rated as low, it consistently reported no clinically or statistically significant differences between guided and unguided iCBT in terms of improvement in anxiety symptoms post-treatment		
27	Systematic review	Randomised controlled trials of internet-delivered CBT programs for mood and anxiety problems that were conducted in the community, and only offered support via remote methods. The RCTs included in the Arnberg et al. ²⁷ review reported that remote therapist support for online internet programs was generally provided via emails, messages, or	40 studies	Internet-delivered cognitive behaviour therapy programs (iCBT) for mood and anxiety problems, implemented over 8–12 sessions, and compared with wait-list control Remote therapist guidance was delivered by telephone, email, or message, and was 10–20 minutes per iCBT session.	The quality of evidence across these trials was moderate iCBT was associated with significantly better outcomes for depression and anxiety than wait-list controls		Three cost effectiveness studies were identified in the review, with one indicating iCBT for depression had a 70% probability of being more cost effective than treatment as usual, and another revealing that iCBT for social phobia had a 90% chance of being cost effective over group CBT, was US \$1,422 lower in cost to deliver, and resulted in 19% greater improvement in anxiety

		telephone, and was of the order of 10–20 minutes duration each week					symptoms at 6-month follow-up
31	Meta-analysis	RCT comparing transdiagnostic with disorder-specific internet-delivered CBT for depression or anxiety.	19 studies, 2,952 participants	Transdiagnostic internet CBT (guided and unguided) Internet CBT (iCBT) tailored for either depression or anxiety (guided and unguided)	No differences in efficacy for internet CBT programs using student versus experienced therapists to guide the intervention or for unguided models.	Longer treatments (more than 6 sessions) were more effective for depression. This was not true for anxiety For anxiety, no differences in efficacy between transdiagnostic or tailored iCBT. For depression, transdiagnostic iCBT was more effective than tailored CBT for depression	Transdiagnostic iCBT shows promise in managing anxiety and depression, and is effective in unguided and guided models
34	Literature review	Technology-based peer support models in healthcare settings	No studies identified				Review was broadened to explore the potential of technology to improve outcomes for peer support in mental health Peer support provided by telephone, texting, and online groups increases engagement in wellness activities, improves self-management of health in low-literacy minority groups, and increases

							social connectedness to a new community
41	Literature review	Culturally adapted and sensitive treatments for depression		<p>The identified process of cultural adaptation of depression treatments to date has been:</p> <ol style="list-style-type: none"> 1. Top-down (translating an established treatment to make it look and sound more relevant to a cultural group) 2. Bottom-up (engaging the potential end users of the program to understand depression according to their culture, and working with them to adapt the program) 3. Integrative (includes both top-down and bottom-up) 	CBT interventions for depression were the most commonly adapted		<p>Provides some insight into how cultural adaptation models might best be implemented in mental health</p> <p>Existing depression treatments could benefit from an integrated adaptation approach, whilst new treatments should be developed based on culturally appropriate frameworks</p>

Appendix C – Table 4

Table 4 – List of included individual studies and programs identified in the Evidence Check on prevention and early intervention programs for people aged 18 years and over with mild–moderate depression and anxiety

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
Internet- and mobile app-based programs								
62	Iran	RCT	Online	Adults with Mild to moderate depression	93	Email-based CBT (10–12 sessions online CBT translated into native language of participants by psychiatrist)	Waitlist control	Email-based CBT significantly reduced depressive symptoms relative to wait-list at 12-weeks and 6-months follow-up
64	Sweden	RCT	General population recruited via online advertising	Adults with self-reported stress symptoms	157	4 sessions of applied relaxation delivered via web-based content (webpage material, assigned relaxation exercises), and contact with a therapist via the webpage. Daily motivational support provided	4 sessions of same material delivered in paper-based format. Weekly support provided by therapist	All groups improve stress symptoms. Perceptions of external pressure to participate predicted higher post-treatment stress symptoms Perceptions of treatment credibility predicted lower post-treatment stress symptoms. Reliable symptom improvement predicted by high levels of therapeutic bond
49	Sweden	RCT	Newspaper articles, university	Adults, current	69	iCBT (internet-delivered CBT, seven text modules (e.g.	Group CBT (Eight 2-hour sessions of	Significant improvements in

