

Digital interventions in alcohol and drug prevention, treatment and recovery:

Systematic maps of international research and interventions available in England

Helen Burchett, Claire Stansfield, Wendy Macdowall, Michelle Richardson
Samantha Dick, Kelly Dickson, Preethy D'Souza, Claire Khouja, Irene Kwan
Gary Raine, Amanda Sowden, Katy Sutcliffe, James Thomas

2022

NIHR Policy Research Programme Reviews Facility is a collaboration between:



Digital interventions in alcohol and drug prevention, treatment and recovery:

Systematic maps of international research and interventions available in England

2022

The authors of this report are:

Helen Burchett¹, Claire Stansfield², Wendy Macdowall¹, Michelle Richardson², Samantha Dick⁴, Kelly Dickson², Preethy D'Souza², Claire Khouja³, Irene Kwan², Gary Raine³, Amanda Sowden³, Katy Sutcliffe², James Thomas²

¹ London School of Hygiene & Tropical Medicine, London, UK

² EPPI Centre, UCL Social Research Institute, University College London, UK

³ Centre for Reviews & Dissemination, University of York, UK

⁴ University College Cork, Ireland

Acknowledgements

The authors would like to thank all the members of the advisory group and the team at Public Health England, who helped steer this research. We also thank colleagues at the EPPI Centre who contributed during the early stages of this research:

Dr Ginny Brunton, Dr Patrick O’Driscoll and Dr Alison O’Mara-Eves.

Funding

This review was commissioned by the National Institute for Health Research (NIHR) Policy Research Programme (PRP) for the Department of Health and Social Care (DHSC). It was funded through the NIHR PRP contract with the EPPI Centre at UCL (Reviews facility to support national policy development and implementation, PR-R6-0113-11003). The views expressed in this publication are those of the author(s) and not necessarily those of the NHS, the NIHR or the DHSC.

Funder involvement

This work is part of an ongoing programme of work funded by DHSC. Throughout the review, Office for Health Improvement and Disparities (OHID, formerly Public Health England) policy team members were consulted to understand the context of the issue under study, and to identify the focus and scope of the analysis.

Conflicts of interest

There were no conflicts of interest in the writing of this report.

Contributions

The opinions expressed in this publication are not necessarily those of the EPPI Centre or the funders. Responsibility for the views expressed remains solely with the authors.

This report should be cited as: Burchett H, Stansfield C, Macdowall W, Richardson M, Dick S, Dickson K, D’Souza P, Khouja C, Kwan I, Raine G, Sowden A, Sutcliffe K, Thomas J (2022) *Digital Interventions in alcohol and drug prevention, treatment and recovery: Systematic maps of international research and interventions available in England*. London: EPPI Centre, Social Science Research Unit, UCL Social Research Institute, University College London.

Editorial & design by: Lionel Openshaw

ISBN: 978-1-911605-18-8

© Copyright 2022

Authors of the systematic reviews on the EPPI Centre website (<http://eppi.ioe.ac.uk/>) hold the copyright for the text of their reviews. The EPPI Centre owns the copyright for all material on the website it has developed, including the contents of the databases, manuals, and keywording and data-extraction systems. The centre and authors give permission for users of the site to display and print the contents of the site for their own non-commercial use, providing that the materials are not modified, copyright and other proprietary notices contained in the materials are retained, and the source of the material is cited clearly following the citation details provided. Otherwise users are not permitted to duplicate, reproduce, re-publish, distribute, or store material from this website without express written permission.

CONTENTS

Executive Summary	6
Background.....	6
Research questions.....	6
Methods	6
Findings	8
Conclusions and possible topics for in-depth review	15
Glossary & pathway definitions	16
1 Background	20
1.1 Description of the problem	20
1.2 Rationale	22
1.3 Review aims and questions	22
2 Brief methods	24
2.1 Stakeholder engagement	24
2.1.1 Policy stakeholders	24
2.1.2 Transdisciplinary advisory group.....	24
2.2 RQ1: Pathway development	24
2.3 RQ2: Online survey to identify interventions available in England	25
2.3.1 Survey details	25
2.4 RQs 3 – 5: Mapping systematic reviews and primary research.....	26
2.4.1 Identifying systematic reviews and primary studies	26
2.4.2 Coding and quality appraisal.....	26
2.5 Creation of interactive maps	27
3 Findings	28
3.1 Stakeholder engagement	28
3.2 Interactive online maps.....	28
3.2.1 Focus and purpose of the two maps	28
3.2.2 High-level findings depicted in the maps	28
3.2.3 Map interactivity	29
3.3 RQ1: What is the possible range of digital alcohol and drug interventions?.....	29
3.4 RQ2: Which types of digital alcohol and drug interventions are currently available for use in England?	32
3.4.1 Key findings on interventions available in England.....	32
3.4.2 Overview of interventions available for use in England (n=40)	32

3.4.3	Alcohol use interventions (n=26).....	36
3.4.4	Drug use interventions (n=6).....	36
3.4.5	Alcohol and drug or substance use interventions (n=8).....	37
3.6	RQ3: What systematic reviews provide findings for digital alcohol and drug interventions at each point along the prevention/treatment/recovery pathway?	38
3.6.1	Key findings on systematic reviews	38
3.6.2	Overview of the systematic reviews (n=18).....	38
3.6.3	Reviews on alcohol use interventions (n=12).....	41
3.6.4	Reviews on drug use interventions (n=2)	41
3.6.5	Reviews on alcohol and drug or unspecified substance use interventions (n=5*)	42
3.7	RQ4 Which types of digital alcohol and drug interventions have been evaluated in primary research?	43
3.7.1	Key findings on primary studies	43
3.7.2	Note on primary studies map.....	43
3.7.3	Overview of the primary studies (n=1,250)	43
3.8	RQ5: To what extent does the evaluation evidence overlap with digital alcohol and drug interventions that are currently available for use in England?	47
3.8.1	Key findings on the overlap between evaluations and available interventions	47
3.8.2	Overview of evaluation and intervention overlap.....	47
4	Discussion	48
4.1	Summary of findings	48
4.2	Strengths and limitations.....	50
4.3	In-depth review options	52
4.4	Conclusion	55
5	Detailed methods	56
5.1	Stakeholder engagement	56
5.1.1	Policy stakeholders	56
5.1.2	Transdisciplinary advisory group.....	56
5.2	RQ1: Pathway development	57
5.3	RQ2: Online survey to identify interventions available in England	57
5.3.1	The survey questions.....	57
5.3.2	Survey distribution.....	58
5.3.3	Data analysis.....	58
5.3.4	Ethical approval	58
5.4	RQs 3 & 4: Mapping systematic reviews and primary research.....	59

5.4.1	Screening criteria	60
5.4.2	Overview of the priority screening process	62
5.4.3	Coding and quality appraisal.....	63
References		65
	Included systematic reviews (N=18).....	65
	Other references	66
Appendices		69
	Appendix 1: Preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) checklist	69
	Appendix 2: Online survey	72
	Appendix 3: Survey participants and results	86
	Appendix 4: Example search strategy	87
	Appendix 5: Flow of literature through the systematic map	93
	Appendix 6: Digital interventions available for use in England (n=40).....	94
	Appendix 7: Systematic reviews excluded from map (n=69).....	97
	Appendix 8: Risk of bias assessment of the included systematic reviews (n=18).....	100
	Appendix 9: Summary of systematic reviews (n=18).....	104

Executive Summary

Background

Digital interventions in alcohol and drug prevention, treatment and recovery have the potential to overcome barriers faced by non-digital interventions. However, we lack a clear understanding of the types of digital interventions that have been evaluated and where gaps in the evidence base exist. We also need to understand the effectiveness of different types of digital alcohol and drug interventions for various population groups. Further, we do not know which digital alcohol and drug interventions are being used in England, and whether the interventions in use align with those that have been evaluated.

Research questions

To address the above concerns, we sought to address the following questions:

- RQ1: What is the *possible range* of digital alcohol and drug interventions?
- RQ2: Which types of digital alcohol and drug interventions are *currently available* for use in England?
- RQ3: What *systematic reviews* provide findings for digital alcohol and drug intervention strategies within a prevention/treatment/recovery pathway?
- RQ4: Which types of digital alcohol and drug interventions have been evaluated in *primary research*?
- RQ5: To what extent does the evaluation evidence overlap with digital alcohol and drug interventions that are currently available for use in England?
- RQ6: What evidence is there that certain types of digital alcohol and drug interventions are (cost-) effective or ineffective for specific population groups or in particular contexts?

This report covers our findings in relation to questions RQ1 - RQ5. Based on these findings we also provide suggestions as to what could be the focus of further work to answer RQ6.

Methods

To address RQ1 an initial typology was drafted, adapting and building on existing typologies of digital interventions. Through this process it became clear to OHID/PHE that a pathway, presenting a route through services, with different types of interventions recommended for use at different times would be more helpful than a typology of intervention characteristics. This pathway was then developed by

OHID/PHE and trialled by the research team, with refinements made over time with discussions between the study team and PHE.

To address RQ2 we contacted people in England in 2019, who were involved in developing, commissioning, prescribing, recommending or evaluating digital alcohol/drug interventions. Using an online survey, we asked them to describe the interventions they were involved with.

To address RQ3, RQ4 and RQ5 we conducted systematic searching and screening to identify and describe existing systematic reviews (RQ3) and primary studies (RQ4). Included systematic reviews were appraised for quality and detailed information was extracted from full reports. For primary studies we extracted basic details using the information contained within the title and abstract.

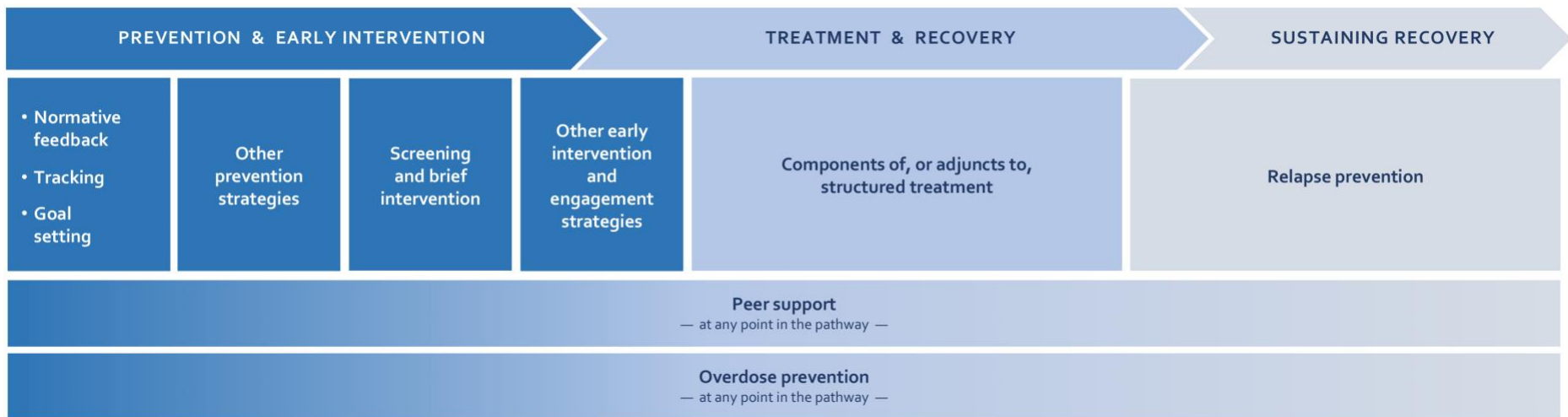
The pathway developed for RQ1 was employed to code and describe the nature of available interventions (RQ2), systematic reviews (RQ3) and primary studies (RQ4). EPPI-Mapper software was used to produce online interactive maps to visually display the findings.

Findings

RQ1: *What is the possible range of digital alcohol and drug interventions?*

As illustrated in Figure RQ1 below, an alcohol and drug pathway was conceptualised, which consists of three stages: prevention and early intervention; treatment and recovery; and sustaining recovery (depicted in top row of figure). Within the prevention and early intervention stage, intervention strategies suited to addressing that stage are presented. Peer support and overdose prevention were considered to be intervention strategies relevant at any stage within the whole pathway.

Figure RQ1: Pathway from prevention to treatment and recovery

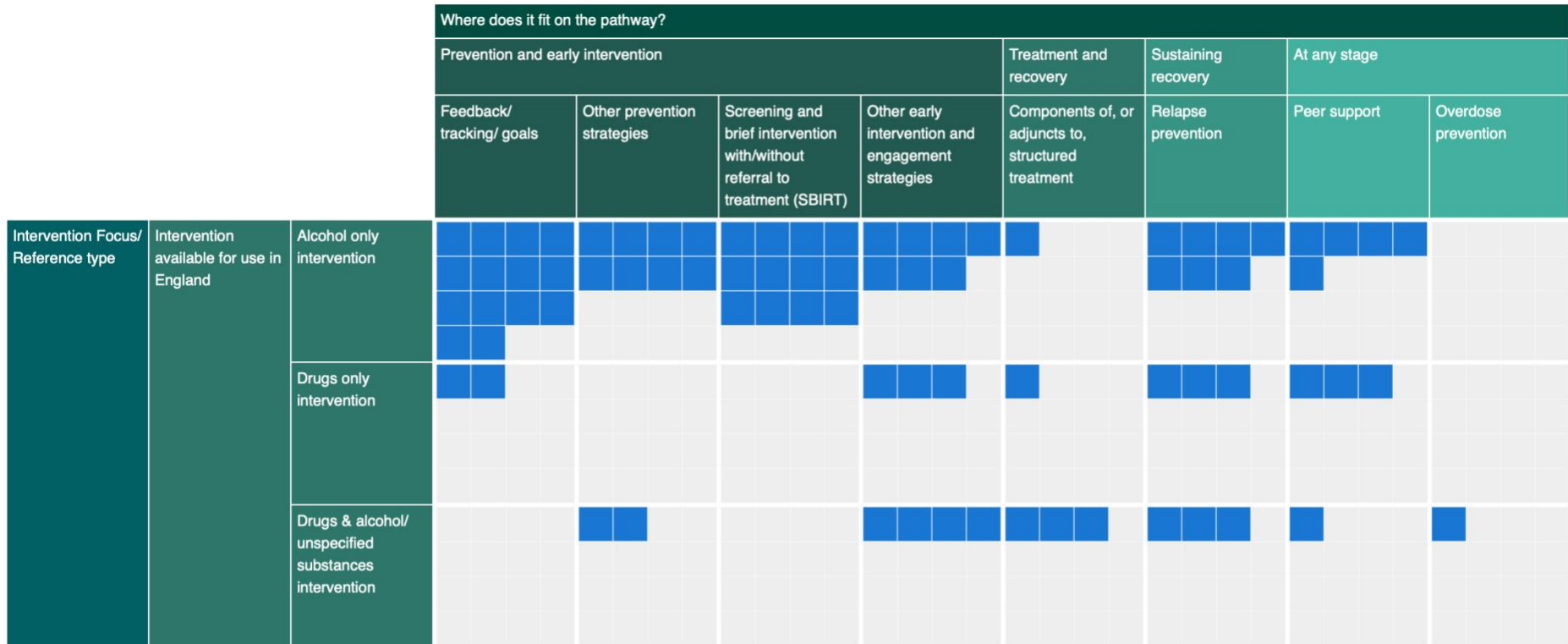


RQ2: *Which types of digital alcohol and drug interventions are currently available for use in England?*

- As illustrated in figure RQ2 below we identified 40 interventions that were available for use in England, of which 35 were in use at the time of the survey.
- Two thirds focused solely on alcohol use (n=26).
- Interventions most commonly focused on ‘prevention and early intervention’ (n=35, 18 exclusively so). Within this stage, ‘feedback, tracking consumption and goal setting’ were the most commonly included strategies (n=16).
- Just over half had undergone some form of evaluation (n=21).

(See Figure RQ2 overleaf.)

Figure RQ2: Map of digital interventions available for use in England in 2019 (n=40)



Link to interactive map:

[https://epi.ioe.ac.uk/cms/Portals/o/AI-SRmaprev23082021_JB_edit_v3%20\(1\).html?ver=2022-08-19-171622-390](https://epi.ioe.ac.uk/cms/Portals/o/AI-SRmaprev23082021_JB_edit_v3%20(1).html?ver=2022-08-19-171622-390)

RQ3: *What systematic reviews provide findings for digital alcohol and drug interventions at each point along the prevention/treatment/recovery pathway?*

- As illustrated in figure RQ3 below, we identified 18 systematic reviews* with evidence on specific intervention strategies.
- The quality of most reviews is not good; seven are low quality (marked red in the figure), seven are moderate quality (orange) and just four are high quality (green).
- Most reviews (n=12) provide analyses on alcohol use interventions. Two reviews provide analyses on drug use interventions (*see note below: one review includes separate analyses for alcohol and for drug use interventions). Five reviews provide analyses on both alcohol and drug use together or on generic substance use interventions.
- All 18 reviews focus on prevention and early intervention, but one also focuses on treatment and recovery. No reviews focus on sustaining recovery, peer support or overdose prevention.

** The map indicates 21 reviews were available; this is because three of the 18 reviews each contain two relevant analyses. Two reviews provide analyses on two different intervention strategies. One review examines two 'prevention and early intervention' strategies; specifically 'feedback/tracking consumption/goal setting' and 'other early intervention and engagement' (Leeman et al. 2015). A second examines one type of 'prevention and early intervention strategy', specifically 'other early intervention and engagement' as well as 'treatment and recovery' strategies (Boumparis et al. 2017). The third review has evidence on a single strategy within 'prevention and early intervention ('other early intervention and engagement strategies') but contains separate analyses for drugs and alcohol (Smedslund et al. 2017) bringing the total number of reviews on alcohol to 12 and the number of reviews on drugs to two.*

(See Figure RQ3 overleaf.)

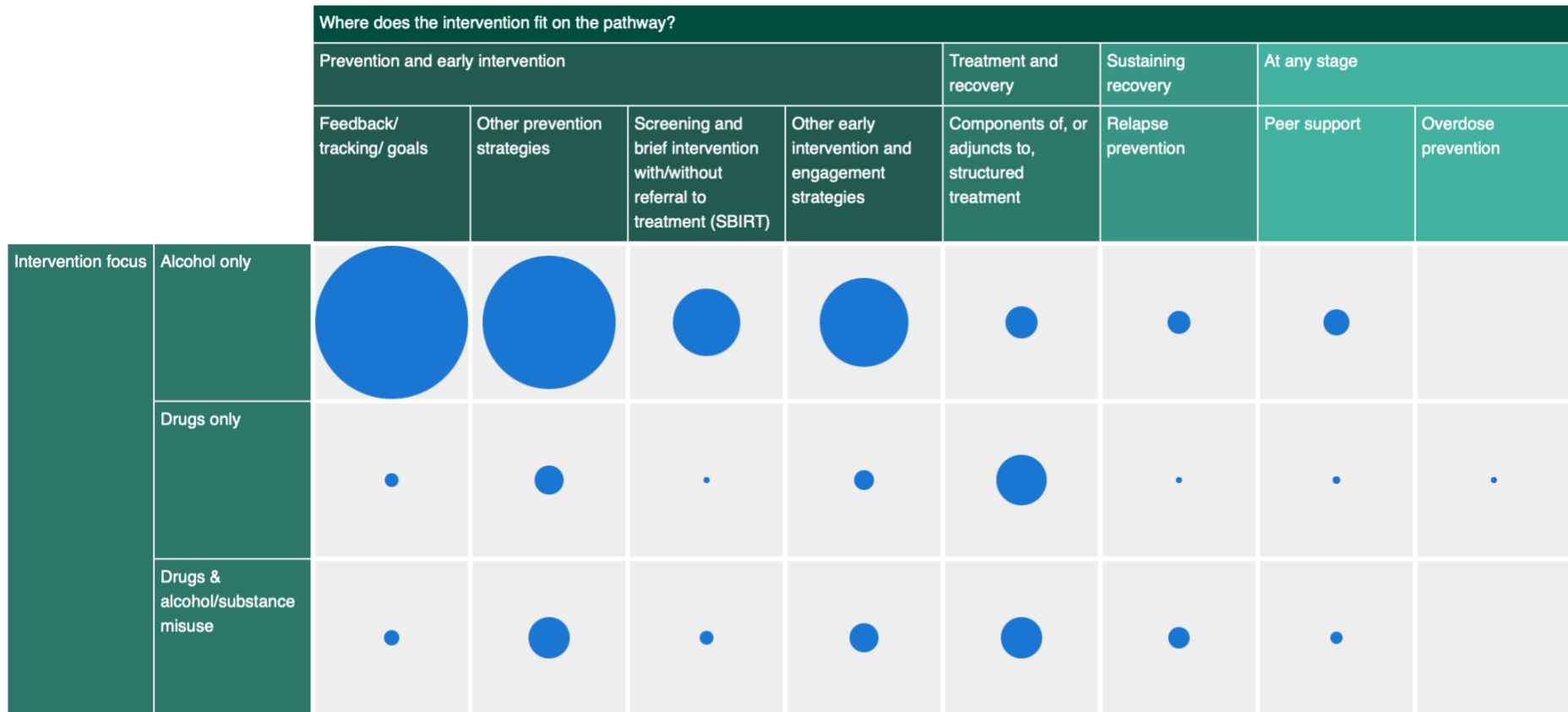
RQ4: *Which types of digital alcohol and drug interventions have been evaluated in primary research?*

- As illustrated in figure RQ4, we identified 1,250 primary studies on digital alcohol and/or drug interventions**.
- The majority of studies assessed interventions targeting alcohol use (n=773), followed by alcohol and drug or unspecified substance use (n=252) and drug use only (n=225).
- The majority of studies assessed ‘prevention and early intervention’ (n=932), followed by ‘treatment and recovery’ (n=220) and ‘sustaining recovery’ (n=90).
- Fewer studies evaluated peer support (n=81) or overdose prevention (n=8).
- 922 studies reported intervention outcomes (such as changes in alcohol consumption); 510 reported process measures (such as attitudes towards the intervention) and 12 reported cost outcomes or economic analysis; 13 did not report which measures were used.

*** primary studies were screened and coded on title and abstract only, rather than full papers.*

(See Figure RQ4 overleaf.)

Figure RQ4: Primary research evaluating digital alcohol and drug interventions (n=1,250)



Link to interactive map: https://eppi.ioe.ac.uk/cms/Portals/o/digintPSmap1Sep20_JB_edit_v3.html?ver=2022-08-19-171356-143

RQ5: *To what extent does the evaluation evidence overlap with digital alcohol and drug interventions that are currently available for use in England?*

Most available interventions and evaluation evidence focused on alcohol only and on the ‘prevention and early intervention’ stage of the pathway. The majority of interventions that were in use had not been evaluated.

Conclusions and possible topics for in-depth review

We created two interactive online maps which provide a pre-pandemic snapshot of the landscape of digital alcohol and drug evaluation evidence and interventions available in England.

Overall, most of the interventions, systematic reviews and primary research focus on alcohol use, rather than drug use or substance use. They also all predominantly focus on ‘prevention and early intervention’ rather than ‘treatment and recovery’ or ‘sustaining recovery’. However, the findings suggest a range of options for topics that that could be explored in further depth.

Option 1: Topics where interventions are available but no high quality reviews exist

Option 2: Topics where neither interventions nor high quality reviews are available

Option 3: Building on existing evidence to focus on participation and retention

In particular, the advisory group indicated that an in-depth review focusing on the processes and mechanisms that support implementation and retention in digital interventions (Option 3) would likely have relevance across the pathway and maintain relevance as intervention strategies evolve. For example, we propose conducting a synthesis of process evaluation research, as an adjunct to an existing in-depth review looking at the effectiveness of brief interventions (with or without screening, referral or additional intervention components). This would aim to understand what factors are associated with more or less effective brief digital interventions for alcohol use, in order to identify how to develop and deliver digital interventions so that they are as effective as possible.

Glossary & pathway definitions

Glossary

Available interventions: digital drug/alcohol interventions that were in use or available for use in England in 2019, or had recently been evaluated in England and could potentially be made available.

Citation: a reference to a journal article, conference abstract, dissertation or report of a primary research study, consisting of its title and when and where it was published.

Digital interventions: any interactive programmes and/or devices using digital technology to support behaviour change, for use by services users or individuals (rather than for use by professionals). We define interactive as involving a two-way flow of information; hence interactive digital interventions do not include those that solely provide health information or those that just involve screening.

Outcome measures: measures of the impact the intervention has on the outcomes it aimed to affect for example, behaviours, knowledge, attitudes.

Primary research: findings from empirical evaluations of digital interventions.

Process measures: measures of the intervention process, including retention, adherence, implementation, satisfaction with or other views about the intervention.

Substance use: either unspecified substance use, or both drug and alcohol use.

Systematic review: a review of research identified from at least two databases and using inclusion criteria.

Pathway definitions

Prevention and early intervention: This point of the pathway covers interventions which aim to prevent or delay the start of substance use, or which aim to prevent substance use and associated problems escalating among people who use but are not yet dependent. Below are the specific types of interventions used for prevention and early intervention.

Feedback/tracking/goals: refers to prevention-focused interventions involving normative feedback, tracking consumption and/or setting goals.

Normative feedback: seeks to challenge an individual's misperceptions about the frequency and quantity of their own alcohol or drug use (descriptive norms) and associated behaviours (injunctive norms) by comparing these to actual norms.

Tracking consumption: includes features that allow the user to record, monitor and review their alcohol or drug consumption over time. Tracking functions may also allow users to see their consumption in terms of money (how much it costs) and calories.

Goal setting: allows users to set their own behaviour change objectives, which may be to reduce or to abstain from drug and alcohol use (or another harm reduction goal). Goal setting functions are usually coupled with some form of tracking function, so users can monitor and review progress.

Other prevention strategies: aim to prevent the use or misuse of alcohol or drugs before it becomes problematic or risky. Other prevention strategies include educational interventions, such as educational gaming, and personalised text messaging.

Screening and brief intervention, with or without referral to treatment (SBIRT): This involves the use of a standardised, validated, screening tool to assess the user's level of risk to alcohol and/or drug-related harm. Such screening tests include the alcohol screening tool Alcohol Use Disorders Identification Test (AUDIT) and its shortened forms. The level of risk identified through screening determines whether a brief intervention and/or onward referral is made. A brief intervention typically involves a short (5-10 minute) conversation focused on the score, risks related to current use, benefits of cutting down, tips for cutting down and, where appropriate, onward referral to specialist treatment for diagnostic assessment and brief or structured treatment.

Other early intervention and engagement strategies: include a range of behaviour change approaches focused on intervening early to identify and reduce risky alcohol/drug use or mild alcohol/drug use disorders, such as brief motivational interventions, extended brief interventions (EBI) and brief treatment. Early interventions range from comparatively unstructured to more formal. Structured approaches are often based on (or drawn from) therapeutic models such as motivational interviewing. Early interventions often take place before, or without, a comprehensive specialist assessment for alcohol/drug use disorder. Some of these interventions are focused on referring and initially engaging people into specialist alcohol/drug treatment.

Treatment and recovery: This point in the pathway covers interventions for people who misuse or are dependent on alcohol or drugs. Below we define structured treatment and list some interventions that form components of it, or are adjunct to it.

Structured treatment: consists of a comprehensive package of concurrent or sequential specialist drug or alcohol-focused interventions. It addresses multiple or more severe needs that would not be expected to respond, or have already not responded, to less intensive or non-specialist interventions alone. Structured

treatment requires a comprehensive assessment of need and either pharmacological or psychological treatment or both, and may or may not include adjunct interventions. It is delivered according to a recovery care plan, which is regularly reviewed with the client. The plan sets out clear goals which include change to substance use, and how other client needs will be addressed in one or more of the following domains: physical health; psychological health; social well-being; and, when appropriate, criminal involvement and offending. All interventions must be delivered by competent staff, within appropriate supervision and clinical governance structures. Most service users will require interventions to be delivered at least partly in-person¹, especially assessment and reviews, and all service users should have the option of regular in-person keyworking appointments throughout their treatment. Structured treatment provides access to specialist medical assessment and intervention, and works jointly with services for mental and physical health, safeguarding and family support, according to need.

Components of, or adjuncts, to structured treatment include:

- ***Comprehensive Assessment:*** includes the formal collection of information necessary to make a clinical assessment, and diagnosis, of alcohol and/or drug use and dependence; and to identify and respond to other physical and mental health and social problems. Comprehensive Assessment is essential to establish the needs and strengths of the patient, explore treatment options with the patient to address their needs, build on their strengths and develop a treatment plan. The assessment would typically also include provision of harm reduction advice and identifying a support network. Most people will require in-person interaction to accurately and comprehensively assess their needs and start building rapport with their keyworker.
- ***Pharmacological interventions:*** prescribing of medicines for alcohol or drug misuse and dependence, including medicines to support stabilisation, maintenance, withdrawal and relapse prevention. This includes prescribing medication to replace illicit opioids with a replacement opioid such as buprenorphine or methadone; manage and treat withdrawal from drugs or alcohol and associated symptoms; prevent and treat Wernicke's encephalopathy/Wernicke-Korsakoffs; and prevent relapse with medication such as naltrexone.
- ***Psychosocial interventions:*** psychosocial interventions incorporate psychological approaches and practical support to someone to help them overcome their alcohol or drug use and dependence, and support recovery. These interventions typically help people to build their commitment, motivation and belief in their capacity to reduce or stop their drug/alcohol consumption, and develop a range of cognitive and behavioural skills and techniques to

¹ At the time of screening for this review (prior to the pandemic), it was felt that it was essential that comprehensive assessment was conducted in-person, therefore studies without in-person comprehensive assessment were excluded from the map. However since the pandemic, this is no longer felt to be essential and so this revised thinking is reflected in the definition presented here.

support them in reaching their personal goals. These interventions include:
motivational interventions

- family and social network interventions
 - contingency management
 - cognitive and behavioural based relapse prevention interventions
 - evidence-based psychological interventions for co-existing mental health disorders
 - psychodynamic therapy
 - 12-step work
 - Counselling
- **Adjunct interventions:** these optional, additional activities are designed to support, encourage, and/or reward engagement with treatment, or foster a strong ‘therapeutic alliance’ between the service provider and patient. Such activities include active monitoring and feedback (including appointment/treatment reminders) and contingency management which incentivises behaviour through rewards.

