National Institute for Health and Care Excellence

Draft for consultation

Harmful gambling: identification, assessment and management

[F] Psychological and psychosocial treatment of harmful gambling

NICE guideline number tbc

Evidence review underpinning recommendations 1.5.12 to 1.5.15 and research recommendations in the NICE guideline

October 2023

Draft for consultation

Disclaimer

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users. The recommendations in this guideline are not mandatory and the guideline does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Local commissioners and/or providers have a responsibility to enable the guideline to be applied when individual health professionals and their patients or service users wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with compliance with those duties.

NICE guidelines cover health and care in England. Decisions on how they apply in other UK countries are made by ministers in the Welsh Government, Scottish Government, and Northern Ireland Executive. All NICE guidance is subject to regular review and may be updated or withdrawn.

Copyright

ISBN:

Contents

Psychological and psychosocial treatment of harmful gambling

Review question

What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Introduction

A number of approaches are currently used to reduce the severity and frequency of gambling, with the aim of reducing the harms that gambling causes. These range from self-help interventions and peer support groups to higher intensity pharmacological and psychological treatments within specialist gambling treatment settings. Several approaches may also be combined with the aim of improving outcomes. However, the relative effectiveness of these approaches is not known.

The aim of this review is to determine the effectiveness and cost-effectiveness of different psychological and psychosocial treatments for people experiencing gambling-related harms.

Summary of the protocol

See Table 1 for a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	**Inclusion:** People aged ≥ 18 years old, currently participating in harmful gambling.
Intervention	**1. Psychological interventions for the treatment of harmful gambling:** • Cognitive & behavioural interventions and related techniques (including but not limited to cognitive behavioural therapy [CBT], cognitive restructuring technique and aversion therapies.) • Other psychotherapeutic interventions for harmful gambling (including but not limited to supportive counselling, harm reduction interventions and psychodrama and dramatherapy). • Trauma informed interventions for addiction (including but not limited to CBT based trauma interventions, eye movement desensitisation and Eriksonian hypnosis). • Neurological/ brain stimulation interventions (including but not limited to transcranial magnetic stimulation [TMS], deep brain stimulation and cognitive bias modification). • Residential treatment (including but not limited to short-term residential treatment, medium and long-term residential treatment and hybrid residential treatment, such as Retreat and Counselling model). • Self-help, digital interventions and helplines (including but not limited to self-help literature and workbooks, personalised feedback interventions and gamification psychotherapy). **2. Psychosocial interventions for the treatment of harmful gambling:** • Life and social skills-based interventions (including but not limited to assertiveness training, life skills training and functional communication training).

	• Family, systemic and significant other interventions (including but not limited to family therapies with varying styles depending on the theoretical underpinning, transgenerational models and the structural family model). • Community and peer support interventions (including but not limited to peer support groups, intentional peer support and SMART recovery). **Combinations** • A combination of 2 or more from the above categories (for example a psychological combined with a psychosocial treatment). • A pharmacological intervention combined with 1 of the above categories.
Comparison	Interventions compared with each other (psychological or psychosocial) or: • A pharmacological treatment • Treatment as usual • Placebo or sham treatment • No treatment (including wait-list controls)
Outcome	**Critical** • Gambling symptom severity • Frequency of gambling sessions • Time spent gambling • Gambling expenditure • Recovery capital • Psychological wellbeing • Personal, social and life functioning • Adverse events such as suicide, self-harm, or unplanned acute mental health hospital admission. **Important** • Physical and mental health related quality of life

CBT: Cognitive behavioural therapy; TMS: Transcranial magnetic stimulation;

For further details see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in appendix A, and methods specific to the NMA are summarised below and described in appendix L and in the methods document (Supplement 1: methods).

Declarations of interest were recorded according to NICE's conflicts of interest policy.

Summary of methods

Evidence synthesis

Network meta-analysis (NMA) was the main method used to synthesise evidence on psychological and psychosocial interventions included in this review. NMA was employed to assess the following outcomes:

- Gambling symptom severity, reported in the included studies either as a score on a continuous severity scale or as the average number of diagnostic criteria met, and expressed as standardised mean difference (SMD) of gambling symptom change scores from baseline to treatment endpoint

- Gambling frequency

The main (base-case) analyses for both gambling symptom severity and gambling frequency utilised intention-to-treat (ITT) data. In studies where ITT data were not available or possible to estimate, the NMA included imputed ITT data using completer case (CC) data and using the baseline observation carried forward (BOCF) method for imputation.

Pairwise meta-analysis was undertaken to assess the following outcomes:

- Follow-up data on gambling symptom severity and frequency of gambling sessions
- Time spent gambling, gambling expenditure, and psychological wellbeing
- Personal, social, and life functioning
- Physical and mental health related quality of life

Analysis for the outcomes of recovery capital and adverse events was also planned but no data for these outcomes were located.

Class models

Due to the large number of interventions included in this review, comparing all pairs of interventions individually within the NMA (and also in the pairwise meta-analysis) would require multiple comparisons and complex consideration and interpretation of the evidence. Moreover, some interventions included in the systematic review had been tested on small numbers of participants and their effects were characterised by considerable uncertainty. For these reasons, the NMAs utilised class models. Psychological therapies were grouped according to common theoretical structure and methodological approach, using relevant information extracted from the included studies. Interventions within a class were expected to have similar (but not necessarily identical) effects. The final grouping of interventions into classes was approved by the committee.

Following appropriate tests of fit, fixed class effect models were used for both outcomes examined in the NMA, which assume that all interventions in a class share the class effect, due to lack of adequate data to allow estimation of individual intervention effects within each class.

Bias adjustment NMA models and other sensitivity analysis

As the NMAs included a significant number of small studies, a bias-adjusted analysis was carried out on each outcome (gambling symptom severity and gambling frequency), which adjusted for bias associated with small study size effects by including a covariate effect for 1/N for active vs control comparisons, where N is the sample size. The analysis was based on the assumption that the smaller the study the greater the bias. The analysis assumed possible bias in comparisons of active interventions versus inactive control; no bias was assumed between inactive control comparisons, and also no bias was assumed between active intervention comparisons.

Moreover, analyses adjusting for potential bias associated with the source of funding were undertaken for the outcomes of gambling symptom severity and gambling frequency, by including a covariate effect if a study reported receiving industry funding or if industry funding was unclear, assuming bias favouring the active interventions versus inactive controls for trials with industry and unclear funding; no bias was assumed between inactive control comparisons, and also no bias was assumed between active intervention comparisons.

In addition, a sensitivity analysis was conducted including only studies classified as not receiving industry funding.

Finally, as the main (base-case) analyses for both gambling symptom severity and gambling frequency were conducted for the full dataset, including ITT data where available and

imputed ITT data from studies reporting CC data using the BOCF method for imputation, sensitivity analysis were run using the following subsets of the full dataset:

- Studies reporting ITT only
- Studies reporting CC only (without imputation)

Presentation of the NMA results

For both outcomes (gambling symptom severity and gambling frequency), results of the NMAs are presented as the posterior mean SMD of change scores, with 95% Credible Intervals (CrI), for each treatment class compared with no treatment, which was selected as the reference treatment as it is considered to represent standard of care for the majority of people experiencing gambling-related harms in England. Results are provided for the base-case analysis of the full dataset as well as for sensitivity analyses. Results of bias-adjusted analyses are not presented, as the bias models did not indicate statistical evidence of bias associated with small study size or source of funding.

Detailed methods and results of the NMA are provided in appendix L and supplement 4: NMA data and results.

Presentation of the pairwise comparisons results

For pairwise comparisons, meta-analyses using random-effects models were conducted to combine results from similar studies. An ITT approach was taken where possible. Continuous outcomes were assessed using SMD and dichotomous outcomes using relative risk (RR) (see the methods document - supplement 1: methods).

Effectiveness evidence

Included studies

Forty-eight studies reported in 51 papers were included analysis for this review, 1 reporting a non-randomised controlled trial (Zhuang 2018), and 50 papers reporting randomised controlled trials (RCTs: Abbott 2012 and Abbott 2018, Armstrong 2020, Bouchard 2017, Boudreault 2018, Bucker 2018, Bucker 2021, Campos 2016, Carlbring 2008, Cunningham 2019, Cunningham 2012, Cunningham 2009, Diskin 2009, Dowling 2007, Dowling 2021, Ede 2020, Grant 2009, Hodgins 2001 and Hodgins 2004, Hodgins 2019, Hodgins 2009, Jonas 2020, Korman 2008, LaBrie 2012, Ladouceur 2001, Ladouceur 2003, Larimer 2012, Lee 2015, Luquiens 2016, Marceaux 2011, Martens 2015, McIntosh 2016, Milton 2002, Myrseth 2009, Myrseth 2011, Neighbors 2015, Nilsson 2019, Oei 2018, Petry 2006, Petry 2016, Petry 2008, Petry 2009, Rodda 2018, Smith 2015, So 2020, Thomas 2017, Toneatto 2009, Toneatto 2016, Wittekind 2019, and Wong 2015).

Thirteen papers reported studies conducted in the USA (Armstrong 2000, Campos 2016, Cunningham 2019, Grant 2009, LaBrie 2012, Larimer 2012, Marceaux 2011, Martens 2015, Neighbors 2015, Petry 2006, Petry 2016, Petry 2008, Petry 2009), 15 reported studies conducted in Canada (Bouchard 2017, Boudreault 2018, Cunningham 2012, Cunningham 2019, Diskin 2009, Hodgins 2001, Hodgins 2004, Hodgins 2019, Hodgins 2009, Korman 2008, Ladouceur 2003, Ladouceur 2001, Lee 2015, Toneatto 2009 and Toneatto 2016), 7 reported studies conducted in Australia (Dowling 2007, Dowling 2021, McIntosh 2016, Milton 2002, Oei 2018, Rodda 2018, Smith 2015), 4 in Germany (Bucker 2018, Bucker 2021, Jonas 2020, Wittekind 2019), 2 reported studies conducted in Sweden (Carlbring 2008, Nilsson 2019), 2 reported studies conducted in Norway (Myrseth 2009, Myrseth 2011), 2 reported studies conducted in New Zealand (Abbott 2012 and Abbott 2018), 1 reported a study conducted in Nigeria (Ede 2020), 1 reported a study conducted in France (Luquiens 2016), 1 reported a study conducted in Japan (So 2020), and 2 reported studies conducted in Hong Kong (Wong 2015 and Zhuang 2018).

Four studies compared self-help interventions with guided self-help interventions (Dowling 2021, Hodgins 2001, Hodgins 2004 and Hodgins 2019), while Hodgins 2001 and Hodgins 2004 also included a waitlist control and Hodgins 2019 another self-help and waitlist control group. Four studies compared self-help interventions with other self-help interventions with no or minimal support (Cunningham 2012, LaBrie 2012, Luquiens 2016 and Martens 2015), while LaBrie 2012 and Cunningham 2012 also included a waitlist control group, Martens 2015 a no treatment group, and Luquiens 2016 a guided self-help group and waitlist control group. Four studies compared self-help interventions with a waitlist control (Bucker 2018, Bucker 2021, Cunningham 2009 and Oei 2018). Three studies compared self-help interventions with an attention placebo (Armstrong 2020, Neighbors 2015, Wittekind 2019) and 3 studies compared self-help interventions with no treatment or treatment as usual (Cunningham 2019, So 2020 and Rodda 2018).

Seventeen studies reported in 18 papers compared individual CBT treatment with other treatments. Some studies included more than one comparison (Thomas 2017, Toneatto 2009, Toneatto 2016). The comparisons included:

- other individual CBT treatment (Bouchard 2017, McIntosh 2016 and Milton 2002),
- group CBT and a waitlist control (Dowling 2007)
- self-help (Petry 2006 and Petry 2016),
- motivational interviewing, self-help and no treatment (Petry 2008 and Petry 2009)
- individual behavioural therapy (Smith 2015, Thomas 2017, Toneatto 2009 and Toneatto 2016)
- motivational interviewing and counselling (Thomas 2017),
- motivational interviewing (Toneatto 2009 and Toneatto 2016)
- a pharmacological intervention (Myrseth 2011)
- the twelve-step programme (Marceaux 2011)
- individual behavioural therapies (Korman 2008)
- treatment as usual (Grant 2009)
- a waitlist control group (Ladouceur 2003 and Ladouceur 2001).

Five studies compared guided self-help to other treatments. One compared to individual CBT treatment (Boudreault 2018), 1 to a waitlist control (Carlbring 2008), and 3 to guided self-help (Hodgins 2009, Jonas 2020 and Nilsson 2019), while Jonas 2020 also included a waitlist control group.

Three studies compared group CBT treatment to a waitlist control (Ede 2020, Ladouceur 2003 and Myrseth 2009), 1 study compared group CBT combined with treatment as usual to treatment as usual (Wong 2015) and 1 study compared group CBT treatment to an attention placebo (Zhuang 2019).

One study compared motivational interviewing to guided self-help and treatment as usual (Abbott 2012/2018), 1 study compared motivational interviewing to an attention placebo (Diskin 2009) and 1 study compared motivational interviewing to group CBT (Larimer 2012).

Data for the following outcomes were identified through analysis of the included studies:

- gambling symptom severity
- frequency of gambling sessions
- time spent gambling
- gambling expenditure
- psychological wellbeing
- personal, social and life functioning

- physical and mental health related quality of life

The included studies are summarised in Table 2.

See the literature search strategy in appendix B and study selection flow chart in appendix C.

Excluded studies

Studies not included in this review are listed, and reasons for their exclusion are provided in appendix J.

Summary of included studies

Summaries of the studies that were included in this review are presented in Table 2.

Table 2: Summary of included studies.