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
			campus, health care facilities and web pages	depressive symptoms		chapters) totaling 114 pages, including exercises) with therapist guidance.	psychoeducation, review of homework, in session exercises, and scheduling of the group sessions)	depression across both groups indicating non-inferiority of guided iCBT. Evidence for guided iCBT group to be superior to group-based CBT at three-year follow-up
51	Sweden	RCT	Online	Adults with depressive symptoms but who were not currently undergoing treatment	1843	4 sessions iCBT (rationale of CBT, identifying and tackling negative thoughts, behavioural activation) 4 sessions iIPT (grief, role disputes, role transition and interpersonal deficits)	MOODGym (active control, behavioural methods to overcome dysfunctional thinking, assertiveness and self-esteem training).	Older participants (age over 25 years) in the MoodGYM or iCBT conditions had larger improvements in depression scores than those in the IPT condition Younger participants (age 24 or less) in the iIPT intervention had larger improvements than those in the MoodGYM or CBT conditions
69	US	RCT	Online	Adults under 55 years, moderate levels of depression	376	Deprexis (10 1-hour modules of CBT, acceptance, mindfulness, attachment experiences, interpersonal processes, positive psychology, dream- work, and the role of nutrition and exercise in depression). Daily brief messages are sent	Wait-list control (8 weeks)	Significant benefit of Deprexis over control, 12 times more likely to experience 50% or greater improvement in depressive symptoms than the waitlist condition

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
						automatically by the program and are intended to remind and motivate the users to engage with the program		
50	Germany	RCT	German statutory health insurance company	Adults with mild-moderate depression	180	12-week web-based program that included access to structured interactive sessions and therapist support upon request	Wait-list control (access to web-based psychoeducation).	Web-based intervention group reported significant greater improvements in depression than did wait-list
75	England	Pre/post study	Referral from the Employee Assistance Program (EAP) of a large academic medical centre	Adults with moderate depression	29	Six 30-minute ePSTM sessions over 9 weeks (problem-solving therapy, highly interactive and varies in content depending on users' choices), access to non-clinician study if needed	None	Significant improvement in depression over time. Participants rated the program as highly usable, acceptable, and credible, and reported a therapeutic alliance with the program comparable to that observed in live therapy
72	Netherlands	RCT	Community, flyers, Facebook, Newspapers	Adults with mild to moderate depression	284	PsyFIT (mental fitness online, fully automated self-help intervention to improve well-being based on positive psychology). Six modules, each containing a 4-lesson program: (1) personal mission statement and setting your goals, (2) positive emotions, (3) positive relations, (4)	Wait-list (2 months)	Significantly improved well-being and symptoms of depression and anxiety observed in PsyFit group. No differences between PsyFit and wait-list control at 6 months for wellbeing, but differences existed for anxiety and depression

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
						mindfulness, (5) optimistic thinking, and (6) mastering your life		
77	Netherlands	RCT	General population	Adults with mild to moderate depression	184	PsyFIT	Wait-list (2 months)	<p>Significant improvements in wellbeing at follow-up. Clinically significant improvements in depression relative to wait-list</p> <p>Intervention NOT cost effective. The better effects are obtained for substantially higher costs (€21,319 and €9807 per treatment responder on well-being and depression, assuming no willingness to pay for treatment.</p> <p>22% probability that it is more cost effective than usual care</p>
73	UK	RCT	General	Adults with moderate depression	369	Telephone-facilitated iCBT (allocated a telephone support worker, who provided weekly telephone calls to (1) facilitate the use of MoodGYM and (2) engage in between-session exercises with problem formulation	MoodGYM alone	<p>There was a difference in the severity of depression at 4 and 12 months, with lower levels in the telephone-facilitated group</p> <p>Telephone-facilitated MoodGYM was associated with</p>

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
						and adherence to CBT principles)		significantly lower depression scores than MoodGYM alone
76	Germany	RCT	Large statutory health insurance company and an open access website	Adults with subthreshold depression	406	GET.ON Mood Enhancer (web-Based guided self-help, CBT, problem solving therapy. 6 30-minute sessions). Each session takes about 30 minutes to complete. Assisted by supervised graduate students or health care professionals	Enhanced Usual Care (web-based psychoeducational intervention, which was based on the German S3-Guideline/National Disease Management Guideline Unipolar Depression)	GET.ON was associated with significantly more depression free years than control
46	UK	RCT	Participants were invited in writing by clinicians in the three countries from their active caseloads	Adults with depression, currently receiving treatment	28	Help4Mood online CBT plus scheduled appointments with their usual clinician, either face to face or by phone, at two weeks and at four weeks to discuss any reports generated by the Help4Mood system	Treatment as usual	Regular users of Help4Mood reported greater benefit for depression than non-regular users. Small improvements in depression were observed for both groups
81	Ireland	Non-random trial	Primary care	Adults in rural settings with mild-moderate depression	79	MindWise 2.0 (online program for mild depression or anxiety, CBT theory and techniques). Four online modules	Wait-list control	Significant reduction in anxiety but not depression observed in MindWise participants, and no improvement in work or social adjustment compared to