Sustaining Recovery: This point in the pathway covers interventions for people who have in the past, or are currently, addressing their problems with alcohol and/or drugs and are seeking to continue and sustain their recovery. Below we list the specific types of intervention for sustaining recovery.

Relapse prevention: includes a range of interventions designed to identify and prevent high-risk situations, prevent relapse and maintain recovery. These include interventions which link people into mutual aid groups, help people to identify and track the early warning signs of relapse (for example, cravings) and develop coping skills to prevent relapse, and interventions that monitor/encourage compliance with relapse prevention medications.

At any stage of the pathway: Several interventions are suitable for use at any point in the pathway.

Peer support: Peer support refers to motivational, emotional, practical or social support offered by people with lived experience of alcohol/drug use. It is support given and shared between peers, as opposed to support given by professionals. It may include one-to-one or group peer support.

Overdose prevention: includes interventions which help to prevent overdose and support the management of an overdose situation.

1 Background

1.1 Description of the problem

Substance use is an important public health concern in the UK. Alcohol is the most prolific substance used and is a major risk factor for early mortality, ill health and disability (Burton, Henn et al. 2016). Risky alcohol use is also associated with a range of social consequences, including violence and negative effects on employment and personal relationships. There are varying levels of risky use, with 20% of adults (8.5m) in England drinking at 'increasing risk' (15-49 units per week for men or 15-35 for women), 4% (1.9m) drinking at 'higher risk' levels (i.e. more than 50 units for men; more than 35 for women). Among all drinkers, 17% of adults (7.3m) in 2014 were binge drinking (i.e. more than eight units in a day for men, or six for women) and 1% (0.5m) were dependent drinkers (ibid).

Overall levels of drug use are lower than alcohol use; however, drug use is also an important public health concern, and is associated with mental and physical health problems as well as negative social consequences. In England and Wales, 8% of 16-59 year olds (2.9m) had taken an illicit drug in the year 2014-15 (Stats Team NHS Digital 2017). The prevalence was highest among those aged 16-24 years, at 18% (1.1m). In 2014, 4.3% of men and 1.9% of women aged over 16 were drug dependent (ibid).

As illustrated in Figure 1.1, drug and alcohol prevention, treatment and recovery strategies cover a range of aims, from preventing people from starting to use drugs or alcohol, reducing the risk of harm among those that do use, through to treating dependency and supporting recovery beyond any service involvement. The United Nations Office of Drug Control classify prevention interventions as either universal (i.e. aimed at an entire population), selective (i.e. targeting specific higher risk sub-populations) or indicated (i.e. those already using) (Public Health England 2015). In addition, the Advisory Council on the Misuse of Drugs have noted that interest in environmental prevention is growing, albeit falling outside the Institute of Medicine framework (ACMD Recovery Committee 2015).

The Government's approaches to reducing levels of drug use and drug-related harm is set out in the 2017 Drug Strategy (HM Government, 2017). The 2016 public health burden of alcohol evidence review outlines the impact of alcohol use on public health and the effectiveness of policies to address the harm. The drug strategy and alcohol evidence review cover the environmental aspects noted above. These include the availability of cheap alcohol and drug supply, as well as promoting individual behaviour change with regards to prevention, treatment and recovery.

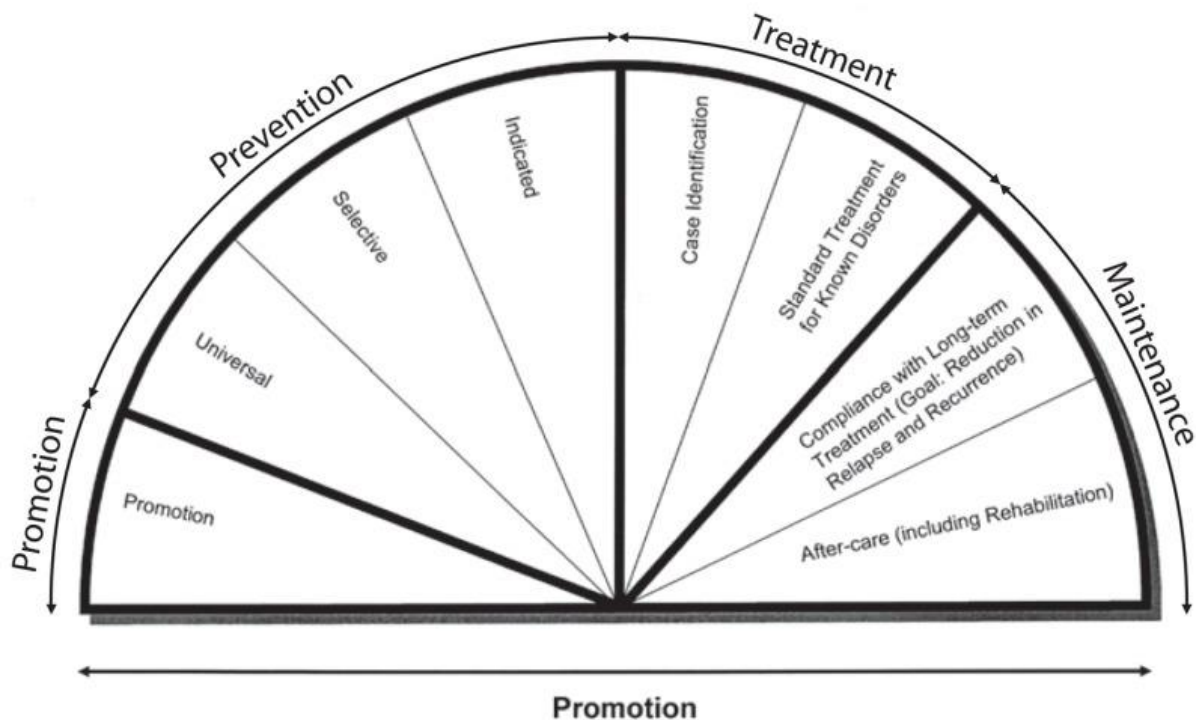


Figure 1.1: Spectrum of interventions (Institute of Medicine 2009)

Treatment numbers for people who are alcohol dependent have fallen in recent years; yet there are high levels of unmet need, with 80% of adults dependent on alcohol not engaged in treatment. There was a 19% drop in the number entering treatment for alcohol-only dependency between 2013-4 and 2016-7 (Public Health England 2018). The number of people entering drug treatment, particularly opiate users, has also fallen (Burkinshaw et al. 2017). In addition, many people who start alcohol/drug treatment in England do not successfully complete it (ibid; [PHE Public Health Dashboard](#)).

It has been suggested that digital drug and alcohol interventions have the potential to help overcome some of the barriers faced in implementing services, such as time constraints, lack of training and lack of adequate resources (Nair et al. 2015), as well as tackling patient-related barriers such as stigma and convenience (Garnett et al. 2018). The availability of a range of digital drug and alcohol interventions has been growing in recent years. For the purposes of this project, we use the term ‘digital intervention’ to refer to “devices and programs using digital technology to foster or support behaviour change” (p1) (Michie et al. 2017). They include, but are not limited to:

- apps
- interactive text-messaging services
- websites that enable a personalised interaction
- computer-assisted therapies
- Voice over Internet Protocol (VoIP)

- Ecological Momentary Assessment and Intervention (EMA, EMI)
- Augmented Reality (AR)/Virtual Reality (VR)
- wearables/bio-sensors/digital breathalysers
- live chat/chatbots
- chat rooms.

These digital interventions can play several different roles from prevention, monitoring conditions and consumption of alcohol and drugs, through to treatment and recovery. However, they vary considerably in their content and mechanisms of effect, depending on their aims, target populations and intended outcomes (Garnett, Crane et al. 2018).

With the recent COVID-19 crisis, there has been some evidence that alcohol use has increased, at the very same time that access to services has been disrupted (Martin, McBride et al. 2020). This has highlighted the potential role that digital interventions could play in preventing and treating use, as well as aiding recovery. However, which digital interventions are available for use in England, as well as what evidence exists to support their use, remains unclear².

1.2 Rationale

At the outset of this research we were aware of increasing research into digital drug and alcohol interventions, including systematic reviews (Nair, Newton et al. 2015, Champion, Newton et al. 2016, Kaner, Beyer et al. 2017, Kazemi, Borsari et al. 2017, Garnett, Crane et al. 2018, Nesvåg and McKay 2018). While there was some evidence that digital drug and alcohol interventions could reduce substance use or related outcomes, there was no clear understanding of the types of digital interventions that have been evaluated and the gaps in the evidence base. We also needed to understand the effectiveness of different types of digital alcohol and drug interventions for a variety of population groups. Further, it was not known which digital alcohol and drug interventions are being used in England, and whether the digital alcohol and drug interventions in use align with the interventions evaluated in the evidence base.

1.3 Review aims and questions

This review aims to produce a systematic map that identifies the extent of overlap and gaps between digital drug and alcohol interventions that are available for use in England and research evidence to support them. Systematic maps are useful for providing an overview of a broad research field and are particularly beneficial for

² This review was commissioned and conducted prior to the Covid-19 pandemic (see methods section for more details)

informing future research effort by identifying research gaps and avoiding duplication of effort. The aim is to facilitate a greater understanding of what has been investigated and to identify areas which require further investigation. As this is a systematic map rather than a review, it does not produce a synthesis of findings, but an account of what systematic reviews have been undertaken.

Our review questions are:

RQ1: What is the possible range of digital alcohol and drug interventions?

RQ2: Which types of digital alcohol and drug interventions are currently available for use in England?

RQ3: What systematic reviews provide findings for digital alcohol and drug intervention strategies within a prevention/treatment/recovery pathway?

RQ4: Which types of digital alcohol and drug interventions have been evaluated in primary research?

RQ5: To what extent does the evaluation evidence overlap with digital alcohol and drug interventions that are currently available for use in England?

RQ6: What evidence is there that certain types of digital alcohol and drug interventions are (cost-) effective or ineffective for specific population groups or in particular contexts?

This report addresses the first five research questions; and considers which specific interventions / populations might most usefully be addressed in an in-depth review to address RQ6.

2 Brief methods

This chapter provides a brief overview of the methods used to produce the pathway and systematic maps. A more detailed account of the methods is provided in [Chapter 5](#). A protocol was written in 2019 and, although not published, is available from the authors on request. It should be noted that the project was commissioned and conducted prior to the COVID-19 pandemic.

2.1 Stakeholder engagement

2.1.1 Policy stakeholders

The focus and scope of this map was informed and shaped by the commissioners throughout the review process. Regular meetings were held between the researchers and the policy team at Public Health England (PHE)/Office of Health Improvement and Disparities (OHID)³ to ensure the work remained closely aligned with their needs. PHE provided detailed input in the development of the pathway used to categorise interventions, assisted in circulating the survey to potential participants, offered feedback on work in progress throughout the process and provided additional information about available interventions in England.

2.1.2 Transdisciplinary advisory group

A transdisciplinary advisory group was convened with representatives from DHSC and PHE, drug and alcohol service providers, commissioners, evaluators and patient advocacy group representatives. The advisory group was invited to comment on the protocol and survey, offered feedback on preliminary findings at a face-to-face meeting, and was invited to comment on a draft of the online systematic review/available interventions map.

2.2 RQ1: Pathway development

An initial typology was drafted to categorise characteristics of digital interventions, adapting and building on existing typologies (Litvin, Abrantes et al. 2013, Mohr, Schueller et al. 2014, European Monitoring Centre for Drugs and Drug Addiction 2018, NICE 2018, World Health Organization 2018). Through ongoing discussion and feedback, it became clear to PHE that a pathway, presenting a route through services, would be more helpful than a typology of intervention characteristics. This would set out the different types of interventions recommended for use at different stages of

³ In 2021, PHE's team was transferred to the newly created OHID. In this report, we refer to PHE and/or OHID, depending on which organisation was involved at that time.

alcohol and drug use; i.e. for prevention, early intervention, treatment or recovery. This pathway was then developed by PHE and trialled by the research team through coding studies and interventions in the maps. The pathway was refined over time, through discussions between PHE and the study team.

2.3 RQ2: Online survey to identify interventions available in England

To identify digital interventions that were in use, or potentially available for use in England, in 2019 we conducted an online survey among those involved in developing, commissioning, prescribing, recommending or evaluating digital interventions for alcohol or drug use.

A link to the online survey was shared through numerous means: via social media, by contacts at PHE and our advisory group, [Collective Voice](#) (a membership body of drug and alcohol treatment charities), the [NHS Substance Misuse Provider Alliance](#)⁴ (a membership body of NHS providers of addictions services), [DrugWise Daily](#) (a news service for the drug and alcohol sector) and other organisations in the field. Interventions were also identified via PHE, advisory group stakeholders and intervention developers.

2.3.1 Survey details

Participants were asked to provide information about digital drug/alcohol interventions they were involved in, such as its target population and which intervention strategies it employed (see [Appendix 2](#)). Participants could provide details of up to five interventions. The interventions and/or publicly available descriptions of them (for example, on developers' or providers' websites) were reviewed in order to produce a description of each intervention, covering details of the population it targeted, its content and its evaluation. Interventions were coded according to the stage(s) in the pathway they address and the intervention strategies they employ. The intervention descriptions were checked for accuracy with intervention developers.

Further details on the survey methods can be found in section 5.3. Details of the survey participants and results can be found in [Appendix 3](#).

⁴ [The NHS Substance Misuse Providers Alliance have since changed their name to NHS Addictions Provider Alliance](#)

2.4 RQs 3 – 5: Mapping systematic reviews and primary research

2.4.1 Identifying systematic reviews and primary studies

Systematic searches of 29 bibliographic databases and registries were carried out in March 2019 (more detail on searches can be found in [Chapter 5](#) and in [Appendix 4](#)). After removal of duplicates, a priority screening approach was used to prioritise the screening of those titles and abstracts identified as most likely relevant, using pre-specified inclusion criteria. Papers were excluded if they:

- were published before 2004,
- were not written in English,
- were not conducted in an OECD country
- did not collect data from a defined sample
- were not an evaluation of an alcohol/drug prevention/treatment/recovery intervention
- did not focus on patients or the general public
- did not include an interactive digital element.

Further details outlining this process, as well as the definitions and rationale informing these criteria, are provided in Section 5.4. Included abstracts were coded as either systematic reviews or primary studies.

2.4.2 Coding and quality appraisal

The full texts of systematic reviews were retrieved and re-screened using the inclusion criteria. Those meeting the criteria and published since 2014 were further screened. Reviews were excluded if they did not include meta-analysis or synthetic statements of findings (i.e. combined the results of two or more studies and reported the direction of the findings from this pooled group, rather than simply describing the included studies individually), or if their synthesised findings combined interventions from different stages or using different strategies within the pathway (for example, they combined findings from counselling interventions with brief feedback interventions) (see [Appendix 7](#) for details). Included systematic reviews were quality appraised and coded according to where the interventions lay within the pathway, as well as other characteristics of the review. Synthetic statements and summary findings were also extracted.

Due to the volume of studies identified, included primary studies were coded based on their titles and abstracts. A coding framework was developed to capture characteristics of the interventions, for example, their focus, target population, pathway stage and intervention strategy. Quality appraisal was not undertaken.

2.5 Creation of interactive maps

Interactive online maps were generated using v.1.2.5 of EPPI-Mapper software (Thomas 2018) which provides an interactive user interface powered by EPPI-Reviewer (Thomas et al. 2020).

3 Findings

3.1 Stakeholder engagement

Fourteen stakeholders agreed to join the advisory group and eleven attended a meeting in September 2019, where preliminary results from the survey and systematic map were presented and in-depth review options discussed. Advisory group members debated the terminology used in the typology and this was revised subsequently.

The advisory group gave a clear steer that they were very interested in process measures, as well as, or more than, outcome measures. It was noted that the field of digital interventions was developing fairly rapidly, such that evidence of effectiveness of specific interventions may not be so useful as new interventions are developed, making those evaluated obsolete. However, process data, such as how to maximise retention and/or engagement, may be of use for a longer period and for a wider range of interventions. There was also interest in gathering information on costs and inequalities.

Following the advisory group meeting, PHE decided that they would like more detailed outputs from the mapping part of the project in order to inform any decisions about the focus of an in-depth review. Therefore, in the subsequent months, additional mapping work was focused on, rather than an in-depth review.

3.2 Interactive online maps

3.2.1 *Focus and purpose of the two maps*

Two online maps were created. The first depicts what interventions were available for use in England (RQ2) and what international systematic reviews had been published (RQ3 & RQ5). The juxtaposition of findings in relation to these two RQs enables users to see where the focus of available systematic reviews aligned with interventions available for use; and where evidence gaps exist. The second map depicts the volume of primary studies (RQ4) relating to each stage and each intervention strategy in the pathway. This second map illustrates where research activity clusters, which areas were not researched or were under-researched, and which areas of the pathway might be amenable to in-depth review.

3.2.2 *High-level findings depicted in the maps*

Both maps provide an overview of each type of information in relation to: (a) the stage within the prevention, treatment and recovery pathway; (b) the specific intervention strategy; and (c) the focus on alcohol use, drug use or both. In addition, systematic reviews are distinguished according to the findings of quality assessment (reviews rated as high quality are marked in green, those of medium quality in orange, and those of low quality in red).

3.2.3 *Map interactivity*

By clicking on an individual cell within each map users are taken to summary information about each individual piece of evidence in that cell.

For interventions available for use in England (RQ2), map users are provided with the following information: name, general description, population, nature of the intervention, details of any evaluations and link to intervention or intervention webpage.

For each systematic review (RQ3), map users are provided with details of: quality rating; review aims; explanation of where the review evidence fits in the pathway; review authors' overview of findings; statistical synthesis findings (for reviews that have conducted meta-analysis); number of included studies; population focus; country focus; authors' description of the digital interventions; and range of outcomes measured.

For primary studies (RQ4), map users are provided with the bibliographic details of each study and a link (where available) to a publicly accessible full text version of the paper.

A 'filter' tab for each map enables users to focus on a particular set of information. Within the primary studies map it is possible to filter by type of drug, study measures (outcome, process, cost or other) publication date, and country the study was located in.

Additional information about the methods, functionality and terms used in the online maps is available in the 'About this map', 'How to use this map' and 'Glossary' sections, to aid usability and transparency.

3.3 RQ1: What is the possible range of digital alcohol and drug interventions?

An alcohol and drug pathway was conceptualised, which consists of three stages: prevention and early intervention; treatment and recovery; and sustaining recovery (depicted in the top row of Figure RQ1). Each stage of the pathway contains a specific intervention strategy or strategies appropriate for that stage (see figure RQ1). However, it should be noted that although presented as three distinct stages, in reality they are a continuum with blurred boundaries between each.

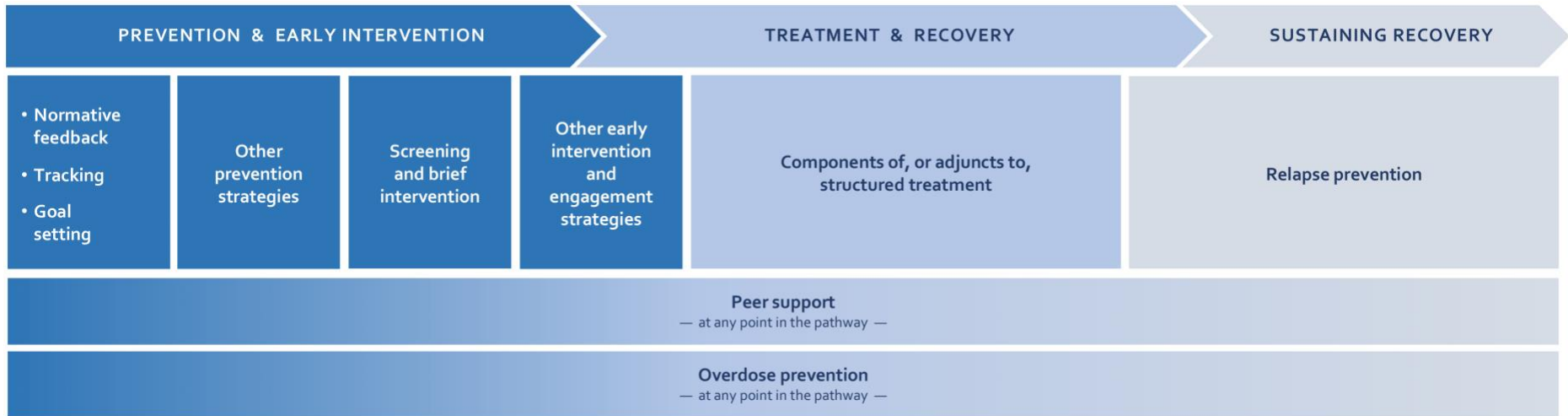
The prevention and early intervention stage contains four intervention strategies: (i) feedback/tracking consumption/goal-setting, (ii) other prevention strategies, (iii) screening and brief interventions with or without referral to treatment (hereafter referred to as SBIRT) and (iv) other early intervention and engagement. The treatment and recovery stage includes components of, or adjuncts to, structured treatment: comprehensive assessment, pharmacological interventions, psychosocial interventions and treatment adjunct/retention interventions. The last stage, sustaining recovery,

includes relapse prevention strategies. Peer support and overdose prevention are interventions strategies that are relevant at all stages of the pathway.

Individual interventions may incorporate multiple intervention strategies and target more than one point of the pathway. For example, *Down Your Drink (DYD)* includes: SBIRT which allows users to assess their drinking using AUDIT-C; goal setting; early intervention and engagement strategies (based on motivational interviewing, cognitive behavioural therapy and behavioural self-control); and relapse prevention, which helps users to understand the triggers for their drinking and teaches skills to help them stick to their goals.

A more detailed description of each pathway stage and each intervention strategy is provided in the 'Glossary and pathway definitions' section of this report.

Figure 3.3: Pathway from prevention to treatment and recovery



3.4 RQ2: Which types of digital alcohol and drug interventions are currently available for use in England?

3.4.1 Key findings on interventions available in England

- We identified 40 interventions available for use in England, of which most (n=35) were in use at the time of the survey
- Two thirds focused solely on alcohol use (n=26).
- Just under half addressed more than one pathway stage (n=16) and more than half (n=22) employed multiple intervention strategies.
- Most included a focus on the ‘prevention and early intervention’ stage of the pathway (n=35).
- Prevention: feedback/tracking consumption/goal setting was the most common intervention strategy (n=16).
- Just over half of the interventions (n=21) had undergone, or had planned, some form of evaluation.

3.4.2 Overview of interventions available for use in England (n=40)

We identified 40 interventions that were available for use in England in 2019. The majority focused on alcohol use only (n=26); the remainder targeted either alcohol and drug use or unspecified substance use (n=8) or drug use alone (n=6), [see online map](#) for more details. Details of survey participants and results can be found in [Appendix 3](#); details of available interventions can be found in [Appendix 6](#).

Status of the available interventions

Almost all interventions (n=35) were available at the time of the survey and used in at least some areas in England. Over half (n = 21) of the interventions had completed, planned or were undergoing some form of evaluation. Of those not in use, one intervention had been developed and, following a feasibility pilot, an evaluation had been planned (*AlcoChange Clinical*) and the remaining four were interventions that had been evaluated in research studies and could potentially be made available (*Health on the Web*, *SIPSjr*, *HeLP-Alcohol* and *TIES*).

Of the 35 interventions that were in use, 16 had undergone some form of evaluation, 17 had not been evaluated and three (*Drink Less*, *Lower my Drinking* and *SURE Recovery*) had evaluations planned or underway (*Drink Less* had both a completed process evaluation and an ongoing outcome evaluation). Outcome evaluations had been conducted for twelve of the ‘in use’ interventions, of which seven had also had some form of process evaluation; three more had ongoing outcome evaluations. Four interventions had process evaluations only; one of these had an outcome evaluation underway. One study had explored the adoption and implementation of an intervention (*Drinkchecker – work*).

Pathway stages addressed by the available interventions

Most interventions (n=35) included elements that addressed the ‘prevention and early intervention’ stage of the pathway. Only five addressed the ‘treatment and recovery’ stage, 13 addressed ‘sustaining recovery’, nine addressed peer support and one addressed overdose prevention. Many interventions (n=24) focused on a single stage of the pathway; although 16 focused on two or more stages.

Strategies employed by the available interventions

Within ‘prevention and early intervention’, ‘feedback/tracking consumption/goal setting’ was the most common intervention strategy and was included in 16 of the interventions (14 of which targeted alcohol use only). Among these, feedback most frequently took the form of ‘personalised normative feedback’ in which the user’s current drinking was compared to the norm (both interventions targeting drug use only, *Drugs Meter* and *Safer Use Limits*, focused only on feedback). Tracking features varied and allowed users to monitor their consumption in terms of quantity of alcohol, calories, and/or financial cost. *Dry Days* and *One You Lincolnshire Drink Less* also included mood and sleep tracker functions. Goal setting features also varied and could, for example, allow users to set goals for alcohol-free days (for example, *Drink Free Days*) or the number of units consumed.

Fourteen interventions (seven of which were alcohol use only) included ‘other early intervention and engagement’ strategies. These included extended brief interventions delivered over Skype (for example, *DrinkCoach Online Coaching*) and other digital interventions based on behaviour change methods such as motivational interviewing and cognitive behavioural therapy (for example, *Down Your Drink* and *Intuitive Recovery*).

Thirteen interventions included relapse prevention strategies such as helping users to understand their triggers for drinking/drug taking and the reasons for lapses and teaching skills to help them stick to their goals and cope with difficult situations (for example, *Down Your Drink*, *Narcotics Anonymous online*), or geolocation features designed to help people respond to situations that may result in use (*DrinkAware app*, *DrinkCoach App*).

Twelve interventions (all targeting alcohol use only) included SBIRT. We identified ten ‘other prevention’ interventions (eight of which were alcohol use only), which included webchat facilities (for example, *Drink Wise*, *Age Well*, *Frank*), online access to health coaches (for example, *One You Lincolnshire Drink Less*) or rewards for achieving targets (for example, *DrinkAware app*).

Nine interventions included peer support (five were alcohol use only), which could take the form of online support groups (for example, *Smart Recovery Online*), Facebook groups (for example, *Dry Days*) or chat rooms (for example, *Soberistas*).

Five interventions used ‘treatment and recovery’ strategies (three of these targeted alcohol and drug or substance use). All of these were interventions that were

components of or adjunct to structured treatment, including incentives for engagement with treatment services (for example, *The Capital Card*), telehealth, online or text message systems to encourage engagement (for example, *Flo*, *myCarePath*), or activities to support behaviour change (for example, *Breaking Free Online*).

One intervention (*SURE Recovery*) included instructions on assisting with an opioid overdose.

3.4.3 Alcohol use interventions (n=26)

Two-thirds of the available digital interventions focused on alcohol use alone (n=26). Twenty-two of these were in use in England at the time of the survey. Most could be accessed for free by members of the public. The exceptions were those that were only available to users in areas where they have been commissioned (for example, *Lower my Drinking*) and those for which there was a subscription fee (for example, *Club Soda, Daybreak*⁵). *DrinkCoach Online Coaching* could either be paid for privately or could be commissioned as part of an alcohol treatment pathway.

Fourteen of 22 ‘in-use’ digital alcohol interventions had been subject to some form of evaluation, of which one had a further assessment underway (*Drink Less*) ([see online map](#) for details). One intervention (*Lower My Drinking*) was undergoing a mixed methods evaluation at the time of the survey. The remaining seven interventions had no planned, ongoing or completed evaluations.

Of the four alcohol use-specific interventions that were not in use in England at the time of the survey, two included SBIRT and ‘feedback/tracking consumption/goal setting’ (*Health on the Web*) and other prevention strategies (*SIPSjr*). The other two included ‘other early intervention and engagement’ strategies (*HeLP-Alcohol*); one also included ‘relapse prevention’ (*AlcoChange Clinical*).

3.4.4 Drug use interventions (n=6)

Six interventions focused on drug use alone, five of which were available and in use in England, and could be accessed for free by members of the public. As far as we could identify, only one of the five (Narcotics Anonymous Online) had been subject to evaluation.

The one drug use intervention that was not in use in England at the time of the survey, *TIES*, was a feasibility study for an RCT of clinical and cost effectiveness of telephone delivered incentives for encouraging adherence to supervised methadone consumption in community pharmacies (Metrebian, Weaver et al. 2020).

Three drug use interventions were mutual aid organisations (*Cocaine Anonymous Online, Marijuana Anonymous Online* and *Narcotics Anonymous Online*) addressing ‘other early intervention and engagement’, ‘relapse prevention’ and ‘peer support’.

No drug use interventions incorporated ‘other prevention strategies’, ‘SBIRT’ or ‘overdose prevention’.

⁵ Daybreak had been commissioned in Australia, where it is free to use by members of the public.

3.4.5 Alcohol and drug or substance use interventions (n=8)

Eight of the interventions focused on alcohol and drug or unspecified substance use; all were in use in England at the time of the survey and could either be accessed for free by members of the public (for example, *Frank*, *SMART Recovery*) or were available for free to users in areas where they had been commissioned (for example, *Breaking Free Online*, *Capital Card*). *Intuitive Recovery* was free where commissioned but could also be paid for by individual users.

Breaking Free Online was by far the most frequently mentioned intervention in our survey.

Four of the interventions (*Breaking Free Online*, *Frank*, *SMART Recovery*, and *Capital Card*) had been subject to evaluation. *SURE Recovery* had an evaluation underway. *Intuitive Recovery*, *myCarePath* and *We Are With You* had not been evaluated (as far as we could identify).