Study	Population	Intervention	Comparison	Outcomes
Abbott 2012 Abbott 2018 RCT New Zealand No industry funding	N=462 people experiencing harmful gambling Age in years [Mean (SD)]: MI: 39.1 (13.1) Guided self-help (brief MI): 39.9 (11.7) Guided self-help (CBT workbook): 37.5 (13.1) TAU: 40.3 (13.6) Sex (n): MI: M=53, F=59 Guided self-help (brief MI): M=53, F=64 Guided self-help (CBT workbook): M=64, F=52 TAU: M=48, F=68 Gambling symptom severity scale and score [Mean (SD)]: not reported	<u>MI (Brief motivational interviewing)</u> Brief motivational interview (1 session) + self-guided cognitive-behavioural workbook + 4 motivational booster calls lasting 10-15min each <u>Guided self-help (brief MI)</u> Brief motivational interview aiming to build commitment and reasons to change (1 session) <u>Guided self-help (CBT workbook)</u> Brief motivational interview + self-guided cognitive-behavioural workbook (5 sessions)	<u>Treatment as usual</u> Protocolled version of the helpline's standard care including brief screening, problem identification and information and referral to face-to-face or other counselling services; any MI aspects were excluded	• Gambling symptom severity • Frequency of gambling sessions • Gambling expenditure • Psychological wellbeing • Quality of life

Study	Population	Intervention	Comparison	Outcomes
Armstrong 2020 RCT US No industry funding	N=94 people experiencing harmful gambling Age in years [Mean (SD)]: 36.6 (9.8) Age by treatment group, not reported. Sex (n): M=45, M=48 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: not reported	Self-help with no or minimal support (computerised analytical training) First intervention task was an extended version based on the Gambler's Fallacy Questionnaire, multiple choice questionnaire followed by showing responses and correct answers to educate participants on common judgment errors regarding gambling. Weekly surveys measured prior week gambling involvement. Participants were also provided with extended GFQ.	Attention placebo: Questionnaire only focused on gambling trivia, no feedback provided.	• Frequency of gambling sessions • Gambling expenditure
Bouchard 2017 RCT Canada No industry funding	N=25 people experiencing harmful gambling according to DSM-5 criteria Age in years [Mean (SD)]: 47 (12.8) Age by treatment group, not reported. Sex (n): M=13, F=12 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: CPGI 29.96 (3.7) Gambling symptom severity	CBT individual (face-to-face): CBT + 2 imaginal exposure exercises CBT: 28-day traditional inpatient CBT program Two sessions focusing on identifying high risk of gambling situations and practising relapse prevention Imaginal exposure: Participants Imagined gambling situations that trigger cravings and relived these for 20min.	CBT individual (face-to-face): CBT + VR (2 imaginal exposure exercises conducted using VR)	• Gambling symptom severity • Remission

Study	Population	Intervention	Comparison	Outcomes
	by treatment group, not reported.			
Boudreault 2018 RCT Canada No industry funding	N=62 people at risk of experiencing harmful gambling and people experiencing harmful gambling Age in years [Mean (SD)]: Guided self-help: 53.06 (12.01) Waitlist: 50.00(11.35) Sex (n): Guided self-help: M=19, F=12 Waitlist: M=19, F=12 Gambling severity scale and score [Mean (SD)]: PGSI 5.49 (2.06) Gambling symptom severity by treatment group, not reported.	<u>Guided self-help (CBT workbook with support)</u> MI's conducted at baseline, the third and eighth week following mailing of the workbook. Interview guide whereby therapist elicited change talk in the gambler tackling motivations and advantages to modify gambling behaviour. Workbook: Updated version of "JEu me questionnae". 145-page French workbook emphasizing gambler's motivation and benefits to change, identifying high-risk gambling situations and strategies, setting treatment goals, identifying gambling-related thoughts, and focusing on cognitive restructuring and relapse prevention. Intervention lasted 11 weeks.	Waitlist	• Remission • Frequency of gambling sessions • Gambling expenditure
Bucker 2018 RCT Germany Any industry funding	N=140 people experiencing harmful gambling Age in years [Mean (SD)]: Self-help with no or minimal support: 34.42	<u>Self-help with no or minimal support (computerised CBT):</u> Program addressing depressive symptoms in ten	Waitlist	• Gambling symptom severity • Other outcomes (depression, anxiety)

Study	Population	Intervention	Comparison	Outcomes
	(10.74) Waitlist: 37.04 (9.53) Sex (n): Self-help with no or minimal support: M=54, F=17 Waitlist: M=53, F=16 Gambling symptom severity scale and score [Mean (SD)]: Self-help with no or minimal support: SOGS 9.75(4.13) Waitlist: SOGS 9.71 (3.24)	modules with therapeutic content broadly based on CBT. Each module can be completed in 10-60minutes. Intervention lasted 8 weeks		
Bucker 2021 RCT Germany No industry funding	N=156 people experiencing harmful gambling Age in years [Mean (SD)]: Self-help with no or minimal support:33.83 (11.26) Waitlist: 36.29 (11.22) Sex (n): Self-help with no or minimal support: M=50, F=27 Waitlist: M=51, F=22 Gambling symptom severity scale and score [Mean (SD)]: Self-help with no or minimal support: SOGS 10.18 (2.85) Waitlist: 10.49 (3.00)	Self-help with no or minimal support (computerised CBT): Self-guided internet-based intervention adapted for pathological gambling problems. Also access to treatment as usual (such as outpatient psychotherapy or medication). Intervention lasted 8 weeks.	Waitlist	• Gambling symptom severity • Other outcomes (depression)

Study	Population	Intervention	Comparison	Outcomes
Campos 2016 RCT US No industry funding	N=87 people experiencing harmful gambling Age in years [Mean (SD)]: Self-help with no or minimal support:43.3 (10.8) Guided self-help: 45.1 (11.0) Sex (n): Self-help with no or minimal support: M=28, F=12 Guided self-help: M= 38, F=9 Gambling symptom severity scale and score [Mean (SD)]: Self-help with no or minimal support: SOGS 11.1 (4.6) Guided self-help: SOGS 10.3 (4.3)	<u>Self-help with no or minimal support (CBT workbook):</u> Participants were asked to complete one chapter of the workbook before each study visit. Visits occurred at week 2, 4, 8, 12, and 20 lasting about 15 minutes whereby participants also completed one measure of gambling symptoms, and research assistants ensured that participants completed the required chapter. No guidance was provided.	<u>Guided self-help (CBT workbook with support):</u> Participants also completed one chapter of the workbook before each study visit which also occurred at week 2, 4, 8, 12, and 20. Participants met with a PhD-level psychologist and their answers were discussed and the therapists provided supportive feedback for gambling behaviour change. Sessions lasted around 45-50 minutes each.	• Gambling symptom severity • Abstinence
Carlbring 2008 RCT Sweden No industry funding	N= 66 people who experience harmful gambling Age in years [Mean (SD)]: 31.9(9.8) Age by treatment group, not reported. Sex (n): M= 62, F=4 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: NODS 8.03(1.36) Gambling	<u>Guided self-help (computerised CBT with support):</u> Intervention consists of 8 modules with first four modules focusing on motivational interviewing and the other 4 modules focusing on CBT. Feedback on homework assignment was provided within 24h via email. Once weekly the therapist called the participant to provide motivation and encouragement.	Waitlist	• Other outcomes (anxiety, depression, quality of life)

Study	Population	Intervention	Comparison	Outcomes
	symptom severity by treatment group, not reported.	Each conversation lasting about 15minutes. Therapists were social workers with 2-year training in CBT and MI.		
Cunningham 2019 RCT USA No industry funding	N=321 people experiencing harmful gambling Age in years [Mean (SD)]: 36.5(10.9) Age by treatment group, not reported. Sex (n): M=177. F=144 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: Meet diagnostic PGSI 11.5(5) Gambling symptom severity by treatment group, not reported.	<u>Self-help with no or minimal support (computerised personalised feedback):</u> 6-week online self-help booklets developed by Hodgins et al	No treatment	• Gambling symptom severity
Cunningham 2012 RCT Canada Any industry funding	N=209 people experiencing harmful gambling Age in years [Mean (SD)]: 46.6(13.9) Age by treatment group, not reported. Sex (n): M=110, F=99 Sex by treatment group, not reported.	<u>Self-help with no or minimal support (personalised feedback intervention):</u> Full personalised normative feedback intervention: Workbook includes information on summary of different types of gambling including	<u>Waitlist</u>	• Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
	Gambling symptom severity scale and score [Mean (SD)]: PGSI 7.2(4.8) Gambling symptom severity by treatment group, not reported.	gambling behaviours comparisons to other Canadians. Participants provide information on their gambling behaviours and get feedback of their PGSI score, classification, and a list of problems reported on the PGSI. <u>Self-help with no or minimal support (personalised feedback intervention)</u>: Partial feedback condition containing same feedback information as the other intervention except normative feedback (no comparisons to general population provided)		
Cunningham 2009 RCT Canada Any industry funding	N= 49 people experiencing harmful gambling Age in years [Mean (SD)]: Self-help with no or minimal support: 41.2 (9.2) Waitlist: 47.5 (11.8) Sex (n): Self-help with no or minimal support: M=9, F=13 Waitlist: M=15, F=10 Gambling symptom severity	<u>Self-help with no or minimal support (personalised feedback intervention)</u>: Workbook includes information on summary of different types of gambling including gambling behaviours comparisons to other Canadians. Participants provide information on their gambling behaviours and get feedback of their CPGI score, classification, a	Waitlist	• Gambling symptom severity • Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
	scale and score [Mean (SD)]: Self-help with no or minimal support: CPGI 15.4 (5.0) Waitlist: CPGI 14.5 (5.6)	list of problems reported on the CPGI, descriptions on the types of gambling cognitions, and a list of techniques for person to reduce their gambling. Length of the workbook varied depending on the number of gambling activities the individual participates in.		
Diskin 2009 RCT Canada Unclear funding source	N= 81 people experiencing harmful gambling Age in years [Mean (SD)]: 45(10.6) Age by treatment group, not reported. Sex (n): M=35, F=81 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: PGSI 15.7(5.1) Gambling symptom severity by treatment group, not reported.	<u>MI (brief motivational interviewing):</u> Therapists used counselling skills incorporating the MI approach including reflective listening, summarising, and supporting self-efficacy. The interview was manualised to ensure participants were offered a similar experience. Two doctoral students who received extensive training each delivered half of the control and MI interviews.	<u>Attention placebo (brief semi-structured interview):</u> During the interview participants were asked to talk about their gambling behaviour. Therapists led the semi-structured interviews and avoided any form of MI. Therapists responded naturally to participants without using any form of summary that would be considered MI.	• Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
Dowling 2007 RCT Australia Unclear funding source	N= 56 females experiencing harmful gambling Age in years [Mean (SD)]: CBT individual: 43.5 (8.0) CBT group: 42.6 (11.7) Waitlist: 44.3 (11.0) Sex (n): CBT individual: M=0, F=14 CBT group: M=0, F=17 Waitlist: M=0, F=25 Gambling symptom severity scale and score [Mean (SD)]: CBT individual: DSM-IV: 7.4 (1.6) CBT group: DSM-IV: 7.0 (1.4) Waitlist: DSM-IV: 6.8 (1.7)	<u>CBT individual (face-to-face):</u> 12 sessions of cognitive behavioural program. Halfway through the program participants completed a 20-minute imaginal desensitisation program. Sessions were 1.5h long and completed within a maximum of 51 weeks. <u>CBT group (face-to-face):</u> 12 weekly group sessions of behavioural program lasting 2h. Groups consisted of 4-6 participants.	Waitlist	• Remission • Frequency of gambling sessions • Gambling expenditure • Other outcomes (depression, anxiety)
Dowling 2021 RCT Australia Any industry funding	N= 207 people experiencing harmful gambling Age: not reported Sex (n): Guided self-help: M=67, F=38 Self-help with no or minimal support: M=66, F=35 Gambling symptom severity scale and score [Mean (SD)]: not reported	<u>Guided self-help (Computerised CBT with support):</u> Programme comprising of 4 modules with 13-15 activities each, taking approximately one to two hours to complete. The programme comprises MI, behavioural, cognitive, and relapse prevention modules designed as an 8-week intervention.	<u>Self-help (with no or minimal support):</u> Weekly appointment-based email guidance across an 8-week period. Guidance comprised of one contact per week with a maximum duration of 20min per contact.	• Gambling symptom severity • Frequency of gambling sessions • Gambling expenditure • Psychological wellbeing

Study	Population	Intervention	Comparison	Outcomes
Ede 2020 RCT Nigeria No industry funding	N= 40 college students experiencing harmful gambling Age in years [Mean (SD)]: CBT group: 23.3 (4.02) Waitlist: 22.75 (3.11) Sex [M/F (%)]: CBT group: M=12, F=8 Waitlist: M=16, F=4 Gambling symptom severity scale and score [Mean (SD)]: GSAS36.31(1.79) Gambling symptom severity by treatment group, not reported.	<u>CBT group (face-to-face):</u> 8 weekly 40min sessions designed to help people who participate in harmful gambling by reducing the amount of gambling and changing and reducing psychological symptoms including illusion of impulsivity. Sessions were conducted by two therapists (1male, 1 female) who are trained in counselling psychology and had PhD training in CBT including briefing and guidance on how to use the manual.	Waitlist	• Gambling symptom severity
Grant 2009 RCT US No industry funding	N= 68 people experiencing harmful gambling Age in years [Mean (SD)]: 48.7(12.8) Age by treatment group, not reported. Sex (n): M=25, F=43 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: GSAS 29.76 (7.81) Gambling symptom severity by treatment	<u>CBT individual (face-to-face):</u> Manualised imaginal desensitisation plus motivational interviewing (IDMI). Six 1h sessions over 8-weeks. Sessions focused on psychoeducation, motivational enhancement, functional analysis, behavioural strategies, coping with gambling urges, changing irrational thinking, imaginal desensitizations, relaxation training, cognitive skills, relapse prevention and assertiveness	<u>Treatment as usual</u> Referral to gamblers anonymous	• Gambling symptom severity • Abstinence • Other outcomes (depression, anxiety, functional impairment, quality of life)