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
								similar adults on a waiting list for services
43	Sweden	RCT	Online	Adults, with moderate depression and anxiety	103	The program is an online treatment program focused on worry and consists of seven online modules. The participants were recommended to work with one module per week in a predetermined order, and were given a total time of nine weeks to complete	Wait-list	Moderate to large effects of the intervention on anxiety and depression. No effect on quality of life
60	Canada	RCT	University	University students with mild to moderate anxiety, depression, or stress	66	6-week online program (CBT, 5 core modules - Introduction and Assessment, Activity and Mood, Motivation, Thoughts and Feelings, and Advanced Thoughts and Feelings). Program coach (i.e. a trained graduate or undergraduate student) provided weekly telephone or email support	Wait-list	Program was associated with significant greater reductions in depression, anxiety, and stress over wait-list
54	Australia	RCT	Paid and unpaid media advertisements	Adults with symptoms of social anxiety or phobia	220	DS-CBT (5 online lessons over 8 weeks, targeting social anxiety, with and without support)	TD-CBT (5 online lessons over 8 weeks, wellbeing course, with and without support)	No differences between TD-CBT and DS-CBT or supported/unsupported models

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
52	Australia	Open trial	Online	Adults aged 60 years + with moderate depression	20	Managing your mood - 8-week program: five online lessons, a summary with homework for each lesson, automatic reminder and notification emails, and a secure email system between the clinician and each participant. Participants also had access to additional online resources about assertiveness skills, challenging beliefs, problem solving, strategies for improving sleep and answers to frequently asked questions about the application of skills, along with access to comments which were written by past participants and covered the topics covered in each lesson	None	Participants improved significantly on the depression scores
42	Germany	RCT	Occupational health program of a large health insurance company	Employed adults with high perceived stress	264	iSMI: seven sessions and one booster session including problem-solving and emotion regulation techniques. Participants had the opportunity to choose between 'light coaching' (1 text message every other day) and 'intensive coaching' (2–3 text messages every day)	Wait-list	The iSMI participants reported significantly greater reductions in perceived stress at follow-up, maintained through to 6-months. Also, significantly reduced work-related health symptoms of stressed employees

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
59	US	RCT	University		257	Present control intervention: four modules, completed over a 2-week period (60 minutes in total). Content included video presentations from experts, exercises designed to increase past/present/future control, and to teach a focus on present control as a means of stress reduction. Stress logs were also kept as part of this information	Stress-information only group	Participants in the intervention group reported significant increases in present control, and significant decreases in perceived stress relative to control
68	Germany	RCT	Community	Adults with mild to moderate depression symptoms	509	Deprexis	Care as usual	<p>Higher adherence to the program predicted a greater symptom reduction in depressive symptoms over 12 weeks</p> <p>Older age and higher depressive symptoms were associated with higher usage durations</p>
45	US	Non-random trial	Online	People who had completed BlueWatch as part of an RCT for individuals	15	BlueWatch, a mobile app that comprises short audio activities, journaling exercises, and self-monitoring functions, and was designed to improve the well-being and resilience of	None	Encouraging participant engagement via self-monitoring and feedback, as well as personalized messaging, may be a viable way to maintain participation in

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
				with depression		adults experiencing depressive symptomatology		self-guided interventions
80	Netherlands	RCT	General community	Adults with mild to moderate symptoms of depression and/or anxiety	537	PST – internet delivered problem solving therapy, "Allesondercontrole" Conditions were PST without support, PST with support on request, PST with weekly support The support was focused on helping the respondent work through the self-help method. The time spent on providing support was 25 minutes per week per respondent on average	No PST, but non-specific support via chat or email Wait-list (access to website about anxiety and depression)	Only participants who received PST with weekly support improved significantly more than WLC for depressive symptoms Weekly support + PST produced best results for anxiety reduction
70, 118	Germany	RCT	Online, German health insurance companies and various inpatient and outpatient clinics	Adults with mild to moderate depressive symptoms	509 participants	Deprexis	Care as usual	Deprexis had a significant effect on depression
44	Canada	Pilot study	University	Enrolled at University	206	Destressify (3 days/week for 1 month)	Wait-list	Using DeStressify was shown to reduce trait anxiety, and improve general health, energy, and emotional well-being

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
61	US	Pilot Study	Local university and community college campuses	18-20 year-old first year college students	76	ACT-CL - 3 weeks to complete a Web-based program using ACT	Wait-list	Results provide preliminary support for the feasibility of a Web-based ACT program for depression
28	Australia	RCT	Participants were recruited from an existing wait-list of individuals who had previously expressed interest in participating in iCBT	Adults with depressive and/or anxiety symptoms	109	The Worry and Sadness Program (www.virtualclinic.org.au , six online lessons to be over 10-weeks, illustrated story about two fictional characters who experience anxiety and depression, and gain mastery over their symptoms using CBT techniques	Wait list	Worry and Sadness was more effective than WLC, in reducing depression and anxiety
119	Netherlands	RCT	Media advertisements	Adults with mild to moderate depressive symptoms	150	MBCT – mindfulness training, practice meditations for 15 minutes a day, over 11 sessions	Wait-list	MBCT was associated with significant reductions in depression, anxiety, and experiential avoidance, and improvements in mindfulness and emotional- and psychological mental health
47	Netherlands	RCT	Media advertisements	Adults with mild to moderate depression	236	Web-based ACT	Web-based expressive writing Wait list	Web-based ACT intervention, as compared to the WLC, showed significantly greater improvement for