No substance use interventions employed 'feedback, tracking consumption and goal-setting' or 'SBIRT' strategies.

3.6 RQ3: What systematic reviews provide findings for digital alcohol and drug interventions at each point along the prevention/treatment/recovery pathway?

3.6.1 Key findings on systematic reviews

- 18 systematic reviews are included in the map.
- All 18 reviews focus on prevention and early intervention, but one review also focuses on treatment and recovery.
- Most reviews (n=12) provide analyses on alcohol use interventions. Two reviews provide analyses on drug use interventions (*see note below: one review includes separate analyses for alcohol and for drug use interventions). Five reviews provide analyses on both alcohol and drug use together or on generic substance use interventions.
- Review quality is generally not high; seven are low quality, seven are moderate quality and four are high quality.
- No reviews focus on sustaining recovery, peer support or overdose prevention.

3.6.2 Overview of the systematic reviews (n=18)

We included 18 systematic reviews (see [online map](#) and [Appendix 9](#) for more details). Reviews that combine findings from different intervention strategies are not included as these do not provide clear evidence about specific intervention strategies (see [Appendix 5](#) for flow of literature through systematic map, and [Appendix 7](#) for details of excluded reviews). However, reviews that cover a range of different intervention strategies, but provide separate findings for each specific strategy, are included. As such, the map indicates 21 reviews are available because three of the 18 reviews each contain two relevant analyses. Two reviews analyse two different intervention strategies. One examines ‘prevention and early intervention’ strategies (specifically ‘feedback/tracking consumption/goal setting’ and ‘other early intervention and engagement’) (Leeman et al. 2015); the other examines ‘prevention and early intervention strategies (specifically ‘other early intervention and engagement’) and ‘treatment and recovery’ strategies (Boumparis et al. 2017). The third review provides evidence on a single strategy within ‘prevention and early intervention (‘other early intervention and engagement strategies’) but provides analyses for both drugs and alcohol (Smedslund et al. 2017).

Four reviews are rated as high quality, seven as moderate and seven as low quality (see [Appendix 8](#) for details).

Most reviews (n=12) provide analyses on alcohol use interventions. Two reviews provide analyses on drug use interventions (one review, Smedslund et al. 2017, includes separate analyses for alcohol and for drug use interventions). Five reviews provide analyses on both alcohol and drug use together or on generic substance use interventions.

Half of the reviews (n=9) focus on substance using populations including drinkers (n=5) (some of these specify problem or hazardous drinkers), drug users and drinkers (n=3) and drug users only (n=1). The other half focus on populations ‘at risk’ of

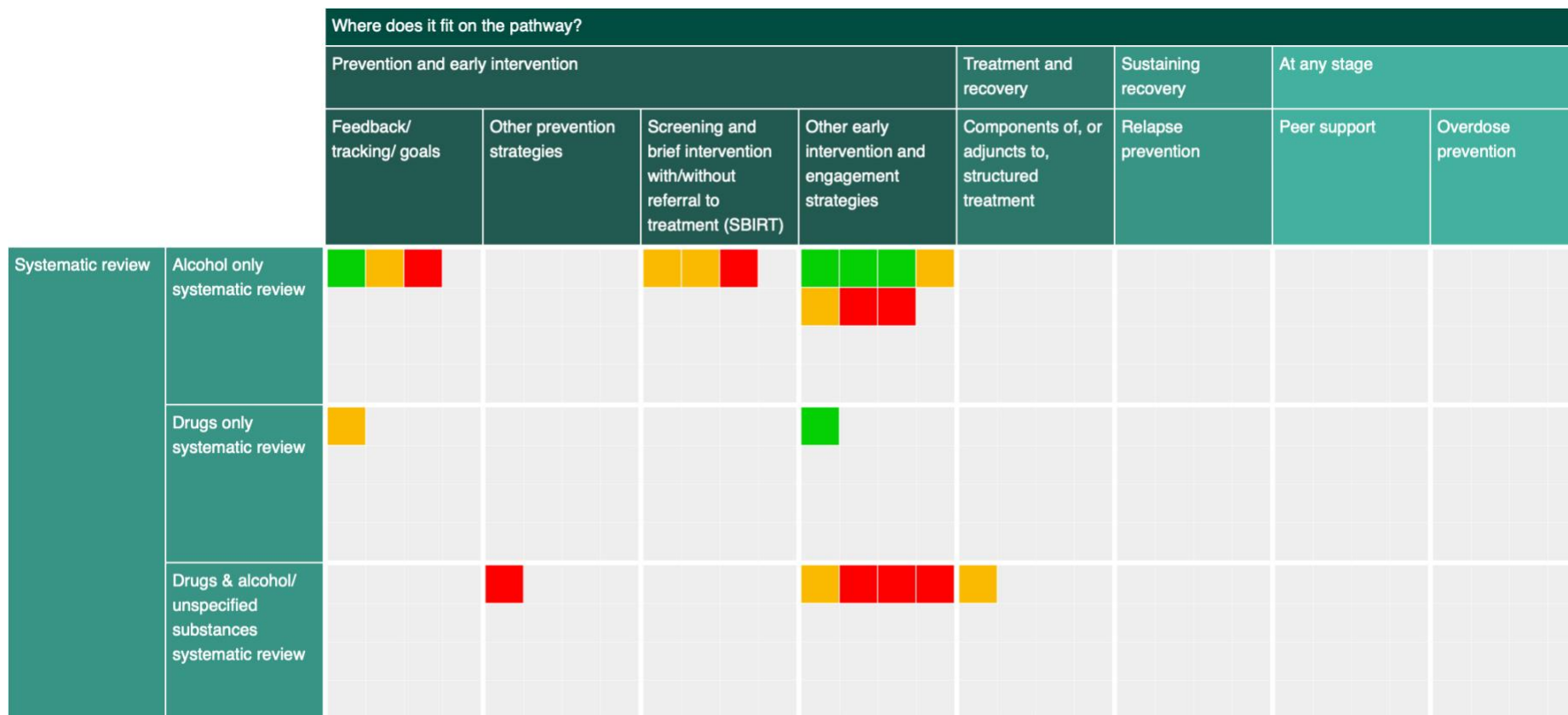
alcohol, drug or substance use including university and college students (n=5), adolescents and young people (n=2) and armed forces personnel (n=2).

Types of interventions in the systematic reviews

In terms of the pathway stages, 17 of the systematic reviews explore ‘prevention and early intervention’ only. The remaining review examines one group of studies on ‘prevention and early intervention’ and another on ‘treatment and recovery’ strategies (Boumparis et al. 2017). In terms of intervention strategies, the majority of reviews focus on ‘other early intervention and engagement’ (n=11); others focus on ‘feedback/tracking consumption and/or goal setting’ (n=4), ‘SBIRT’ (n=3) and ‘other prevention strategies’ (n=1). One review provides evidence on two intervention strategies; ‘feedback / tracking consumption and / or goal setting’ and on ‘other early intervention and engagement’ (Leeman et al. 2015). No reviews focus on ‘relapse prevention’, ‘peer support’ or ‘overdose prevention’ intervention strategies.

Below we provide an overview of the reviews on alcohol use (section 3.6.3), drug use (section 3.6.4) and alcohol and drug or unspecified substance use (3.6.5).

Figure 3.5: Map of systematic reviews on digital alcohol and drug interventions (n=18*)



* The map indicates 21 reviews were available; this is because three of the 18 reviews each contain two relevant analyses.

Key: Red = low quality review; orange = moderate quality review; green = high quality review.

Link to interactive map:

[https://eppi.ioe.ac.uk/cms/Portals/0/AI-SRmaprev23082021_JB_edit_v3%20\(1\).html?ver=2022-08-19-171622-390](https://eppi.ioe.ac.uk/cms/Portals/0/AI-SRmaprev23082021_JB_edit_v3%20(1).html?ver=2022-08-19-171622-390)

3.6.3 *Reviews on alcohol use interventions (n=12)*

Quality of the alcohol use systematic reviews

Four reviews were rated as high quality (Foxcroft et al. 2015; Kaner et al. 2017; Posadzki et al. 2016; Smedslund et al. 2017), five as moderate quality (Prosser et al. 2018; Riper et al. 2018; Riper et al. 2014; Tansil et al. 2016; Wigham et al. 2017) and three as low quality (Doherty et al. 2017; Donoghue et al. 2014; Leeman et al. 2015).

Types of interventions in the alcohol use systematic reviews

All 12 reviews on interventions targeting alcohol use focus on the ‘prevention and early intervention’ stage of the pathway. In terms of the specific intervention strategies, seven reviews provide evidence on ‘Other early intervention and engagement’ (Doherty et al. 2017; Kaner et al. 2017; Leeman et al. 2015; Posadzki et al. 2016; Riper et al. 2018; Riper et al. 2014; Smedslund et al. 2017), three on ‘SBIRT’ (Donoghue et al. 2014; Tansil et al. 2016; Wigham et al. 2017) and three on ‘Feedback/tracking/goals’ (Foxcroft et al. 2015; Leeman et al. 2015; Prosser et al. 2018). As noted above, Leeman et al. (2015) provides evidence on two intervention strategies.

Of the high quality alcohol use reviews, three focused on hazardous/harmful drinkers. One looked at personalised digital interventions (Kaner et al. 2017), one at automated telephone communication systems for preventive healthcare and management of long-term conditions (Posadzki et al. 2016) and another at early, brief computerised interventions for young people (Smedslund et al. 2017). The remaining high quality review synthesised interventions providing feedback on alcohol use norms for university and college students (Foxcroft et al. 2015).

Findings in the alcohol use systematic reviews

Eight reviews brought together the findings of individual studies using statistical meta-analysis (Doherty et al. 2017; Donoghue et al. 2014; Foxcroft et al. 2015, Kaner et al. 2017, Prosser et al. 2018, Riper et al. 2014; Riper et al. 2018, Smedslund et al. 2017); in the remaining four reviews the authors described the findings narratively (Leeman et al. 2015; Posadzki et al. 2016; Tansil et al. 2016; Wigham et al. 2017). Detailed findings were extracted for the eight reviews where data were meta-analysed (shown in [Appendix 9](#), the online map and summarised in an associated report by OHID ((Burton, Clarke et al. in press))). Detailed findings for reviews synthesised narratively were not amenable to presentation in the map. It is important to note that whilst we have captured the relevant findings reported in each review, and have provided ratings for overall review quality, we did not assess the quality of the individual studies upon which each review’s findings are based and so **we cannot therefore verify the validity of these findings.**

3.6.4 *Reviews on drug use interventions (n=2)*

Two reviews analysed drug use interventions (Gulliver et al. 2015; Smedslund et al. 2017). One moderate quality review provides evidence on ‘feedback, tracking consumption and/or goal-setting’ interventions (Gulliver et al. 2015). The authors

provided a narrative description of the overall findings. As such we have not extracted the findings for presentation in the map, however this has been summarised in an associated report by OHID ((Burton, Clarke et al. in press)).

One high quality review used statistical meta-analysis to combine the findings of studies of ‘other early intervention and engagement’ interventions for risky cannabis using young people primary studies (Smedslund et al. 2017). Detailed findings extracted from these two reviews are shown in [Appendix 9](#), the online map and summarised in an associated report by OHID ((Burton, Clarke et al. in press)). As noted above, since we only assessed the quality of the overarching review, and did not assess the quality of the individual studies upon which each review’s findings are based, **we cannot verify the validity of these findings.**

3.6.5 *Reviews on alcohol and drug or unspecified substance use interventions (n=5*)*

Quality of the substance use systematic reviews

One review was rated as being of moderate quality (Boumparis et al. 2017) and four reviews as being of low quality (Giroux et al. 2017; Holmes et al. 2018; Jiang et al. 2017; Rodriguez et al. 2014).

Types of interventions in the substance use systematic reviews

The five reviews all focus on the ‘prevention and early intervention’ point in the pathway (Boumparis et al. 2017; Giroux et al. 2017; Holmes et al. 2018; Jiang et al. 2017; Rodriguez et al. 2014). One review additionally provides evidence on the ‘treatment and recovery’ pathway point (Boumparis et al. 2017).

In terms of specific intervention strategies, one review focuses on ‘Other prevention strategies’ (Rodriguez et al. 2014) and four focus on ‘Other early intervention and engagement strategies’ (Boumparis et al. 2017; Giroux et al. 2017; Holmes et al. 2018; Jiang et al. 2017). As noted above the review by Boumparis et al. 2017 has a second analysis on treatment and recovery which focuses on adjunct interventions.

Findings in the substance use systematic reviews

One review combined the findings of primary studies using statistical meta-analysis (Boumparis et al. 2017). Detailed findings extracted from this review is shown in [Appendix 9](#), the online map and summarised in an associated report by OHID ((Burton, Clarke et al. in press)). As noted above, since we only assessed the quality of the overarching review, and did not assess the quality of the individual studies upon which each review’s findings are based, **we cannot verify the validity of these findings.** Detailed findings are not shown for the remaining four reviews as narrative analyses were not amenable to presentation in the map.

3.7 RQ4 Which types of digital alcohol and drug interventions have been evaluated in primary research?

3.7.1 Key findings on primary studies

- 1,250 primary studies are included in the map.
- The majority of studies assess interventions targeting alcohol use only (n=773), followed by alcohol and drug or unspecified substance use (n=252) and drug use only (n=225).
- The majority of studies assess interventions within the ‘prevention and early intervention’ stage of the pathway (n=932), followed by ‘treatment and recovery’ (n=220) and ‘sustaining recovery’ (n=90).
- Fewer studies evaluate peer support (n=81) or overdose prevention interventions (n=8).
- 922 studies report outcome measures; 510 report process measures and 12 report cost outcomes or economic analysis; 13 do not report the type of measures used to evaluate the intervention.

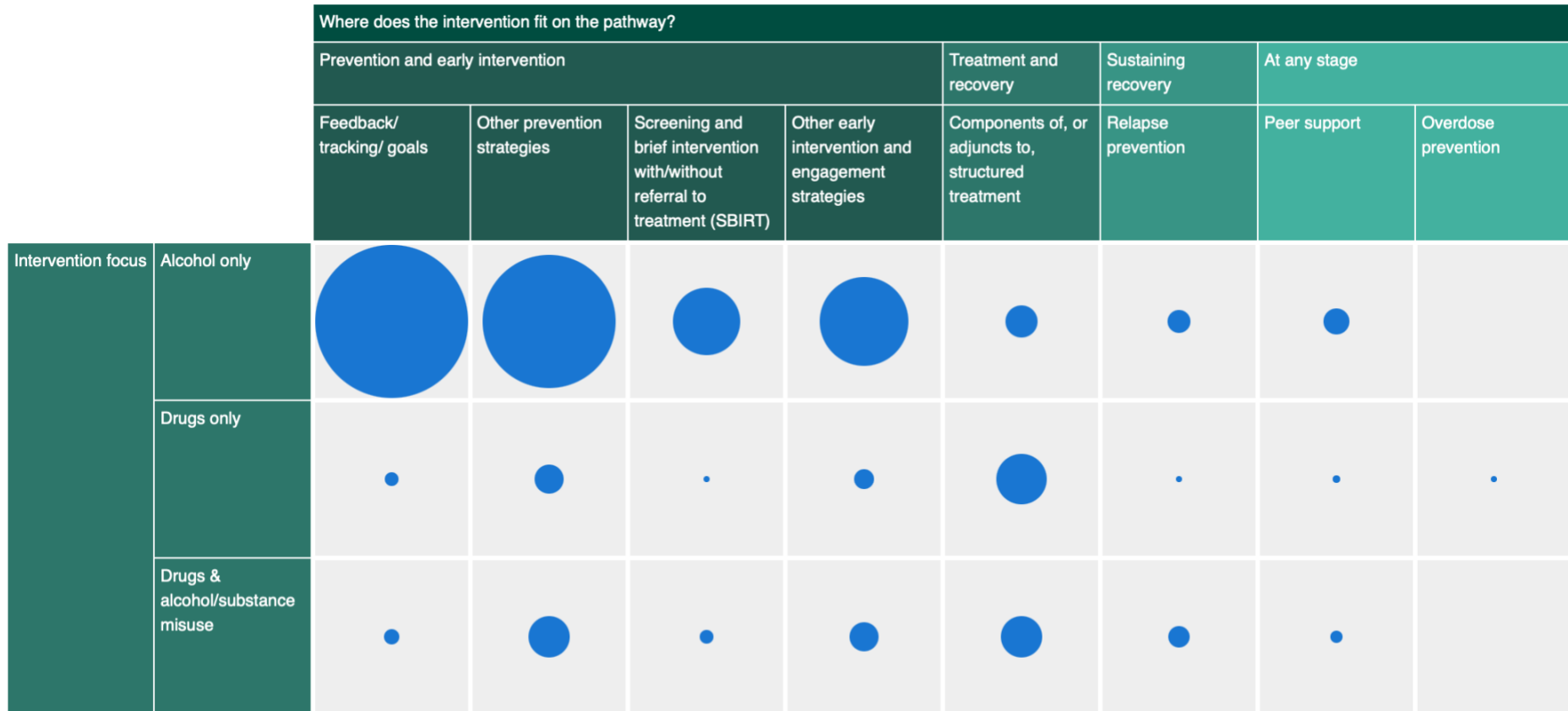
3.7.2 Note on primary studies map

The findings reported here are based on information captured from titles and abstracts, rather than from the full papers. As such the information may not always be complete i.e. where the information is reported in the full text but not in the abstract. However, the findings provide a useful ‘broad brush’ overview of the availability of primary research evidence across the pathway.

3.7.3 Overview of the primary studies (n=1,250)

We found 1,250 citations of primary studies evaluating digital interventions in drug and alcohol prevention, treatment or recovery that met our criteria for inclusion (see [online map](#) and [Appendix 5](#) for details). Of these, 773 assess interventions targeting alcohol use, 252 assess interventions that target both alcohol and drug or unspecified substance use and 225 assess interventions focused on drug use (see figure 3.6). Of those interventions targeting specific drugs, 103 target cannabis and 74 target heroin, cocaine or related substances.

Figure 3.6: Primary research evaluating digital alcohol and drug interventions (n = 1,250)



Link to interactive map: https://eppi.ioe.ac.uk/cms/Portals/o/digintPSmap1Sep20_JB_edit_v3.html?ver=2022-08-19-171356-143

Pathway stages focused on in the primary studies

The majority of studies assess interventions targeting the ‘prevention and early intervention’ stage of the pathway (n=932), followed by ‘treatment and recovery’ (n=220) and then ‘sustaining recovery’ (n=90). Some studies assess interventions that cover more than one of these stages. Peer support is assessed in 81 studies. Most studies (n=1,090) evaluate one intervention, but 160 evaluate two or more interventions.

Outcomes measured in the primary studies

Three quarters of the studies report outcome measures (n=922), such as changes in consumption; two fifths report process measures (n=510), such as retention or acceptability of the intervention. Twelve studies report cost measures or economic analyses; thirteen do not state in their title and abstract which measures were reported.

Most studies (n=743) are from (or are conducted by researchers based in) the USA. Substantial numbers of studies are from the UK (n=106) and Australia (n=84), with fewer from other countries, such as Sweden and the Netherlands.

Digital delivery modes employed

Most studies assess online or computer-based interventions (n=855), 136 were text-message or email based, 114 used mobile phone apps, 65 assessed interactive voice response (IVR) interventions and 40 assessed virtual reality interventions. Other modes of delivery included social media, video conferencing, blogs, chat bots, wearable sensors, and location monitoring. Some studies (n=12) did not specify the mode; and some assessed more than one mode.

Population focus of the interventions evaluated in primary studies

Most studies (n=1,204) evaluate interventions that directly target the person with the problem, rather than (or as well as) parents, partners or friends. A substantial minority focus on university or college students (n=274); all of these target prevention and early intervention and almost all focus on alcohol (N=257). There are 194 studies of children and adolescents, most of which focus on prevention (n=178) and are mainly focused on either alcohol (n=81) or alcohol and drugs (n=80), or drug use (n=33).

Types of alcohol interventions evaluated (n=773)

Most alcohol studies focus on the prevention and early intervention stage of the pathway (n=660). Most of these evaluate digital interventions involving ‘feedback, tracking consumption or goal setting’ strategies (n=270); followed by ‘other prevention strategies’ such as education (n=234), ‘other early intervention and engagement’ strategies (n=156) and SBIRT (n=118). Almost all of the alcohol studies

within ‘treatment and recovery’ (n=59) evaluated adjunct to treatment (n=55)⁶. Forty-six evaluate interventions which include peer support (at any stage of the pathway). Forty studies focus on ‘sustaining recovery’ via relapse prevention strategies (for example, text messaging, interactive voice response or smartphone apps to monitor abstinence or provide support).

Types of drug interventions evaluated (n=225)

As with alcohol, the most frequently evaluated pathway stage was ‘prevention and early intervention’ (n=113), followed by ‘treatment and recovery’ (n=88). Within the former, the most commonly evaluated intervention strategy for drug use was ‘other prevention strategies’ (n=52), followed by ‘early intervention and engagement’ interventions (n=36), ‘feedback, tracking or goals’ (n=25) and ‘SBIRT’ (n=9). Within the latter, as was the case for alcohol, almost all of the interventions evaluated focused on adjunct to treatment strategies⁷. Fourteen evaluate ‘peer support’ interventions, eleven studies focus on ‘relapse prevention’ and eight on ‘overdose prevention’.

Types of substance use interventions evaluated (n=252)

Within ‘prevention and early intervention’ (n=159), the most frequently evaluated substance use intervention was ‘other prevention strategies’ (n=72), followed by ‘other early intervention and engagement’ strategies (n=50), as ‘feedback, tracking consumption or goal setting’ interventions (n=27), ‘SBIRT’ (n=23) and ‘peer support’ interventions (n=21). Almost all of the ‘treatment and recovery’ evaluated interventions (n=73) focused on adjunct to treatment strategies (n=68)⁸. We identified 39 studies of ‘relapse prevention’ interventions. No studies evaluate substance use ‘overdose prevention’ interventions.

6 This may be due to the definition of structured treatment that was employed – at the time of screening (prior to the pandemic), it was felt that it was essential that comprehensive assessment was conducted in-person, therefore studies without in-person comprehensive assessment were excluded.

7 as above

8 as above

3.8 RQ5: To what extent does the evaluation evidence overlap with digital alcohol and drug interventions that are currently available for use in England?

3.8.1 Key findings on the overlap between evaluations and available interventions

- Most available interventions and evaluation evidence focused on alcohol only
- Most available interventions and evaluation evidence focused on the ‘prevention and early intervention’ stage of the pathway
- The majority of interventions in use had not been evaluated

3.8.2 Overview of evaluation and intervention overlap

The majority of available interventions (n = 26/40) focused on alcohol use only; this was also the case for the majority of systematic reviews (n = 12/18) and primary research (n = 773/1250). The majority of available interventions (n = 35/40), systematic reviews (n = 18/18) and primary research (n = 932/1250) focused on the prevention and early intervention stage of the pathway.

Over half of the 35 interventions that were in use in England had not been evaluated and only 16 had some form of evaluation either ongoing or completed. However, of those not evaluated, ten used intervention strategies that had been evaluated through different interventions: six were SBIRT interventions (and a seventh was SBIRT as well as other intervention strategies), two were peer support interventions and two focused on feedback, tracking and/or goal setting. The extent to which findings from these evaluations could be applied to these interventions could be explored in future work.

4 Discussion

This systematic map aimed to identify and describe an alcohol and drug intervention pathway (RQ1), digital alcohol and drug interventions that were available for use in England in 2019 (RQ2); systematic reviews with evidence about digital interventions along the pathway (RQ3); primary research on digital interventions (RQ4) and the overlap between the available interventions and the evaluation evidence (RQ5). Assembling and plotting this evidence along the intervention pathway from prevention to treatment and recovery, enabled us to produce accessible ‘interactive maps’ for policy-makers, service commissioners and researchers. The map enables users to:

- see a high-level overview of the evidence-base underpinning different types of interventions along the pathway;
- access detailed information about the available interventions and systematic reviews;
- assess whether interventions in use in England align with the interventions evaluated within systematic reviews and primary research; and
- identify gaps in the evidence base i.e. where further in-depth review of the evidence is required and possible, and where primary research is lacking.

This last function of the map will be used to support decisions about what type(s) of digital intervention should be evaluated in RQ6: ‘What evidence is there that certain types of digital alcohol and drug interventions are (cost-) effective or ineffective for specific population groups or in particular contexts?’.

4.1 Summary of findings

RQ1) What is the possible range of digital alcohol and drug interventions?

An alcohol and drug pathway was conceptualised, which consists of three stages; prevention and early intervention, treatment and recovery, and sustaining recovery. Peer support and overdose prevention were considered intervention strategies relevant at any point along the whole pathway.

RQ2) Which types of interactive digital alcohol and drug interventions are currently available for use by service users and individuals in England?

We identified 40 interventions that were available for use in England in 2019, of which 26 focused on alcohol use, six on drug use and eight on either alcohol and drugs or unspecified substance use. Thirty-five interventions were in use in at least one area in England; four more had been evaluated and one other had been developed, with an evaluation planned. Many interventions incorporated multiple strategies and addressed several pathway stages but the majority (n=35) focused on prevention and early intervention, five focused on treatment and recovery and thirteen related to

sustaining recovery. Nine included peer support and one had an overdose prevention component (some interventions covered more than one of these categories).

RQ3) What systematic reviews provide findings for digital alcohol and drug interventions at each point along the prevention/treatment/recovery pathway?

We identified 18 systematic reviews that were published in or since 2014 and contained synthesised findings relating to a specific intervention strategy within the pathway. We rated four of these as high quality, seven as moderate quality and seven as low quality. Twelve reviews focus on alcohol-use only, two focus on drug use only, the remaining five focus on alcohol and drug use or unspecified substance use. All 18 reviews focus on the 'prevention and early intervention' stage of the pathway; of which one also focuses on 'treatment and recovery'. No reviews were identified that focus on 'sustaining recovery', 'peer support' or 'overdose prevention'.

RQ4) Which types of digital alcohol and drug interventions have been evaluated in primary research?

1250 reports of primary studies evaluating interventions were identified, dated from 2004 onwards. The majority assess interventions targeting alcohol use (n=773), followed by alcohol and drug or unspecified substance use (n=252) and drug use (n=225). The majority of studies assessed prevention and early intervention (n=932), followed by treatment and recovery (n=220) and sustaining recovery (n=90), and 81 concern peer support (some could include more than one of these categories). Threequarters report outcome measures and two fifths report process measures, such as retention or acceptability of the intervention.

RQ5) To what extent does the evaluation evidence overlap with digital alcohol and drug interventions that are currently available for use in England?

Most available interventions and evaluation evidence focused on alcohol only and on the 'prevention and early intervention' stage of the pathway. The majority of interventions in use had not been evaluated.

Reflections on findings and recommendations for future work

The two interactive online maps created for this project provide a pre-pandemic snapshot of the landscape of digital alcohol and drug evaluation evidence and interventions available in England.

There was a clear predominance of alcohol-focused interventions both in terms of interventions available for use in England and in terms of the (international) evaluation evidence. Interventions focused on prevention and early intervention also predominated. Prior to Covid-19 lockdowns, it was felt that it was essential that comprehensive assessments took place in-person, prior to pharmacological or psychological treatment. This need for in-person assessment was reflected in our

inclusion criteria for treatment interventions and may go some way to explain the dearth of available interventions and evaluations in the ‘treatment and recovery’ stage of the pathway. Innovations in remotely delivered assessment for treatment that have taken place because of the Covid-19 lockdowns are therefore not reflected in this report.

A gap existed in terms of available interventions and evaluations focused on drugs, particularly for interventions using feedback, tracking and/or goal setting, other prevention strategies and SBIRT.

More than half of the interventions in use had not undergone any form of evaluation; only a third had evaluated outcomes and only a fifth had some form of both outcome and process evaluation. In future, effort should be made to evaluate interventions in use. Where outcome evaluations exist of similar intervention strategies, process evaluations may suffice, particularly if they explore whether and how the intervention reaches, engages and is experienced by, the user (Skivington, Matthews et al. 2021).

With regards to systematic reviews, the majority of those we identified could not be included in our map, either because of a lack of synthesis or because they synthesised findings from different intervention strategies. Only a minority of the included systematic reviews were rated as high quality. Future systematic reviews should not combine different intervention strategies within their syntheses and should follow established guidelines to ensure quality (Shea, Reeves et al. 2017).

4.2 Strengths and limitations

The methods used in the production of this map follow the rigorous standard procedure developed at the Evidence for Policy and Practice Information Centre (EPPI Centre). This systematic map benefits from user involvement in the form of an advisory group, as well as frequent communication and interaction with the drug/alcohol team at PHE/OHID. By looking at both alcohol and drug use, across prevention, early intervention, treatment and recovery, we were able to explore the breadth of available interventions primary research and systematic reviews undertaken in this field.

To locate relevant research papers, the review team conducted a very comprehensive systematic search of a large number of electronic databases. However, since no database of available digital interventions exists, these were harder to identify. Although we advertised the survey widely, and incorporated additional interventions identified by stakeholders, we may have missed some digital interventions that are available for use in England, particularly given the relatively limited response rate. Future studies should consider alternative survey modes or techniques to encourage a higher response rate. In addition, we did not search for occupation-specific interventions outside of drugs/alcohol services (e.g. those specifically for a military

population). The field of digital interventions was fast paced before the pandemic, but even more so since, with more and more interventions being developed and reviews published all the time. However this map provides a snapshot of the field prior to the changes caused by the pandemic.

Although not explored in detail, it is clear that some primary studies were included in multiple systematic reviews. This should be born in mind when considering the review's findings, since some studies would have been double counted. In addition, systematic reviewers may have interpreted a particular primary study they included differently to other reviewers, or ourselves. For example, interventions which may have been interpreted as 'feedback/tracking/goals' in one review, may have been categorised as 'SBIRT' or 'other early intervention and engagement' in another. This also means that as we coded reviews based on the focus of their syntheses, the same study may have been included as different strategies within the pathway. This limitation is also pertinent to the map of primary studies since the coding was based on the limited information provided in the titles and abstracts.