Study	Population	Intervention	Comparison	Outcomes
	group, not reported.	training.		
Hodgins 2001 Hodgins 2004 RCT Canada No industry funding	N= 102 people experiencing harmful gambling Age in years [Mean (SD)]: 46.0(9) Age by treatment group, not reported. Sex (n): M=49, F=53 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: SOGS 12(3.7) Gambling symptom severity by treatment group, not reported.	<u>Self-help with no or minimal support (CBT workbook):</u> Self-help workbook received through mail following MI interview. <u>Guided self-help (brief MI):</u> Self-help workbook (Becoming a winner: Defeating Problem Gambling) based on CBT and relapse prevention techniques received through mail. The workbook consists of several sections including self-assessment (to increase individuals' awareness of consequences of gambling), goal setting (to facilitate cognitive appraisals), strategies (5 cognitive behavioural strategies), maintenance (to prepare individual to cope with relapse). <u>MI:</u> Basic gambling information was obtained followed by motivational interview to help build commitment to change by using principles of	Waitlist	• Frequency of gambling sessions • Abstinence • Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
		motivational enhancement therapy. MI lasted between 20 and 40 minutes conducted by 2 authors.		
Hodgins 2019 RCT Canada No industry funding	N=187 people experiencing harmful gambling Age in years [Mean (SD)]: Self-help with no or minimal support (intervention): 46.8 (11.8) Self-help with no or minimal support (Waitlist): 46.7 (12.2) Sex (n): Self-help with no or minimal support (intervention): M=49, F=44 Self-help with no or minimal support (control): M=50, F=44 Gambling symptom severity scale and score [Mean (SD)]: Self-help with no or minimal support (intervention): PGSI 14.5 (5.2) Self-help with no or minimal support (control): PGSI 16.5 (5.4)	Self-help with no or minimal support (computerised personalised feedback): Brief intervention: Participants completed a brief assessment and received the personalised feedback report "Check your Gambling (CYG)". CYG provides normative feedback, and brief advice on how to reduce or stop gambling. This intervention has previously been evaluated with small effects.	Self-help with no or minimal support (computerised personalised feedback): Extended intervention: Self-Change tools (SCTs) extended intervention is an online tool with self-help strategies to reduce or stop gambling based on behavioural and cognitive strategies. Content of the tool was from evaluated self-written material.	• Frequency of gambling sessions

Study	Population	Intervention	Comparison	Outcomes
Hodgins 2009 RCT Canada No industry funding	N=314 people experiencing harmful gambling Age in years [Mean (SD)]: Guided self-help (brief MI): 40.3 (11.3) Guided self-help (CBT workbook with support): 41.4 (11.4) Self-help with no or minimal support: 39.9 (12.0) Waitlist: 39.8 (12.0) Sex (n): Guided self-help (brief MI): M=37, F=46 Guided self-help (CBT workbook with support): M=37, F=47 Self-help with no or minimal support: M=37, F=45 Waitlist: M=29, F=36 Gambling symptom severity scale and score [Mean (SD)]: Guided self-help (brief MI): SOGS 10.9 (3.0) Guided self-help (CBT workbook with support): SOGS 41.4 (11.4) Self-help with no or minimal support: SOGS 39.9 (12.0) Waitlist: SOGS 39.8 (12.0)	<u>Guided self-help (brief MI):</u> Brief treatment: Motivational Interview (MI) followed with self-help workbook. MI worked towards building a commitment to change which was based on 5 therapeutic principles. Self-help workbook uses self-assessment and goal setting using a cognitive behavioural approach. <u>Guided self-help (CBT workbook with support):</u> Brief Booster treatment. Same MI followed with self-help workbook with additional telephone support. Therapists contacted participants at week 2, 6, 10, 16, 24, and 34. <u>Self-help with no or minimal support (CBT workbook):</u> Workbook only: Participants received the workbook only via email with not contact to a therapist.	Waitlist	• Frequency of gambling sessions • Gambling improvement

Study	Population	Intervention	Comparison	Outcomes
Jonas 2020 RCT Germany No industry funding	N= 167 people experiencing harmful gambling Age in years [Mean (SD)]: Guided self-help (computerised personalised feedback): 33.7 (10.7) Guided self-help (psychoeducational materials): 31.2 (9.1) Waitlist: 35.5 (11.5) Sex (n): Guided self-help (computerised personalised feedback): M=39, F=15 Guided self-help (psychoeducational materials): M=40, F=16 Waitlist: M=41, F=16 Gambling symptom severity scale and score [Mean (SD)]: Guided self-help (computerised personalised feedback): PGSI 16.4 (4.5) Guided self-help (psychoeducational materials): PGSI 16.2 (5.1) Waitlist: PGSI 16.2 (4.8)	<u>Guided self-help (computerised personalised feedback):</u> CO (Check-out). CO offers web-based counselling by trained psychologists for up to 50 days. CO is based on principles of self-regulation and self-control, solution-focused approach, and motivational interviewing. <u>Guided self-help (psychoeducational materials with email support):</u> EC (Email-counselling): Time-lagged message exchange between participant and associated counsellor. EC lasted as long as the CO and counsellors were the same as COs. EC involved steps on how to cope with harmful gambling which were discussed in the messages. Participants were encouraged to work through PDF worksheets containing tips on how to overcome harmful gambling.	Waitlist	• Gambling symptom severity • Abstinence • Gambling expenditure • Other outcomes (psychological wellbeing)

Study	Population	Intervention	Comparison	Outcomes
Korman 2008 RCT Canada Any industry funding	N=42 people experiencing harmful gambling with comorbid anger problems Age in years [Mean (SD)]: 47.6 (11.1) Age by treatment group, not reported. Sex (n): M=36, F=6 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: not reported	Behavioural therapies individual (Dialectical behaviour therapy): 14 individual sessions were designed to focus on emotion dysregulation.	CBT individual face-to-face (Brief CBT individual face-to-face): Sessions consisted of variable duration and frequency as determined by the CBT therapist based on individual needs.	• Gambling symptom severity • Remission • Gambling expenditure
LaBrie 2012 RCT US Any industry funding	N=315 people experiencing harmful gambling Age in years [Mean (SD)]: 46.3(12.6) Age by treatment group, not reported. Sex (n): M=183, F=132 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: not reported	Self-help with no or minimal support (psychoeducational workbook): Toolkit: Brief self-help intervention for reducing harmful gambling. The toolkit is an adaptation and composite of inoculation theory, stage change theory, and relapse prevention theory. The toolkit helps participants to work through their ambivalence about change and includes information and decisional devices that add personalised information and includes directives and encouragement on how to quit gambling.	Waitlist	• Frequency of gambling sessions • Abstinence

Study	Population	Intervention	Comparison	Outcomes
		Self-help with no or minimal support (psychoeducational workbook): Guided toolkit: Participants received the toolkit and received a scripted telephone conversation lasting around 5 minutes. The telephone call presented the toolkit and provided the opportunity to ask and answer any questions.		
Ladouceur 2001 RCT Canada Any industry funding	N=88 people diagnosed as experiencing harmful gambling according to DSM-IV criteria Age in years [Mean (SD)]: CBT individual: 40.8 (10.2) Waitlist: 43.3 (10.2) Sex (n): CBT individual: M=31, F=4 Waitlist: M=22, F=7 Gambling symptom severity scale and score [Mean (SD)]: CBT individual: DSM-IV 7.6 (1.6) Waitlist: DSM-IV 7.2 (1.6)	CBT individual (face-to-face): Maximum of 20 weekly CBT sessions lasting 60 minutes each. Treatment was delivered by three experienced cognitive therapists supervised by the first author - a psychologist with over 20 years of experience.	Waitlist	• Frequency of gambling sessions • Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
Ladouceur 2003 RCT Canada Unclear funding source	N=59 people experiencing harmful gambling according to DSM-IV criteria Age in years [Mean (SD)]: CBT group: 42.56 (10.48) Waitlist: 44.56 (10.7) Sex (n) CBT group: M=25, F=9 Waitlist: M=21, F=4 Gambling symptom severity scale and score [Mean (SD)]: CBT group: DSM-IV 8.0 (1.38) Waitlist: DSM-IV 7.26 (1.48)	CBT group face-to-face): 10 weekly group CBT sessions lasting 120minutes each. The treatment consisted of 2 components: cognitive correction and relapse prevention. The primary goal of cognitive correction was to correct participants misconceptions of the basic concept of randomness.	Waitlist	• Remission
Larimer 2012 RCT US No industry funding	N=147 college students experiencing harmful gambling Age in years [Mean (SD)]: 21.2(1.4) Age by treatment group, not reported. Sex (n): M=96, F=51 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: NODS 2.27(1.69) Gambling symptom severity by treatment group, not	MI (brief MI): Sessions with a therapist lasting 60-90 minutes each using MI techniques. CBT group (face-to-face): 6 weekly one hour session. Interventions were delivered by 5 therapist pairs and 7 individual therapists. All had a minimum of a Bachelors level degree. CBI therapist also had a 2day training workshop.	No treatment	• Gambling symptom severity • Gambling expenditure • Frequency of gambling sessions

Study	Population	Intervention	Comparison	Outcomes
	reported.			
Lee 2015 RCT Canada Any industry funding	N=18 people experiencing harmful gambling Age in years [Mean (SD)]: 49.3 (SD not reported) Age by treatment group, not reported. Sex (n): M=12, F=6 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: DSM-IV 8.7 Gambling symptom severity by treatment group, not reported.	<u>Couple intervention (congruence couple therapy):</u> 12 weekly sessions of congruence couple therapy (CCT).	<u>Treatment as usual:</u> Couple were allowed to receive counselling (except CCT)	• Gambling symptom severity

Study	Population	Intervention	Comparison	Outcomes
Luquiens 2016 RCT France Any industry funding	N=1122 people experiencing harmful poker gambling Age in years [Mean (SD)]: 34.7(10.1) Age by treatment group, not reported. Sex (n): M= 1032, F=90 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: PGSI 9(4.7) Gambling symptom severity by treatment group, not reported.	Self-help with no or minimal support (personalised feedback intervention): Feedback on PGSI scores and provided with prevalence information. Self-help with no or minimal support (CBT workbook): Email containing self-help book with no guidance. Guided self-help (CBT workbook with support): Weekly email with self-help book with guidance from trained psychologist.	Waitlist	• Gambling symptom severity • Remission • Frequency of gambling sessions • Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
Marceaux 2011 RCT US Unclear funding source	N=38 people meeting criteria for experiencing harmful gambling Age in years [Mean (SD)]: CBT group: 47.64 (12.1) Twelve step group programme: 47.44 (10.5) Waitlist: 48.56 (10.38) Sex (n): CBT group: M=5, F=6 Twelve step group programme: M=9, F=9 Waitlist: M=1, F=8 Gambling symptom severity scale and score [Mean (SD)]: CBT group: DSM-IV 13.91 (1.22) Twelve step group programme: DSM-IV 12.72 (2.95) Waitlist: DSM-IV 12.33 (3.39)	<u>CBT group (face-to-face):</u> 2x weekly 90minute sessions for 8 weeks. Therapists were Master-level counsellors trained according to the Three-step treatment manual for problem gambling. <u>Twelve step group programme</u>: 2x weekly 90minute sessions for 8 weeks. Therapists were Master-level counselors trained according to the twelve-step facilitating manual. Objectives are treatment in cognitive, emotional, behavioural, social and spiritual areas.	Waitlist	• Remission • Frequency of gambling sessions • Gambling expenditure
Martens 2015 RCT US Any industry funding	N=333 college students experiencing harmful gambling Age in years: [Mean (SD)]: Self-help with no or minimal support (personalised feedback intervention): 21.69 (3.61)	<u>Self-help with no or minimal support (personalised feedback intervention):</u> Participants received general information about gambling tailored to college students. <u>Self-help with no or minimal</u>	No treatment	• Gambling symptom severity • Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
	Self-help with no or minimal support (psychoeducational materials): 22.19 (4.27) No treatment: 21.84 (4.99) Sex (n): Self-help with no or minimal support (personalised feedback intervention): M=69, F=42 Self-help with no or minimal support (psychoeducational materials): M=66, F=47 No treatment: M=64, F=45 Gambling symptom severity scale and score [Mean (SD)]: Self-help with no or minimal support (personalised feedback intervention): CPGI 3.23 (3.43) Self-help with no or minimal support (psychoeducational materials): CPGI 3.76 (3.39) No treatment: CPGI 3.05 (2.69)	support (psychoeducational materials): Included a printout where participants received feedback on social norms data comparing their gambling behaviour, their categorisation of harmful gambling, gambling behaviours during the preceding 2 months.		