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
								psychological flexibility and mindfulness
57	Australia and NZ	RCT	Community-based volunteers	Adults with mild to moderate depression, anxiety and/or stress	799	<p>myCompass is a fully-automated, self-help, public health intervention, that is tailored to the user and has no therapist input. Real-time self-monitoring of symptoms (e.g. problem moods, thoughts and behaviours) via mobile phone occurs. Users can self-monitor three symptoms of their choice at any one time</p> <p>The program contains 12 skill-building modules derived from CBT, Interpersonal Psychotherapy, Problem-solving Therapy and Positive Psychology</p> <p>Each module comprises three 10-minute sessions and includes activities for users to complete on the computer</p>	Attention control participants received a control mental health program matched to the active intervention on duration and mode of delivery	The myCompass group showed significantly greater improvement in symptoms of depression, anxiety and stress and in work and social functioning relative to both controls
71	Europe and Ireland	RCT	Online	Adults with mild to moderate distress	188	Internet-delivered SPACE FROM DEPRESSION - plus weekly support from a trained supporter	Wait list	Treatment group reported changes in depression and anxiety relative to wait list

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
66	Germany	RCT	Online	Adults with anxiety symptoms		ConFIID	Usual care	Transdiagnostic Internet interventions for the treatment of anxiety disorders are promising in overcoming the treatment gap for people with anxiety disorders
48	Canada	RCT	Online	Adults interested in becoming happier	466	OPPI cultivating optimism intervention – every second day for approximately 3 weeks, participants were instructed to complete a 5–10-minute exercise (12 exercises in total)	Daily activity log (3 weeks)	The optimism intervention increased the pursuit of engagement-related happiness in the short term and reduced dysfunctional attitudes across follow-ups Pessimistic individuals reported fewer depressive symptoms at post-test
58	Australia	Cohort study	Primary care	Young people (12–25 years) with mild, mild-moderate or moderate-severe depressive symptoms	66	Online decision aid - (i) "What matters to you?", (ii) "Treatment options", (iii) "Your decision", and (iv) "Information".	None	After using the decision aid, clients were more likely to make a decision in line with guideline recommendations for depression

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
56	Australia	Cohort study	Online	Adults with moderate depression and/or anxiety	10,293	MINDSPOT - Four iCBT treatment courses were offered: the Wellbeing course, designed to treat symptoms of anxiety and depression of adults ages 18–60 years, the Wellbeing Plus course, designed to treat symptoms of anxiety and depression of adults; the OCD course, designed to treat symptoms of obsessive-compulsive disorder, and the PTSD course, designed to treat symptoms of post-traumatic stress disorder Each course comprised four to six lessons and homework assignments, systematically made available over an eight-week period	None	Moderate to large noncontrolled effect sizes reductions were found in anxiety and depressive symptoms Mean total therapist time per patient was 111.87 minutes
55	Australia	RCT	Online	Adults with a principal complaint of depression symptoms	290	DS-CBT (5 online lessons over 8 weeks, targeting social anxiety, with and without support)	TD-CBT (5 online lessons over 8 weeks, wellbeing course, with and without support)	Large reductions in symptoms of depression and symptoms of comorbid generalised anxiety, social anxiety, and panic No marked or consistent differences were observed across the four conditions, highlighting the efficacy of different

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
								forms of CBT at treating MDD and comorbid disorders
65	UK	RCT	Online	Adult with worry	996	Participants recorded their worries in an online 'worry log' for a 6-day period + additionally 'postpone' their worries over this time period to a designated '30-minute worry period' at the end of each day	Worry log alone	No group differences were observed. Both groups reduce depression and anxiety
Peer- or clinician-led programs								
87	Australia	RCT	Aged care Residential Facilities	People aged 65 years and over with mild depression or anxiety	18	Participants assigned to the treatment group commenced a manualised CBT program for older adults with depression and anxiety held over 10 weeks in their aged care facility The groups were led by a post graduate psychology student	Treatment and care as usual	Group treatment was associated with significant reductions in depression over control
84	US	RCT	Veterans at an Anxiety Disorders Clinic	Adults with anxiety	105	Group treatment - weekly for 90-minute sessions for 10 weeks, mindfulness-based stress reduction	Group-based CBT over the same time period	CBT outperformed adapted MBSR among those with no to mild depressive symptoms and those with very high anxiety sensitivity At follow up, adapted MBSR outperformed