Conducting a systematic map of reviews has provided a robust method for becoming familiar with a very broad review-level evidence base in a short time frame. However, when utilising meta-review methodology (i.e. exploring evidence at the review level rather than primary research itself) there is always a distance between the reviewers and the original studies. For example, although we have been able to provide frequencies of how many reviews report outcomes, we have not collected information about the size of the primary evidence base for each outcome. In addition, we have judged the quality of the reviews, but we do not know the quality of the primary studies within the reviews, which would require further in-depth review synthesis.

A key strength of this work is the breadth of the evidence assembled and usability / accessibility of the online maps. The maps illustrate the availability of interventions and evidence across the pathway from prevention and early intervention, through treatment and recovery. The maps also illustrate which evidence relates to alcohol use, drug use or substance use. Mapping the evidence according to the pathway enables users to see where there are systematic reviews and primary studies that align with intervention strategies being used in England. In addition to providing an overarching picture, the interactive online maps allow users to explore the evidence base in detail, including detailed summaries of the evidence contained within systematic reviews. However, it is important to note that whilst the summaries report findings from the reviews that employed meta-analysis, we cannot verify the validity of those findings as we did not assess the quality of the primary studies on which those findings are based.

4.3 In-depth review options

Below we consider potential avenues for an in-depth review to address RQ6: ‘What evidence is there that certain types of digital alcohol and drug interventions are (cost-) effective or ineffective for specific population groups or in particular contexts?’

There are three broad options for in-depth review:

1. *Topics where interventions are available but no high quality reviews exist*
2. *Topics where neither interventions nor high quality reviews are available*
3. *Building on existing evidence to focus on participation and retention*

Option 1: Topics where interventions are available but no high quality reviews exist

The first broad option is to identify strategies used in interventions available in England but for which no high quality systematic review exists. This could enable a better understanding of the evidence base for those considering whether to commission, recommend or continue to use such interventions. The possible topics are listed in table 4.2.

Table 4.2: Strategies used in available interventions for which no high quality reviews exist

Alcohol use only interventions	Drug use only interventions	Alcohol and drug or unspecified substance use
	Prevention: feedback/tracking consumption/goal setting	
Other prevention strategies		Other prevention strategies
	Other early intervention and engagement	Other early intervention and engagement
Component of, or adjuncts to, structured treatment	Component of, or adjuncts to, structured treatment	Component of, or adjuncts to, structured treatment
Relapse prevention	Relapse prevention	Relapse prevention
Peer support	Peer support	Peer support
		Overdose prevention

Alternatively, an in-depth review could look at one or more intervention strategies for alcohol use, drug use and unspecified substance use combined. For example, we could

look at all peer support interventions regardless of whether they were for alcohol and/or drugs or unspecified substance use.

However, one possible challenge is that some intervention strategies contain a range of different interventions, whose evaluations could not be meaningfully combined. For example, other early intervention and engagement strategies may include a range of behaviour change approaches such as brief motivational interventions, extended brief interventions (EBI) and brief treatment. These may be delivered with varying intensity in various different ways (for example, in groups or to individuals; unstructured to more formal; peer or professional led or self-directed).

An in-depth review could also explore interventions that cover more than one strategy or stage of the pathway. For example, five of the available interventions were mutual aid groups, offering ‘other early intervention and engagement’, ‘relapse prevention’ and ‘peer support’ (*Alcoholics Anonymous Online*, *Cocaine Anonymous Online*, *Marijuana Anonymous Online*, *Narcotics Anonymous Online* and *Smart Recovery*). Therefore, as well as the topics listed in table 4.2, this is another option for an in-depth review, cutting across alcohol, drug and unspecified substance use interventions. We have identified a possible 24 primary studies, ten reporting outcome measures and 16 reporting process measures (two report both).

Option 2: Topics where neither interventions nor high quality reviews are available

A second option would be to conduct an in-depth review that focuses on points in the pathway where there are currently no interventions available, nor high quality review evidence. Possible foci include screening and brief intervention for risky drug or substance use, or components of, or adjuncts to, structured treatment. This could be useful in informing the development of new interventions. However, this would almost certainly have a longer term impact on health and, given the pressing nature of the current COVID-19 situation, it may be prudent to focus initially on options that could lead to a quicker impact.

Option 3: Building on existing evidence to focus on participation and retention

A third option would be to build on the existing evidence base and to focus on aspects of the process of using and/or delivering digital interventions. Whether, who and how people engage with and maintain involvement in interventions are critical to their potential success. It has been noted elsewhere that participation and retention can be a problem for digital alcohol and drug interventions (Martin, McBride et al. 2020). Members of our advisory group noted that, since there is rapid progress in terms of the development and delivery of digital interventions, whilst a review focused on specific intervention strategies could quickly become obsolete, issues of process (such as participation and retention) will always be pertinent and are likely to be transferable across different strategies in the pathway.

For example, an in-depth review looking at participation in and engagement with brief interventions might be of value as it is a frequently used strategy within the interventions available in England. There has been substantial review-level evidence on the effectiveness of brief interventions (with or without screening, referral or additional intervention components). Recent analysis suggests digital interventions are less effective compared to ‘verbally delivered’ interventions (Beyer, Rice et al. 2019). However, it also noted that there was heterogeneity which the authors recommended should be explored further. We propose conducting a synthesis of process evaluation research, as an adjunct to this recent analysis. This would aim to understand what factors are associated with more or less effective brief digital alcohol interventions, in order to identify how to develop and deliver digital interventions so that they are as effective as possible. These may relate to issues of population, intervention content, implementation or context.

Alternatively, we could conduct a reanalysis of the evidence in the high quality reviews for the other most common strategies employed in available interventions; namely the Foxcroft et al. (2015) review on feedback on social norms for alcohol use among university students and college students, and/or the Smedslund et al. (2017) review on early, brief interventions for risky alcohol/cannabis use among young people. The reanalysis would identify the key features of the most successful interventions using Qualitative Comparative Analysis (QCA). Using QCA in previous reviews we have successfully identified critical ingredients of weight management programmes for adults (Sutcliffe et al. 2016) and children (Burchett et al. 2018), community engagement interventions (Brunton et al. 2015) and vaccine uptake strategies (Sutcliffe and Kneale in preparation). In the first stage we would use the existing high quality reviews to identify the most effective interventions and the least effective interventions. We would then systematically compare the features of these sets of successful and unsuccessful interventions to identify the particular intervention and contextual features that distinguish the more successful ones from the less successful ones. Thus, rather than providing evidence for or against one broad category of intervention strategy, the QCA evidence would allow for detailed guidance about how to best design and implement feedback or brief interventions commonly used in England.

4.4 Conclusion

We created two interactive online maps which provide a pre-pandemic snapshot of the landscape of digital alcohol and drug evaluation evidence and interventions available in England. Overall, most of the available interventions, systematic reviews and primary research focused on alcohol use, rather than drug use or substance use. In terms of the pathway the interventions, reviews and primary research also all predominantly focused on 'prevention and early intervention'. Just over half the interventions in use had undergone some form of evaluation. The findings suggest a range of options for topics that that could be explored in further depth. In particular, the advisory group indicated that an in-depth review focusing on the processes and mechanisms that support implementation and retention in digital interventions would likely be applicable across the pathway and maintain relevance as intervention strategies evolve.

5 Detailed methods

This report adheres to the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidance. [Appendix 1](#) contains our completed PRISMA-ScR checklist for scoping reviews. The PRISMA-ScR checklist (rather than the standard PRISMA checklist) was completed as it is specified for reviews that ‘assess the scope of literature on a topic’ (Tricco, Lillie et al. 2018).

5.1 Stakeholder engagement

5.1.1 Policy stakeholders

Public Health England (PHE) commissioned this project due to concerns about inconsistencies in the evidence base for digital interventions and that despite this, digital interventions may be inappropriately replacing face-to-face interventions. Regular meetings were held with PHE/OHID to ensure that they informed and shaped the focus and scope of this review throughout the review process, and that the work remained closely aligned with their needs and emerging policy requirements. In particular, PHE/OHID developed and revised the prevention, treatment and recovery ‘pathway’ (hereafter referred to as ‘the pathway’), as well as circulating the survey to potential participants, identifying additional interventions to be included and further information on included interventions. They also offered feedback on work at every stage in the process.

5.1.2 Transdisciplinary advisory group

An advisory group was convened with 14 stakeholders⁹ with a range of expertise including: representatives from DHSC and PHE, drug and alcohol service providers, Local Authority service commissioners, academics and patient advocacy group representatives. The advisory group provided input at pivotal stages in the work:

- *Before work on the review commenced:* the advisory group was invited to comment on the plans for the work as set out in the protocol.
- *Following initial coding:* a meeting was held in which we shared preliminary findings from the map of research evidence and the survey of current practice in England. Feedback was sought on: the salience of the draft ‘pathway’ that had been developed in consultation with PHE; the methods used to identify current practice in England; and priorities for the focus for the in-depth review.
- *Following creation of a draft online map:* a draft was circulated of the map of systematic reviews and existing interventions in England, to invite comment on presentation and accessibility.

⁹ Six other stakeholders declined due to other commitments or the work being outside their remit; three suggested alternative members.

5.2 RQ1: Pathway development

An initial typology was drafted to categorise features and characteristics of digital interventions, adapting and building on existing typologies (Litvin, Abrantes et al. 2013, Mohr, Schueller et al. 2014, European Monitoring Centre for Drugs and Drug Addiction 2018, NICE 2018, World Health Organization 2018). This included the target group (who?); focus (what?), aim (why?) and mode and strategy (how?).

After sharing this initial typology with PHE, they felt that it would be more helpful to develop a pathway rather than a typology, so that types of interventions could be described according to when it was recommended for use. For example, whether it was most suited for use prior to, or in the early stages of risky alcohol or drug use (i.e. prevention and early intervention) – or alongside treatment, or in the recovery stage after alcohol or drug use treatment. This pathway was then developed by PHE and trialled by the research team through coding studies and interventions in the maps. The study team discussed issues identified through coding and explored challenges and solutions to the definitions of terms and points in the pathway. In this way, the pathway was refined over time; OHID also provided further revisions as their thinking developed following the period of COVID lockdowns in 2020-21.

5.3 RQ2: Online survey to identify interventions available in England

In order to find out what digital interventions were in use, or potentially available in England, in 2019 we conducted an online survey of people who have been involved in developing, commissioning, prescribing, recommending or evaluating digital interventions for drug/alcohol use.

5.3.1 The survey questions

We designed the survey following the first round of screening references for the map and after developing the initial typology, to ensure that we captured information of most relevance to the project.

The draft questionnaire was piloted prior to being distributed, and changes made based on the feedback. The final questionnaire can be seen in [Appendix 2](#). In summary, participants were first asked if they had any conflicts of interest to declare, they were then asked to indicate their professional role and which sector they work in. The remainder of the questionnaire focused on capturing information about the digital intervention(s) that they were involved in. This included details of: the focus (drugs, alcohol or both); the target group; what intervention strategies it employed (for example, normative feedback, screening and brief intervention, peer support); the technology used (for example, app, video conferencing); whether it was being used in addition to, or as an alternative to, face-to-face interventions and whether (and where) it was being commissioned. We also asked for details about its evaluation.

Participants could tell us about a maximum of five interventions, although there was no restriction on the number of times the questionnaire could be completed.

5.3.2 *Survey distribution*

We used the online survey tool JISC (<https://www.onlinesurveys.ac.uk/>) to conduct the survey. We promoted the survey, and encouraged participation, in a number of ways. Firstly, PHE supported participation in the survey by sending it to their regional and local leads, and asking them both to complete survey and to cascade it down to their drug and alcohol leads/commissioners. Secondly, we advertised via relevant networks including [Collective Voice](#) (a national alliance of drug and alcohol treatment charities) and the [NHS Substance Misuse Providers Alliance](#), asking them to share it with their member organisations. Thirdly, we promoted the survey in [DrugWise Daily](#) (a news service for the drug and alcohol sector). Fourthly, we asked members of our advisory group, and people who had piloted the survey, to share it through their networks. We also contacted a number of other organisations directly including the National Drug Treatment Monitoring System, Action on Addiction and the Nominet Trust. The survey was available for completion during July 2019.

In advertising the survey, we highlighted that participation was voluntary, that responses were anonymous, that they could withdraw at any time and also that it was quick and easy to complete.

Additional interventions were identified after the survey had been closed, via PHE, advisory group stakeholders and intervention developers.

5.3.3 *Data analysis*

Completed surveys were downloaded from JISC and imported into a spreadsheet for analysis. Each intervention that was identified from the survey or by stakeholders was then reviewed. Those which were not focused on alcohol or drug use, were not digital, or were not available for use in England, were excluded. The included interventions and/or their publicly available webpages were then reviewed, alongside responses from the survey. A description of each intervention was written, including its use, costs, target population, content and intervention strategy and any planned or completed evaluations. These descriptions and intervention strategy coding were shared with the interventions' developers in order to check for accuracy. Intervention evaluations were cross-checked with references included in the systematic map.

5.3.4 *Ethical approval*

Ethical approval for the survey was granted by the London School of Hygiene & Tropical Medicine Research Ethics Committee (reference 1777495).

5.4 RQs 3 & 4: Mapping systematic reviews and primary research: Identification of reviews and primary research

The search strategy comprised of a systematic search of 29 databases and specialist resources. Searches of bibliographic databases, specialist resources and clinical trials registries that contain research literature in the fields of healthcare, social science and information science were carried out during March 2019 for studies dated from 2004 onwards. The resources were selected to identify an extensive variety of ongoing and published research in journals and other types of reports. We searched databases focused research generally and primary studies, rather than on specific systematic review resources, as a systematic review of reviews was not a primary focus at the outset of this research.

The search strategy was developed in collaboration with our information specialist (CS) and other members of the review team (HB and KD). This search was informed from scoping searches to familiarise the team with the review topic and checking the included studies of twelve relevant reviews that were identified during this scoping stage. The search was also informed by search strategies used in these reviews and others identified during the scoping stage.

A database search strategy was developed based on three concepts (1) drug use, heavy alcohol use, withdrawal or recovery; (2) digital technologies; and (3) intervention. The search was designed to maximize both sensitivity and precision. Synonyms and alternative words for each of these concepts were used to search titles, abstracts, keywords and controlled vocabulary fields of the databases in order to try to capture a wide range of research. The search comprised of many terms for: substance use or heavy drinking; the intervention (for example, apps, telehealth, e-therapy, computer-assisted therapy); technologies (for example, mobile, web, computer, smartphone, digital); and actions of the technology (behaviour change, support, treatment, feedback, chat, self-help, interact). Additional search terms were used for title-only searches for the technology and the outcome on behaviours (for example, smartphone with recovery or smartphone with reduce with drug).

Where possible, the database searches were limited to citations published since 2004 in the English language. The search was developed in Medline and translated into other databases as appropriate. The search strategy for Medline is shown in [Appendix 4](#). For databases and trials registries which have a limited functionality for searching or for generating a suitable output of results, the search strategy was adapted and simplified.

The following resources were searched:

- 1) Scholarly bibliographic databases were searched: AMED (OVID), CENTRAL (Cochrane Library), CINAHL (EBSCO), EMBASE (OVID), Health Management Information Consortium (OVID), Library, Information Science & Technology

- Abstracts (EBSCO), MEDLINE (OVID), PsycINFO (OVID), Scopus, Social Policy and Practice (OVID) SSCI, ESCI, CPCI (Web of Science).
- 2) Trials registries: UK clinical trials gateway, Clinicaltrials.gov, WHO ICTRP trials, ISRCTN Registry.
 - 3) Drug and alcohol research registries: Drug and Alcohol Findings (findings.org.uk), Alcohol Change UK, ([https://alcoholchange.org.uk/research-hub/research and Impact Pathways](https://alcoholchange.org.uk/research-hub/research-and-impact-pathways)), (<http://www.impactpathways.org.uk/Addiction-Recovery-Apps/News-and-Events/>).
 - 4) Other databases and websites: ACM Digital Library, IEEE Explore, NIHR-Health Technology Assessment Database (Canada and international HTA), NHS Evidence, OpenGrey, Bielefeld Academic Search Engine, TRoPHI (Trials Register of Health Promoting Interventions), Proquest dissertations and theses, and NLTD theses.

References were imported into EPPI-Reviewer software and duplicates were identified and removed.

5.4.1 Screening criteria

We developed a set of pre-specified criteria in order to systematically screen each reference so that we only included systematic reviews and primary studies of intervention evaluations of digital interventions for preventing, treating or aiding the recovery of alcohol and/or drug use.

Table 5.3.6 sets out the screening criteria that were applied to all the citations. Once the initial title and abstract screening took place, further criteria were applied to the systematic reviews and primary studies that were included in the map.

Table 5.3.6 Screening inclusion criteria

Criteria	Specification
Publication Date	From 2004
Language	English
Country	Conducted in an OECD country
Study type	Systematic review of studies, or primary research, with empirical design from a defined sample, from whom data are collected and analysed.
Study focus	Quantitative or qualitative evaluation of an intervention focused on the prevention, treatment or recovery from alcohol, drug or substance misuse. Exclude studies focused on Foetal Alcohol Syndrome, solely tobacco use or harm reduction such as needle-exchange or drink driving.
Population focus	Patients or the general public of any age (i.e. exclude studies focusing on interventions for use by health professionals).

Digital element	Must be digital and interactive (e.g. exclude interventions with automated text messages that only contain appointment reminders or generic information).
Systematic reviews only	
Study design	Must be a systematic review (i.e. searched 2+ databases and had set inclusion criteria) and not a review of reviews or other type of literature review
Publication date	From 2014
Systematic review: type	Must contain a synthetic statement in a full-text report. This must group together the results of two or more studies and report the direction of the findings from this pooled group. The statement must clearly show which evidence it is referring to. Meta-reviews are not included. Duplicate reviews are excluded: e.g. where an abridged version is reported in a separate citation to the full version.
Systematic review: focus	Must contain synthesis of interventions from the same intervention strategy the pathway (e.g. reviews were excluded if their syntheses combined different intervention strategies e.g. synthesising findings from counselling interventions with brief feedback interventions).
Primary studies for evidence map	
Citation content	Contains title and abstract
Publication format	Exclude control trial registry reports. Exclude 'duplicate' abstracts that have the same title and authorship, and published in different formats; for example, conference abstracts where there also a journal paper, or presented at two conferences.

We limited studies to those targeting OECD countries in order to maximise the likelihood that the population and setting will be similar to England's. Interventions were only included if they have an interactive digital element, in order to exclude more passive digital interventions such as websites solely providing information, since these are less distinct from non-digital information provision interventions. Since the team does not have capacity to search for and examine evidence in all languages, we included only those available in English language. We limited the search to articles published from 2004 onwards, since this coincides with the significant shift in the capabilities of mobile web-based and social media digital technologies emerging at this time ('Web 2.0'). These technologies informed a rapid growth in the type of e-health and m-health interventions possible. Prior to this digital interventions were considered

to be in their infancy as they had limited functionality and were not widely available or evaluated) (Chou, Prestin et al. 2013).

Titles and abstracts returned by the search strategy were exported into EPPI-Reviewer and duplicates were removed. Pilot screening was initially conducted among the whole team to ensure that the screening criteria were being applied consistently. Titles and abstracts were then screened by two reviewers independently, until an inter-rater agreement rate of over 80% was reached. References were then independently screened by one of eight reviewers using the predefined criteria specified in Table 6.1. Decisions on citations which were unclear were made by the lead reviewer (HB). The systematic reviews were each assessed independently at full-text by two reviewers using the criteria specified in Table 6.1. Following the pilot screening, priority screening was utilised in order to accelerate the process. Out of the 20,961 citations obtained from the searches after removal of duplicated, 14,402 were screened.

5.4.2 Overview of the priority screening process

Test searches indicated the terms used in the searches would retrieve a relatively large number of irrelevant items owing to the broad focus of the topic and the broad vocabulary used to describe it. It was planned at the outset that the volume of irrelevant items screened against the review's screening criteria would be reduced by using priority screening. Priority screening is a method to identify those references most likely to be relevant and prioritise them for screening. The system orders the list of references to be screened in terms of their likely relevance, with the less relevant ones moved towards the end of the list. . It uses machine learning based on text-mining to prioritise the most likely relevant studies. The screening of studies is halted once an appropriate pre-determined cut-off point has been reached. The machine learning reviewing software in EPPI-Reviewer 4 'learns' to recognise citations that are likely to be included and excluded based on how researchers apply screening criteria (Brunton et al. 2017; Thomas et al. 2011). Citations are sorted iteratively throughout the screening process so that those most likely to be included are screened first, prioritising these to significantly speed up the screening process (O'Mara-Eves et al. 2015, Shemilt et al. 2014).

To implement priority screening a number of steps were taken. First, a random sample of 391 citations were screened to provide an *initial predicted inclusion rate* (17%). Second, a power calculation (using Lenth's 2006 tool) was used to calculate the number of references required to be screened randomly in order to provide an estimate for attaining the initial predicted inclusion rate of 17%, based on a margin of error of 2% at 95% confidence interval. The power calculation indicated that at least (n=1251) records would need to be screened to confidently establish the *baseline inclusion rate*. Third, once this quantity of references had been screened the baseline inclusion rate was determined (in practice over 1767 references were screened), along with a further power calculation to check the significance of the sample in determining this rate. As this baseline inclusion rate was within the margin of error of the initial

predicted inclusion rate, and sufficient quantity of references had been screened, we took the baseline inclusion rate as a reasonable indicator of the likely number of eligible studies in the corpus of records. Later on in the screening process, the inclusion criteria were applied in a narrower way. All included records were checked against the narrower interpretation for inclusion and the steps to establish the baseline inclusion rate were repeated.

The decision to stop screening was based on two pieces of information. The first was the predicted number of eligible studies based on the baseline inclusion rate. Once that number of includable studies was met or exceeded, we could make the reasonable assumption that we had identified all (or the vast majority) of all relevant records. The second was the observation that no new records were being identified as screening down the list progressed. A graphical display of the inclusion rate over time was observable during screening, and reaching a long plateau (over 1200 records with no new includes) indicated that we had exhausted the relevant studies in the prioritised list.

5.4.3 *Coding and quality appraisal*

Systematic reviews were assessed at full-text and were independently quality appraised using AMSTAR2 (Shea, Reeves et al. 2017) by two researchers, who then met to agree their appraisal scores. Each review was assigned an overall assessment of high, medium or low quality. The reviews were then coded according to where the interventions lay within the pathway, as well as other characteristics of the review. Synthetic statements and overviews of findings were extracted by two researchers and cross-checked for consistency. For each review a summary was prepared describing the review and its findings.

Primary studies were coded based on their titles and abstracts. A coding framework was developed to capture characteristics of the interventions, for example, their focus on alcohol, drugs and/or other focus; type of drug, and intervention strategy within the prevention, treatment and recovery pathway; target population; types of study measures (outcome, process, costs or other); countries the studies were undertaken in and publication date; type of digital intervention and intervention strategies. Coding was initially conducted by all reviewers on a subset of references in order to check consistency in coding and interpretation of the framework. Once agreement was reached, the remaining references were coded by individual reviewers. Quality appraisal was not undertaken.

5.4 Creation of interactive online maps

Online interactive maps were generated using v.1.2.5 of the EPPI-Mapper software (Thomas 2018), which provides an interactive user interface powered by EPPI-Reviewer (Thomas, Graziosi et al. 2020). The appearance and content of the maps were created and adapted following feedback from the review team, PHE, advisory group members and others for whom such maps were novel.

References

Included systematic reviews (N=18)

Boumparis N, Karyotaki E, Schaub MP, Cuijpers P, Riper H (2017) Internet interventions for adult illicit substance users: a meta-analysis. *Addiction* 112: 1521-1532.

Doherty AM, Mason C, Fear NT, Rona R, Greenberg N, Goodwin L (2017) Are brief alcohol interventions targeting alcohol use efficacious in military and veteran populations? A meta-analysis. *Drug Alcohol Depend* 178: 571-578.

Donoghue K, Patton R, Phillips T, Deluca P, Drummond C (2014) The effectiveness of electronic screening and brief intervention for reducing levels of alcohol consumption: a systematic review and meta-analysis. *J Med Internet Res* 16: e142.

Foxcroft DR, Moreira MT, Almeida Santimano NM, Smith LA (2015) Social norms information for alcohol misuse in university and college students. *Cochrane Database Syst Rev*, issue 12: CD006748.

Giroux I, Goulet A, Mercier J, Jacques C, Bouchard S (2017) Online and Mobile Interventions for Problem Gambling, Alcohol, and Drugs: A Systematic Review. *Front Psychol* 8: 954.

Gulliver A, Farrer L, Chan JK, Tait RJ, Bennett K, Calex AL, Griffiths KM (2015) Technology-based interventions for tobacco and other drug use in university and college students: a systematic review and meta-analysis. *Addict Sci Clin Pract* 10: 5.

Holmes NA, van Agteren JE, Dorstyn DS (2018) A systematic review of technology-assisted interventions for co-morbid depression and substance use. *J Telemed Telecare* 25: 131-141.

Jiang S, Wu L, Gao X (2017) Beyond face-to-face individual counseling: A systematic review on alternative modes of motivational interviewing in substance abuse treatment and prevention. *Addict Behav* 73: 216-235.

Kaner EF, Beyer FR, Garnett C, Crane D, Brown J, Muirhead C, Redmore J, O'Donnell A, Newham JJ, de Vocht F, Hickman M, Brown H, Maniatopoulos G, Michie S (2017) Personalised digital interventions for reducing hazardous and harmful alcohol consumption in community-dwelling populations. *Cochrane Database Syst Rev* 9: CD011479.

Leeman RF, Perez E, Nogueira C, DeMartini KS (2015) Very-Brief, Web-Based Interventions for Reducing Alcohol Use and Related Problems among College Students: A Review. *Front Psychiatry* 6: 129.

Posadzki P, Mastellos N, Ryan R, Gunn LH, Felix LM, Pappas Y, Gagnon MP, Julious SA, Xiang L, Oldenburg B, Car J (2016) Automated telephone communication systems for preventive healthcare and management of long-term conditions. *Cochrane Database Syst Rev* 12: CD009921.

Prosser T, Gee KA, Jones F (2018) A meta-analysis of effectiveness of E-interventions to reduce alcohol consumption in college and university students. *J Am Coll Health* 66: 292-301.

Riper H, Andersson G, Hunter SB, de Wit J, Berking M, Cuijpers P (2014) Treatment of comorbid alcohol use disorders and depression with cognitive-behavioural therapy and motivational interviewing: a meta-analysis. *Addiction* 109: 394-406.

Riper H, Hoogendoorn A, Cuijpers P, Karyotaki E, Boumparis N, Mira A, Andersson G, Berman AH, Bertholet N, Bischof G, Blankers M, Boon B, Boss L, Brendryen H, Cunningham J, Ebert D, Hansen A, Hester R, Khadjesari Z, Kramer J, Murray E, Postel M, Schulz D, Sinadinovic K, Suffoletto B, Sundstrom C, de Vries H, Wallace P, Wiers RW, Smit JH (2018) Effectiveness and treatment moderators of internet interventions for adult problem drinking: An individual patient data meta-analysis of 19 randomised controlled trials. *PLoS Med* 15: e1002714.

Rodriguez DM, Teesson M, Newton NC (2014) A systematic review of computerised serious educational games about alcohol and other drugs for adolescents. *Drug Alcohol Rev* 33: 129-135.

Smedslund G, Wollscheid S, Fang L, Nilsen W, Steiro A, Larun L (2017) Effect of early, brief computerized interventions on risky alcohol and cannabis use among young people. *Campbell Collaboration*.

Tansil KA, Esser MB, Sandhu P, Reynolds JA, Elder RW, Williamson RS, Chattopadhyay SK, Bohm MK, Brewer RD, McKnight-Eily LR, Hungerford DW, Toomey TL, Hingson RW, Fielding JE, Community Preventive Services Task F (2016) Alcohol Electronic Screening and Brief Intervention: A Community Guide Systematic Review. *Am J Prev Med* 51: 801-811.

Wigham S, Bauer A, Robalino S, Ferguson J, Burke A, Newbury-Birch D (2017) A systematic review of the effectiveness of alcohol brief interventions for the UK military personnel moving back to civilian life. *J R Army Med Corps* 163: 242-250.

Other references

ACMD Recovery Committee (2015) *Prevention of Drug and Alcohol Dependence: Briefing by the Recovery Committee*. Advisory Council on the Misuse of Drugs.

Beyer, F., S. Rice, J. Simpson, D. Craig, D. Caldwell, C. Angus, C. Garnett, S. Michie, M. Hickman, D. Lavoie and E. Kaner (2019). "Reducing hazardous alcohol consumption: an evidence synthesis." *The Lancet* 394(S): 24.

Burton, R., Z. Clarke, C. Wright, L. Pechey and C. Sharpe (in press). Digital interventions in alcohol and drug prevention, treatment and recovery: A summary of findings from systematic reviews. London, UK, Office for Health Improvement and Disparities.

Burton, R., C. Henn, D. Lavoie, R. O'Connor, C. Perkins, K. Sweeney, F. Greaves, B. Ferguson, C. Beynon, A. Belloni, M. V., J. Marsden, N. Sheron, A. Wolff and staff at PHE (2016). *The Public Health Burden of Alcohol and the Effectiveness and Cost-Effectiveness of Alcohol Control Policies: An evidence review*. Public Health England. London, Public Health England.

Champion, K. E., N. C. Newton and M. Teesson (2016). "Prevention of alcohol and other drug use and related harm in the digital age: what does the evidence tell us?" *Curr Opin Psychiatry* **29**(4): 242-249.