Study	Population	Intervention	Comparison	Outcomes
McIntosh 2016 RCT Australia Any industry funding	N=77 people experiencing harmful gambling Age in years [Mean (SD)]: CBT individual: 40.04 (11.08) CBT individual (brief CBT, Intervention): 36.64 (9.65) CBT individual (brief CBT, control): 39.08 (11.47) Sex (n): CBT individual: M=14, F=9 CBT individual (brief CBT, Intervention): M=23, F=5 CBT individual (brief CBT, control): M=18, F=9 Gambling symptom severity scale and score [Mean (SD)]: DSM-5 7.51(1.41) Gambling symptom severity by treatment group, not reported.	<u>CBT individual (face-to-face):</u> 4 manualised CBT sessions which were extracted from Hospital's treatment guideline manual 'Cognitive Behavioural Therapy for Problem Gambling' based on evidence-based treatment. <u>CBT individual (brief CBT):</u> Sessions were developed from mindfulness-based interventions used in 'Mindfulness Based Cognitive Therapy'.	<u>CBT individual (brief CBT):</u> CBT based treatment as usual	• Remission • Frequency of gambling sessions • Improvement
Milton 2002 RCT Australia Any industry funding	N=40 people meeting diagnostic criteria for experiencing harmful gambling according to DSM-IV Age in years [Mean (SD)]: CBT individual (intervention): 39.25 (9.5) CBT individual (control): 35.95 (10.86)	<u>CBT individual (face-to-face):</u> CBT treatment focused on psychoeducation, cognitive restructuring, problem-solving skills, and relapse prevention. Psychologist with 4 years of clinical experience conducted the treatment under supervision of a clinician with 20 years of	<u>CBT individual (brief CBT):</u> Participants also received compliance-improving interventions in addition to the CBT treatment.	• Gambling symptom severity • Remission

Study	Population	Intervention	Comparison	Outcomes
	Sex (n): M=29, F=11 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: SCIP 6.18(0.69) Gambling symptom severity by treatment group, not reported.	experience. Eight one-to-one counselling sessions of 90 minutes in length provided the treatment.		
Myrseth 2009 RCT Norway Unclear funding source	N=14 people meeting diagnostic criteria for experiencing harmful gambling according to DSM-IV Age in years [Mean (SD)]: CBT group: 36.57 (8.4) Waitlist: 38.29 (11.15) Sex (n): CBT group: M=4, F=7 Waitlist: M=7, F=0 Gambling symptom severity scale and score [Mean (SD)]: CBT group: DSM-IV 7.86 (1.35) Waitlist: DSM-IV 8.71 (1.11)	<u>CBT group (face-to-face):</u> 6 group meetings lasting 2h each within 3 months. CBT program followed a manual by Bergen Clinics focusing on motivation, ambivalence, decision-making, problem solving, and relapse prevention. CBT program was delivered by two trained psychology graduate students with supervision from a specialist in clinical psychology	Waitlist	• Remission • Gambling expenditure • Improvement

Study	Population	Intervention	Comparison	Outcomes
Myrseth 2011 RCT Norway No industry funding	N=35 people experiencing harmful gambling Age in years [Mean (SD)]: CBT individual: 29.7 (8.2) SSRI: 35.8 (10.8) Sex (n): CBT individual: M=13, F=2 SSRI: M=13, F=2 Gambling symptom severity scale and score [Mean (SD)]: CBT individual: NODS 7.5 (1.3) SSRI: NODS 8.2 (1.2)	<u>CBT individual (face-to-face):</u> 8 weekly sessions lasting 50minutes each based on patient and therapist manuals and using a motivational interviewing style. Treatments were delivered individually by one therapist with a degree in clinical psychology with experience in group therapy in CBT for harmful gambling. Therapist was also supervised by a specialist in psychology with extensive experience with CBT treatments	<u>SSRI (Escitalopram):</u> CBT treatment + Escitalopram: Participants received escitalopram for 8 weeks followed by escitalopram plus CBT treatment for 8 weeks. Dosage started at 5 mg/day for the first week, increasing to 10 mg/day the following week and finally to 20 mg/day for the remaining 14 treatment weeks.	• Gambling symptom severity • Remission • Gambling expenditure • Other outcomes (depression)
Neighbors 2015 RCT USA Any industry funding	N=252 college students experiencing harmful gambling Age in years [Mean (SD)]: 23.1(5.3) Age by treatment group, not reported. Sex (n): M=150, F=102 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: GPI 3.69(6.49) Gambling symptom severity by treatment group, not reported.	<u>Self-help with no or minimal support (personalised feedback intervention):</u> Personalised normative feedback (PNF) involving 4 components: participants own frequency, expenditure and time spent gambling, perceptions of other participants, actual norms, percentile ranking	<u>Attention placebo (attention-control feedback):</u> Attention control feedback included information on number of hours spent studying for class, watching TV and exercising, amount of money spent on fast food, number of students with a part time job, and number of times students check Facebook.	• Gambling symptom severity • Gambling expenditure • Frequency of gambling sessions

Study	Population	Intervention	Comparison	Outcomes
Nilsson 2019 RCT Sweden Any industry funding	N= 168 people experiencing harmful gambling Age in years [Mean (SD)]: Guided self-help (intervention): 35.8 (12.2) Guided self-help (control): 35.4 (11.5) Sex (n): Guided self-help (intervention): M=55, F=12 Guided self-help (control): M=56, F=12 Gambling symptom severity scale and score [Mean (SD)]: Guided self-help (intervention): NODS 6.6 (2.2) Guided self-help (control): NODS 6.4 (2.3)	<u>Guided self-help (computerised CBT with support):</u> CBT only: Only people experiencing harmful gambling received the modules. <u>Guided self-help (computerised behavioural couples therapy with support):</u> CBT treatment + concerned significant others (CSO): Both groups received the modules. Both treatments consisted of 10 therapist guided self-help modules administered within a 12 weeks peiod. Participants received weekly support from the therapist by telephone and email. Therapists spent 15 minutes with each participant each week.	<u>Guided self-help (computerised behavioural couples therapy with support):</u> CBT treatment + concerned significant others (CSO): Both groups received the modules.	• Gambling symptom severity
Oei 2018 RCT Australia No industry funding	N=110 people experiencing harmful gambling Age in years [Mean (SD)]: Self-help with no or minimal support: 49.78 (15.07) Waitlist: 48.97 (13.04) Sex (n): Self-help with no or minimal support: M=12, F=11	<u>Self-help with no or minimal support (CBT workbook):</u> Participants completed a self-help CBT manual. The manual includes components normally included in CBT treatment including cognitive correction of erroneous perceptions about gambling, problem solving	Waitlist	• Gambling symptom severity • Gambling expenditure • Frequency of gambling sessions • Other outcomes (psychological wellbeing, depression, anxiety, quality of life, psychological wellbeing)

Study	Population	Intervention	Comparison	Outcomes
	Waitlist: M=15, F=17 Gambling symptom severity scale and score [Mean (SD)]: Self-help with no or minimal support: CPGI 16.04 (6.95) Waitlist: CPGI 18.53 (4.79)	skills and relapse prevention. Participants were required to complete each chapter on a weekly basis over 7 weeks.		
Petry 2006 RCT US No industry funding	N=231 people experiencing harmful gambling Age in years [Mean (SD)]: CBT individual: 44.4 (11.7) Self-help with no or minimal support: 44.3 (9.4) Treatment as usual: 45.8 (11.6) Sex (n): CBT individual: M=30, F=33 Self-help with no or minimal support: M=48, F=36 Treatment as usual: M=49, F=35 Gambling symptom severity scale and score [Mean (SD)]: CBT individual: DSM-IV 7.3 (3.0) Self-help with no or minimal support: DSM-IV 7.4 (1.7) Treatment as usual: DSM-IV 7.3 (1.8)	<u>CBT individual (brief individual CBT):</u> Participants also received individual 1h therapist sessions once a week for 8 weeks. Sessions included discovering triggers, functional analysis, increasing pleasant activities, self-management planning, coping with the urge to gamble, assertiveness training, changing irrational thinking, and relapse prevention. <u>Self-help with no or minimal support (CBT workbook & referral to GA):</u> Participants also received a 70-page workbook containing CB exercises and were instructed to complete one chapter a week for 8 weeks.	<u>Treatment as usual</u>: Gamblers Anonymous alone: Participants received location and times of GA meetings and were encouraged to attend meetings.	• Gambling symptom severity • Remission

Study	Population	Intervention	Comparison	Outcomes
Petry 2016 RCT US Unclear funding source	N= 217 substance abuse treatment patients experiencing harmful gambling with comorbid substance abuse Age in years [Mean (SD)]: CBT individual: 40.9 (10.5) Self-help with no or minimal support (intervention): 42.1 (10.3) Self-help with no or minimal support (control): 42.7 (11.3) Sex (n): CBT individual: M=48, F=21 Self-help with no or minimal support (intervention): M=40, F=26 Self-help with no or minimal support (control): M=61, F=21 Gambling symptom severity scale and score [Mean (SD)]: CBT individual: SOGS 7.7 (2.6) Self-help with no or minimal support (intervention): SOGS 7.8 (2.8) Self-help with no or minimal support (control): SOGS 7.9 (3.9)	CBT individual (brief MI): Participants met with a therapist for a 50minute MET session, where they received personalised feedback, explored positive and negative consequences of gambling, and discussed how gambling fits within their goals and values. Participants were encouraged to return to 3 CBT sessions for 3 weeks. Self-help with no or minimal support (psychoeducational material): A therapist provided a 10-15minute intervention describing participant's gambling behaviour compared to the general population and included steps to reduce their gambling. Participants were reminded of follow-ups and provided with a phone number to call in case of experiencing increases in gambling.	Self-help with no or minimal support (personalised feedback intervention): One-page handout describing basic information about gambling was provided and reviewed by a therapist in a 10-15min session. No further advice was provided. Participants were reminded of follow-ups and provided with a phone number to call in case of experiencing increases in gambling.	• Gambling symptom severity • Frequency of gambling sessions

Study	Population	Intervention	Comparison	Outcomes
Petry 2008 RCT US No industry funding	N=180 people experiencing harmful gambling Age in years [Mean (SD)]: CBT individual: 43.5 (14.4) MI: 45.0 (13.8) Self-help with no or minimal support: 44.0 (10.2) No treatment: 41.4 (12.5) Sex (n): CBT individual: M=26, F=19 MI: M=35, F=20 Self-help with no or minimal support: M=22, F=18 No treatment: M=33, F=15 Gambling symptom severity scale and score [Mean (SD)]: CBT individual: NODS 5.1 (3.1) MI: NODS 5.5 (3.3) Self-help with no or minimal support: NODS 5.5 (2.5) No treatment: 5.2 (3.1)	<u>CBT individual (brief MI):</u> Motivational enhancement therapy + CBT: Participants received MET and 3 sessions of CBT with therapist, discussing internal and external triggers, and several coping mechanisms. <u>MI (brief MI):</u> Included one initial 50minute MET session with therapist discussing PNF about participants gambling behaviour, positive and negative consequences of gambling, and how gambling fits within goals and values of participant. <u>Self-help with no or minimal support (personalised feedback intervention):</u> One initial 10-minute brief advice from therapist discussing the participants level of gambling, outlining risk factors, and 4 step advice to retain from harmful gambling.	No treatment	• Gambling symptom severity • Remission • Gambling expenditure
Petry 2009 RCT US	N=117 college students experiencing harmful gambling Age in years	<u>CBT individual (brief MI):</u> Initial MET session plus 3 weekly individual CBT sessions.	No treatment	• Gambling symptom severity • Frequency of gambling sessions

Study	Population	Intervention	Comparison	Outcomes
No industry funding	[Mean (SD)]: CBT individual: 20.2 (1.9) MI: 20.5 (1.4) Self-help with no or minimal support: 20.1 (1.4) No treatment: 20.5 (2.0) Sex (n): CBT individual: M=25, F=7 MI: M=26, F=4 Self-help with no or minimal support: M=19, F=2 No treatment: M=29, F=5 Gambling symptom severity scale and score [Mean (SD)]: CBT individual: SOGS 3.9 (2.9) MI: SOGS 4.2 (3.3) Self-help with no or minimal support: SOGS 4.9 (4.4) No treatment: SOGS 4.3 (3.3)	MI (brief MI): 50-minute MET session with therapist, including personalised feedback, exploring the positive and negative consequences of gambling, and how gambling fits within the life goals. Self-help with no or minimal support (personalised feedback intervention): 10-15minute session with therapist including one page handout describing the participant's level of gambling compared to general college population and including suggestions to reduce further development into harmful gambling.		
Rodda 2018 RCT Australia Any industry funding	N=198 people experiencing harmful gambling and accessing e-mental health services Age in years [Mean (SD)]: Self-help with no or minimal support: 39.1 (12.5) Treatment as usual: 39.5 (11.9) Sex (n): Self-help with no	Self-help with no or minimal support (behaviour change SMS & accessing internet mental health services): Contacted via SMS on weekly basis and included motivational messages and tips on how to reduce urges to gamble	Treatment as usual: Accessing internet mental health service	• Gambling symptom severity • Frequency of gambling sessions • Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
	or minimal support: M=58, F=41 Treatment as usual: M=61, F=38 Gambling symptom severity scale and score [Mean (SD)]: Self-help with no or minimal support: G-SAS 30.3 (7.6) Treatment as usual: G-SAS 17.0 (15.3)			
Smith 2015 RCT Australia Any industry funding	N=99 people experiencing harmful gambling Age in years [Mean (SD)]: CBT individual: 45.5 (12.04) Behavioural therapy: 47.45 (13.88) Sex (n): CBT individual: M=21, F=22 Behavioural therapy: M=22, F=22m Gambling symptom severity scale and score [Mean (SD)]: CBT individual: DSM-IV 43 (100) Behavioural therapy: DSM-IV 40 (90.91)	<u>CBT individual (face-to-face):</u> Participants in each group averagely received 12x 50min individual treatment sessions weekly. Both treatments were written as a session-by-session guide for the therapists. CBT was provided by 2 cognitive behavioural therapists with qualifications in clinical psychology and extensive practice experience.	<u>Behavioural therapy (exposure therapy):</u> Participants in each group averagely received 12x 50min individual treatment sessions weekly. Both treatments were written as a session-by-session guide for the therapists. Exposure therapy provided by cognitive behavioural therapists with postgraduate qualifications in CBT.	• Gambling symptom severity • Frequency of gambling sessions • Other outcomes (psychological wellbeing, functional impairment)
So 2020 RCT Japan	N=254 people experiencing harmful gambling Age in years [Mean (SD)]: Self-help with no	<u>Self-help with no or minimal support (chatbot delivered CBT):</u> Computerised rule based chatbot where participants	No treatment	• Gambling symptom severity • Frequency of gambling sessions • Gambling