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
								CBT among those with moderate to severe depressive symptoms and among those with average anxiety sensitivity
91	Australia	Analysis	Online	Participants aged 65–92 years	108	Online activity. Online activity was measured using a method developed to record breadth and frequency of Internet use. Participants rated the frequency with which they engaged in online activities separated into five components as follows: communication with friends and family, meeting new people online, acquiring information, use for commerce, and use for entertainment	None	The online activities in which older adults most frequently engaged were communicating with family and friends, reading the news, and banking. Face-to-face social connectedness was by far the strongest predictor of depression
93	England	Interviews	Online	Males who had: (a) attended mental health groups; (b) not attended mental health groups but had spoken	29	Interviews with 17 men experiencing depression or anxiety A further 12 interviews were conducted with staff who worked with depressed men (half of whom also experienced depression or anxiety themselves)	None	Some men attend groups for support with depression and anxiety There was a strong theme of isolated men, some reluctant to discuss problems with their close family and friends but attending groups

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
				to their GP about depression or anxiety; (c) not attended groups nor spoken to their GP about depression or anxiety				Peer support, reduced stigma and opportunities for leadership were some of the identified benefits of groups
83	Australia	Cohort	Community and outpatient health settings Study one- recruited through social recreation groups run by a community organisation ('Reclink') in a regional city characterised by a culturally diverse and socioeconomically disadvantaged population. Study two- adult outpatients who completed group cognitive-	Adults with depression and anxiety	52 (Study 1) 92 (Study 2)	STUDY 1 - Reclink - a nationwide non-government organisation that organises recreational and social activities for disadvantaged people (social participation)	Study 2- Patients were referred to either a depression or anxiety CBT psychotherapy group based on their primary diagnosis. Group therapy was 2 3.5-hour groups per week for four weeks	STUDY 1 – participants reported reductions in depression over time STUDY 2 – Participants reported significant reductions in depression and anxiety over time.

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
			behavior therapy for depression or anxiety					
89	US	RCT	University	First year psychology students	56	The Depression OutReach Alliance (DORA) College Program is a peer-peer engagement approach for depression and suicide prevention. DORA consists of a video, student workbook and structured discussion groups facilitated by mental health professionals, and trains students as peer workers	Video alone	DORA group demonstrated better crisis response skills than the control, reported less social distance from a distressed peer, and lower levels of stigma in relation to help seeking for psychological issues
86	Canada	Pilot study	Outpatients of the Centre for Addiction and Mental Health	Adults with mood problems	356	CBT for depression (MindOverMood), 14 two-hour group sessions, facilitated by a therapist	None	Significant reductions in depression were observed. Higher use of behavioural activation, was more effective for participants with mild-moderate depression
85	Canada	Pilot study	General practice	Adults with moderate depression or anxiety symptoms	18	Online video conference delivered CBT group therapy. Thirteen one-hour sessions	Face to face delivery of the same group CBT	No differences between groups in terms of reduction in depression
88	UK	RCT	Community	Adults aged 45 years and older with mild to moderate	62	Peer-facilitated cognitive-behavioural bibliotherapy, the "Five Areas approach", which includes 16 workbooks for addressing depression	Wait list	Clinically meaningful reductions in depressive symptoms were observed for those assigned to the

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
				depression and anxiety		and 5 workbooks for addressing anxiety		treatment condition compared to those that were wait-listed. The same pattern was observed for anxiety symptom, but this was not significant. Participants were satisfied with the peer mentoring sessions and moderately satisfied with the workbooks
Email and text-based programs								
95	NZ	RCT	Young person's health centre and helpline	Young people aged 12–24 years with mild or moderate anxiety and/or depression	22	The text package comprised three, weekly text messages (a psycho- educational message, a weekly challenge relating to the week's message, and an inspirational message) that were sent to each participant for 10 weeks Participants also received a phone call each week to support them with the text package	Text package alone	Both groups reported improvements in symptoms of depression and anxiety over time, with no differences between groups Dropout was lower for people who received the support phone call
96	UK	RCT	University and Online	University students	213	MYLO: a problem-solving program that aims to facilitate a participant focusing on a problem. It simulates the type of	ELIZA text-based program designed to communicate in natural language. The program	Both programs were associated with significant reductions in

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
						questioning that might be helpful to prompt thinking about their problems differently and to begin to solve them	attempts to emulate a Rogerian psychotherapist	mood, distress, and stress
97	Singapore	RCT	Researcher social networks	Adults aged 60 years and over, with mild to moderate depression.	29	Life story review – sessions conducted in participant homes by health worker, once a week in the first month and the final visit was on week 8. Participants completed an interview sharing memories from life up until current time. The researcher used a guiding set of questions. Each of these interview sessions lasted for approximately 30-45 minutes	Meetings with health worker at same rate as intervention	Significantly greater reductions in depression in the intervention group over controls scores, and at 8 weeks, levels of depression in the intervention group were significantly lower than controls
33	Romania	RCT	University students	Adults (first year university students) assessed using an online BDI-II assessment (Beck Depression Inventory)	96	Students were randomised to bibliotherapy including five-minute weekly telephone calls to discuss potential questions about the reading material or other practical concerns about the study.	Participants were randomized to one of four groups: bibliography; delayed treatment (wait list); Placebo (similar book on how to be more organized at home or in the workplace + five-minute weekly telephone calls;	Bibliotherapy resulted in both statistically and clinically significant changes in depressive symptoms and maladaptive cognitions. Following treatment, bibliotherapy was superior to placebo (in terms of cognitions) and to delayed treatment and no treatment (in terms of symptoms and cognitions). Placebo was