Chou, W. S., A. Prestin, C. Lyons and K. Wen (2013). "Web 2.0 for Health Promotion: Reviewing the Current Evidence." *American Journal of Public Health* **103**: e9-e18.

European Monitoring Centre for Drugs and Drug Addiction (2018). *m-Health Applications for Responding to Drug Use and Associated Harms*.

Garnett, C. V., D. Crane, J. Brown, E. F. S. Kaner, F. R. Beyer, C. R. Muirhead, M. Hickman, E. Beard, J. Redmore, F. de Vocht and S. Michie (2018). "Behavior Change Techniques Used in Digital Behavior Change Interventions to Reduce Excessive Alcohol Consumption: A Meta-regression." *Ann Behav Med* **52**(6): 530-543.

Kaner, E., F. R. Beyer, C. Garnett, D. Crane, J. Brown, C. Muirhead, J. Redmore, A. O'Donnell, J. J. Newham, F. De Vocht, M. Hickman, H. Brown, G. Maniatopoulos and S. Michie (2017). "Personalised Digital Interventions for Reducing Hazardous and Harmful Alcohol Consumption in Community-Dwelling Populations." *Cochrane Database of Systematic Reviews* **9**.

Kazemi, D. M., B. Borsari, M. J. Levine, S. Li, K. A. Lamberson and L. A. Matta (2017). "A Systematic Review of the mHealth Interventions to Prevent Alcohol and Substance Abuse." *J Health Commun* **22**(5): 413-432.

Litvin, E. B., A. M. Abrantes and R. A. Brown (2013). "Computer and mobile technology-based interventions for substance use disorders: an organizing framework." *Addictive Behaviors* **38**(3): 1747 - 1756.

Martin, J., T. McBride, T. Masterman, I. Pote, N. Mokhtar, E. Oprea and M. Sorgenfrei (2020). *Covid-19 and early intervention: Evidence, challenges and risks relating to virtual and digital delivery*. London, Early Intervention Foundation.

Metrebian, N., T. Weaver, S. Pilling, K. Goldsmith, E. Carr, J. Shearer, K. Woolston-Thomas, B. Tas, C.-A. Getty, C. Cooper, R. van der Waal, M. Kelleher, E. Finch, P. Bijral, D. Taylor, J. Scott and J. Strang (2020). "Telephone delivered incentives for encouraging adherence to supervised methadone consumption (TIES): Study protocol for a feasibility study for an RCT of clinical and cost effectiveness." *Contemporary Clinical Trials Communications* **17**: 100506.

Mohr, D. C., S. M. Schueller, E. Montague, M. N. Burns and P. Rashidi (2014). "The Behavioural Intervention Technology Model: An integrated conceptual and technological framework for eHealth and mHealth interventions." *Journal of Medical Internet Research* **16**(6): e146.

Nair, N. K., N. C. Newton, A. Shakeshaft, P. Wallace and M. Teesson (2015). "A Systematic Review of Digital and Computer-Based Alcohol Intervention Programs in Primary Care." Curr Drug Abuse Rev **8**(2): 111-118.

Nesvåg, S. and J. R. McKay (2018). "Feasibility and Effects of Digital Interventions to Support People in Recovery From Substance Use Disorders: Systematic Review." Journal of Medical Internet Research **20**(8): e255.

NICE (2018). Evidence Standards Framework for Digital Health Technologies.

Shea, B. J., B. C. Reeves, G. Wells, M. Thuku, C. Hamel, J. Moran, D. Moher, P. Tugwell, V. Welch and E. Kristjansson (2017). "AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both." BMJ **358**: j4008.

Skivington, K., L. Matthews, S. A. Simplson, P. Craig, J. Baird, J. M. Blazeby, K. A. Boyde, N. Craig, D. P. French, E. McIntosh, M. Petticrew, J. Rycroft-Malone, M. White and L. Moore (2021). "Framework for the development and evaluation of complex interventions: gap analysis, workshop and consultation-informed update." Health Technology Assessment **25**(57).

Thomas, J. (2018). "EPPI-Reviewer: past, present and future." EPPI-Centre Blog <http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=3097>.

Thomas, J., S. Graziosi, J. Brunton, Z. Ghouze, P. O'Driscoll and M. Bond (2020). EPPI-Reviewer: advanced software for systematic reviews, maps and evidence synthesis. EPPI-Centre Software. London: UCL Social Research Institute.

Tricco, A., E. Lillie, W. Zarin, K. O'Brien, H. Colquhoun, D. Levac, D. Moher, M. Peters, T. Horsley, L. Weeks, S. Hempel and et al. (2018). "PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation." Ann Intern Med **169**(7): 467-473.

World Health Organization (2018). Classification of Digital Health Interventions. Geneva.

Appendices

Appendix 1: Preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) checklist

Section	Item	PRISMA-ScR checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a scoping review.	Title page
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	6
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	22
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	22
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a web address); and if available, provide registration information, including the registration number.	24
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	57
Information sources	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	56

Search	8	Present the full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	70
Selection of sources of evidence	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	57
Data charting process	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	60
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	60
Critical appraisal of individual sources of evidence	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	60
Synthesis of results	13	Describe the methods of handling and summarising the data that were charted.	61
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	91
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	95 & 102
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	98
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	92 & 102
Synthesis of results	18	Summarise and/or present the charting results as they relate to the review questions and objectives.	37

DISCUSSION			
Summary of evidence	19	Summarise the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	46
Limitations	20	Discuss the limitations of the scoping review process.	50
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	52
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	2

Digital Drug/Alcohol Interventions Survey

Introduction

Survey about digital interventions for alcohol and other drugs

This survey aims to identify what digital drug/alcohol interventions are currently in use in England.

By digital intervention we mean any interactive programmes and/or devices using digital technology to support behaviour change, for service users (rather than for professionals). Such interventions include: mobile applications (apps); personalised/tailored text messages or emails (not simple appointment reminders); websites that enable a personalized interaction and/or computer-assisted therapies. We are NOT including solely information provision, or digital screening/audit interventions in this survey.

We are also NOT including interventions targeting tobacco/smoking.

Please take part if you:

- Commission,
- Refer or recommend,
- Develop, OR
- Evaluate digital interventions for drug/alcohol prevention/treatment/recovery in England.

Participation is voluntary and you can withdraw at any point. If you withdraw before completing the survey, none of the data you supplied will be used.

How long will it take? Around five to ten minutes.

Why are we doing this survey? We want to know what digital drug/alcohol interventions are currently in use in England. To accompany the survey, we are conducting a systematic review to explore the research evidence about which interventions are effective for whom and in which circumstances.

Who is running it? Researchers from the London School of Hygiene & Tropical Medicine (LSHTM) and University College London (UCL), as part of the Policy Reviews Facility for the Department of Health and Social Care (<https://eppi.ioe.ac.uk/cms/default.aspx?tabid=73>). The survey has been approved by the ethics committee of LSHTM (ref: 17495).

This project was commissioned by the National Institute for Health Research (NIHR) Policy

Research Programme (PRP) for the Department of Health and Social Care.

What about data protection? We will **NOT** collect your name or the TC/IP address of your device or try to install any cookies on it. We will **NOT** collect any information about you that would allow anybody to identify you.

Where will the data go? The anonymous data will be stored on an encrypted and password protected drive. Data will be held by LSHTM for ten years after the completion of the project (as per LSHTM policy).

When can I see the results? Results will be available after March 2020. The project report will be available at <http://www.eppi.ioe.ac.uk>.

For more information about the survey, please contact Helen Burchett at LSHTM, London, UK.

Email: helen.burchett@lshtm.ac.uk; tel: 0207 612 6854; fax: 0207 612 6400

1. Have you read and understood the information above and do you want to take part in the survey? ✕ *Required*

Yes

No

Declaration of interest

2. We ask you to declare any interests that you may have that could give the appearance of a conflict, even where no actual conflict exists. Conflicts of interest are not restricted to just financial interest and alcohol industry funding but include non-financial interests as well, for instance enhancement of an individual's career, education or professional reputation; access to privileged information or facilities. Do you have any interests to declare? ✕ *Required*

- No
- Yes

2.a. If yes, please specify:

Background information

3. What is your main professional role? *✕ Required*

- Drug/alcohol service commissioner
- Drug/alcohol service manager
- Drug/alcohol service worker/clinician (i.e. who deals directly with clients/patients/public)
- Digital intervention developer
- Researcher/digital intervention evaluator
- Other

3.a. If you selected 'Other', please specify:

3.b. Who do you work for?

- NHS
- Third sector
- Private provider
- Other

3.b.i. If you selected 'Other', please specify:

Digital interventions

We would like to find out what digital interventions are currently in use in England to support drug/alcohol prevention, treatment and recovery.

We want to ask you about the drug/alcohol interventions that you have been involved in developing, commissioning, prescribing, recommending or evaluating.

By digital intervention we mean any interactive programmes and/or devices using digital technology to support behaviour change, for use by service users/individuals (rather than for professionals). Such interventions include: mobile applications (apps); personalised/tailored text messages or emails (not simple appointment reminders); websites that enable a personalized interaction and/or computer-assisted therapies.

We are interested in collecting information about interventions that are both delivered exclusively via digital means AND 'hybrid' interventions in which there are a combination of different intervention elements, at least one of which is digital.

We are NOT including solely information provision, or digital screening/audit interventions in this survey. Only if the screening component leads to another digital intervention phase, should this subsequent phase be included in the survey.

We are also NOT including interventions targeting tobacco/smoking.

4. Have you been involved in developing/commissioning/referring to/recommending/evaluating any digital drug/alcohol interventions? ✕ *Required*

- Yes
- No
- Other/unsure

4.a. If you selected 'Other/unsure', please specify:

You may have experience of more than one digital intervention.

We will give you the opportunity to answer questions about up to five interventions (if you'd like to tell us about more than five, simply complete the survey again).

Please tell us about one intervention at a time.

4.b. Please tell us about the first digital drug/alcohol intervention that you have been involved in. What is its name?

4.c. How have you been involved in this intervention? (select all that apply)

- I am/have been involved in its development
- I am/have been commissioning it as part of a substance misuse pathway
- I am/have been commissioning it for other services (i.e. not substance misuse pathway, or unsure)
- I am/have been using/recommending as part of a substance misuse pathway
- I am/have been using/recommending it for other services with individuals (i.e. not an intervention for providers to use themselves)
- I am/have been evaluating it
- Other

4.c.i. Please specify who/where it is being commissioned/used and with whom:

4.c.ii. If you selected 'Other', please specify:

4.c.iii. Is this intervention being commissioned/used in England?

- Yes
- No, not yet (e.g. still being developed; currently used elsewhere but not in England)
- No, but has been used in England in the past
- No, never
- Unsure/don't know

4.c.iii.a. If 'Yes', please specify who/where it is being commissioned/used and with whom:

4.c.iv. Is this intervention designed for patients/clients to use *in addition to face-to-face/telephone services*, or as an *alternative to these services*?

- In addition to face-to-face/telephone services
- As an alternative to face-to-face/telephone services
- Either 'in addition to', or 'as an alternative'
- Unsure/other

4.c.iv.a. If you selected 'Unsure/other', please specify:

4.c.v. Are you doing this currently?

- Yes, I am doing this currently
- No, I am no longer doing this (e.g. because intervention is no longer in use, or because you changed role)
- Other

4.c.v.a. If you selected 'Other', please specify:

4.d. Does this digital intervention focus on.....

- Both alcohol and drugs?
- Alcohol only?
- Drugs only?
- Co-occurring conditions (e.g. alcohol/drugs AND depression)?
- Other?

4.d.i. Please tell us which co-occurring conditions the intervention focuses on:

4.d.ii. If you selected 'Other', please specify:

4.e. Is this intervention delivered exclusively digitally or in combination with other modes of delivery?

- Digital only (e.g. only through an app or website)
- Mixed digital and other mode of delivery (e.g. alongside face-to-face or telephone components)
- Can be either exclusively digital OR mixed (i.e. user can decide)
- Other

4.e.i. If you selected 'Other', please specify:

For the remaining questions, please answer about the digital component of the intervention ONLY.

4.f. Does this intervention include:

(select all that apply)

- Mobile application (app)
- Text messages or email or whatsapp service (interactive/tailored; not just appointment reminders)
- Website that enables personalised feedback/interaction (not simply information provision)
- Video conferencing/voice over internet protocol (VOIP) e.g. Skype, FaceTime
- Chat rooms (i.e. live/real time)
- Online forum/blogs
- Social media e.g. facebook
- Live chat
- Chatbot
- Interactive voice response
- Artificial Intelligence (AI)
- Virtual reality (VR) or gaming
- Biosensors and wearables (e.g. fitbit, breathalyser)
- Location monitoring/GPS tracking
- Unsure/don't know
- Other

4.f.i. If you selected 'Unsure/don't know' or 'Other', please specify:

4.g. Is this digital intervention aimed at... (select all that apply)

- Prevention
- Treatment
- Recovery
- Other

4.g.i. If you selected 'Other', please specify:

4.h. Is this digital intervention targeted at anyone in particular? (i.e. who is it specifically aimed at, not who actually uses it)

- No specific target (i.e. the general population)
- Yes, it is targeted
- Unsure/don't know

4.h.i. If targeted, please specify who is targeted: (tick all that apply)

- A population sub-group (e.g. prisoners, students, a particular age group)
- Individuals screened/identified as being at higher risk of drug/alcohol use problems (e.g. heavy or binge drinkers, or people dependent/addicted)

4.h.ii. If you would like to provide more information about who is targeted, please do so here:

4.h.iii. If you selected 'Unsure/don't know', you can tell us why you're unsure here:

4.i. What is the intervention strategy employed in this digital intervention? (select all that apply)

- Monitoring/tracking behaviour or consumption
- Goal setting
- Incentives/rewards
- Online peer support/communities
- Counselling or psychological therapy e.g. Cognitive Behaviour Therapy (CBT), motivational interviewing (MI), brief intervention, extended brief intervention (EBI), treatment programme
- Other

4.i.i. If you selected 'Other', please specify:

4.j. Could this intervention be described as 'brief' or 'short'? (i.e. one-off and of 'short' duration e.g 10 minutes or less)

- Yes
- No
- Could be either brief or not e.g. user decides
- Unsure/don't know

4.j.i. If you are unsure, please explain:

4.k. Where can users access this digital intervention? (select all that apply)

- In a service facility only (e.g. GP practice, drug/alcohol treatment facility)
- Outside a service facility (e.g. at home)
- Unsure/don't know
- Other

4.k.i. If you selected 'Unsure/don't know' or 'Other', please specify:

4.l. Is a member of staff required in the delivery of this digital intervention?

- Yes (e.g. therapy via videoconferencing, or a moderated chat room)
- No (e.g. feedback based on an algorithm, automated text message system, unmoderated chat room, chat bot)
- Unsure/don't know
- Other

4.l.i. If you selected 'Unsure/don't know' or 'Other', please specify:

4.m. What is the cost of providing this digital intervention?

- Commissioning organisation pays a subscription (e.g. license for use by multiple users); free for user
- Commissioning organisation pays per user; free for user
- Individual user pays
- It's free
- Unsure/don't know
- Other

4.m.i. If you selected 'Unsure/don't know' or 'Other', please specify:

4.n. Has this digital intervention been evaluated? (Or is it currently being evaluated?)

(We are interested in all types of evaluation: internal data monitoring, qualitative, quantitative, external trials, PhDs, and everything in between!)

- Yes
- No
- Unsure/don't know
- Other

4.n.i. We would love to know as much as possible about the evaluation! Please provide us with as much detail as you can:

- Who led this evaluation?
- What type of study was it?
- Do you have any links to its reports? (or if unpublished, please email any evaluation reports you are willing to share to helen.burchett@lshtm.ac.uk)

4.n.ii. If you selected 'Unsure/don't know' or 'Other', please specify:

Other digital interventions

5. Are there any other digital drug/alcohol interventions you commission/recommend/refer to/develop/evaluate? ✕ *Required*

Yes

No

Appendix 3: Survey participants and results

Survey participants (n=38)

59 people responded to our survey. Of these, 21 indicated that they had not been involved in developing/commissioning/referring to/recommending/evaluating any digital alcohol or drug interventions. These were excluded from further analysis, resulting in 38 eligible participants. Among these, eight people declared a conflict of interest. Predominantly, these conflicts stemmed from having been involved in the development of digital interventions; none referred to having received industry funding.

More than half of participants indicated that they were involved in commissioning (n=8), managing (n=10), and/or delivering (n=7) drug and alcohol services. The remainder were involved in digital interventions as developers (n=7) and/or researchers (n=10). The total sums to more than 38 as participants could select more than one professional role.

Identification of interventions

Participants reported 28 unique interventions (some were reported by more than one person). However, we excluded eight of these.

- Three were excluded because they did not focus on drugs and/or alcohol (*NHS Smoke Free*; *SleepBot* and *BlueIce*, the latter is an app targeted at young people who self-harm).
- Four were excluded as they did not, as far as we could ascertain, include an interactive digital intervention (*The No More Service* and *Wellbeing Cloud*) or insufficient detail was provided for us to establish whether it did (*'Drug and Alcohol Procurement'* and *'a text messaging system'*).
- One intervention was excluded as it is not available in the UK (*Pear Therapeutics*).

This left us with 20 interventions. However, one of these, *DrinkCoach*, comprised of three discrete interventions, an alcohol test, an app and an online coaching service. We coded these as three separate interventions. Another, *Drugs Meter*, encompasses a suite of nine separate apps; one for each of the seven most common drugs plus ones for alcohol and tobacco. We coded the alcohol specific app (*Drinks Meter*) separately. Thus we identified 23 discrete digital alcohol and drug interventions via the survey.

An additional 17 digital interventions were identified by advisory group members, PHE or intervention developers, taking the total included in the map to 40. See [Section 3.4](#) and [Appendix 6](#) for further details of these interventions.

Appendix 4: Example search strategy

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily <1946 to March 20, 2019>

Terms for substance use or heavy drinking

- 1 (Substance adj2 ("use" or user* or usage or misuse or abuse* or misuse or depend* or addict* or disorder*)).ti,ab,kw. (55038)
- 2 ((solvent* or drug or drugs) adj3 (addict* or abus* or misuse* or user or users or disorder* or dependen* or recovery or intoxicat* or withdraw* or detox* or habit* or recreation* or illicit or relapse)).ti,ab,kw. (96747)
- 3 ((cocaine or marijuana* or cannab* or hashish or opium or opioid* or opiate* or heroin or amphetamine* or methamphetamine* or Ketamine or ecstasy or MDMA or "recreational drugs" or "illicit drugs" or "illicit substances" or "street drug" or "street drugs" or "poly-drug" or polydrug or morphine or meth or methadone or methoxetamine) adj2 (addict* or abus* or misuse* or user or users or disorder* or dependen* or recovery or intoxicat* or withdraw* or detox* or habit* or "use" or abstain* or abstinence or relapse or craving)).ti,ab,kw. (64785)
- 4 ("club drug" or "club drugs" or "Drug using population" or "Drug using populations" or "who inject drugs" or "who use drugs").ti,ab,kw. (3181)
- 5 "Drug problems".ti,ab,kw. (1007)
- 6 "drug use".ti,ab,kw. (41260)
- 7 "drug treatment".ti,ab,kw. (28976)
- 8 "drug prevention".ti,ab,kw. (662)
- 9 Street drugs/ or crack cocaine/ or designer drugs/ or substance-related disorders/ or Amphetamine-Related Disorders/ or cocaine-related disorders/ or inhalant abuse/ or marijuana abuse/ or opioid-related disorders/ or heroin dependence/ or morphine dependence/ or opium dependence/ or substance abuse, intravenous/ or phencyclidine abuse/ or substance abuse, oral/ or exp substance withdrawal syndrome/ or drug users/ (157963)
- 10 exp Alcohol-related disorders/ or alcoholism/ or alcoholics/ or binge drinking/ or alcohol abstinence/ or alcohol intoxication/ or exp Alcohol-Induced Disorders/ or Wernicke Encephalopathy/ or Alcohol Withdrawal Delirium/ or Alcohol Withdrawal Seizures/ or Psychoses, Substance-Induced/ (114328)
- 11 alcohol drinking/th (625)
- 12 (Alcoholic* or alcoholism).ti,ab,kw. (81070)

13 (alcohol* adj3 (abus* or misuse* or disorder* or problem* or dependen* or treatment* or recovery or quit* or anonymous or harmful* or hazardous or intoxicat* or risky* or withdraw* or detox* or heavy or heavily or excess* or therap* or habit* or addict* or unhealthy or abstinence)).ti,ab,kw. (79554)

14 (((Drinker* or drinking) adj2 (binge or risky or excess* or harmful* or hazardous* or heavy or heavily or unhealthy)) or (Alcohol and (drink* adj2 problem*))).ti,ab,kw. (17831)

15 (((("at risk" or relapse* or risky) adj2 drink*) or (risk adj2 drinker*)).ti,ab,kw. (1990)

16 (((risky or unhealthy or harmful or excess* or heavy or hazardous) adj1 consumption) and alcohol).ti,ab,kw. (757)

17 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 (446540)

Controlled terms for technology and either the intervention/ action of the technology/ evaluation

18 Computer Terminals/ or Microcomputers/ or minicomputers/ or Computers, Handheld/ or Smartphone/ or Telemedicine/ or Telerehabilitation/ or Mobile applications/ or Text messaging/ or Cell phone/ or Therapy, computer assisted/ or Information technology/ or Internet/ or speech recognition software/ or Computer simulation/ or virtual reality/ or User-computer interface/ or Social networking/ or online social networking/ or "cell phone use"/ or Technology transfer/ or internet access/ or Virtual reality exposure therapy/ or automation/ or social media/ or computer communication networks/ or Wireless technology/ or telecommunications/ or Telemetry/ or Remote Sensing Technology/ or Wearable electronic devices/ or medical informatics applications/ (365477)

19 (therapy or "prevention and control" or rehabilitation).fs. (1926923)

20 User-computer interface/ or treatment outcome/ or Telemedicine/ or Telerehabilitation/ or Precision medicine/ or patient care/ or rehabilitation/ or self care/ or Therapy, computer assisted/ or Secondary prevention/ or Primary prevention/ or Tertiary prevention/ or Self help groups/ or Feedback, Psychological/ or Feedback, Sensory/ or Biofeedback, Psychology/ or Behavior Therapy/ or Neurofeedback/ or Mind-Body Therapies/ or Psychotherapy/ or Psychosocial Support Systems/ or Social Support/ or "Treatment Adherence and Compliance"/ or "Ecological Momentary Assessment"/ or Behavior control/ or risk reduction behavior/ or evaluation studies as topic/ or pilot projects/ or feasibility studies/ or program evaluation/ or benchmarking/ or Health Behavior/ or health risk behaviors/ or Feedback/ or Harm reduction/ or Patient Education as Topic/ (1579909)

21 19 or 20 (3120814)

22 18 and 21 (91301)

Free text terms for technology and intervention

23 ((intervention* or program* or service*) and (mobile or web* or computer* or digital* or wireless* or Bluetooth or cyber* or online* or virtual* or intelligent* or software or Cellular phone* or cell phone* or electronic* or smartphone* or "smart phone" or "smart phones" or automated or electronic* or (portable adj2 media) or Internet* or Technolog* or Automation or microcomp* or ipad or iphone or ipod or netbook or "touch screen" or hardware or software or "multimedia device" or "multi media device" or "portable device*" or ("hand held" adj2 device*) or (handheld adj2 device*) or texting* or "text messag*" or SMS or ("short messag*" adj1 service*) or (text adj3 deliver*) or "social networking" or "social media" or Messenger* or Facebook or Whatsapp)).ti. (17405)

24 ((intervention* or program* or service*) adj5 (mobile or web* or computer* or digital* or wireless* or Bluetooth or cyber* or online* or virtual* or intelligent* or Cellular phone* or cell phone* or electronic* or smartphone* or "smart phone" or "smart phones" or automated or (artificial adj2 intelligent*) or (portable adj2 media) or Internet* or Technolog* or Automation or microcomp* or ipad or iphone or ipod or netbook or "touch screen" or hardware or software or "multimedia device" or "multi media device" or "portable device*" or ("hand held" adj2 device*) or (handheld adj2 device*) or texting* or "text messag*" or SMS or ("short messag*" adj1 service*) or (text adj3 deliver*) or "social networking" or "social media" or Messenger* or Facebook or Whatsapp)).ab. (59987)

25 ("mhealth" or "mobile health" or "m health" or "e health" or ehealth or ("electronic health" not "electronic health record*")).ti,ab. (7925)

26 (telehealth* or telemedicine or teletherap* or "tele health*" or "tele medicine" or "tele therap*" or telemonitor* or "tele monitor*").ti,ab. (14322)

27 (smartwatch* or "smart watch" or "smart watches" or "smart shoe*" or "smart book*" or "assistive technolog*" or (digital* adj2 phenoty*) or "Augmented Reality" or "Virtual Reality").ti,ab. (11053)

28 ((smart* or wearable) adj3 (device or technolog* or sensor* or track*)).ti,ab. (5849)

29 (voice adj2 (response or recog* or automat* or intelligent* or electronic* or Internet or computer* or digital*)).ti,ab. (1702)

30 (mobile-sensing or "mobile sensing" or msens* or geosens* or geolocat* or geofenc* or "geo sens*" or "geo-sens*" or "geo fenc*" or "geo-fenc*" or "geo locat*")

or "geo-locat*" or Ecounsel* or eCBT or "e CBT" or etherapy or "e therapy" or "eSBI" or "e SBI" or chatroom* or "chat room*" or (text adj3 chat*) or chatbot* or "live chat*" or "chat bot" or "chat bots" or "chat interface*" or "chat forum*" or "chat site" or "chat sites" or chatsite* or chatbox* or "chat box*" or breathal*).ti,ab. (1776)

31 (app or apps or "app-based").ti. (5387)

32 (((smartphone* or "smart phone" or "smart phones") adj3 apps) or (mobile* adj3 apps) or (digital* adj3 apps) or (electronic* adj3 apps) or (web* adj3 apps) or (internet* adj3 apps) or (computer* adj3 apps)).ab. (1705)

33 (((smartphone* or "smart phone" or "smart phones") adj3 app) or (mobile* adj3 app) or (digital* adj3 app) or (electronic* adj3 app) or (web* adj3 app) or (internet* adj3 app) or (computer* adj3 app)).ab. (2019)

34 (((smartphone* or "smart phone" or "smart phones") adj3 application*) or (mobile* adj3 application*) or (digital* adj3 application*) or (electronic* adj3 application*) or (web* adj3 application*) or (internet* adj3 application*) or (computer* adj3 application*)).ti,ab. (16739)

Free text terms for technology and the action of the technology

35 (((Device* or platform* or interface* or deliver* or assist* or facilitat* or guid* or aid* or generat* or application*) adj3 (portable or mobile* or web* or computer* or digital* or wireless or Bluetooth or cyber* or online or virtual* or intelligen* or software or Cellular phone* or cell phone* or electronic* or automated or smartphone* or "smart phone" or "smart phones" or electronic* or "multi media" or multimedia or handheld or "hand held" or Internet* or Technolog* or Automation or microcomp* or ipad* or iphone* or ipod* or netbook* or "touch screen" or hardware or software)) and ((behav* adj2 chang*) or support* or treatment* or feedback or monitor* or chat* or interact* or advice or advis* or tailor* or personalis* or counsel* or therap* or "self help" or "self-help" or "self care" or "self-care" or "self-guide*" or "self guide*" or communicat* or messag* or biofeedback or rehab* or "momentary assessment*" or "momentary intervention*" or "mutual help" or prevent* or forum or discuss* or comment* or post* or share or sharing or network*)).ti,ab. (102831)

36 (((behav* adj2 chang*) or support* or treatment* or feedback or monitor* or chat* or interact* or advice or advis* or tailor* or personalis* or counsel* or therap* or "self help" or "self-help" or "self care" or "self-care" or "self-guide*" or "self guide*" or communicat* or messag* or biofeedback or rehab* or "momentary assessment" or "momentary intervention*" or "mutual help" or prevent*) adj5 (portable or mobile* or web* or computer* or digital* or wireless or Bluetooth or cyber* or online or virtual* or intelligen* or software or cellular phone* or cell phone* or electronic* or automated or smartphone* or "smart phone" or "smart phones" or electronic* or "multi media" or multimedia or handheld or "hand held" or Internet* or

technolog* or automation or microcomp* or ipad* or iphone* or ipod* or netbook* or "touch screen" or hardware or software)).ti,ab. (123610)

37 ((forum or discuss* or comment* or post* or share or sharing or network*) adj5 (portable or mobile* or web* or computer* or digital* or wireless or Bluetooth or cyber* or online or virtual* or intelligen* or software or cellular phone* or cell phone* or electronic* or automated or smartphone* or "smart phone" or "smart phones" or electronic* or "multi media" or multimedia or handheld or "hand held" or Internet* or technolog* or automation or microcomp* or ipad* or iphone* or ipod* or netbook* or "touch screen" or hardware or software)).ti,ab. (44293)

38 (assessment adj5 (web* or computer* or online or virtual* or electronic* or automated or Internet* or text*)).ti,ab. (8932)

39 ((texting* or "text messag*" or SMS or ("short messag*" adj1 service*) or (text adj3 deliver*) or "social networking" or "social media" or Messenger* or Facebook or Whatsapp) adj5 ((behav* adj2 chang*) or support* or treatment* or feedback or monitor* or chat* or interact* or advice or advis* or tailor* or personalis* or counsel* or therap* or "self help" or "self-help" or "self care" or "self-care" or "self-guide*" or "self guide*" or biofeedback or rehab* or "momentary assessment" or "momentary intervention*" or "mutual help" or prevent*)).ti,ab. (4020)

Specific title only terms for technology and the outcome on behavior, where not covered by above.