Study	Population	Intervention	Comparison	Outcomes
No industry funding	or minimal support: 37.3 (10.6) No treatment: 35.4 (9.0) Sex (n): Self-help with no or minimal support: M=77, F=19 No treatment: M=79, F=21 Gambling symptom severity scale and score [Mean (SD)]: Self-help with no or minimal support: PGSI 16.9 (5.0) No treatment: PGSI 16.7 (4.5)	receive personalised feedback, monitoring, and messages based on CBT. Participants in received monitoring, personalised feedback, and messages based on CBT from the GAMBOT every day for the 28-day trial.		expenditure
Thomas 2017 RCT Australia Any industry funding	N=297 people experiencing harmful gambling Age in years [Mean (SD)]: CBT individual: 51.68 (12.99) Behavioural therapy: 46.16 (15.28) MI: 50.74 (12.89) Counselling: 49.48 (14.27) Sex (n): CBT individual: M=36, F=38 Behavioural therapy: M=45, F=29 MI: M=40, F=33 Counselling: M=41, F=35 Gambling symptom severity scale and score [Mean (SD)]: CBT individual:	<u>CBT individual (face-to-face):</u> Focusing on gambling history, gambling education, cognitive restructuring, challenging gambling specific erroneous cognitions, and relapse prevention. <u>Behavioural therapy (face-to-face):</u> Focusing on gambling history, gambling education, imaginal exposure, reducing urge to gamble, and relapse prevention. <u>MI:</u> Focusing on	<u>Counselling (client-centred therapy):</u> Focusing on engaging with participant and explaining treatment, checking participants ideas on what to focus on in the session, relying on the principles of unconditional positive regard, genuineness, empathy, understanding, reflective listening, staying entirely within the participant's frame or reference and avoidance of volunteering leading questions, interpretations, suggestions or guidance.	• Gambling symptom severity • Frequency of gambling sessions • Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
	PGSI 14.7 (6.5) Behavioural therapy: PGSI 15.8 (7.1) MI: PGSI 14.3 (5.2) Counselling: 14.9 (5.9)	engaging with participant and explaining treatment, checking participants goals, expressing empathy, rolling with resistance, supporting self-efficacy, and developing discrepancy.		
Toneatto 2009 Toneatto 2016 RCT Canada Any industry funding	N=99 people experiencing harmful gambling Age in years [Mean (SD)]: 47.5(13.5) Age by treatment group, not reported. Sex (n): M=73, F=26 Sex by treatment group, not reported. Gambling symptom severity scale and score [Mean (SD)]: DSM-IV 6.5(2.2) Gambling symptom severity by treatment group, not reported.	<u>CBT individual (face-to-face):</u> Focusing on identification and cognitive restructuring of key gambling related distortions. <u>Behavioural therapy (face-to-face):</u> Focusing on action-oriented strategies designed to achieve stimulus control, coping with urges, increasing behavioural reinforcement, and strengthening social reinforcement. <u>MI:</u> Treatment was tailored to the participants states but included components of ambivalence about gambling behaviour, value clarification, awareness of gambling, consequences, decisional balance analysis. Four therapists with Master and Doctoral level degreed with	<u>MI (brief MI):</u> One 90-min feedback session during which practical advice was provided to the participant	• Frequency of gambling sessions • Abstinence • Gambling expenditure

Study	Population	Intervention	Comparison	Outcomes
		experience in cognitive behavioural treatment delivered sessions. CBT individual, behavioural therapy, and MI consisted of six treatment sessions, individually administered on a quasi-weekly basis over the course of 8–10 weeks.		
Wittekind 2019 RCT Germany Any industry funding	N=131 of people experiencing harmful gambling Age in years [Mean (SD)]: Self-help with no or minimal support: 36.62 (10.32) Attention placebo: 33.72 (11.53) Sex (n): Self-help with no or minimal support: M=52, F=14 Attention placebo: M=46, F=19 Gambling symptom severity scale and score [Mean (SD)]: SOGS 10.17(3.28) Gambling symptom severity by treatment group, not reported.	<u>Self-help with no or minimal support (computerised attentional bias modification):</u> Computer programme with 10 images related to slot-machine gambling and 10 neutral images. A slot-machine picture was shown and participants had to rate the urge to gamble. Then pictures were shown in random order and had to pushed (for example avoidance) or pulled (for example approach) with the computer mouse.	<u>Attention placebo (sham computerised attentional bias modification):</u> 50% of the slot-machine related and 50% of the neutral pictures had to be pushed, and 50% of each picture type had to be pulled.	• Gambling symptom severity • Other outcomes (depression)

Study	Population	Intervention	Comparison	Outcomes
Wong 2015 RCT Hong Kong Unclear funding source	N=40 participants in gambling treatment centres experiencing harmful gambling Age: Not reported Sex: Not reported Gambling symptom severity scale and score [Mean (SD)]: not reported	CBT group face-to-face + TAU (CBT group + routine counselling): 10 sessions lasting 3hours each were provided by qualified CBT therapists.	TAU (routine counselling): Routine counselling provided every 1-3 weeks, each session lasting 45-90 minutes.	• Gambling symptom severity • Time spent gambling • Frequency of gambling sessions • Gambling expenditure • Other outcomes (depression, anxiety, psychological distress)
Zhuang 2018 non RCT Hong Kong No industry funding	N=84 people experiencing harmful gambling Age: Not reported Sex (n): CBT group: M=42, F=0 Attention placebo: M=42, F=0 Gambling symptom severity scale and score [Mean (SD)]: CBT group: SOGS 11.14 (3.54) Attention placebo: SOGS 12.21 (3.23)	CBT group (face-to-face): Provided by team of qualified CBT therapists. 8 sessions per group lasting 3h each. Sessions focussed on enhancing change, recognising internal triggers, facilitating awareness of participants, facilitating to recognise negative emotions, and relapse prevention.	Attention placebo (social activity group): 8 sessions per group lasting 3h each. During each group session, the participants discussed current social issues and planned and implemented social activities.	• Gambling expenditure • Frequency of gambling sessions • Gambling symptom severity • Remission • Other outcomes (psychological wellbeing, depression, anxiety)

CBT: Cognitive Behavioural Therapy; CCT: Client Centred Therapy; CSO: Concerned Significant Other; CPGI: Canadian Problem Gambling Index; CYG: Check your Gambling; DSM-IV: Diagnostic and Statistical Manual of Mental Disorder; EC: E-mail Counselling; EGM: Electronic Gambling Machines; F: Female; GPI: Global Poker Index; G-SAS: Gambling Symptom Assessment Scale; M: Male; MET: Motivational Enhancement Therapy; MI: Motivational Interviewing; n: number; NODS: National Opinion Research Center DSM-IV Screen For Gambling Problems; PGSI: Problem Gambling Severity Index; PhD: Doctor pf Philosophy; RCT: Randomised Controlled Trial; SCT: Self Change Tools; SD: Standard Deviation; SOGS: South Oaks Gambling Screen; SSRI: Selective serotonin reuptake inhibitor; TAU: Treatment as Usual; VGS: Victorian Gambling Screen; VR: Virtual Reality

See the full evidence tables in appendix D and the forest plots in appendix E.

Summary of the evidence from the network meta-analysis

The numbers of people tested on each treatment class and intervention (including relevant comparators) for each of the two outcomes (gambling symptom severity and gambling frequency) are shown in Table 3. Psychological therapies were grouped according to

common theoretical structure and methodological approach. For each outcome, we first present the evidence network plot and results (relative effects of each treatment versus no treatment) both in a forest-like plot and in tabulated form of the base-case analysis (full dataset). These are followed by the results of sensitivity analyses conducted using ITT data, CC data, and non-industry funded data. Bias-adjusted models did not show statistical evidence of bias due to small study size or source of funding, and therefore respective results of those analyses are not shown.

In each network plot presented below, the width of lines is proportional to the number of trials that make each direct comparison; the size of each circle (treatment node) is proportional to the number of participants tested on each treatment class.

Full results of the NMA including relative effects of all pairs of treatments for the full dataset and sensitivity analyses are reported in appendix L and supplement 4: NMA data and results.

Table 3. Treatment classes, interventions and numbers of participants tested on each in the NMAs of gambling symptom severity and gambling frequency in adults experiencing harmful gambling

Class	N Severity	N Frequency	Intervention	N Severity	N Frequency
No treatment	681	592	No treatment	681	592
TAU	153	111	TAU	8	-
			Information + referral	110	111
			Referral to Gamblers anonymous (GA) group	35	-
Attention placebo	179	39	Brief semi-structured interview	-	39
			Attention-control (non-gambling) feedback	114	-
			Sham computerised attentional bias modification	65	-
Waitlist	461	401	Waitlist	461	401
CBT individual	592	331	Brief CBT individual	317	183
			Brief motivational interviewing + brief CBT individual	143	103
			CBT individual	104	45
			Brief Mindfulness-based cognitive therapy (MBCT) individual	28	-
CBT group	121	30	CBT group	121	30
Behavioural therapies individual	136	98	Behavioural therapy individual	73	98
			Exposure therapy individual	43	-
			Dialectical behavior therapy, modified for anger & addiction	20	-
Counselling individual	76	76	Client-centred therapy (CCT)	76	76
Motivational interviewing	303	290	Brief motivational interviewing	231	195
			Motivational interviewing	72	95
Self-help (with no or minimal support)	1616	1526	Personalised feedback intervention	446	349
			Psychoeducational materials	182	182
			Psychoeducational workbook	-	213
			CBT workbook	191	199

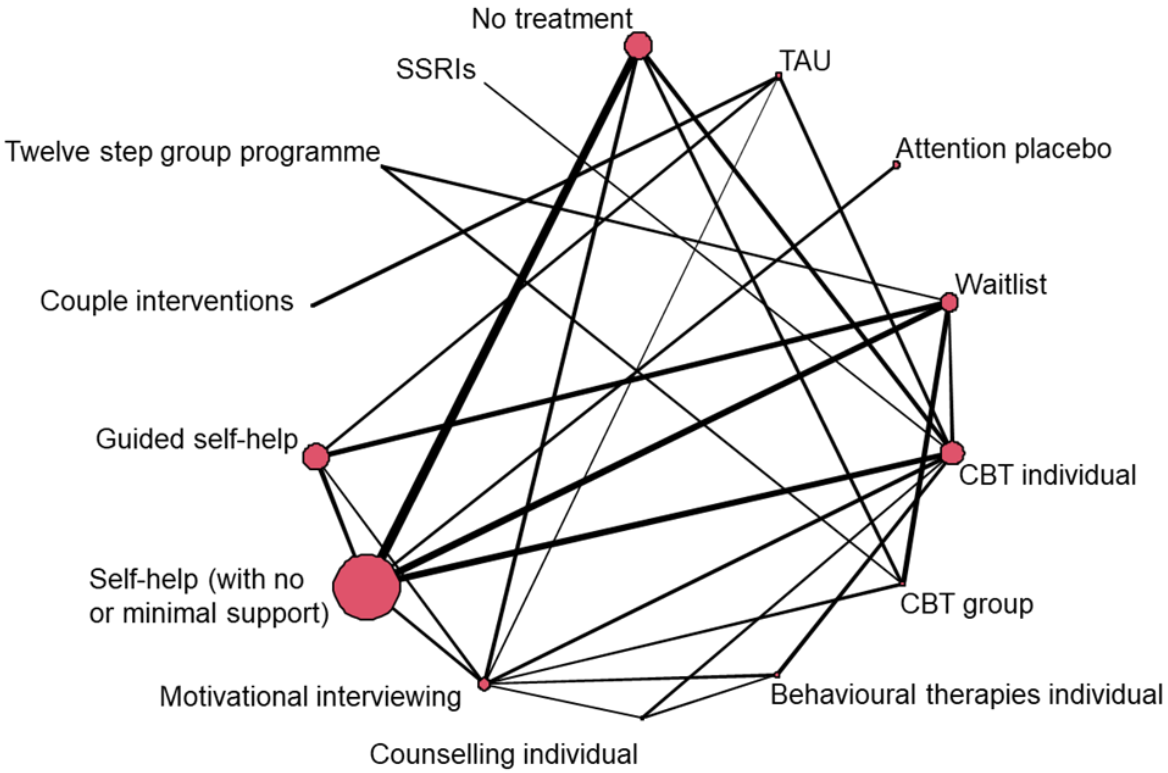
			Computerised personalised feedback intervention	243	243
			Computerised CBT	222	145
			Chatbot-delivered CBT	96	96
			Computerised CBT for depression	71	-
			Computerised attentional bias modification	66	-
			Behaviour change SMS + accessing internet mental health service	99	99
Guided self-help	644	608	Brief motivational interviewing + CBT workbook	110	223
			CBT workbook with support	189	224
			CBT workbook with email support	14	-
			Psychoeducational materials with email support	56	56
			Computerised CBT with support	153	51
			Computerised behavioural couples therapy with support	68	-
			Computerised counselling with support	54	54
Couple interventions	8	-	Congruence couple therapy	8	-
Twelve step group programme	11	-	Twelve-step facilitated group therapy	11	-
SSRIs	15	-	Escitalopram	15	-
TOTAL	4996	4102		4996	4102

Gambling symptom severity

Base-case analysis (full dataset)