Source	Country	Study type	Setting	Population	Sample size	Program	Comparator	Outcomes
							No treatment (not included in the current study).	only associated with a temporary decrease in symptoms without any changes at the cognitive level. Automated thoughts mediated the effect of bibliotherapy on depressive symptoms.
94	Australia, US, NZ, Canada, UK, Ireland or US	RCT	Online	Adults with mild, moderate, and severe depression	1,736	MoodMemo – emails sent twice a week for 6 weeks by an automated system and had no interaction with a therapist. Emails advocated self-help strategies endorsed as effective and feasible by depression experts	Basic emails twice a week for 6 weeks, covering depression, symptoms, prevalence, and risk factors, and did not suggest any action	Both groups showed large improvements in depression symptoms overall, with no significant difference in improvement at the end of the study
98	Thailand	RCT	Outpatient Psychiatric Hospital.	Adults with moderate depression	56	Self-help booklet - eight modules covering mental health literacy about depression, relaxation, exercise, problem solving and measures to promote sleep One module was completed per week for 8 weeks. Each module took 1–2 h to complete	Standard care	Booklet was associated with significant reductions in depression over standard care, higher levels of resilience and lower psychological distress

Exercise-based programs									
103	Iran	RCT	Psychology clinics	Adults with mild to moderate depression	77	Group-CBT (one session per week for 12 weeks, 90-minute session) was provided to both groups once a week for 12 weeks. In addition, this group also received three weekly exercise sessions over 12 weeks. The exercises were performed at moderate intensity	CBT only No control group.	Significant reductions in depression were reported for both groups. Those participants receiving both CBT and exercise interventions reported significantly greater reductions in suicide ideation and depression than the CBT alone	
104	US	RCT	University counselling and psychiatric services clinics	Adults with moderate depressive symptoms, and adults without depression	69	Each session consisted of 30 minutes of focused-attention meditation and 30 minutes of moderate-intensity aerobic exercise The intervention consisted of 2 sessions per week for 8 weeks	Both groups (people with and without depression) received the same intervention	Both groups reported significantly lower symptoms of depression following the 8-week intervention	
120	US	RCT	Community	Older adults aged 60–79 years with mild to moderate depression	247	All groups met at local campus recreation centers for 1 hour, three times per week for 24 weeks Each session began with a warm-up (light walking followed by stretching exercises targeting major muscle groups) All exercise sessions were led by trained exercise leaders	Participants were randomised to one of three exercise training programs: Dance, Walking, and Strengthening, Stretching, Stability The Strengthening, Stretching, Stability group	Increases in physical activity over the course of the intervention were associated with greater reductions in psychological distress which, in turn, were significantly associated with improvements in quality of life	

							served as the active control condition	
113	South Africa	RCT	Community	Males aged 18–42 years old with moderate depression	30	Six-week program comprising exercise three days per week, for one hour per day The HIGHs exercised at 70–75% of heart rate reserve, the MODs at 45–50%, while the CONs kept their heart rates below 120 beats per minute by walking and/or doing very light cycling		The HIGHs showed the greatest improvement on depression, followed by the MODs. The CONs improved somewhat, but not to the same extent
110	France	RCT	Community	Adults aged over 55 years with depression	121	Six-month moderate intensity walking intervention (three times a week, 40 minutes per session, supervised and home-based)	Wait list	Participants in the walking intervention showed a significant decrease in depression as compared with controls
121	US	RCT	University	Adults	80	Aerobic exercise	No exercise – stretching	Moderate aerobic exercise may help attenuate negative emotions for participants initially experiencing regulatory difficulties
111	US	RCT	Community	People aged 65–92 years with depression	98	Participants were randomised to (a) chair yoga, (b) chair exercise, or (c) wait list control	Wait-list control	There was a significant reduction in depression observed for participants in the chair yoga intervention