40 ((portable or mobile or web* or computer* or digital* or wireless or Bluetooth or cyber* or online or virtual* or intelligen* or software or Cellular phone* or cell phone* or electronic* or automated or smartphone* or "smart phone" or "smart phones" or electronic* or "multi media" or multimedia or handheld or "hand held" or Internet* or Technolog* or Automation or microcomp* or ipad or iphone or ipod or netbook or "touch screen" or hardware or software or texting* or "text messag*" or SMS or ("short messag*" adj1 service*) or (text adj3 deliver*) or "social networking" or "social media" or Messenger* or Facebook or Whatsapp) and (recovery or relapse or withdraw* or abstinence)).ti. (998)

41 ((portable or mobile or web* or computer* or digital* or wireless or Bluetooth or cyber* or online or virtual* or intelligen* or software or Cellular phone* or cell phone* or electronic* or automated or smartphone* or "smart phone" or "smart phones" or electronic* or "multi media" or multimedia or handheld or "hand held" or Internet* or Technolog* or Automation or microcomp* or ipad or iphone or ipod or netbook or "touch screen" or hardware or software or texting* or "text messag*" or SMS or ("short messag*" adj1 service*) or (text adj3 deliver*) or "social networking" or "social media" or Messenger* or Facebook or Whatsapp) and ((reduc* or increase* or frequency or prevent* or curb*) adj3 (intake or consumption or alcohol or drink* or

drug or drugs or "substance use" or substances or illicit or solvent or cocaine or marijuana* or cannab* or hashish or opium or opioid* or opiate* or heroin or amphetamine* or methamphetamine* or Ketamine or ecstasy or MDMA or "poly-drug" or polydrug or morphine or meth or methadone or methoxetamine))).ti. (356)

42 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 (326520)

Combining the concepts together

43 22 or 42 (376951)

44 17 and 43 (6828)

45 limit 44 to yr="2004 -Current" (5658)

46 animals/ not (animals/ and humans/) (4526213)

47 45 not 46 (5561)

48 limit 47 to (comment or editorial) (51)

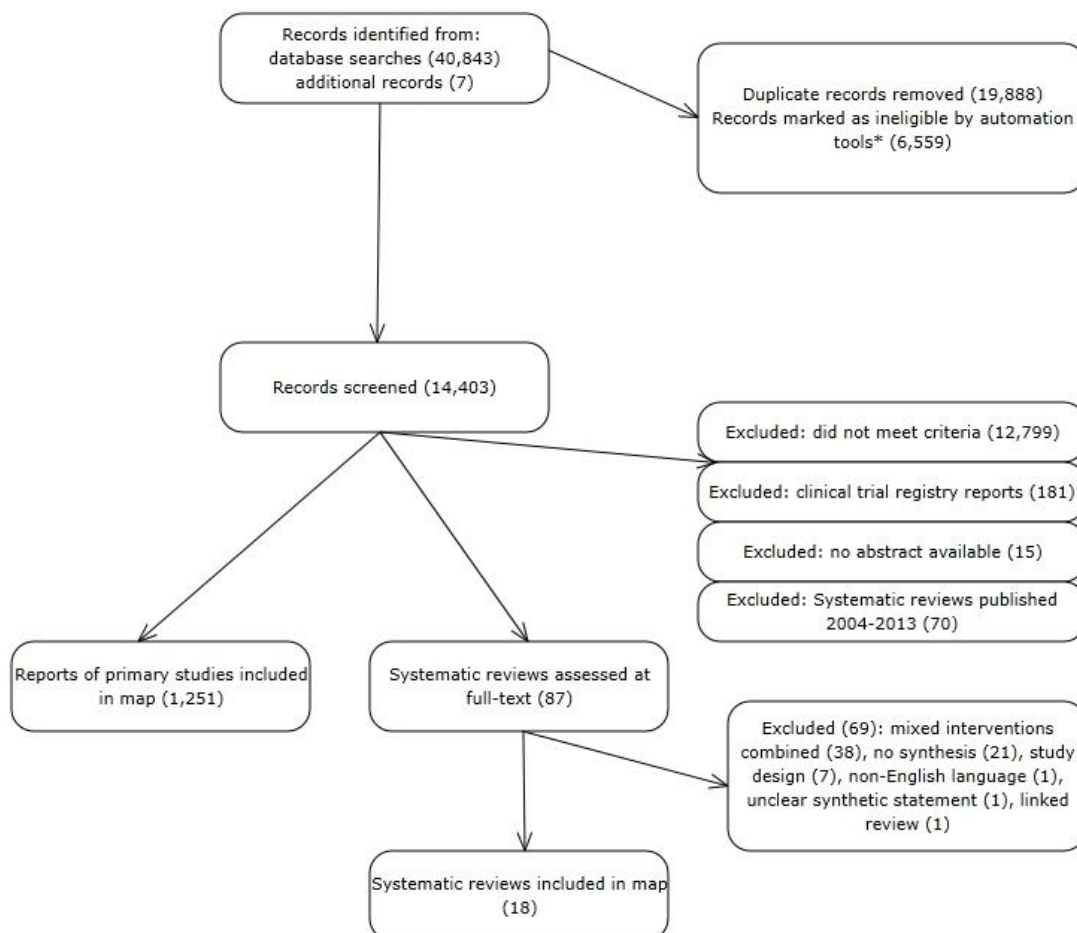
49 47 not 48 (5510)

50 limit 49 to English language (5348)

Appendix 5: Flow of literature through the systematic map

The flow of research literature is shown in Figure A5.1. The database searches located 40,843 potential citations for inclusion in the review, and an additional five citations were identified from undertaking the survey and two citations were encountered by the team during the review. Duplicates were removed. A total of 20,961 citations were available to screen, of which 14,402 citations were screened on title and abstract. 12,799 of these citations did not meet the inclusion criteria. 181 citations were clinical trial registry reports and 15 citations appeared relevant on title, though both these types of citations did not contain abstracts to enable inclusion in the map of primary studies. Based on title and abstract screening, 1250 primary studies were identified as relevant to the evidence map. A further 157 citations appeared to be relevant systematic reviews; of these we obtained the full-text of 87 published since 2014. Full-text screening identified 18 reviews that met the criteria for inclusion in the evidence map.

Figure A5.1: Flow of literature through the systematic map



* As part of priority screening, machine learning indicated that these records would likely be excluded and so they were not screened

Appendix 6: Digital interventions available for use in England (n=40)

Available intervention	Prevention and early intervention				Treatment and recovery	Sustaining recovery	At any stage	
	Feedback/ tracking/ goals	Other prevention strategies	Screening and brief intervention with/without referral to treatment (SBIRT)	Other early intervention & engagement strategies	Components of, or adjuncts to, structured treatment	Relapse prevention	Peer support	Overdose prevention
Alcohol use interventions								
AlcoChange Clinical				✓		✓		
Alcohol Test: Hackney			✓					
Alcoholics Anonymous Online				✓		✓	✓	
Change Your Tomorrow			✓					
Club Soda	✓	✓						
Daybreak	✓			✓			✓	
Down Your Drink	✓		✓	✓		✓		
Drink Free Days	✓							
Drink Less	✓	✓	✓					
Drink Wise, Age Well		✓	✓					
DrinkAware	✓	✓				✓		
Drinkchecker (work)			✓					
DrinkCoach Alcohol Test			✓					
DrinkCoach App	✓	✓				✓		
DrinkCoach Online Coaching				✓				

Available intervention	Prevention and early intervention				Treatment and recovery	Sustaining recovery	At any stage	
	Feedback/tracking/goals	Other prevention strategies	Screening and brief intervention with/without referral to treatment (SBIRT)	Other early intervention & engagement strategies	Components of, or adjuncts to, structured treatment	Relapse prevention	Peer support	Overdose prevention
Drinks Meter	✓	✓	✓					
Dry Days	✓						✓	
e-drink check			✓					
Flo					✓			
Health on the Web	✓		✓					
HeLP-Alcohol				✓		✓		
Lower My Drinking	✓		✓	✓		✓		
One You Lincolnshire Drink Less	✓	✓						
OneTooMany	✓							
SIPS jr	✓	✓	✓					
Soberistas							✓	
Drug use interventions								
Cocaine Anonymous Online				✓		✓	✓	
Drugs Meter	✓							
Marijuana Anonymous Online				✓		✓	✓	
Narcotics Anonymous Online				✓		✓	✓	
Safer Use Limits	✓							

Available intervention	Prevention and early intervention				Treatment and recovery	Sustaining recovery	At any stage	
	Feedback/ tracking/ goals	Other prevention strategies	Screening and brief intervention with/without referral to treatment (SBIRT)	Other early intervention & engagement strategies	Components of, or adjuncts to, structured treatment	Relapse prevention	Peer support	Overdose prevention
TIES					✓			
Alcohol and drug or unspecified substance use interventions								
Breaking Free Online				✓	✓	✓		
FRANK		✓						
Intuitive Recovery				✓				
MyCarePath					✓			
Smart Recovery Online				✓		✓	✓	
SURE Recovery				✓		✓		✓
The Capital Card					✓			
We Are With You (formerly Addaction)		✓						

Appendix 7: Systematic reviews excluded from map (n=69)

The titles and abstract citations of 157 references were screened for inclusion as systematic reviews, of which 70 were published before 2014 and so excluded from further analysis.

The full texts of the remaining 87 were then retrieved and underwent a second stage of screening, in order to exclude reviews that would not be able to populate the map. 69 systematic reviews were excluded for various reasons; see table A7 below for each reference excluded with the reason for exclusion. In summary, most reviews (n=38) were excluded because they combined a mix of different intervention strategies; 21 were excluded because they did not include a synthesis of findings. Seven papers were excluded based on their design; these included meta-reviews (n=5); protocols (n=1), and non-systematic reviews (n=1). The rest were excluded for other reasons: unclear synthetic statement (1); full text in non-English language (1); and one reported additional analysis for an included review (findings from both were included, but to avoid double counting, it was recorded as a linked review).

Table A7: Details of excluded reviews (n=69)

	First author and year	Reason for exclusion
1.	Afshin (2016)	Study design (not a systematic review)
2.	Armanasco (2017)	Doesn't fit pathway
3.	Asuzu (2018)	Doesn't fit pathway
4.	Balhara (2014)	Doesn't fit pathway
5.	Berman (2016)	No synthesis
6.	Berrouguet (2016)	No synthesis
7.	Bhochhibhoya (2015)	No synthesis
8.	Biroscak (2019)	No synthesis
9.	Bumgarner (2017)	No synthesis
10.	Cadigan (2015)	Doesn't fit pathway
11.	Chebli (2016)	Doesn't fit pathway
12.	Choo (2018)	Doesn't fit pathway
13.	Cole (2018)	Doesn't fit pathway
14.	Cooper (2015)	Doesn't fit pathway
15.	Das (2016)	Study design (meta-review)
16.	Danielsson (2014)	Doesn't fit pathway
17.	Dedert (2015)	Doesn't fit pathway
18.	De Martini (2015)	Doesn't fit pathway
19.	Donker (2015)	No synthesis
20.	Durl (2018)	Doesn't fit pathway
21.	Erbe (2017)	Unclear synthetic statement
22.	Field (2019)	No synthesis

23.	Flodgren (2015)	Doesn't fit pathway
24.	Fowler (2016)	Doesn't fit pathway
25.	Ghita (2018)	Doesn't fit pathway
26.	Gilmore (2017)	Doesn't fit pathway
27.	Hoch (2016)	Doesn't fit pathway
28.	Hopson (2015)	No synthesis
29.	Hu (2015)	No synthesis
30.	Kaner (2015)	Study design (protocol only)
31.	Kazemi (2017)	Doesn't fit pathway
32.	Kolar (2015)	Doesn't fit pathway
33.	Korczak (2015)	Non-English language
34.	Kurti (2016)	Doesn't fit pathway
35.	Loucas (2014)	Doesn't fit pathway
36.	MacArthur (2018)	No synthesis
37.	Mason (2015)	Doesn't fit pathway
38.	McGinnes (2016)	Doesn't fit pathway
39.	Menon (2017)	No synthesis
40.	Meredith (2015)	No synthesis
41.	Milward (2018)	No synthesis
42.	Nair (2015)	Doesn't fit pathway
43.	NCCMH (2014)	Doesn't fit pathway
44.	Nesvag (2018)	Doesn't fit pathway
45.	Olmos (2018)	Doesn't fit pathway
46.	Oosterveen (2017)	Doesn't fit pathway
47.	O'Rourke (2016)	No synthesis
48.	Palmer (2018)	Doesn't fit pathway
49.	Patton (2014)	Study design (meta-review)
50.	Pradhan (2019)	No synthesis
51.	Provoost (2017)	No synthesis
52.	Riper (2014)	Doesn't fit pathway
53.	Rogers (2017)	Study design (meta-review)
54.	Scott (2018)	Study design (meta-review)
55.	Smedslund (2018)	Linked review
56.	Song (2019)	Doesn't fit pathway
57.	Steinkamp (2019)	Doesn't fit pathway
58.	Stockings (2016)	Doesn't fit pathway
59.	Sugarman (2017)	Doesn't fit pathway
60.	Sundstrom (2017)	Study design (meta-review)
61.	Tait (2015)	No synthesis
62.	Tebb (2016)	Doesn't fit pathway

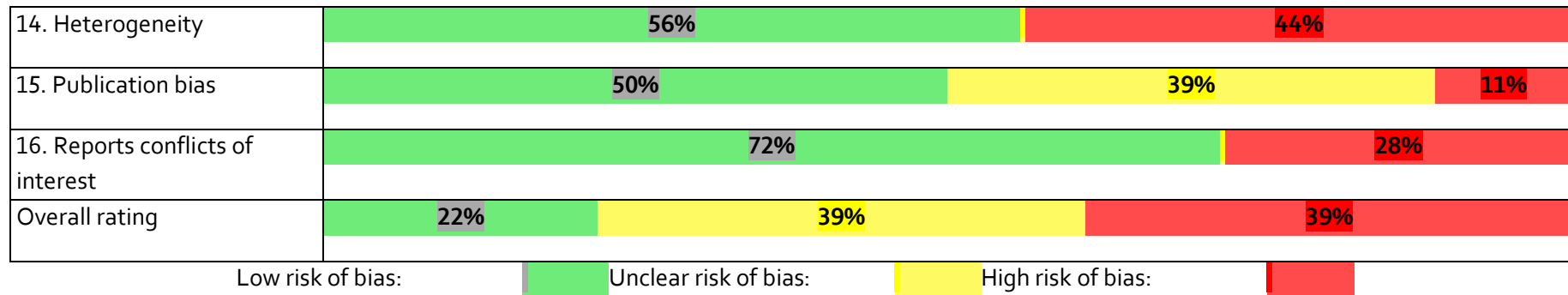
63.	Tofighi (2017)	Doesn't fit pathway
64.	Trahan (2019)	No synthesis
65.	Wang (2018)	No synthesis
66.	Watson (2016)	Doesn't fit pathway
67.	Wood (2014)	Doesn't fit pathway
68.	Young (2015)	No synthesis
69.	Zhao (2016)	No synthesis

Appendix 8: Risk of bias assessment of the included systematic reviews (n=18)

	1. PICO components	2. Protocol	3. Study design explanation	4. Comprehensive search strategy	5. Duplicate study selection	6. Duplicate data extraction	7. Details of excluded studies	8. Description of included studies	9a. Risk of Bias (RoB) assessment (RCTs)	9b. RoB assessment (NRSIs)	10. Funding sources	11a. RCTs Meta-analysis	11b. NRSIs Meta-analysis (MA)	12. MA: RoB in individual studies	13. RoB: discussion of results	14. Heterogeneity	15. Publication bias	16. Reports conflicts of interest	Overall rating
Boumparis (2017)	+	-	-	+	+	-	+	-	+	?	-	+	?	+	+	+	+	+	-
Doherty (2017)	+	-	-	-	-	-	?	+	+	+	-	+	-	+	+	+	-	+	?
Donoghue (2014)	+	-	-	?	+	+	-	+	+	?	-	+	?	+	+	+	+	+	?
Foxcroft (2015)	+	+	-	+	+	+	+	+	+	?	+	+	?	+	+	+	+	+	+
Giroux (2017)	+	-	-	?	-	-	-	-	-	?	-	?	?	?	-	-	?	+	?
Gulliver (2015)	+	-	-	?	+	+	+	+	+	?	-	?	?	?	+	-	?	+	-
Holmes (2018)	+	-	+	+	+	-	-	+	-	-	-	-	-	-	-	-	+	-	?
Jiang (2017)	+	-	-	?	+	-	-	+	+	?	-	?	?	?	+	-	?	-	?
Kaner (2017)	+	+	-	+	+	+	+	+	+	?	+	+	?	+	+	+	+	+	+
Leeman (2015)	+	-	-	-	-	+	-	+	+	?	-	?	?	?	+	-	?	+	?

Posadzki (2016)	+	+	+	+	+	+	+	+	+	?	+	?	?	?	+	+	?	-	+
Prosser (2018)	+	-	-	+	-	-	-	-	?	?	-	+	?	+	+	+	+	-	-
Riper (2014)	+	-	+	?	+	-	-	?	+	-	-	+	+	-	-	+	+	+	-
Riper (2018)	+	-	-	?	-	-	-	?	+	?	-	+	?	-	-	+	+	+	-
Rodriguez (2014)	-	-	-	?	-	-	-	?	-	-	-	?	?	?	-	-	?	-	?
Smedslund (2017)	+	+	-	+	+	+	+	+	+	?	+	+	?	+	+	-	+	+	+
Tansil (2016)	+	-	-	?	+	+	-	-	?	?	-	?	?	?	+	-	-	+	-
Wigham (2017)	+	-	-	+	-	+	-	+	?	?	-	?	?	?	-	+	?	+	-

1. PICO components	94%	6%	
2. Protocol	22%	78%	
3. Study design explanation	17%	83%	
4. Comprehensive search strategy	44%	45%	11%
5. Duplicate study selection	61%	39%	
6. Duplicate data extraction	50%	50%	
7. Details of excluded studies	33%	6%	61%
8. Description of included studies	61%	17%	22%
9a. Risk of Bias (RoB) assessment (RCTs)	67%	16%	17%
9b. RoB assessment (NRSIs)	6%	77%	17%
10. Funding sources	22%	78%	
11a. RCTs Meta-analysis	50%	44%	6%
11b. NRSIs Meta-analysis (MA)	6%	83%	11%
12. MA: RoB in individual studies	39%	44%	17%
13. RoB: discussion of results	67%	33%	



Appendix 9: Summary of systematic reviews (n=18)

Table A9.1: Where on the pathway did systematic reviews' syntheses focus?¹⁰

Systematic review	Prevention and early intervention				Treatment and recovery
	Feedback/ tracking / goals	Other prevention strategies	Screening and brief intervention with/without referral to treatment (SBIRT)	Other early intervention and engagement strategies	Components of, or adjuncts to, structured treatment
Boumparis (2017)					
Doherty (2017)					
Donoghue (2014)					
Foxcroft (2015)					
Giroux (2017)					
Gulliver (2015)					
Holmes (2018)					
Jiang (2017)					
Kaner (2017)					
Leeman (2015)					
Posadzki (2016)					
Prosser (2018)					
Riper (2014)					
Riper (2018)					
Rodriguez (2014)					
Smedslund (2017)					
Tansil (2016)					
Wigham (2017)					

¹⁰ No SRs were identified that included syntheses of interventions focused on 'relapse prevention', 'peer support' or 'overdose prevention'.

Table A9.2: Summary and detailed findings of the included systematic reviews

First author (year of publication)	Summary of systematic reviews
Alcohol use reviews (12 reviews)	
Prevention: feedback/tracking/goals (3 reviews)	
Foxcroft (2015)	<p>Social norms information for alcohol misuse in university and college students</p> <p>Review quality: High</p> <p>Review aim: “To determine whether social norms interventions reduce alcohol-related negative consequences, alcohol misuse or alcohol consumption when compared with a control (ranging from assessment only/no intervention to other educational or psychosocial interventions) among university and college students.” (page 9)</p> <p>Where it fits in the pathway: <u>Prevention & early intervention (FEEDBACK/TRACKING/GOALS)</u> - This review included 70 studies evaluating a range of digital and non-digital feedback interventions. Many of their analyses looked at non-digital interventions and so were not included in this map. However, six meta-analyses looked specifically at the effect of web/computer feedback on alcohol related problems, on alcohol consumption and on drinking norms in the short and longer term – see detailed findings below.</p> <p>Overview of findings: “No effects on alcohol-related problems at four or more months were found for web/computer feedback... For the frequency of consumption outcome [...] for web/computer feedback, a meta-analysis of 10 studies showed a difference in favour of social norms information [...] at four or more months. Our interpretation of these results is that, although we found some effects, the effect sizes were small and were unlikely to be of meaningful benefit in practice.” (Page 25)</p>

Detailed findings

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

1) Web/ computer feedback vs. a variety of comparators for alcohol-related problems at short follow-up:

At up to three months follow-up web/computer feedback interventions showed evidence of an effect equivalent to a reduction of 1.4 points in Rutgers Alcohol Problems Index (RAPI) score, assuming an SD of 9.17. As heterogeneity was very high, this pooled result should be interpreted with caution.

(n = 21 studies; n = 10,166 participants; pooled effect size (SMD) = -0.15; 95% CI -0.26 to -0.05).

2) Web/ computer feedback vs. a variety of comparators for alcohol-related problems at longer follow-up:

At four months or more follow-up web/computer normative feedback interventions showed no evidence of an effect on alcohol related problems. As heterogeneity was high, this pooled result should be interpreted with caution.

(n = 15 studies; n = 11,767 participants; pooled effect size (SMD) = -0.04; 95% CI -0.11 to 0.02)

3) Web/ computer feedback vs. a variety of comparators for alcohol consumption (frequency) at short follow-up:

At up to three months follow-up web/computer feedback interventions showed evidence of an effect equivalent to a reduction of 0.3 points in daily drinking questionnaire (DDQ) scale score, assuming an SD of 1.54.

(n = 12 studies; n = 6,385 participants; pooled effect size (SMD) = -0.17; 95% CI -0.25 to -0.09).

4) Web/ computer feedback vs. a variety of comparators for alcohol consumption (frequency) at longer follow-up: At four months or more follow-up web/computer normative feedback interventions showed evidence of an effect

equivalent to a reduction of 0.2 points in DDQ scale score, assuming an SD of 1.54. The reviewers estimate this will result in a fall from 2.74 drinking days/week to 2.58 drinking days/week.

(n = 10 studies; n = 9,929 participants; pooled effect size (SMD) = -0.11; 95% CI -0.17 to -0.04).

5) Web/ computer feedback vs. a variety of comparators for drinking norms at short follow-up:

At up to three months follow-up web/computer feedback interventions showed evidence of an effect equivalent to an improvement in perceived drinking norms of 1.8 points on the drinking norms questionnaire (assuming an SD of 3.6). As heterogeneity was high, this pooled result should be interpreted with caution.

(n = 8 studies; n = 1,196 participants; pooled effect size (SMD) = -0.51; 95% CI -0.71 to -0.31).

6) Web/ computer feedback vs. a variety of comparators for drinking norms at longer follow-up:

At four months or more follow-up web/computer feedback interventions showed evidence of an effect on drinking norms. As heterogeneity was very high, this pooled result should be interpreted with caution.

(n = 6 studies; n = 2227 participants; pooled effect size (SMD) = -0.34; 95% CI -0.57 to -0.11).

Review Information

Review focus: Digital and non-digital alcohol interventions.

Type of analysis: Meta-analysis.

Number of included studies: 36 RCTs on digital interventions.

(The review included 70 RCTs in total, but 34 were on non-digital interventions)

Population focus: University and college students.

Country focus: USA (n = 22 studies), New Zealand (n = 5 studies), UK (n = 5 studies), Sweden (n = 2 studies), Australia (n = 1 study), Brazil (n = 1 study).

Digital intervention description: A range of computer/web-based social norms feedback interventions including electronic screening and brief intervention (e-SBI), personalised normative feedback, behavioural motivational interventions.

Comparator(s): A variety of control conditions were used including: assessment/screening only, generic feedback on college student alcohol use and associated consequences, alcohol education leaflet, web-based alcohol education, very brief summary only feedback, no intervention.

Outcomes: Reviewers grouped outcome measures into the following categories: 'short-term follow-up' (up to three months); and 'longer-term follow-up' (four or more months). The following outcomes were measured:

1) Alcohol consumption: binge drinking or heavy episodic drinking, number of drinks/units consumed over a specific period, daily drinking questionnaire (DDQ) and quantity-frequency scale(s), alcohol consumption (frequency), peak blood alcohol content (peak BAC), AUDIT score, CAGE; drinks per occasion; drinks in last week alcohol-related risky behaviour; alcohol consumption inventory (ACI), quantity-frequency scale (QFS),

2) Knowledge / attitudes / perceptions: drinking norms rating form (DNRF)

3) Alcohol-related problems: Self-reported measures such as the Rutgers Alcohol Problems Index (RAPI) which includes adverse legal events as a consequence of alcohol, inappropriate risky behaviours, alcohol-related injuries and Illicit drugs consumption, alcohol problems scale (APS), academic role expectations and alcohol scale (AREAS).

Leeman
(2015)

Very-brief, web-based interventions for reducing alcohol use and related problems among college students: a review

Review quality: Low

Research aim: To evaluate “the efficacy of very-brief, web-based alcohol reduction interventions for college students” (Page 2)

Where it fits in the pathway: Prevention and early intervention (FEEDBACK/TRACKING/GOALS and OTHER EARLY INTERVENTIONS) - This review examined the findings from 15 studies. We were not able to include the overarching analysis of the 15 studies in this map because it combined interventions at different points in the pathway. However, the review also conducted two separate analyses, one of 12 studies on multi-component interventions which we categorised as other early interventions and one of three studies on personalised normative feedback interventions which we categorised as feedback, tracking and goals. Therefore this review can be found in two points in the online map, and this summary can be found in two sections of this appendix.

Overview of review findings: “We found evidence to support the efficacy of two main types of intervention content: (a) focused solely on personalized normative feedback designed to correct misconceptions about peer alcohol consumption and (b) multi-component interventions.” (Abstract, page 1)

Detailed findings

Detailed review findings were not amenable to presentation for this map.

Review Information

Review focus: Digital alcohol interventions.

	<p>Type of analysis: Narrative synthesis.</p> <p>Number of included studies: 15 RCTs (15 interventions).</p> <p>Population focus: University and college students.</p> <p>Country focus: Not reported.</p> <p>Digital intervention description: Web-based or computerised personalised normative feedback interventions. Some were feedback only interventions and others were multi-component interventions.</p> <p>Comparator(s): A variety of control conditions were used including: assessment only, very brief feedback, attention control, education only and non-alcohol related feedback.</p> <p>Outcomes: Outcomes were measured at a range of time points from one month to 24 months. The following outcome was measured: alcohol consumption: alcohol units per occasion, units of alcohol per week, frequency, proportion heavy drinking, overall volume, binge drinking, heavy drinking, risky drinking, peak number of drinks, peak blood alcohol concentration (BAC). Measures included the Alcohol Use Disorders Identification Test (AUDIT) and the CAGE questionnaire.</p>
Prosser (2018)	<p>A meta-analysis of effectiveness of E-interventions to reduce alcohol consumption in college and university students</p> <p>Review quality: Moderate</p> <p>Aim: “To evaluate the effectiveness of E-Interventions versus assessment only controls in the reduction of alcohol consumption in college and university students.” (Abstract, page 292)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (FEEDBACK/TRACKING/GOALS)</u> - This review examined the findings of 23 studies evaluating a range of e-interventions. The main analysis combined findings from</p>

interventions at different points in the pathway and so was not included in this map. However, the review examined specific groups of studies and we were able to include one analysis of the findings relating to feedback interventions.

Overview of findings: “E-Interventions show a small, significant effect at reducing mean alcoholic DPW [drinks per week]. Personalised feedback E-Interventions showed the strongest effect.” (Abstract, page 292)

Detailed findings

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

Web-based personalised feedback vs. assessment only controls for alcohol consumption (drinks per week): For the web-based personalised feedback interventions, there was a significant effect in the small to medium range.

(n = 17 studies; n = 4,376 participants; pooled effect size (SMD) = -0.19; CI 95% -0.27 to -0.11; p < 0.00001).

Review Information

Review focus: Digital alcohol interventions.

Type of analysis: Meta-analysis.

Number of included studies: 23 RCTs (23 interventions).

Population focus: University and college students.

Country focus: USA (n = 16 studies), UK (n = 3 studies), Sweden (n = 2 studies), Canada (n = 1 study), Netherlands (n = 1 study)

	<p>Digital intervention description: A range of e-interventions, most commonly web-based personalised feedback. Other types of e-intervention included electronically delivered education or phone-delivered interventions.</p> <p>Comparator(s): Assessment only.</p> <p>Outcomes: Outcomes were measured at a range of time points from one week to 12 months. The following outcome was measured: alcohol consumption: alcoholic drinks per week (DPW). (Studies measured this in a variety of ways, including asking participants to report alcohol consumption over the course of a day, week or month, which were all transformed to provide a weekly consumption).</p>
<p>Prevention and early intervention: SBIRT (3 reviews)</p>	
<p>Donoghue (2014)</p>	<p>The Effectiveness of Electronic Screening and Brief Intervention for Reducing Levels of Alcohol Consumption: A Systematic Review and Meta-Analysis</p> <p>Review quality: Low</p> <p>Review aim: “To determine the effectiveness of eSBI [electronic screening and brief intervention] over time in nontreatment-seeking hazardous/harmful drinkers.” (Abstract, no page numbers)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (SCREENING AND BRIEF INTERVENTION)</u> - This review examines the findings of 23 studies on eSBI, 17 of which were included in meta-analyses. It contains four meta-analyses looking at the effectiveness of eSBI at reducing alcohol consumption in the short, medium and long term – see detailed findings below.</p> <p>Overview of findings: “The results of this systematic review and meta-analysis suggest that eSBI is effective in reducing alcohol consumption in the follow-up post intervention period of less than 3 months, between 3 months and less than 6 months, and between 6 months and less than 12 months, but not in the longer term follow-up period of 12</p>

months or longer. The overall mean difference in grams of ethanol per week consumed between those in the intervention and controls groups was [...] equivalent to 2 standard drinks in the United Kingdom.” (Page 15)

Detailed findings

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

1) eSBI vs. assessment only or assessment with general information on alcohol consumption (quantity) at up to three months follow-up: At up to three months follow-up a statistically significant mean difference in grams of ethanol consumed per week was found between those receiving an eSBI versus controls.