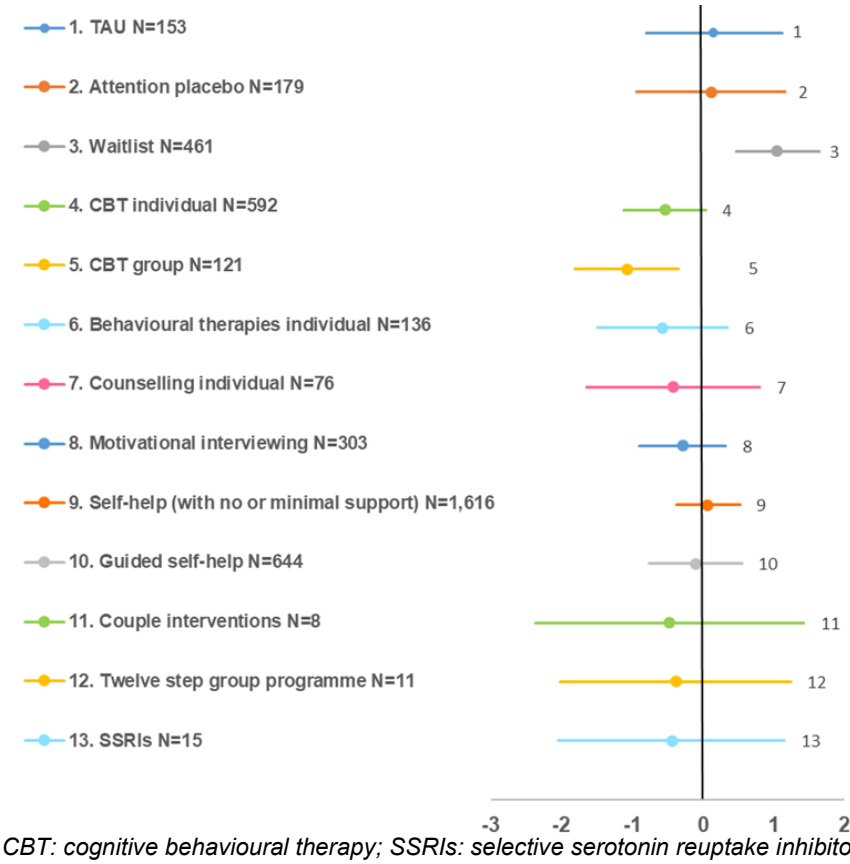
The network plot at the treatment class level for the base-case analysis is shown in Figure 1. The base-case relative effects (posterior mean SMD with 95% CrI) of all treatment classes versus no treatment (reference treatment) are illustrated in Figure 2 (forest plot) and reported in Table 4. Treatment classes in the table have been ordered by effectiveness, based on their mean rankings in the NMA iterations.

Figure 1. Gambling symptom severity network plot – full dataset containing 39 RCTs, 95 treatment arms, 14 treatment classes and 40 interventions, 4,996 participants



CBT: cognitive behavioural therapy; SSRIs: selective serotonin reuptake inhibitors; TAU: treatment as usual

Figure 2. Gambling symptom severity forest plot – full dataset. Standardised mean difference versus no treatment (N=681). Vertical axis shows effect of no treatment. Values on the left side of the vertical axis indicate better effect compared with no treatment.



CBT: cognitive behavioural therapy; SSRIs: selective serotonin reuptake inhibitors; TAU: treatment as usual

Table 4. Gambling symptom severity results – full dataset: posterior standardised mean difference (SMD) of all treatments versus no treatment

Treatment class	N rand	K arms	SMD vs no treatment (mean, 95% CrI)
CBT group	121	6	**-1.08 (-1.82 to -0.35)**
CBT individual	592	17	-0.54 (-1.11 to 0.04)
Behavioural therapies individual	136	3	-0.57 (-1.49 to 0.35)
Couple interventions	8	1	-0.48 (-2.37 to 1.42)
Counselling individual	76	1	-0.42 (-1.64 to 0.80)
SSRIs	15	1	-0.44 (-2.05 to 1.16)
Twelve step group programme	11	1	-0.38 (-2.02 to 1.23)
Motivational interviewing	303	5	-0.29 (-0.90 to 0.32)
Guided self-help	644	11	-0.10 (-0.75 to 0.54)
No treatment	681	9	Reference
Attention placebo	179	2	0.12 (-0.92 to 1.18)
Self-help (with no or minimal support)	1616	22	0.07 (-0.38 to 0.52)
TAU	153	3	0.16 (-0.81 to 1.13)
Waitlist	461	13	**1.05 (0.46 to 1.65)**

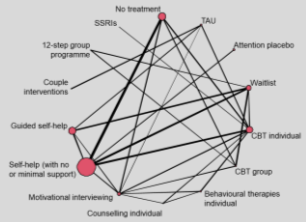
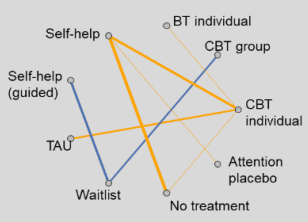
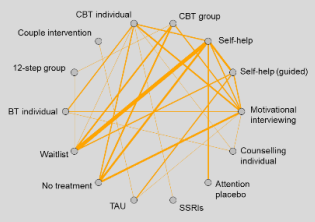
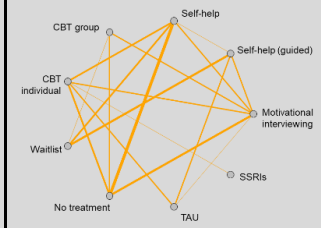
CBT: cognitive behavioural therapy; CrI: credible intervals; K arms: number of arms; N rand: number randomised; SMD: standardised mean difference; SSRIs: selective serotonin reuptake inhibitors; TAU: treatment as usual

Treatment classes ordered from best to worst, according to mean rankings. Negative effect values indicate a favourable outcome compared with no treatment. Results where 95% CrI do not cross the no effect line are shown in bold.

Sensitivity analyses

Table 5 shows the network plots and the NMA results of the base-case and all sensitivity analyses for the outcome of gambling symptom severity.

Table 5. Gambling symptom severity – base-case and sensitivity analyses: network plots and results, all treatments versus no treatment

Analysis	Full dataset		Intention-to-treat only		Completer only		No industry funding	
Number of RCTs	39		11		26		18	
Network plot								
Class	**N rand**	**SMD vs no treat (mean, 95% CrI)**	**N rand**	**SMD vs no treat (mean, 95% CrI)**	**N rand**	**SMD vs no treat (mean, 95% CrI)**	**N rand**	**SMD vs no treat (mean, 95% CrI)**
CBT group	121	**-1.08 (-1.82 to -0.35)**	-	*Class not present*	114	**-1.01 (-1.84 to -0.22)**	50	-0.60 (-1.65 to 0.40)
CBT individual	592	-0.54 (-1.11 to 0.04)	363	**-0.59 (-0.90 to -0.28)**	212	-0.51 (-1.30 to 0.28)	218	-0.40 (-1.09 to 0.29)
Behavioural therapies individual	136	-0.57 (-1.49 to 0.35)	20	**-1.20 (-2.06 to -0.34)**	106	-0.31 (-1.47 to 0.86)	-	*Class not present*
Couple interventions	8	-0.48 (-2.37 to 1.42)	-	*Class not present*	8	-0.52 (-2.69 to 1.66)	-	*Class not present*
Counselling individual	76	-0.42 (-1.64 to 0.80)	-	*Class not present*	66	-0.28 (-1.65 to 1.09)	-	*Class not present*
SSRIs	15	-0.44 (-2.05 to 1.16)	-	*Class not present*	15	-0.41 (-2.18 to 1.33)	15	-0.31 (-1.94 to 1.34)
Twelve step group programme	11	-0.38 (-2.02 to 1.23)	-	*Class not present*	11	-0.31 (-2.05 to 1.41)	-	*Class not present*
Motivational interviewing	303	-0.29 (-0.90 to 0.32)	-	*Class not present*	269	-0.17 (-0.88 to 0.53)	231	-0.14 (-0.81 to 0.54)
Guided self-help	644	-0.10 (-0.75 to 0.54)	-	*Class not present*	348	0.17 (-0.66 to 1.02)	443	-0.21 (-1.03 to 0.61)
No treatment	681	Reference	273	Reference	337	Reference	457	Reference
Attention placebo	179	0.12 (-0.92 to 1.18)	65	**-0.58 (-1.15 to -0.01)**	134	0.55 (-0.69 to 1.79)	-	*Class not present*
Self-help (with no or minimal support)	1616	0.07 (-0.38 to 0.52)	792	**-0.28 (-0.49 to -0.08)**	630	0.26 (-0.37 to 0.89)	727	-0.01 (-0.57 to 0.55)
TAU	153	0.16 (-0.81 to 1.13)	35	**0.74 (0.14 to 1.33)**	100	0.11 (-1.25 to 1.48)	145	0.19 (-0.83 to 1.22)
Waitlist	461	**1.05 (0.46 to 1.65)**	-	*Class not present*	296	**1.21 (0.48 to 1.96)**	236	**1.09 (0.27 to 1.95)**

TOTAL	4996		1548		2646		2522	

CBT: cognitive behavioural therapy; CrI: credible intervals; N rand: number randomised; SMD: standardised mean difference; SSRIs: selective serotonin reuptake inhibitors; TAU: treatment as usual

Negative effect values indicate a favourable outcome compared with no treatment. Results where 95% CrI do not cross the no effect line are shown in bold.

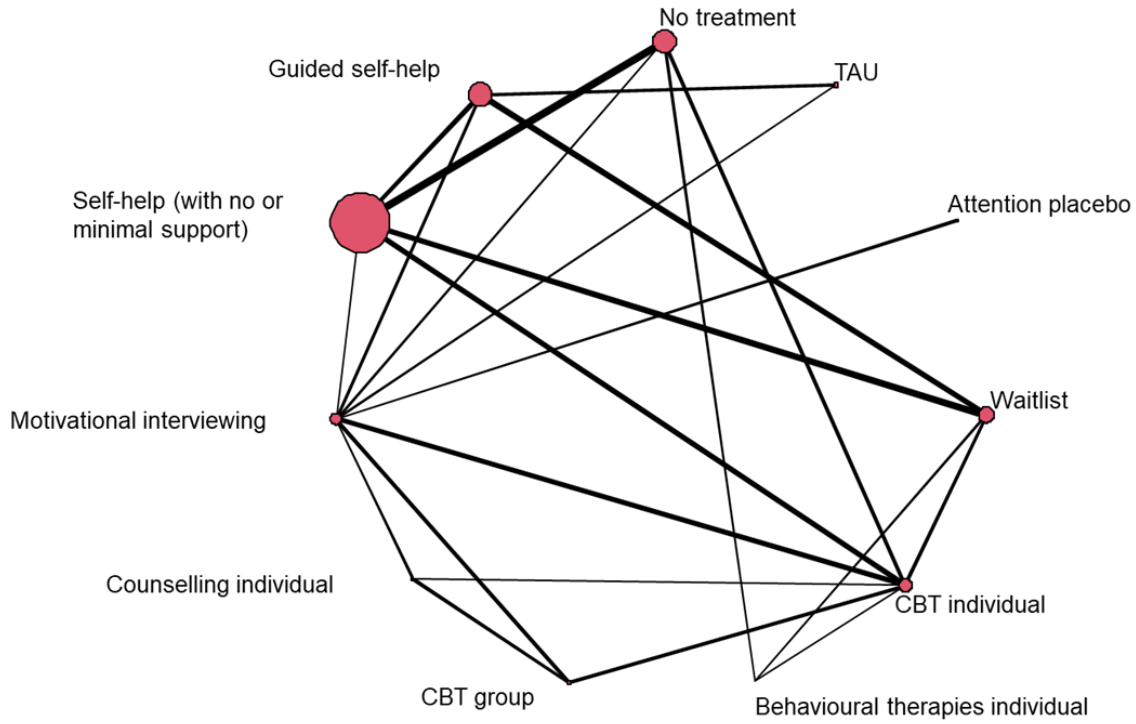
Gambling frequency

Base-case analysis (full dataset)

The network plot at the treatment class level for the base-case analysis is shown in Figure 3. The base-case relative effects (posterior mean SMD with 95% CrI) of all treatment classes versus no treatment (reference treatment) are illustrated in Figure 4 (forest plot) and reported in CBT: cognitive behavioural therapy; TAU: treatment as usual

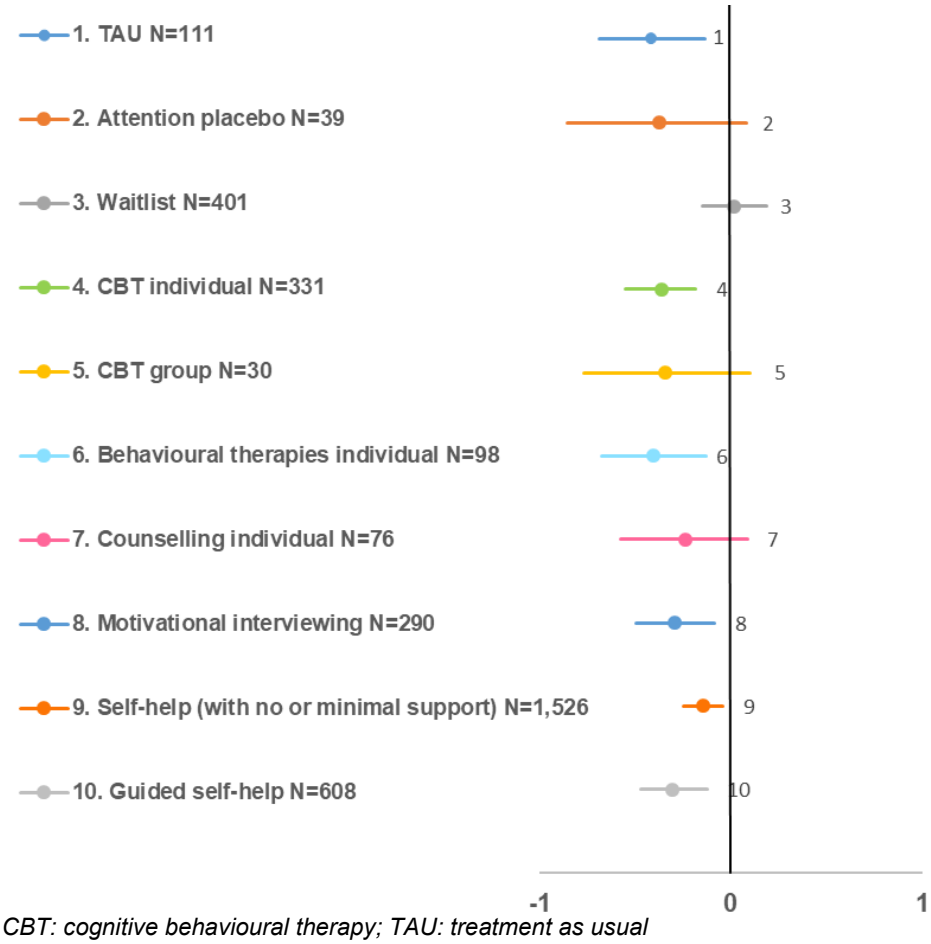
Table 6. Treatment classes in the table have been ordered by effectiveness, based on their mean rankings in the NMA iterations.