109	Taiwan	Prospective cohort study	Community	Adults, 65 years and over with depressive symptoms	2,673	Four different types/ amounts of exercise: (1) 3 times/week, 15 min/time; (2) 3 times/ week, 30 min/time; (3) 6 times/week, 15 min/time; and (4) 6 times/week, 30 min/time All exercise types were required to have at least moderate intensity	None	Consistent exercise with at least 15 minutes per time, three times a week of moderate intensity is significantly associated with lower risk of depressive symptoms
122	Sweden	RCT	Primary healthcare facilities	Adults with moderate depression	945	Three groups: light exercise (yoga/stretching classes), moderate exercise (intermediate aerobics class) and vigorous exercise (a higher-intensity aerobics/ bodyweight strength training class) All exercise sessions were delivered by qualified trainers with a certificate in personal training Patients were requested to complete three 60 minute sessions per week for 12 weeks The manual was mostly text-based, but also included images and sound clips. This group was helped by a qualified psychologist Treatment as usual-participants randomised to usual care received standard	Internet based CBT- online self-help manual Treatment as usual	Depression severity reduced significantly in all three exercise groups from baseline to 3 months and from baseline to 12 months Compared with usual care by a physician, prescribed exercise and clinician-supported ICBT are at least equally effective long-term treatment alternatives for adults with mild to moderate depression

						treatment for depression administered by their primary care physician. In most instances, 'usual care' consisted of 45–60 minutes CBT delivered by an accredited psychologist or counsellor Of the 945 patients, 740 (78%) returned a 3-month questionnaire and 797 (84%) returned a 12-month questionnaire		
105, 106, 123	Sweden	RCT	Primary care centres	Adults with moderate depression	620	The three exercise groups were prescribed: 1. light exercise consisting yoga-based stretching and balance exercises, (without a mindfulness component, extensive breathing exercises or emphasis on mental wellbeing as would be present in traditional yoga classes) 2. moderate exercise consisting of intermediate-level aerobics 3. vigorous exercise, consisting of more strenuous aerobics Participants were asked to attend three classes of 55 minutes duration per	Treatment as usual	At the 12-month follow-up, the light exercise group had significantly lower scores than both the treatment as usual and the moderate groups

						week for 12 consecutive weeks		
100	Ireland	Pilot study	University	Age 18–35 years with worry	17	Acute aerobic exercise- Participants completed a vigorous 30-minute supervised bout of running on a treadmill at 65%e-5% of maximal heart rate reserve (%HRR)	30 minutes of quiet rest	Compared with quiet rest, acute aerobic exercise significantly reduced worry and feelings of fatigue, and significantly increased feelings of energy
112	Netherlands	RCT	Primary care	Women who satisfied low-SES criteria, had stress or depression	161	Exercise + psychoeducation	Exercise alone Psychoeducation alone	Those who received exercise + psychoeducation reported superior reductions in depression and increases in wellbeing relative to an exercise alone or psychoeducation alone condition

RCT=randomised controlled trial, CBT=cognitive behaviour therapy, iCBT=internet-delivered cognitive behaviour therapy, PST=problem solving therapy, IPT=interpersonal therapy, ACT=acceptance and commitment therapy

Appendix D – Internet programs and Apps used in the National Health System in England, UK

Source: Bennion, M. R., Hardy, G., Moore, R. K., & Millings, A. (2017). E-therapies in England for stress, anxiety or depression: what is being used in the NHS? A survey of mental health services. *BMJ open*, 7(1).

Table 1 All web and smartphone apps reported to be used or recommended by the NHS for common mental health problems

App	Format	Payment model	Web or phone based (w/p)	Number of IAPTs using/recommending (% of 191 IAPT services)	Number of Trusts using/recommending (% of 51 Trusts)	Listed in NHS Health Apps Library (y/n)	Listed in Mental Health Apps Library (y/n)
Living Life to the Full	Online modular self-help	Free to access	w	94 (49.2%)	24 (47.1%)	n	n
MoodGYM	Online modular self-help	Free to access	w	46 (24.1%)	10 (19.6%)	n	n
Big White Wall	Online forum with tools, courses and one-to-one messenger based chat with a professional.	Paid for by provider (but only available in some areas) or end user	w	39 (20.4%)	12 (23.5%)	y	y
Beating the Blues*	Online modular self-help	Paid for by provider (but only available in some areas) or end user	w	34 (17.8%)	13 (25.5%)	n	n
Silvercloud health	Online modular self-help with therapist support	Paid for by provider (but only available in some areas)	w	27 (14.1%)	5 (9.8%)	n	y
Ieso Digital Health	Online one-to-one messenger-based chat with a professional	Paid for by provider (but only available in some areas)	w	22 (11.5%)	5 (9.8%)	y	y
Fear Fighter	Online modular self-help	Paid for by provider (but only available in some areas) or end user	w	20 (10.5%)	5 (9.8%)	n	y
Headspace	Meditation via app or online	Paid for by end user	p	11 (5.8%)	3 (5.9%)	n	n
Buddy App†	Tool to support face-to-face therapy	Paid for by provider	w	6 (3.1%)	2 (3.9%)	y	y
Don't Panic!	Self-help resources	Free to access	p	5 (2.6%)	1 (2.0%)	n	n
MyMoodTracker	Mood tracker	Paid for by end user	p	2 (1.0%)	1 (2.0%)	n	n
Mindfulness Bell	Meditation	Paid for by end user	p	2 (1.0%)	0 (0%)	n	n
Moodkit—Mood Improvement Tools	Tools to improve mood	Paid for by end user	p	2 (1.0%)	0 (0%)	y	n
Thought Diary Pro	Thought diary	Paid for by end user	p	2 (1.0%)	0 (0%)	n	n
WellMind	Tools to help with depression, stress, anxiety	Free to access	p	2 (1.0%)	1 (2.0%)	n	n
Moodometer	Tool to support face-to-face therapy	Free to access	p	2 (1.0%)	0 (0%)	n	n
Kooth	Online one-to-one messenger-based chat with a professional for children and young adults aged 11–19	Free to access (but only available in some areas)	w	2 (1.0%)	2 (3.9%)	n	y
CBTReferee	Journal to assist face-to-face CBT	Paid for by end user	p	1 (0.5%)	1 (2.0%)	n	n
iCBT	Tool for self-help using CBT	Paid for by end user	p	1 (0.5%)	0 (0%)	n	n
Thought Diary	Thought diary	Paid for by end user	p	1 (0.5%)	0 (0%)	n	n
Stay Alive	Tools to prevent suicide	Free to access	p	1 (0.5%)	1 (2.0%)	n	n