(n = 9 studies; number of participants not reported; pooled effect size (mean difference) = -32.74; 95% CI -56.80 to -8.68, P = .01)

2) eSBI vs. assessment only or assessment with general information on alcohol consumption (quantity) at three months to less than six months follow-up: At three months to less than six months follow-up a statistically significant mean difference in grams of ethanol consumed per week between those receiving an eSBI versus controls.

(n = 7 studies; number of participants not reported; pooled effect size (mean difference) = -17.33; 95% CI -31.82 to -2.84, P = .02)

3) eSBI vs. assessment only or assessment with general information on alcohol consumption (quantity) at six months to less than 12 months follow-up: At six months to less than 12 months follow-up a statistically significant mean difference in grams of ethanol consumed per week between those receiving an eSBI versus controls.

(n = 9 studies; number of participants not reported; pooled effect size (mean difference) = -14.91; 95% CI -25.56 to -4.26, P = .01).

4) **eSBI vs. assessment only or assessment with general information on alcohol consumption (quantity) at 12 months or longer follow-up:** At a follow-up period of 12 months or greater no statistically significant difference was found.

(n = 6 studies; number of participants not reported; pooled effect size (mean difference) = -7.46; 95% CI -25.34 to 10.43, P=.41).

Review Information

Review focus: Digital alcohol interventions.

Type of analysis: Meta-analysis.

Number of included studies: 23 RCTs, 17 of which were included in meta-analyses (21 interventions in meta-analyses).

Population focus: Most studies used student populations (n = 153 studies).

Country focus: USA (n = 10 studies), the Netherlands (n = 3 studies), New Zealand (n = 3 studies), Canada (n = 2 studies), one study each in Australia, Denmark, Germany, Japan, Sweden.

Digital intervention description: Opportunistic electronic screening and brief intervention (eSBI) which included an assessment followed by personalised and/or normative feedback, motivational interviewing (MI) and / or cognitive behavioural therapy (CBT).

Comparator(s): A variety of control conditions were used including: care as usual, assessment only, or general information on alcohol consumption.

	<p>Outcomes: Reviewers grouped outcome measures into the following categories: less than three months, between three and less than six months, between six and less than 12 months, and 12 months or greater. The following outcome was measured: Alcohol consumption: ethanol consumed per week, drinking quantity (average consumption of alcohol per specified time period), drinking frequency (number of drinking occasions per specified time period), drinking intensity (number of drinks per drinking day), or drinking within recommended limits or levels of laboratory markers of reduced alcohol consumption, such as serum gamma-glutamyltransferase (GGT) or mean corpuscular volume (MCV).</p>
Tansil (2016)	<p>Alcohol Electronic Screening and Brief Intervention: A Community Guide Systematic Review</p> <p>Review quality: Moderate</p> <p>Review aim: "To assess whether e-SBI [electronic screening and brief intervention] reduces the prevalence, frequency, and intensity of adult binge drinking." (Page 803)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (SCREENING AND BRIEF INTERVENTION)</u> - This review examined the findings of 31 studies categorised by the authors as electronic screening and brief intervention. Whilst some studies contained non-digital screening components and others could be considered feedback / tracking / consumption interventions, it has been categorised in this map as screening and brief intervention, since this was the explicit intention of the review.</p> <p>Overview of findings: "Based on the studies in this review, study participants who received e-SBI consistently reported greater reductions in excessive alcohol consumption than controls [...] the effects of e-SBI on measures of alcohol-related harms, using measures such as RAPI scores, were less pronounced." (Page 8)</p> <p><u>Detailed findings</u></p> <p>Detailed review findings were not amenable to presentation for this map.</p>

Review Information

Review focus: Digital alcohol interventions.

Type of analysis: This review reports some statistical analyses but they were not amenable to extraction for this map.

Number of included studies: 31 RCTs (36 interventions).

Population focus: Excessive drinkers (n = 24 studies) all drinkers (n = 7 studies).

Country focus: "All studies were conducted in high-income countries, approximately half were conducted outside the US."

Digital intervention description: Electronic screening and brief intervention (eSBI). The brief interventions involved personalised feedback that could be fully automated (e.g., computer-based); interactive (e.g., provided by a person via telephone); or partially automated and interactive.

Comparator(s): A variety of control conditions were used including: assessment only, assessment and education, wait-list control, alternative intervention (including face-to-face support).

Outcomes: Outcomes were measured at a range of time points, from one month follow up period to 12 months. The following outcomes were measured:

1) Alcohol consumption: excessive alcohol consumption, binge drinking measures, prevalence (based on proportions of study participants); frequency (episodes per month); and intensity (peak alcohol consumption [maximum drinks/binge episode]) or the maximum estimated blood alcohol concentration (BAC) during a binge episode, drinking measures were converted into standard US drinks (i.e., 14 grams of pure alcohol/drink).

2) Alcohol-related harms: No details available.

Wigham
(2017)

A systematic review of the effectiveness of alcohol brief interventions for the UK military personnel moving back to civilian life

Review quality: Moderate

Review aim: “To examine the effectiveness of alcohol brief interventions [...] in reducing harmful levels of drinking for armed forces personnel.” (Page 243)

Where it fits in the pathway: Prevention and early intervention (SCREENING AND BRIEF INTERVENTION) - This review examined the findings of ten ‘screening and brief intervention’ studies. However, three of the ten interventions were non-digital and another three were delivered to clinicians rather than directly to the target population. This map, therefore, includes the analysis of the remaining four studies of ‘self-administered web-based interventions’.

Overview of findings: “The findings suggest some evidence for effectiveness of self-administered web-based interventions, involving personalised feedback over a number of sessions. However, there were mixed results. ‘VetChange’ and ‘Drinkers Check-Up’ were shown to be effective. However, ‘Alcohol Savvy’ and a 15-minute web-based intervention did not show significant effects.” (p.242)

Detailed findings

Detailed review findings were not amenable to presentation for this map.

Review Information

Review focus: Digital and non-digital alcohol interventions.

Type of analysis: Narrative synthesis.

Number of included studies: three studies (four interventions) on digital alcohol interventions - two RCTs and one non-RCT.

(There was a total of ten studies in review, but six studies focused on non-digital or clinician-based interventions.)

Population focus: Armed forces personnel and veterans.

Country focus: USA (n = 3 studies).

Digital intervention description: Self-administered, web-based screening and brief intervention (SBI). The interventions included a variety of different components, although common across all was personalised feedback.

Comparator(s): Waitlist control or usual care.

Outcomes: Outcomes were measured at a range of time points from one month to six months. The following outcomes were measured:

- 1) Alcohol consumption: self-report measures (timeline follow back, quick drink screen, daily drinking questionnaire, Alcohol Use Disorders Identification Test (AUDIT, AUDIT-C); estimates of blood alcohol content.
- 2) Alcohol related problems: consequences of drinking, short inventory of problems, drinker inventory of consequences.

Prevention and early intervention: other early intervention and engagement (7 reviews)

Doherty
(2017)

Are brief alcohol interventions targeting alcohol use efficacious in military and veteran populations? A meta-analysis

Review quality: Low

Review aim: “To explore which BAIs [Brief Alcohol Interventions] have been used in the military and to conduct a meta-analysis to determine whether these interventions are efficacious in reducing alcohol use in military and veteran populations.” (Page 572)

Where it fits in the pathway: Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT) – This review examines the findings of ten studies on brief alcohol interventions. The review reports five analyses, however four focus on both digital and non-digital interventions and so are not included in this map. Only one analysis on web-based interventions is included in this map – see detailed findings below.

Overview of findings: “There was no overall effect of BAIs; a non-significant weekly drink reduction [...] was found. This lack of efficacy persisted regardless of military group (conscripts, serving or veterans) and method of delivery (i.e., face-to-face, web-based or written information). Furthermore, sensitivity analyses revealed this small drink reduction was driven mainly by a single study.” (Abstract, page 571)

Detailed findings

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

Brief web-delivered personalised feedback vs. unspecified controls on alcohol consumption (average weekly drinks): Web-based interventions reduced average weekly drinks by 1.81 compared to controls, however this was not significant.

(n = 5 studies / 6 interventions; n = 5,357 participants; pooled effect size (weighted mean difference) = 1.81; 95% CI, -0.06 to 3.68).

Review Information

Review focus: Digital and non-digital alcohol interventions.

Type of analysis: Meta-analysis.

Number of included studies: five digital intervention studies (six interventions) of which four were RCTs and one was a non-RCT.

(In total there were ten studies in the review, but five were non-digital).

Population focus: Armed forces personnel or veterans.

Country focus: USA (n = 3 studies), Switzerland (n = 1 study), not reported (n = 1 study).

Digital intervention description: Web-delivered personalised normative feedback.

	<p>Comparator(s): A variety of control conditions were used including: control, waitlist control, treatment as usual.</p> <p>Outcomes: Outcomes were measured at a range of time-points, immediate post intervention, one month, two months, three months and six months. The following outcome was measured: Alcohol consumption: average weekly drinks, drinks per drinking day, and percent heavy drinking days, average drinks consumed per occasion, and average days binge drinking, self-report measures such as AUDIT scores.</p>
Kaner (2017)	<p>Personalised digital interventions for reducing hazardous and harmful alcohol consumption in community-dwelling populations</p> <p>Review quality: High</p> <p>Review aim: “To assess the effectiveness and cost-effectiveness of digital interventions for reducing hazardous and harmful alcohol consumption, alcohol-related problems, or both, in people living in the community” (Page 1)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> - This review included 55 studies of ‘personalised digital interventions’. These focused on hazardous and/or harmful drinkers and, although some included studies were ‘screening and brief interventions’, most either conducted screening prior to randomisation and so did not evaluate the screening component of a ‘screening and brief intervention’, whilst others used brief assessments rather than validated screening tools. Therefore, since the review’s focus was on the effect of interventions on those ALREADY IDENTIFIED AS HAZARDOUS/HARMFUL DRINKERS, it fits within ‘other early intervention and engagement’. There were seven main analyses reported in the review and in the companion paper Garnett et al. 2018; six analyses examined different outcomes compared to different control groups and a seventh analysis examined the impact of different behavioural techniques – see detailed findings. Further detailed analyses relating to specific sub-populations, time points and behaviour change techniques are not reported here but can be found in the review report (p 134 onwards) and in the companion paper.</p>

Overview of findings: “Personalised advice using computers or mobile devices may help people reduce heavy drinking better than doing nothing or providing only general health information. Personalised advice through computers or mobile devices may make little or no difference to reduce drinking compared to face-to-face conversation.” (Page 7)

“The behaviour change techniques (BCTs) of behaviour substitution, problem solving and credible source were associated with the effectiveness of digital interventions to reduce alcohol consumption. Other BCTs, such as self-monitoring, goal setting and review of behavioural/outcome goals, were rarely used in the included studies.” (Page 30)

“Limited economic evidence suggested that digital interventions may be cost-effective compared to no intervention.” (Page 27)

Detailed findings

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

1) **Digital behaviour change interventions vs. no intervention for alcohol consumption (Quantity):** Participants using a digital intervention drank approximately 23 g alcohol weekly (about three UK units) less than participants who received no or minimal interventions at end of follow up.

(n = 42 studies; n = 19,241 participants; pooled effect size (mean difference) = -22.8 g per week, 95% CI -15 to -30).

2) **Digital behaviour change interventions vs. no intervention for alcohol consumption (Frequency):** Participants who engaged with digital interventions had less than one drinking day per month fewer than no intervention controls.

(n = 16 studies; n = 10,862 participants; pooled effect size (mean difference) = -0.16 days per week, 95% CI -0.24 to -0.09).

3) **Digital behaviour change interventions vs. no intervention for binge drinking (Frequency):** About one binge drinking session less per month in the intervention group compared to no intervention controls.

(n = 15 studies; n = 3587 participants; pooled effect size (mean difference) = - 0.24 binges / week, 95% CI - 0.35 to - 0.13).

4) **Digital behaviour change interventions vs. no intervention for intensity of drinking:** Intervention participants drank one unit per occasion less than no intervention control participants.

(n = 15 studies; n = 9791 participants; pooled effect size (mean difference) = -4.63 g per drinking day, 95% CI -8 to -1).

5) **Digital interventions vs. face-to-face intervention for alcohol consumption (quantity):** There was no evidence of a difference in alcohol consumption between digital and face-to-face

(n = 5 studies; n = 390 participants; pooled effect size (mean difference) = 0.52 g per week; 95% CI -24.59 to 25.63).

6) **Digital interventions vs. face-to-face intervention for binge drinking (frequency):** There was no indication of difference in binge frequency between the digital and face-to-face intervention

(n = 3 studies; n = 206 participants; pooled effect size (mean difference) = - 0.04 binges / week; 95% CI -0.15 to 0.22).

7) **Behaviour Change Techniques (BCTs) (adjusted model)**

Behaviour substitution: Prompt substitution of the unwanted behaviour with a wanted or neutral behaviour was associated with reduced alcohol consumption.

(-95.12 grams per week; 95% CI -162.90 to -27.34; p = .01)

Problem solving: Analysing, or prompting the person to analyse, factors influencing the behaviour and generate or select strategies that include overcoming barriers and/or increasing facilitators was associated with reduced alcohol consumption.

(-45.92 grams per week; 95% CI -90.97 to -0.87; p = .05)

Credible source: Presenting verbal or visual communication from a credible source in favour of or against the behaviour was associated with reduced alcohol consumption.

(-32.09 grams per week; 95% CI - 60.64 to -3.55; p = .03).

Review Information

Review focus: Digital alcohol interventions.

Type of analysis: Meta-analysis.

Number of included studies: 57 RCTs (57 interventions).

Population focus: Hazardous and/or harmful drinkers.

Country focus: USA (n = 31 studies), Australia (n = 2 studies), Canada (n = 2 studies), Denmark (n = 1 study), Germany (n = 2 studies), Japan (n = 1 study), Netherlands (n = 7 studies), New Zealand (n = 3 studies), Norway (n = 1 study), Sweden (n = 4 studies), Switzerland (n = 1 study), UK (n = 2 studies).

	<p>Digital intervention description: A broad range of personalised digital behaviour change interventions delivered primarily through a programmable computer or mobile device (laptop, phone or tablet).</p> <p>Comparator(s): A variety of control conditions were used including: no intervention (screening or screening and assessment only), printed or onscreen health or alcohol-related information, treatment as usual, face-to-face brief intervention.</p> <p>Outcomes: Outcomes were measured at a range of time points from one month to 12 months. The following outcomes were measured:</p> <ol style="list-style-type: none"> 1) Alcohol consumption: grams of alcohol per week, quantity (g/day), frequency (drinking days/week) and intensity (drinks/drinking day) of consumption, number of binge episodes, frequency of drinking occasions, screening tool results such as AUDIT or AUDIT-C or FAST score, blood alcohol concentration (BAC). 2) Alcohol-related problems: alcohol-related harm or social problems for drinkers or affected others. 3) Cost-effectiveness: incremental cost-effectiveness ratios (ICERs) by quality adjusted life years (QALY) or disability adjusted life years. 4) Adverse outcomes.
Leeman (2015)	<p>Very-brief, web-based interventions for reducing alcohol use and related problems among college students: a review</p> <p>Review quality: Low</p> <p>Research aim: To evaluate "the efficacy of very-brief, web-based alcohol reduction interventions for college students" (Page 2)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (FEEDBACK/TRACKING/GOALS and OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> - This review examined the findings from 15 studies. We were not able to include the overarching analysis of the 15 studies in this map because it combined interventions at different points in the pathway. However, the review also conducted two separate analyses, one of 12 studies on multi-component</p>

interventions which we categorised as other early interventions and one of three studies on personalised normative feedback interventions which we categorised as feedback, tracking and goals. Therefore this review can be found in two points in the online map, and this summary can be found in two sections of this appendix.

Overview of review findings: “We found evidence to support the efficacy of two main types of intervention content: (a) focused solely on personalized normative feedback designed to correct misconceptions about peer alcohol consumption and (b) multi-component interventions.” (Abstract, page 1)

Review Information

Review focus: Digital alcohol interventions.

Type of analysis: Narrative synthesis.

Number of included studies: 15 RCTs (15 interventions).

Population focus: University and college students.

Country focus: Not reported.

Digital intervention description: Web-based or computerised personalised normative feedback interventions. Some were feedback only interventions and others were multi-component interventions.

Comparator(s): A variety of control conditions were used including: assessment only, very brief feedback, attention control, education only and non-alcohol related feedback.

Outcomes: Outcomes were measured at a range of time points from one month to 24 months. The following outcome was measured: alcohol consumption: alcohol units per occasion, units of alcohol per week, frequency, proportion heavy drinking, overall volume, binge drinking, heavy drinking, risky drinking, peak number of drinks, peak blood

	alcohol concentration (BAC). Measures included the Alcohol Use Disorders Identification Test (AUDIT) and the CAGE questionnaire.
Posadski (2016)	<p>Automated telephone communication systems for preventive healthcare and management of long-term conditions</p> <p>Review quality: High</p> <p>Review aim: “To assess the effects of ATCS [Automated telephone communication systems] for preventing disease and managing long-term conditions on behavioural change, clinical, process, cognitive, patient-centred and adverse outcomes.”</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> - This review included 132 studies of digital interventions for the prevention and management of a range of conditions, not just risky alcohol and drug use. For the management of alcohol intake, there were three analyses combining the findings of more than one study, however the first (comparing ATCS Plus with no intervention or usual care) combined interventions at different points in the pathway and so was not included in this map. Of the remaining two analyses one combined two studies on other early interventions (ATCS Plus versus another intervention) and the other combined two studies on engagement interventions (Interactive Voice Response (IVR) versus control).</p> <p>Overview of findings: “Depending on the type of intervention, ATCS [automated telephone communication systems] may have small effects on outcomes for alcohol consumption. There is insufficient evidence to determine their effects for preventing alcohol/substance misuse or managing illicit drug addiction.” (Abstract, page 2)</p> <p>Detailed findings</p> <p>Detailed review findings were not amenable to presentation for this map.</p>

Review Information

Review focus: Digital interventions for a range of long-term conditions including drug and alcohol misuse.

Type of analysis: Narrative synthesis.

Number of included studies: 8 RCTs (15 interventions) on digital drug or alcohol interventions.

(There were 132 studies included in the review, but only 11 focused on drug or alcohol interventions and only eight of these, all focused alcohol, were included in a synthesis. The other three studies were reported individually but were not synthesized).

Population focus: heavy or problematic drinkers, or those with diagnosed alcohol dependence or alcohol misuse disorder (n = 7 studies), HIV positive drinkers (n = 1 study).

Country focus: USA (n = 7 studies), Sweden (n = 1 study).

Digital intervention description: A range of automated telephone communication systems (ATCS); either interactive voice response (IVR) or ATCS Plus.

Comparator(s): A variety of control conditions were used including: no intervention control, assessment-only, information pamphlet, usual care, alternative intervention.

Outcomes: Outcomes were measured at a range of time points from six weeks to six months. The following outcomes were measured:

1) Alcohol consumption: proportion of days abstinent, proportion of heavy drinking days, continuous abstinence, drinking days, heavy drinking days, and total drinks consumed, Alcohol Use Disorders Identification Test (AUDIT).

	2) Alcohol-related problems: drinking problems, coping problems, post-traumatic stress disorder symptoms.
Riper (2014)	<p>Treatment of comorbid alcohol use disorders and depression with cognitive-behavioural therapy and motivational interviewing: a meta-analysis</p> <p>Review quality: Moderate</p> <p>Research aim: “To review published studies on the effectiveness of combining cognitive-behavioural therapy (CBT) and motivational interviewing (MI) to treat comorbid clinical and subclinical alcohol use disorder (AUD) and major depression (MDD) and estimate the effect of this compared with usual care.” (Abstract, page 394)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> - This review examined 12 studies, of which only two evaluated digital interventions. This meant that their overarching analysis of the 12 studies was not included in this map. However, one sub-group analysis examined the two studies on computerised adjunct cognitive behavioural therapy/motivational interviewing and this was included in the map.</p> <p>Overview of findings: “No significant differences emerged for decrease of depression symptoms or alcohol consumption in association with any of the subgroup analyses we conducted.” (Page 402)</p> <p>Detailed findings</p> <p>(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)</p> <p>Computerised adjunct cognitive-behavioural therapy/motivational interviewing vs. treatment-as-usual controls for decrease in alcohol consumption: No significant difference.</p> <p>(n = 2 studies; number of participants not stated; pooled effect size (g) = 0.39; 95% CI -0.06 to 0.85).</p>

Review Information

Review focus: Digital and non-digital alcohol interventions.

Type of analysis: Meta-analysis.

Number of included studies: two RCTs (two interventions) of digital interventions.

(A total of 12 studies were included in the review but ten focused on non-digital interventions.)

Population focus: Adults with co-morbid alcohol use disorders (AUD) and depression.

Country focus: Australia (n = 2 studies).

Digital intervention description: Computerised cognitive behavioural therapy (CBT).

Comparator(s): Alternative intervention (brief intervention only or person centred therapy).

Outcomes: Outcomes were measured at a range of time points from 1.5 months to 12 months. The following outcome was measured: alcohol consumption: number of days abstinent, drinks per day, AUDIT score, heavy drinking days, days of use per month, drinking above harmful threshold.

Riper (2018)	<p>Effectiveness and treatment moderators of internet interventions for adult problem drinking: An individual patient data meta-analysis of 19 randomised controlled trials</p> <p>Review quality: Moderate</p> <p>Review aim: “We investigated effectiveness and moderators of treatment outcomes in internet-based interventions for adult problem drinking.” (Abstract, page 2)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> - This review examined the findings from 19 studies of internet-based brief alcohol interventions which were based on personalised normative feedback, behavioural self-control, cognitive behavioural therapy, and/or motivational interviewing. They conducted four analyses, two compared internet-based interventions to controls (e.g., assessment only or minimal intervention) and two compared internet-based interventions to human-guided interventions.</p> <p>Overview of findings: “Internet-based alcohol interventions in both community and healthcare populations are effective in reducing mean weekly alcohol consumption and in achieving adherence to low-risk drinking limits. [...] Human-guided interventions showed a stronger impact on treatment outcome than fully automated ones, but waitlist design controls may inflate outcomes.” (Page 3)</p>
--------------	---

Detailed findings

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

1) Internet-based alcohol intervention vs. various controls for alcohol consumption (weekly reduction):

The overall difference in mean weekly alcohol reduction was significant and in favour of the iAI (internet based alcohol intervention) condition.

(n = 19 studies / 27 interventions; n = 8,095 participants; pooled effect size (b) = -5.02 standard units; 95% CI -7.57 to -2.48; p < 0.001.)

2) Internet-based alcohol intervention vs. various controls for alcohol treatment response (adherence to low risk drinking guidelines): iAI participants also had a significantly greater likelihood of treatment response (consumption of less than 14/21 standard units for women/men weekly) than controls.

(n = 19 studies / 27 interventions; n = 6,082 participants; pooled effect size (odds ratio) = 2.20; 95% CI 1.63 to 2.95; p < 0.001).

3) Human guided internet-based alcohol interventions vs. fully automated interventions for alcohol consumption (weekly reduction): Human-supported interventions (n = 8 interventions) were superior to fully automated ones (n = 19 interventions).

(n = 19 studies / 27 interventions; n = 8,095 participants; pooled effect size (b) = -6.78 standard units; 95% CI -12.11 to -1.45; p = 0.013)

4) **Human guided internet-based alcohol interventions vs. fully automated interventions for treatment response (adherence to low risk drinking guidelines):** Human-supported (n = 8) interventions were superior to fully automated ones (n = 19).

(n = 19 studies / 27 interventions; n = 6,082 participants; pooled effect size (odds ratio) = 2.23; 95% CI 1.22 to 4.08, p = 0.009)

Review Information

Review focus: Digital alcohol interventions.

Type of analysis: Meta-analysis (individual patient data).

Number of included studies: 19 RCTs (27 interventions).

Population focus: Adult problem drinkers (regular drinkers and binge-only drinkers).

Country focus: Not reported.

Digital intervention description: A range of internet-based therapies including personalised normative feedback, behavioural self-control, cognitive behavioural therapy (CBT) and motivational interviewing (MI).

Comparator(s): A variety of control conditions were used including: minimal-intervention (e.g., information leaflet, web-based unguided self-help), assessment-only, or waitlist-control.

Outcomes: Outcomes were measured at a range of time points from one month to 12 months. The following outcomes were measured:

	<p>1) Alcohol consumption: mean weekly alcohol consumption, the Alcohol Use Disorders Identification Test (AUDIT-C), binge drinking.</p> <p>2) Other: Treatment response.</p>
<p>Smedslund (2017)</p>	<p>Effect of early, brief computerized interventions on risky alcohol and cannabis use among young people</p> <p>Review quality: High</p> <p>Review aim: “To assess the effectiveness of early, computerized brief interventions on alcohol and cannabis use by young people aged 15 to 25 years who are high or risky consumers of either one or both of these substances.” (Page 16)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> (<i>Note: this review contains findings for both alcohol and drug use separately and so it can be found in two points in the online map, and this summary can be found in two sections of this appendix.</i>) - This review examined the findings of 60 studies evaluating a range of early computerised brief interventions, of which 53 focused on alcohol, three focused on cannabis, and four on both alcohol and cannabis. The studies focused on hazardous and/or harmful alcohol and/or cannabis users. Although some included studies were ‘screening and brief interventions’, most used a brief assessment of consumption, or else conducted screening to identify who to include in the study and so did not evaluate the screening component of a ‘screening and brief intervention’, whilst others used brief assessments rather than validated screening tools. Therefore, since the review’s focus was on the effect of interventions on those already identified as hazardous/harmful alcohol/cannabis users, it fits within ‘other early intervention and engagement’. Thirteen analyses were included in this map – see detailed findings.</p> <p>Overview of findings: “The interventions significantly reduce alcohol consumption in the short-term compared to no intervention, but the effect size is small, and there is no significant effect in the long-term. There are also shortcomings in the quality of the evidence. Interventions which provide an assessment of alcohol use with feedback may have a larger effect than those which do not, but again, the evidence is weak. The few studies on cannabis did not show significant effects in the reduction of cannabis consumption. There was no evidence of adverse effects.” (Page 6)</p>

Detailed findings

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

Findings on alcohol use:

1) Assessment and feedback vs. no intervention for alcohol consumption at short term follow-up: A meta-analysis of 15 interventions found that assessment and feedback significantly reduced short-term alcohol consumption compared to no intervention. The effect size is small. The quality of the evidence was low. (n = 14 studies / 15 interventions; n = 4,558 participants; pooled effect size (SMD) = -0.17; 95% CI = -0.27 to -0.08).

2) Assessment and feedback vs. no intervention for alcohol consumption at longer term follow-up: A For long-term alcohol consumption, there were only three studies. The effect size is of a similar magnitude. The quality of the evidence was low (n = 3 studies; n = 916 participants; pooled effect size (SMD) = -0.17; 95% CI = -0.30 to -0.04).

3) Assessment and feedback vs. assessment only for alcohol consumption at short term follow-up: A meta-analysis of 24 studies with 25 independent samples showed reduced short-term alcohol consumption from assessment and feedback compared to assessment only. The effect size is small. The quality of the evidence was low.

(n = 22 studies / 25 interventions; n = 5,794 participants; pooled effect size (SMD) = -0.15; 95% CI = -0.25 to -0.06).

4) Assessment and feedback vs. assessment only for alcohol consumption at longer term follow-up: For the long-term follow-up there were only three studies; and there was no significant effect. The quality of the evidence was very low.

(n = 3 studies; n = 638 participants; pooled effect size (SMD) = -0.03; 95% CI = -0.19 to 0.12).

5) Feedback plus moderation skills vs. feedback only for alcohol consumption at short term follow-up: Two studies explored the short-term effect of adding moderation skills training to feedback, and they found a small to moderate effect size; low quality evidence.

(n = 2 studies; n = 302 participants; pooled effect size (SMD) = -0.26, 95% CI -0.49 to 0.03).

6) Assessment and feedback vs. education for alcohol consumption at short term follow-up: A meta-analysis of seven studies showed no significant short-term effect of assessment and feedback compared to education. The quality of the evidence was very low.

(n = 7 studies; n = 1,131 participants; pooled effect size (SMD) = -0.02; 95% CI = -0.21 to 0.17).

7) Comprehensive feedback vs. brief feedback for alcohol consumption at short term follow-up: Four studies directly compared a brief computerised intervention using comprehensive feedback to a computerised brief intervention using brief feedback. Hence, the comprehensive interventions were also brief, but the feedback was a little less brief than in the comparison group. A meta-analysis of four studies did not find an added short-term effect of comprehensive feedback compared to brief feedback. The evidence was of low quality.

(n = 4 studies; n = 839 participants; pooled effect size (SMD) = -0.01; 95% CI = -0.18 to 0.19).

8) Computer assessment and feedback vs. counsellor assessment and feedback for alcohol consumption at short term follow-up: A meta-analysis of six studies did not find that the short-term effect of computerised brief interventions is different from a brief intervention delivered by a counsellor. The evidence was very low quality.

(n = 6 studies; n = 853 participants; pooled effect size (SMD) = -0.10; 95% CI = -0.30 to 0.11).

9) Computer assessment and feedback vs. counsellor assessment and feedback for alcohol consumption at longer term follow-up: The two studies with long-term effects also showed no difference. The evidence was very low quality.