Figure 3. Gambling frequency network plot – full dataset containing 62 treatment arms, 11 treatment classes and 25 interventions, 4,102 participants



CBT: cognitive behavioural therapy; TAU: treatment as usual

Figure 4. Gambling frequency forest plot – full dataset. Standardised mean difference versus no treatment (N=592). Vertical axis shows effect of no treatment. Values on the left side of the vertical axis indicate better effect compared with no treatment.



CBT: cognitive behavioural therapy; TAU: treatment as usual

Table 6. Gambling frequency results – full dataset: posterior standardised mean difference (SMD) of all treatments versus no treatment

Treatment class	N rand	K arms	SMD vs no treatment (mean, 95% CrI)
TAU	111	1	**-0.42 (-0.69 to -0.14)**
Behavioural therapies individual	98	2	**-0.41 (-0.68 to -0.13)**
CBT individual	331	7	**-0.36 (-0.55 to -0.18)**
Attention placebo	39	1	-0.37 (-0.86 to 0.08)
CBT group	30	2	-0.34 (-0.77 to 0.10)
Guided self-help	608	9	**-0.31 (-0.47 to -0.13)**
Motivational interviewing	290	6	**-0.30 (-0.49 to -0.09)**
Counselling individual	76	1	-0.24 (-0.57 to 0.08)
Self-help (with no or minimal support)	1526	18	**-0.15 (-0.25 to -0.04)**
No treatment	592	7	Reference
Waitlist	401	8	0.01 (-0.15 to 0.19)

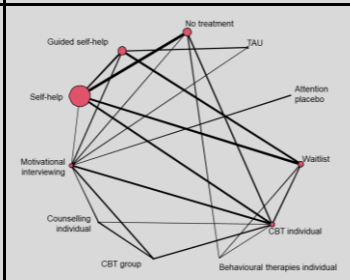
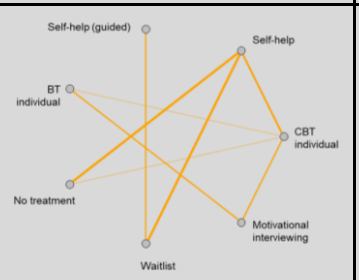
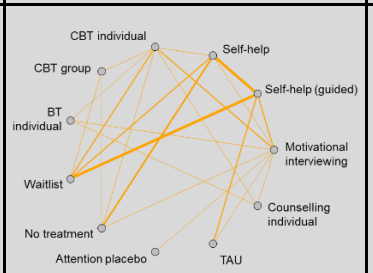
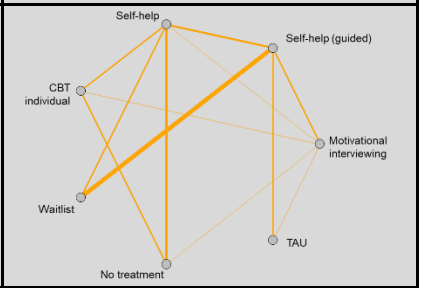
CBT: cognitive behavioural therapy; CrI: credible intervals; K arms: number of arms; N rand: number randomised; SMD: standardised mean difference; TAU: treatment as usual

Treatment classes ordered from best to worst, according to mean rankings. Negative effect values indicate a favourable outcome compared with no treatment. Results where 95% CrI do not cross the no effect line are shown in bold.

Sensitivity analyses

Table 7 shows the network plots and the NMA results of the base-case and all sensitivity analyses for the outcome of gambling frequency.

Table 7. Gambling frequency – base-case and sensitivity analyses: network plots and results, all treatments versus no treatment

Analysis	Full dataset		Intention-to-treat only		Completers only		No industry funding	
Number of RCTs	22		9		13		10	
Network plot							
Class	**N rand**	**SMD vs no treat (mean, 95% CrI)**	**N rand**	**SMD vs no treat (mean, 95% CrI)**	**N rand**	**SMD vs no treat (mean, 95% CrI)**	**N rand**	**SMD vs no treat (mean, 95% CrI)**
TAU	111	**-0.42 (-0.69 to -0.14)**	-	*Class not present*	100	**-0.41 (-0.78 to -0.04)**	111	**-0.47 (-0.84 to -0.11)**
Behavioural therapies individual	98	**-0.41 (-0.68 to -0.13)**	24	-0.22 (-0.89 to 0.46)	66	**-0.47 (-0.86 to -0.07)**	-	*Class not present*
CBT individual	331	**-0.36 (-0.55 to -0.18)**	191	**-0.32 (-0.59 to -0.05)**	125	**-0.48 (-0.81 to -0.15)**	105	-0.21 (-0.47 to 0.07)
Attention placebo	39	-0.37 (-0.86 to 0.08)	-	*Class not present*	39	-0.38 (-0.90 to 0.13)	-	*Class not present*
CBT group	30	-0.34 (-0.77 to 0.10)	-	*Class not present*	30	-0.37 (-0.83 to 0.10)	-	*Class not present*
Guided self-help	608	**-0.31 (-0.47 to -0.13)**	110	**-0.59 (-1.07 to -0.12)**	424	**-0.31 (-0.58 to -0.04)**	557	**-0.36 (-0.62 to -0.10)**
Motivational interviewing	290	**-0.30 (-0.49 to -0.09)**	50	-0.04 (-0.61 to 0.52)	225	**-0.31 (-0.61 to -0.01)**	125	**-0.36 (-0.66 to -0.05)**
Counselling individual	76	-0.24 (-0.57 to 0.08)	-	*Class not present*	67	-0.29 (-0.71 to 0.16)	-	*Class not present*
Self-help (with no or minimal support)	1526	**-0.15 (-0.25 to -0.04)**	1079	**-0.21 (-0.38 to -0.04)**	336	-0.14 (-0.34 to 0.06)	665	-0.14 (-0.30 to 0.01)
No treatment	592	Reference	273	Reference	249	Reference	368	Reference
Waitlist	401	0.01 (-0.15 to 0.19)	228	-0.12 (-0.41 to 0.16)	169	0.05 (-0.25 to 0.37)	186	-0.03 (-0.32 to 0.27)
TOTAL	4102		1955		1830		2117	

CBT: cognitive behavioural therapy; CrI: credible intervals; N rand: number randomised; SMD: standardised mean difference; TAU: treatment as usual

1 *Negative effect values indicate a favourable outcome compared with no treatment. Results where 95% CrI do not cross the no effect line are shown in bold.*

Quality assessment of the NMA

Threshold analysis was undertaken to test the robustness of treatment recommendations based on the NMA of gambling symptom severity, to potential biases or sampling variation in the included evidence. Full methods and results of threshold analysis are presented in appendix M.

Summary of the evidence from the pairwise comparisons

Across all the comparisons in the pairwise analysis, the majority showed no clinically important difference between the interventions compared (for example motivational interviewing versus individual counselling, self-help versus attention placebo, behavioural therapies versus motivational interviewing, and behavioural therapies versus individual counselling). These comparisons typically included only one study and often had serious to very serious imprecise findings.

Exceptions were group CBT versus waitlist and behavioural therapies versus individual CBT where the interventions had an important benefit compared with the controls, in terms of gambling symptom severity. Important benefits were also shown for self-help (with no or minimal support) compared with no treatment in terms of gambling frequency. Important benefits were also shown for self-help versus waitlist, and group CBT plus treatment as usual compared with attention placebo in terms of abstinence and remission and money spent gambling respectively.

Important benefits were also shown for expenditure. For example, self-help (with no or minimal support) versus waitlist, self-help (with no or minimal support) versus no treatment, guided self-help versus self-help (with no or minimal support), guided self-help versus waitlist, individual CBT versus waitlist, group CBT plus treatment as usual versus attention placebo, and behavioural therapies versus individual CBT where the intervention showed an important benefit over the comparator in terms of money spent gambling.

Important benefits were also shown for gambling frequency. For example self-help (with no or minimal support) versus waitlist where the intervention showed important benefits. Important benefits were also shown for time spent gambling for group CBT plus treatment as usual versus attention placebo showed important benefits for the intervention.

Important benefits were also shown for other non-gambling outcomes. For example, individual CBT versus treatment as usual showed important differences for the intervention in terms of depression and anxiety symptoms, functional impairment and quality of life. Group CBT plus treatment as usual versus attention placebo, and self-help (with no or minimal support) versus waitlist showed important differences for the intervention in terms of depression and anxiety symptoms and psychological distress. Guided self-help versus waitlist also showed important difference for the intervention in terms of depression and anxiety symptoms and quality of life.

Typically, the comparisons where no difference between interventions were found included only one study and had serious to very serious imprecise findings, therefore they should not be taken as definitive evidence of no difference between the interventions.

The overall quality of the outcomes for the pairwise comparisons ranged from very low to low.

There was no evidence identified for the following interventions: trauma informed interventions, neurological and brain stimulation interventions and residential treatment.

There was no evidence identified for the following outcomes recovery capital, and adverse life events, such as suicide, self-harm, or unplanned acute mental health hospital admission.

See appendix F for full GRADE tables.

Economic evidence

Included studies

A single economic search was undertaken for all topics included in the scope of this guideline. One economic study was identified which was relevant to this question (Bellringer 2021). Moreover, three studies reporting utility data were included in the review, and these are described in Appendix I (Economic model), in the respective 'Utility data' section. See the literature search strategy in appendix B and economic study selection flow chart in appendix G.

Excluded studies

Economic studies not included in this review are listed, and reasons for their exclusion are provided in appendix J.

Summary of included economic evidence

See Table 8 for the economic evidence profile of the included study and of the economic analysis conducted for this guideline.

Table 8: Economic evidence profile for psychological and psychosocial interventions for gambling-related harms

Study and country	Limitations	Applicability	Other comments	Incremental costs[1]	Incremental effects	ICER[1]	Uncertainty
Bellringer et al. 2022 New Zealand	Potentially serious[2]	Partially applicable[3]	Interventions: • Low intensity combined cognitive behaviour + cue exposure therapy (CBT) • MI combined with a self-help workbook and follow-up telephone booster sessions (MI+W+B) Outcomes: Self-reported monthly average • number of days spent gambling (days gambled) • amount of money lost per day gambling (Money lost) Time horizon: 12 months Cost year: 2021 Cost-consequence analysis	CBT vs MI+W+B: -£8	OR CBT vs MI+W+B: • days gambled: 1.35 (0.34 to 5.39) • money lost: 0.87 (0.31 to 2.40) [ORs adjusted for deprivation & employment]	NR	NR apart from 95%CI: CBT: £749 (£665 to £833) MI+W+B: £757 (£650 to £865)
Economic analysis conducted for this guideline	Minor[4]	Directly applicable[5]	Interventions: • Individual CBT • Individual BT • Individual counselling • Group CBT • MI • Guided SH • No treatment	Vs no treatment: 1a Individual CBT: £763 Individual BT: £838 Counselling: £595 Group CBT: £322 MI: £158 Guided SH: £269	Vs no treatment: Individual CBT: 0.014 Individual BT: 0.015 Counselling: 0.012 Group CBT: 0.029	NMB: 1a CBT group £29528 No treat £29274 MI £29270 Guided SH £29070 Counselling £28919 CBT indiv £28796 BT indiv £28745	Probability of group CBT being the most cost-effective option: 1a 0.63 1b 0.76 2a 0.73 2b 0.76

Study and country	Limitations	Applicability	Other comments	Incremental costs[1]	Incremental effects	ICER[1]	Uncertainty
			Outcome: QALY Time horizon: 2 years + 3 months Cost year: 2022 4 separate analyses conducted: • OHID cost set ○ NHS/PSS perspective (1a) ○ Public sector perspective (1b) • NIESR cost set ○ NHS/PSS perspective (2a) ○ public sector perspective (2b)	1b Individual CBT: £452 Individual BT: £501 Counselling: £335 Group CBT: -£304 MI: -£10 Guided SH: £198 2a Individual CBT: £591 Individual BT: £652 Counselling: £449 Group CBT: -£24 MI: £64 Guided SH: £230 2b Individual CBT: £125 Individual BT: £147 Counselling: £58 Group CBT: -£958 MI: -£187 Guided SH: £125	MI: 0.007 Guided SH: 0.003	1b CBT group £27549 MI £26833 No treat £26669 Counselling £26575 Guided SH £26536 CBT indiv £26502 BT indiv £26477 1c CBT group £28512 MI £28001 No treat £27912 Guided SH £27746 Counselling £27703 CBT indiv £27605 BT indiv £27569 1d CBT group £25576 MI £24381 Counselling £24224 BT indiv £24204 CBT indiv £24201 No treat £24041 Guided SH £23981	

BT: behavioural therapy; CBT: cognitive behavioural therapy; CI: confidence interval; MI: motivational interviewing; NA: non-applicable; NMA: network meta-analysis; NMB: net monetary benefit; OR: odds ratio; QALY: quality-adjusted life year; SH: self-help

1 Costs reported in different currency were converted to GBP using Purchasing Power Parity exchange rates

2 Study based on RCT (N=227); national unit costs used; 12-month time horizon

3 Study conducted in New Zealand, no QALYs used, health funder perspective including out-of-pocket expenses (social costs / productivity losses reported separately), discounting: NA

4 Study based on economic modelling conducted for this guideline; efficacy informed by NMA; other clinical input parameters taken from published longitudinal studies; resource use and costs based on RCT data and UK published reports; national unit costs used; 2 years + 3 months time horizon

5. UK study, QALYs based on SG-6D (UK values), NHS/PSS and public sector perspectives used, discounting 3.5% annually for costs and QALYs

Economic model

A decision-analytic model was developed to assess the relative cost effectiveness of psychological and psychosocial treatments for adults experiencing gambling-related harms. The objective of economic modelling, the methodology adopted, the results and the conclusions from this economic analysis are described in detail in appendix I. This section provides a summary of the methods employed and the results of the economic analysis.