Continued

Table 1 Continued

App	Format	Payment model	Web or phone based (w/p)	Number of IAPTs using/recommending (% of 191 IAPT services)	Number of Trusts using/recommending (% of 51 Trusts)	Listed in NHS Health Apps Library (y/n)	Listed in Mental Health Apps Library (y/n)
Take a break!	Meditation app	Free to access	p	1 (0.5%)	1 (2.0%)	n	n
Mindshift	Tools to help with anxiety	Free to access	p	1 (0.5%)	0 (0%)	n	n
Moodscope	Tool to monitor mood	Free to access, stepped payment	w	1 (0.5%)	1 (2.0%)	y	n
DigitalMeds	Binaural beat technology for meditation	Paid for by end user	p	0 (0%)	0 (0%)	y	n
How Are You App	Mood tracker	Paid for by end user	p	0 (0%)	0 (0%)	y	n
Mindfulness by Digipill	Meditation	Paid for by end user	p	0 (0%)	0 (0%)	y	n
Mindlogr	Video journal	Paid for by end user	p	0 (0%)	0 (0%)	y	n
Panic Attack Aid	Tools to help with panic attacks	Paid for by end user	p	0 (0%)	0 (0%)	y	n
Phobia Free	Augmented Reality (AR) for exposure treatment	Paid for by end user	p	0 (0%)	0 (0%)	y	n
Stress Management App	Tools to help with stress	Paid for by end user	p	0 (0%)	0 (0%)	y	n
WorkGuru	Tools to help with stress at work	Paid for by end user	w	0 (0%)	0 (0%)	y	n
Worry Watch	Journal for anxiety	Paid for by end user	p	0 (0%)	0 (0%)	y	n
MindEd	Online advice and support	Free to access	w	0 (0%)	1 (2.0%)	n	n
Puffell	Online advice and support	Free to access	w	0 (0%)	1 (2.0%)	n	n
Virtual Hope Box	Tools to compliment face-to-face	Free to access	p	0 (0%)	1 (2.0%)	n	n
Aventurine Mood Improver	Tool for self-help using CBT	Free to access	p	0 (0%)	0 (0%)	y	n
Black Rainbow	Advice and audio for relaxation	Free to access	p	0 (0%)	0 (0%)	y	n
Depression Calculator	PHQ-9 screening tool	Free to access	p	0 (0%)	0 (0%)	y	n
Five Ways to Well-being	Tools for well-being	Free to access	p	0 (0%)	0 (0%)	y	n
Ginsberg	Activity and mood diary	Free to access	p	0 (0%)	0 (0%)	y	n
Happy Healthy App	Tools for well-being	Free to access	p	0 (0%)	0 (0%)	y	n
Healthstored	Health tracker	Free to access	p	0 (0%)	0 (0%)	y	n
Healthy Living	Guide to healthy living	Free to access	p	0 (0%)	0 (0%)	y	n
Hello Brain Health	Brain exercises for better health	Free to access	p	0 (0%)	0 (0%)	y	n
Moodbug	Mood tracker	Free to access	p	0 (0%)	0 (0%)	y	n
SAM: Self-help for Anxiety	Tools to help with anxiety	Free to access	p	0 (0%)	0 (0%)	y	n
Stress & Anxiety Companion	Tools to help with anxiety	Free to access	p	0 (0%)	0 (0%)	y	n

*Beating the Blues developer Ultrasis went into administration in October 2015. The program is now linked with 365 Health and Well-being who have been unreachable for comment.

†Buddy Enterprises has ceased operations and as a result of this Buddy App has been discontinued.

CBT, cognitive-behaviour therapy; IAPT, Improving Access to Psychological Therapies; NHS, National Health Service; PHQ-9, Patient Health Questionnaire.