(n = 2 studies; n = 443 participants; pooled effect size (SMD) = -0.10; 95% CI = -0.53 to 0.32).

10) Gender-specific feedback vs. gender-neutral feedback for alcohol consumption at short term follow-up: We found three studies comparing gender-specific feedback with gender-neutral feedback. A meta-analysis of three studies indicate a small, but not statistically significant effect, and the evidence was of low quality.

(n = 3 studies; n = 586 participants; pooled effect size (SMD) = -0.14, 95% CI -0.3 to 0.03).

11) Multi-dose assessment and feedback vs. single dose assessment and feedback for alcohol consumption at short term follow-up: A meta-analysis of four studies by the same first author found a 16 percent significant short-term reduction in drinking after a repeated assessment and feedback compared to a single assessment and feedback. The quality of evidence was moderate.

(n = 4 studies; n = 7,357 participants; pooled effect size (Rate ratio) = 0.84; 95% CI -0.78 to 0.91).

Findings on drug use:

12) Assessment and feedback compared to assessment only for cannabis consumption at short term follow-up: A meta-analysis with three studies did not find any short-term effect of adding feedback to assessment only; low quality evidence.

(n = 3 studies; n = 638 participants; pooled effect size (SMD) = -0.03, 95% CI -0.19 to 0.12).

13) Assessment and feedback vs. education for cannabis consumption at short term follow-up: Two studies compared assessment and feedback to education and found a non-significant small reduction in cannabis consumption. The evidence quality was low.

(n = 2 studies; n = 234 participants; pooled effect size (SMD) = -0.08, 95% CI -0.33 to 0.18).

Review Information

Review focus: Digital drug and alcohol interventions.

Type of analysis: Meta-analysis.

Number of included studies: 60 studies - 59 RCTs and one cluster RCT. 53 studies focused on alcohol, three focused on cannabis, and four focused on both alcohol and cannabis.

Population focus: Young people 15-25 years, who are high or risky consumers of alcohol and/or cannabis.

Country focus: USA (n = 44 studies), New Zealand (n = 4 studies), the Netherlands (n = 2 studies), Sweden (n = 4 studies), Australia (n = 2 studies), Germany (n = 1 studies), Switzerland (n = 1 studies) and Brazil (n = 1 study), multiple European countries (n = 1 study).

Digital intervention description: A range of early, computerised brief interventions. Interventions included any preventive or therapeutic activity administered within an hour or less of the substance abuse.

Comparator(s): A variety of control conditions were used including: no intervention, waitlist control, alternative brief intervention (computerised or face-to-face).

Outcomes: Reviewers grouped outcomes into the following categories 'short term' (< 6 months) and 'long term' (>6 months). The following outcomes were measured:

- 1) Alcohol consumption: daily drinking questionnaire, the Alcohol Timeline Follow Back (TLFB), urine analysis, blood sample analysis, frequency, quantity or peak consumption, occasions, drinking days.
- 2) Drug use / Substance-misuse: Cannabis Abuse Screening Test, Revised Drug History Questionnaire, self-report.
- 3) *Adverse outcomes: No details provided.*

Drug use reviews (2 reviews)	
Prevention: feedback/tracking/goals (1 review)	
Gulliver (2015)	<p>Technology-based interventions for tobacco and other drug use in university and college students: a systematic review and meta-analysis</p> <p>Review quality: Moderate</p> <p>Review aim: “The current study systematically reviewed published randomized trials of technology-based interventions evaluated in a tertiary setting for tobacco and other drug use (excluding alcohol).” (Page 2)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (FEEDBACK/TRACKING/GOALS)</u> - This review included 12 studies, but nine of these focused on solely tobacco use interventions and a tenth, although partially focused on marijuana use, did not measure marijuana consumption outcomes. However, two studies targeted marijuana use using personalised feedback interventions and measured marijuana consumption outcomes.</p> <p>Overview of findings: “Neither of the marijuana interventions consisting of brief web- or computer-based personalized feedback programs, was effective at reducing or preventing (in abstainers) marijuana use for participants in the intervention condition compared with no-intervention control conditions.” (Page 6)</p> <p><u>Detailed findings</u></p> <p>Detailed review findings were not amenable to presentation for this map.</p> <p><u>Review Information</u></p> <p>Review focus: Digital drug and tobacco interventions.</p> <p>Type of analysis: Narrative synthesis.</p>

	<p>Number of included studies: Two RCTs on drug interventions which measured consumption outcomes.</p> <p>(The review included a total of 12 RCTs, but nine focused exclusively on tobacco use interventions and another, although partially focused on marijuana use, did not measure marijuana consumption outcomes.)</p> <p>Population focus: University and college students.</p> <p>Country focus: USA (n = 2).</p> <p>Digital intervention description: Brief web-based personalised feedback.</p> <p>Comparator(s): No intervention or electronic physical activity brochure.</p> <p>Outcomes: Outcomes were measured at: one month, three months and six months. The following outcome was measured: drug use / substance-misuse: marijuana use (any during previous month / number of days).</p>
<p>Prevention and early intervention: Other early intervention and engagement (1 review)</p>	
<p>Smedslund (2017)</p>	<p>Effect of early, brief computerized interventions on risky alcohol and cannabis use among young people</p> <p>Review quality: High</p> <p>Review aim: “To assess the effectiveness of early, computerized brief interventions on alcohol and cannabis use by young people aged 15 to 25 years who are high or risky consumers of either one or both of these substances.” (Page 16)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> (Note: this review contains findings for both alcohol and drug use separately and so it can be found in two points in the online map, and this summary can be found in two sections of this appendix.) - This review examined the findings of 60 studies evaluating a range of early computerised brief interventions, of which 53 focused on alcohol, three focused on</p>

cannabis, and four on both alcohol and cannabis. The studies focused on hazardous and/or harmful alcohol and/or cannabis users. Although some included studies were ‘screening and brief interventions’, most used a brief assessment of consumption, or else conducted screening to identify who to include in the study and so did not evaluate the screening component of a ‘screening and brief intervention’, whilst others used brief assessments rather than validated screening tools. Therefore, since the review’s focus was on the effect of interventions on those already identified as hazardous/harmful alcohol/cannabis users, it fits within ‘other early intervention and engagement’. Thirteen analyses were included in this map – see detailed findings.

Overview of findings: “The interventions significantly reduce alcohol consumption in the short-term compared to no intervention, but the effect size is small, and there is no significant effect in the long-term. There are also shortcomings in the quality of the evidence. Interventions which provide an assessment of alcohol use with feedback may have a larger effect than those which do not, but again, the evidence is weak. The few studies on cannabis did not show significant effects in the reduction of cannabis consumption. There was no evidence of adverse effects.” (Page 6)

Detailed findings

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

Findings on alcohol use:

1) Assessment and feedback vs. no intervention for alcohol consumption at short term follow-up: A meta-analysis of 15 interventions found that assessment and feedback significantly reduced short-term alcohol consumption compared to no intervention. The effect size is small. The quality of the evidence was low. (n = 14 studies / 15 interventions; n = 4,558 participants; pooled effect size (SMD) = -0.17; 95% CI = -0.27 to -0.08).

2) Assessment and feedback vs. no intervention for alcohol consumption at longer term follow-up: A For long-term alcohol consumption, there were only three studies. The effect size is of a similar magnitude. The quality of the evidence was low (n = 3 studies; n = 916 participants; pooled effect size (SMD) = -0.17; 95% CI = -0.30 to -0.04).

3) Assessment and feedback vs. assessment only for alcohol consumption at short term follow-up: A meta-analysis of 24 studies with 25 independent samples showed reduced short-term alcohol consumption from assessment and feedback compared to assessment only. The effect size is small. The quality of the evidence was low.

(n = 22 studies / 25 interventions; n = 5,794 participants; pooled effect size (SMD) = -0.15; 95% CI = -0.25 to -0.06).

4) Assessment and feedback vs. assessment only for alcohol consumption at longer term follow-up: For the long-term follow-up there were only three studies; and there was no significant effect. The quality of the evidence was very low.

(n = 3 studies; n = 638 participants; pooled effect size (SMD) = -0.03; 95% CI = -0.19 to 0.12).

5) Feedback plus moderation skills vs. feedback only for alcohol consumption at short term follow-up: Two studies explored the short-term effect of adding moderation skills training to feedback, and they found a small to moderate effect size; low quality evidence.

(n = 2 studies; n = 302 participants; pooled effect size (SMD) = -0.26, 95% CI -0.49 to 0.03).

6) Assessment and feedback vs. education for alcohol consumption at short term follow-up: A meta-analysis of seven studies showed no significant short-term effect of assessment and feedback compared to education. The quality of the evidence was very low.

(n = 7 studies; n = 1,131 participants; pooled effect size (SMD) = -0.02; 95% CI = -0.21 to 0.17).

7) Comprehensive feedback vs. brief feedback for alcohol consumption at short term follow-up: Four studies directly compared a brief computerised intervention using comprehensive feedback to a computerised brief intervention using brief feedback. Hence, the comprehensive interventions were also brief, but the feedback was a little less brief than in the comparison group. A meta-analysis of four studies did not find an added short-term effect of comprehensive feedback compared to brief feedback. The evidence was of low quality.

(n = 4 studies; n = 839 participants; pooled effect size (SMD) = -0.01; 95% CI = -0.18 to 0.19).

8) Computer assessment and feedback vs. counsellor assessment and feedback for alcohol consumption at short term follow-up: A meta-analysis of six studies did not find that the short-term effect of computerised brief interventions is different from a brief intervention delivered by a counsellor. The evidence was very low quality.

(n = 6 studies; n = 853 participants; pooled effect size (SMD) = -0.10; 95% CI = -0.30 to 0.11).

9) Computer assessment and feedback vs. counsellor assessment and feedback for alcohol consumption at longer term follow-up: The two studies with long-term effects also showed no difference. The evidence was very low quality.

(n = 2 studies; n = 443 participants; pooled effect size (SMD) = -0.10; 95% CI = -0.53 to 0.32).

10) Gender-specific feedback vs. gender-neutral feedback for alcohol consumption at short term follow-up: We found three studies comparing gender-specific feedback with gender-neutral feedback. A meta-analysis of three studies indicate a small, but not statistically significant effect, and the evidence was of low quality.

(n = 3 studies; n = 586 participants; pooled effect size (SMD) = -0.14, 95% CI -0.3 to 0.03).

11) Multi-dose assessment and feedback vs. single dose assessment and feedback for alcohol consumption at short term follow-up: A meta-analysis of four studies by the same first author found a 16 percent significant short-term reduction in drinking after a repeated assessment and feedback compared to a single assessment and feedback. The quality of evidence was moderate.

(n = 4 studies; n = 7,357 participants; pooled effect size (Rate ratio) = 0.84; 95% CI -0.78 to 0.91).

Findings on drug use:

12) Assessment and feedback compared to assessment only for cannabis consumption at short term follow-up: A meta-analysis with three studies did not find any short-term effect of adding feedback to assessment only; low quality evidence.

(n = 3 studies; n = 638 participants; pooled effect size (SMD) = -0.03, 95% CI -0.19 to 0.12).

13) Assessment and feedback vs. education for cannabis consumption at short term follow-up: Two studies compared assessment and feedback to education and found a non-significant small reduction in cannabis consumption. The evidence quality was low.

(n = 2 studies; n = 234 participants; pooled effect size (SMD) = -0.08, 95% CI -0.33 to 0.18).

Review Information

Review focus: Digital drug and alcohol interventions.

Type of analysis: Meta-analysis.

Number of included studies: 60 studies - 59 RCTs and one cluster RCT. 53 studies focused on alcohol, three focused on cannabis, and four focused on both alcohol and cannabis.

Population focus: Young people 15-25 years, who are high or risky consumers of alcohol and/or cannabis.

Country focus: USA (n = 44 studies), New Zealand (n = 4 studies), the Netherlands (n = 2 studies), Sweden (n = 4 studies), Australia (n = 2 studies), Germany (n = 1 studies), Switzerland (n = 1 studies) and Brazil (n = 1 study), multiple European countries (n = 1 study).

Digital intervention description: A range of early, computerised brief interventions. Interventions included any preventive or therapeutic activity administered within an hour or less of the substance abuse.

Comparator(s): A variety of control conditions were used including: no intervention, waitlist control, alternative brief intervention (computerised or face-to-face).

Outcomes: Reviewers grouped outcomes into the following categories 'short term' (< 6 months) and 'long term' (>6 months). The following outcomes were measured:

	<p>1) Alcohol consumption: daily drinking questionnaire, the Alcohol Timeline Follow Back (TLFB), urine analysis, blood sample analysis, frequency, quantity or peak consumption, occasions, drinking days.</p> <p>2) Drug use / Substance-misuse: Cannabis Abuse Screening Test, Revised Drug History Questionnaire, self-report.</p> <p>3) Adverse outcomes: No details provided.</p>
--	---

Alcohol and drug use or generic substance use (5 reviews)	
Prevention: other (1 review)	
Rodriguez (2014)	<p>A systematic review of computerised serious educational games about alcohol and other drugs for adolescents</p> <p>Review quality: Low.</p> <p>Research aim: “This paper will report a systematic review of computerised SEGs [serious educational games] for alcohol and other drugs that have been trialled with adolescents” (Page 130).</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER PREVENTION STRATEGIES)</u> - This review examined the findings from eight studies on SEGs (i.e., video games developed primarily for reasons other than entertainment) and involved two analyses; one examined the effect of SEGs on knowledge (six studies) and a second examined the effect of SEGs on attitudes towards the targeted drugs (two studies).</p> <p>Overview of findings: “Eight SEGs (serious educational games) were identified targeting tobacco, alcohol, cannabis, methamphetamine, ecstasy, inhalants, cocaine and opioids. Six reported positive outcomes in terms of increased content knowledge and two reported increased negative attitudes towards the targeted drugs.” (Abstract, P.129)</p>

Detailed findings

Detailed review findings were not amenable to presentation for this map.

Review Information

Review focus: Digital drug and alcohol interventions.

Type of analysis: Narrative synthesis.

Number of included studies: eight studies (eight interventions) – two RCTs, five pre-post studies and one post-test only study (no control groups).

Population focus: Adolescents (10 to 14 years).

Country focus: USA (n = 7 studies), UK (n = 1 study).

Digital intervention description: Computerised serious educational games.

Comparator(s): Alternate alcohol prevention program. (Note: only two of the eight studies involved a comparison group).

Outcomes: These were measured between zero and seven days. The following outcome was measured: knowledge/ attitudes/ perceptions: content knowledge, knowledge about drug abuse prevention, drug-related attitudes, perception of the harm of alcohol use.

Prevention and early intervention: Other early intervention and engagement (4 reviews)

<p>Boumparis (2017)</p>	<p>Internet interventions for adult illicit substance users: a meta-analysis</p> <p>Review quality: Moderate</p> <p>Review aim: “To examine to what extent internet interventions are effective in reducing the use of opioids, cocaine, amphetamines and any illicit substances in adults compared to controls.” (Page 1522)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT) and Treatment and recovery (COMPONENTS OF, OR ADJUNCTS TO, STRUCTURED TREATMENT)</u> (<i>Note: this review can be found in two points in the online map, and this summary can be found in two sections of this appendix.</i>) - This review examined the findings of 18 studies on a range of internet interventions on substance use reduction. Because the main findings of this review mixed evidence about early intervention and engagement interventions with evidence on interventions adjunct to structured treatment, we were not able to include them in this map. However, the review also provided findings for three specific sub-groups of studies that we were able to include. These sub-group analyses related to:</p> <ol style="list-style-type: none">1) <u>Other early intervention and engagement</u> – see detailed findings below on ‘Motivational interviewing interventions’ and ‘Cognitive behavioural therapy interventions’.2) <u>Components of, or adjuncts to, structured treatment</u> – see detailed findings below on ‘Community reinforcement approach / contingency management interventions’ <p>Overview of findings: “Internet interventions demonstrate small but significant effects in decreasing substance use among various target populations at post-treatment and at the follow-up assessment. However, given the small number of available studies for certain substances, the findings should be interpreted with caution.” (Abstract, page 1521)</p>
-------------------------	---

Detailed findings:

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

Findings on ‘other early intervention and engagement’:

1) **Motivational interviewing interventions vs. a variety of controls for substance use** – small but significant effects in decreasing substance use

(n = 5 studies; n = 470 participants; pooled effect size (g) = 0.30; 95% CI = 0.16 to 0.44; $P \leq 0.001$)

2) **Cognitive behavioural therapy interventions vs. a variety of controls for substance use** – small but significant effects in decreasing substance use

(n = 4 studies; n = 261 participants; pooled effect size (g) = 0.19; 95% CI = 0.02 to 0.35; [p value not stated])

Findings on components of, or adjuncts to, structured treatment:

3) **Effects for community reinforcement approach/contingency management interventions vs a variety of controls for substance use** - small but significant effects in decreasing substance use

(n = 6 studies; n = participants not stated; pooled effect size (g) = 0.39; 95% CI = 0.26 to 0.52; $P \leq 0.001$)

Review Information

Review focus: Digital drug interventions

	<p>Type of analysis: Meta-analysis</p> <p>Number of included studies: 17 RCTs (18 interventions)</p> <p>Population: Drug users - opioids (n = 4 studies), stimulants (n = 4 studies), any illicit substances (n = 9 studies).</p> <p>Country focus: USA (n = 13 studies), Australia (n = 1 study), Brazil (n = 1 study), Sweden (n = 1 study), Switzerland (n = 1 study).</p> <p>Digital intervention description: A range of web-based or computerised therapeutic interventions, including community reinforcement approach (CRA), contingency management (CM), motivational interviewing (MI) and cognitive behavioural therapy (CBT). Some interventions included professional support, some were unguided.</p> <p>Comparator(s): A variety of control conditions were used including: treatment as usual (TAU), wait list control, motivational interviewing (MI), brief intervention (BI), psychoeducation.</p> <p>Outcomes: Reviewers grouped outcomes according to ‘post-treatment’ and ‘longest follow-up’ (at six months or after). The following outcome was measured: drug use / substance misuse: toxicology screening (urine or hair analysis), self-report (number of days or weeks abstinent, consumption within previous weeks or months, online questionnaires such as ASSIST, DUDIT).</p>
Giroux (2017)	<p>Online and Mobile Interventions for Problem Gambling, Alcohol, and Drugs: A Systematic Review</p> <p>Review quality: Low</p> <p>Aim: “To summarize current knowledge regarding psychological interventions provided entirely online (via computers or mobile applications) for at risk or problem gamblers or users (alcohol, illegal drugs)” (Page 2)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> - This review included 18 studies of digital interventions focused on either alcohol or drugs. Whilst</p>

the reviewers also looked for studies on gambling, they did not find any. The studies evaluated a range of mostly other early intervention and engagement interventions, the majority of which "used standard self-help therapeutic material: self-report assessment, self-recordings of use, exercises, readings, and videos" p4. The review looked at short-term and medium/long-term effects of the interventions.

Overview of findings: "More than three quarters of the studies showed a short-term decrease in use that was maintained 6 months later, but only two studies included a 12 months follow-up." (Abstract, page 1)

Detailed findings

Detailed review findings were not amenable to presentation for this map.

Review Information

Review focus: Digital drug, alcohol and gambling interventions.

Type of analysis: Narrative synthesis.

Number of included studies: 18 studies (22 interventions). Unclear how many are RCTs.

Population focus: People with high-risk use or addiction to alcohol (n = 15 studies) or drugs (n = 3 studies).

Country focus: Not reported.

Digital intervention description: A broad range of online (computer or mobile) psychological interventions based on motivational interviewing (MI) or cognitive behavioural therapy (CBT) approaches.

	<p>Comparator(s): A variety of control conditions were used including: no intervention controls, waitlist controls, alternative intervention or written information. Note: some of the included studies did not have a control / comparator.</p> <p>Outcomes: Reviewers grouped outcomes into the following categories, ‘short’ < 3 months, ‘medium’ (6months) and ‘long term’ (12 months). The following outcomes were measured:</p> <p>1) Alcohol consumption: alcohol harm, quantity, drinking frequency, abstinence from alcohol, heavy drinking episodes, blood alcohol concentration, FAST (fast alcohol screening test), QDS (quick drink screen), DDQ (daily drinking questionnaire), AUDIT.</p> <p>2) Drug use / Substance-misuse: quantity and frequency of use.</p> <p>3) Alcohol-related problems: APS (alcohol-related problem scale).</p> <p>4) Drug/substance-related problems: severity of dependence, symptoms of abuse.</p>
Holmes (2018)	<p>A systematic review of technology-assisted interventions for co-morbid depression and substance use</p> <p>Review quality: Low</p> <p>Review aim: “To address the following research question: are technology-based interventions effective in managing mental health symptoms for adults with co-morbid depression and SUD?” (Page 132)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> - This review included six studies, and they conducted two separate analyses. One analysis, which combined digital and non-digital mobile phone interventions was not included. The other analysis was included in the map as it focused exclusively on digital interventions, combining four studies on computer-based interventions for</p>

people with hazardous/harmful alcohol consumption, or risky alcohol and cannabis use. The interventions ranged from feedback and psychoeducation to cognitive-behavioural therapy and motivational interviewing.

Overview of findings: “Effectiveness findings were mixed [...] Intervention completion and adherence rates, which varied from 45% to 89%, were generally comparable to control groups” (Page 137)

Detailed findings

Detailed review findings were not amenable to presentation for this map.

Review Information

Review focus: Digital substance use interventions.

Type of analysis: Narrative synthesis.

Number of included studies: Five RCTs.

(The review included a total of six studies, but one focused on a non-digital phone intervention.)

Population focus: Adults with co-morbid depression and substance use disorders; alcohol (n = 3 studies), alcohol and marijuana (n = 2 studies).

Country focus: Australia (n = 3 studies), USA (n = 1 studies), Ireland (n = 1 study).

Digital intervention description: A range of mental health interventions delivered through a digital technological device (i.e., computer, tablet, smartphone) or process (i.e., email, internet, short message service (SMS), video).

	<p>Comparator(s): A variety of control conditions were used including: attention control, assessment only, brief intervention, matched 'live' control.</p> <p>Outcomes: Outcomes were measured at a range of time points, one month, three months, six months and 12 months. The following outcomes were measured:</p> <p>1) Alcohol consumption: Alcohol Use Disorders Identification Test (AUDIT) questionnaires, frequency of alcohol and drug use, quantity of alcohol consumed, abstinence duration, DDQ (daily drinking questionnaire).</p> <p>2) Knowledge / attitudes / perceptions: alcohol craving.</p>
Jiang (2017)	<p>Beyond face-to-face individual counseling: A systematic review on alternative modes of motivational interviewing in substance abuse treatment and prevention</p> <p>Review quality: Low</p> <p>Review aim: “To synthesize the evidence on the effectiveness of motivational interviewing (MI), delivered in modes other than face-to-face individual counseling, in preventing and treating substance abuse related behaviors.” (Abstract, page 216)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT)</u> - This review included 22 studies, however 17 focused on tobacco use, medication overuse and/or non-digital interventions. Most of the analyses combined digital and non-digital interventions. However, two analyses were able to be included in our map. The first focused on digital forms of MI for controlling alcohol intake and included three studies, two testing internet-based MI and one testing SMS-based MI. The second relevant analysis looked internet-based MI for illicit drug use and included two studies.</p>

Overview of review findings: “The effectiveness of [...] SMS-based MI, internet-based MI and group MI remains controversial or unclear, although a limited number of studies suggested their potential in improving abstinence outcomes.” (Page 233)

Detailed findings

Detailed review findings were not amenable to presentation for this map.

Review Information

Review focus: Digital and non-digital substance use interventions.

Type of analysis: Narrative synthesis.

Number of included studies: Four RCTs (six digital drug / alcohol interventions).

(The review included a total of 22 RCTs but 18 focused on tobacco use, medication overuse and / or non-digital interventions.)

Population focus: Alcohol misuse (n = 2), cannabis use (n = 1), alcohol and illicit drugs (n = 1).

Country focus: Not reported.

Digital intervention description: Internet based and SMS based Motivational Interviewing (MI) and Cognitive Behavioural Therapy (CBT).

Comparator(s): A variety of control conditions were used including: no intervention, , assessment only, standard care, non-digital interventions.

	<p>Outcomes: Outcomes were measured at a range of time points two months, three months, six months, nine and 12 months. The following outcomes were measured:</p> <ol style="list-style-type: none"> 1) Alcohol consumption: total consumption, risky drinking days, decreased substance involvement score, binge drinking days, binge drinking prevalence, drinks per drinking day. 2) Alcohol-related problems: alcohol-related injuries. 3) Illicit drug use: use and readiness to quit
<p>Treatment and recovery: Components of, or adjuncts to, structured treatment (1 review)</p>	
<p>Boumparis (2017)</p>	<p>Internet interventions for adult illicit substance users: a meta-analysis</p> <p>Review quality: Moderate</p> <p>Review aim: “To examine to what extent internet interventions are effective in reducing the use of opioids, cocaine, amphetamines and any illicit substances in adults compared to controls.” (Page 1522)</p> <p>Where it fits in the pathway: <u>Prevention and early intervention (OTHER EARLY INTERVENTION AND ENGAGEMENT) and Treatment and recovery (COMPONENTS OF, OR ADJUNCTS TO, STRUCTURED TREATMENT)</u> (Note: <i>this review can be found in two points in the online map, and this summary can be found in two sections of this appendix.</i>) - This review examined the findings of 18 studies on a range of internet interventions on substance use reduction. Because the main findings of this review mixed evidence about early intervention and engagement interventions with evidence on interventions adjunct to structured treatment, we were not able to include them in this map. However, the review also provided findings for three specific sub-groups of studies that we were able to include. These sub-group analyses related to:</p>

1) Other early intervention and engagement – see detailed findings below on ‘Motivational interviewing interventions’ and ‘Cognitive behavioural therapy interventions’.

2) Components of, or adjuncts to, structured treatment – see detailed findings below on ‘Community reinforcement approach / contingency management interventions’

Overview of findings: “Internet interventions demonstrate small but significant effects in decreasing substance use among various target populations at post-treatment and at the follow-up assessment. However, given the small number of available studies for certain substances, the findings should be interpreted with caution.” (Abstract, page 1521).

Detailed findings:

(Note: We recommend you refer to the review for the specific information about the intervention, comparators, outcomes and measurement timing for each of these findings.)

Findings on ‘other early intervention and engagement’:

1) **Motivational interviewing interventions vs. a variety of controls for substance use** - small but significant effects in decreasing substance use

(n = 5 studies; n = 470 participants; pooled effect size (g) = 0.30; 95% CI = 0.16 to 0.44; $P \leq 0.001$)

2) **Cognitive behavioural therapy interventions vs. a variety of controls for substance use** - small but significant effects in decreasing substance use

(n = 4 studies; n = 261 participants; pooled effect size (g) = 0.19; 95% CI = 0.02 to 0.35; [p value not stated])

Findings on components of, or adjuncts to, structured treatment:

3) Effects for community reinforcement approach/contingency management interventions vs a variety of controls for substance use - small but significant effects in decreasing substance use

(n = 6 studies; n = participants not stated; pooled effect size (g) = 0.39; 95% CI = 0.26 to 0.52; P≤0.001

Review Information

Review focus: Digital drug interventions

Type of analysis: Meta-analysis

Number of included studies: 17 RCTs (18 interventions)

Population: Drug users - opioids (n = 4 studies), stimulants (n = 4 studies), any illicit substances (n = 9 studies).

Country focus: USA (n = 13 studies), Australia (n = 1 study), Brazil (n = 1 study), Sweden (n = 1 study), Switzerland (n = 1 study).

Digital intervention description: A range of web-based or computerised therapeutic interventions, including community reinforcement approach (CRA), contingency management (CM), motivational interviewing (MI) and cognitive behavioural therapy (CBT). Some interventions included professional support, some were unguided.

Comparator(s): A variety of control conditions were used including: treatment as usual (TAU), wait list control, motivational interviewing (MI), brief intervention (BI), psychoeducation.

Outcomes: Reviewers grouped outcomes according to 'post-treatment' and 'longest follow-up' (at six months or after). The following outcome was measured: drug use / substance misuse: toxicology screening (urine or hair analysis), self-

	report (number of days or weeks abstinent, consumption within previous weeks or months, online questionnaires such as ASSIST, DUDIT).
--	---

The NIHR Policy Research Programme Reviews Facility puts the evidence into development and implementation of health policy through:

- Undertaking policy-relevant systematic reviews of health and social care research
- Developing capacity for undertaking and using reviews
- Producing new and improved methods for undertaking reviews
- Promoting global awareness and use of systematic reviews in decision-making

The Reviews Facility is a collaboration between the following centres: EPPI Centre (Evidence for Policy and Practice Information Centre), UCL Social Research Institute, University College London; CRD (Centre for Reviews and Dissemination), University of York; and the London School of Hygiene and Tropical Medicine.

The NIHR Policy Research Programme Reviews Facility collaboration has grown out of a previous 'reviews facility' in Health Promotion and Public Health based at the EPPI Centre, and has been funded by the Department of Health and Social Care since 1995.

The views expressed in this work are those of the authors and do not necessarily reflect the views of the collaborating centres or the funder. All errors and omissions remain those of the authors.

First produced in 2022 by:

Evidence for Policy and Practice Information Centre (EPPI Centre)
Social Science Research Unit, UCL Social Research Institute
UCL Institute of Education, University College London
18 Woburn Square
London WC1H 0NR

<https://eppi.ioe.ac.uk>
<https://www.ucl.ac.uk/ioe/departments-and-centres/departments/ucl-social-research-institute>

ISBN: 978-1-911605-18-8

Editorial & design by: Lionel Openshaw

This document is available in a range of accessible formats including large print. Please contact the Social Science Research Unit for assistance.

Email: ioe.ssrु@ucl.ac.uk
Telephone: +44 (0)20 7331 5263