Overview of economic modelling methods

A hybrid decision-analytic model consisting of a decision-tree followed by a three-state Markov model was constructed to evaluate the relative cost effectiveness of a number of psychological and psychosocial treatments for adults experiencing gambling-related harms. The time horizon of the analysis was 3 months of treatment (decision-tree) plus 2 years of follow-up (Markov model). The treatments assessed were determined by the availability of efficacy data obtained from the NMA that was conducted to inform this guideline. The economic analysis included only treatments with a higher mean effect on gambling symptom severity compared with no treatment.

The following treatments were assessed:

- Individual cognitive behavioural therapy (CBT)
- Individual behavioural therapy
- Individual counselling
- Group CBT
- Motivational interviewing
- Guided self-help
- No treatment, which served as the reference treatment, and currently represents standard care for the majority of adults experiencing gambling-related harms in England.

The model structure considered the health states of problem gambling (reflected in a PGSI score of 8 or above), no problem gambling, which consisted of the states of moderate risk of problem gambling (PGSI score of 3-7), low risk of problem gambling (PGSI score of 1-2) and no risk of problem gambling (PGSI score of 0), and death (due to suicide or other reasons).

Efficacy data were derived from the guideline systematic review and NMA on gambling symptom severity. Other clinical inputs were estimated from longitudinal studies. The measure of outcome of the economic analysis was the number of QALYs gained. In a scenario analysis, lifetime QALY losses due to completed suicide were also considered. Utility data were derived from a systematic review of the literature. The analysis adopted two different perspectives: the NHS/PSS (personal social services) and a wider, public sector perspective. Intervention resource use was based on RCTs that informed the NMA, modified to reflect optimal routine delivery of the assessed interventions in the UK. Costs associated with problem gambling were taken from 2 recently published reports, and were considered in 2 separate analyses, respectively, to avoid possible double counting, as the reports estimated costs in overlapping areas. National UK unit costs were used. The cost year was 2022. Model input parameters were synthesised in a probabilistic analysis. This approach allowed more comprehensive consideration of the uncertainty characterising the input parameters and captured the non-linearity characterising the economic model structure. A number of one-way deterministic sensitivity analyses was also carried out.

Overview of economic modelling results and conclusions

Group CBT was the most cost-effective treatment and more cost-effective than no treatment under almost all perspectives, cost sets used, sensitivity and scenario analyses, with, a high probability of being the most cost-effective option that exceeded 0.60 under all perspectives and cost sets used.

Motivational interviewing was the second most cost-effective treatment, following group CBT, and more cost-effective than no treatment in the majority of analyses. This result was sensitive to the initial PGSI score and the perspective and magnitude of the costs associated with gambling-related harms: a higher gambling symptom severity, represented by higher PGSI scores, and lower costs associated with gambling-related harms led to motivational interviewing becoming less cost-effective than no treatment.

The other individual high intensity treatments (individual CBT, individual behavioural therapy, counselling) were less cost-effective than no treatment in all scenarios tested under a NHS/PSS perspective, apparently because their clinical effectiveness and the associated cost-savings resulting from a reduction in gambling symptom severity were not high enough to offset their higher intervention costs compared with other treatment options. However, they were more cost-effective than no treatment in several analyses conducted under a public sector perspective, which accounted for higher cost-savings to the public sector resulting from provision of these treatments that were adequate to offset their intervention costs.

Guided self-help was not cost-effective relative to no treatment under any analysis (probabilistic or deterministic).

Economic evidence statements

- Evidence from one study from New Zealand conducted alongside a RCT (N=227) suggested no differences in costs or outcomes between face-to-face low intensity combined cognitive behaviour + cue exposure therapy and face-to-face motivational interviewing combined with a self-help workbook and follow-up telephone booster sessions for adults experiencing gambling-related harms. The study is partially applicable to the UK and is characterised by potentially serious limitations.
- Evidence from the economic analysis conducted for this guideline indicated that group CBT was cost-effective versus no treatment and the most cost-effective treatment option among those assessed for adults experiencing gambling-related harms, followed by motivational interviewing. Individual behavioural therapy, individual CBT and counselling were likely to be cost-effective versus no treatment when a wider, public sector perspective was considered, especially considering that the public sector cost estimates utilised in the economic model conducted for this guideline were likely to be an underestimate of the true costs associated with gambling-related harms. Guided self-help was not cost-effective versus no treatment under any scenario tested. The study is directly applicable to the UK and is characterised by minor limitations, as results were robust under most alternative scenarios explored, despite the uncertainty characterising a number of input parameters.

The committee's discussion and interpretation of the evidence

The outcomes that matter most

Gambling symptom severity, frequency of gambling, time spent gambling, gambling expenditure, recovery capital, psychological wellbeing, and personal, social and life functioning, were prioritised by the committee as critical outcomes because changes in these would most accurately capture the clinical effectiveness of psychological and psychosocial interventions for gambling.

The committee also discussed that the shame and distress caused by gambling often prevents people from seeking help when they experience it and can lead to a variety of adverse events such as self-harm and suicide or mental health crises, and so this was also included as a critical outcome.

Physical and mental health related quality of life was also identified as an important outcome by the committee because people who gamble less or abstain from gambling are likely to have an improved quality of life, compared to people who gamble more frequently.

The quality of the evidence

NMA

The quality of the individual studies included in the NMAs ranged from very low to low, mainly due to risk of bias stemming from lack of blinding, poor reporting of randomisation procedures, or high attrition rates. This impacted on the quality of the NMAs.

The two NMAs on gambling symptom severity and gambling frequency allowed estimation of relative effects between all pairs of treatments for people experiencing harmful gambling, via direct and indirect comparisons, using available RCT evidence, without breaking the rules of randomisation. Due to the large number of interventions, class effects models were fitted. Following appropriate tests of fit, fixed class effect models were used for both outcomes examined in the NMA, which assume that all interventions in a class share the class effect, due to lack of adequate data to allow estimation of individual intervention effects within each class.

For both outcomes, inconsistency between direct and indirect evidence was found only in the comparison between individual CBT versus waitlist: one study showed very strong effects for individual CBT versus waitlist, which were at odds with the rest of the studies included in the NMA, especially for the gambling frequency outcome. Heterogeneity was found to be moderate-to-high for gambling symptom severity (lower for the ITT analysis) and very low for gambling frequency (slightly higher for the ITT analysis). The committee attributed the moderate-to-high heterogeneity identified for gambling symptom severity to construct differences across gambling symptom scales and between gambling symptom scales and DSM criteria, which were synthesised in the analysis; in contrast, gambling frequency, which was straightforward to measure using very similar methods across studies, was characterised by very low heterogeneity. Bias adjustment analyses testing for bias resulting from small study size and bias associated with funding source (any industry / unclear funding) showed no statistical evidence of such bias. However, it is still possible that such bias exists, as the comparisons on which such bias could be tested were limited.

Effects for a number of treatments included in the NMA (12 step group programme, couple interventions and SSRIs) were informed by very limited evidence on gambling symptom severity (each was tested on 15 people or fewer) and were characterised by particularly high uncertainty, whereas no evidence was identified on gambling frequency. These treatments were therefore not considered when formulating recommendations.

Threshold analysis on the gambling symptom severity outcome (appendix M) suggested that conclusions of the NMA, which directly informed recommendations, were robust to potential changes in the evidence. Therefore, the committee was confident in the recommendations they made based on the NMA evidence.

The committee noted the above information around the strengths and limitations of the NMAs when interpreting the results. They agreed to make strong recommendations where the clinical evidence was robust, as it was also supported by economic evidence and the committee's clinical experience. They also decided to make weaker ('consider') recommendations on treatments that were supported by less robust evidence.

Pairwise meta-analysis

The quality of the evidence for quantitative outcomes assessed in pairwise meta-analysis was assessed with GRADE methodology and the overall confidence in the findings ranged from very low to low. Findings were downgraded due to risk of bias stemming from lack of blinding, poor reporting of randomisation procedures, or high rates of attrition from the study. Studies were also downgraded for imprecision when 95% confidence intervals crossed 1 or more decision-making thresholds. Some evidence was downgraded for inconsistency as heterogeneity could not be explained as no subgroup analysis was performed as per protocol. Evidence was not downgraded for indirectness.

See appendix F for full GRADE tables with quality ratings of all outcomes.

Benefits and harms

Network meta-analysis

The recommendations based on both the NMA and pairwise results are for commissioners and providers of gambling treatment services.

The committee discussed the results of the NMAs on gambling symptom severity and gambling frequency. Results were interpreted in terms of 'evidence of effect', which was determined by 95% credible intervals (CrI) not crossing the line of no effect. The committee compared the results of the NMA base-case analyses, which used the full study dataset, and the results of sensitivity analyses, each of which was informed by more limited evidence. They agreed that results of the sensitivity analyses were overall consistent with those of the base-case analyses and decided to focus on the base-case results in order to make recommendations. The committee noted that, for the gambling symptom severity outcome, all active treatments except pure self-help showed evidence of benefit compared to no treatment, although for most treatments results were characterised by uncertainty as indicated by 95%CrI that crossed the line of no effect; moreover, all active treatments ranked in a higher position than treatment as usual (TAU) and waiting list. Waiting list showed evidence of leading to increased symptom severity compared with no treatment, with 95%CrI not crossing the line of no effect.

For the gambling frequency outcome, the committee noted that all active treatments showed a benefit compared to no treatment, with evidence of efficacy (the 95%CrI that did not cross the line of no effect) for most treatments. Waiting list had practically the same effect as no treatment. However, all active treatments showed similar to lower effects compared to TAU. The committee's interpretation of the results on gambling frequency was that any intervention (including TAU, which was described as 'information and referral to face-to-face problem gambling counselling services or other services and websites and/or suggestions for self-care' in the single TAU arm included in the gambling frequency NMA) reduces gambling frequency compared with no treatment, but all treatments have a similar effect, and it is not possible to differentiate from one another. The committee expressed the view that gambling frequency is only one aspect of gambling symptom severity, which may explain the low heterogeneity of this analysis. They noted the more limited evidence base for every treatment in the NMA of gambling frequency compared with the NMA of gambling symptom severity and decided to consider mainly the results on symptom severity when formulating recommendations.

The committee noted that the results of the NMA base-case analysis on gambling symptom severity, which utilised the full study dataset, suggested that group CBT had the highest effect among all treatments, and was the only treatment that showed evidence of effect compared with no treatment. This was followed by individual CBT, the 95% CrI of which only marginally crossed the line of no effect compared with no treatment. Based on these findings, which were supported by their own clinical experience, the committee decided to make a strong ('offer') recommendation for group CBT, and, where this was not possible (for

example, there were no other people available to form a group) or considered unsuitable for the person or was not preferred by the person, individual CBT was recommended instead. The recommendation for offering individual CBT as an alternative treatment was further supported by the evidence of a negative effect for waiting list compared with no treatment in the NMA of gambling symptom severity, which suggested that people experiencing gambling-related harms presenting to services should receive effective treatment rather than be placed on a waiting list.

According to the committee's expert advice, CBT needs to be offered by practitioners with gambling-specific training and competence, who can help to address the fact that people sometimes experience CBT as being stigmatising, and this was reflected in the related recommendations on the delivery of CBT. For group CBT it was agreed that at least 1 of the 2 therapists in the group should have appropriate gambling-specific training and competence. The committee looked at the evidence and considered their own experience and noted that CBT treatments that showed important benefits were delivered using a current CBT treatment manual and included a relapse prevention component, and captured this information in recommendations. They also recommended the number of sessions for group and individual CBT based on the number of sessions that had been delivered in the evidence that had shown benefit.

The committee noted that individual behavioural therapy had similar effects with individual CBT in reducing gambling symptom severity, albeit with higher uncertainty (as indicated by 95% CrI that crossed the line of no effect) and a somewhat smaller evidence base. However, they noted that pure behavioural therapy is lacking the cognitive element that is part of CBT and that direct work on cognition, enabled with CBT (but not with behavioural therapy), is preferable, as cognitive errors are a maintaining factor in gambling disorder. Ultimately, they expressed the view that therapy for adults experiencing gambling-related harms needs to include a cognitive element, which pure behavioural therapy is lacking, and therefore they decided not to recommend behavioural therapy.

The committee did not wish to make a recommendation for counselling, as its effects in reducing gambling symptom severity were lower than other high intensity interventions, were characterised by high uncertainty and were based on more limited evidence.

The committee discussed that motivational interviewing had beneficial effects on gambling symptom severity versus no treatment, that were lower than those of all other high intensity treatments and were also characterised by uncertainty. However, in the committee's experience, the dynamic nature of motivational interviewing often encourages people to seek treatment when they initially feel ambivalent towards it. The committee also advised that motivational interviewing is the only approach that is appropriate to use in people undecided as to whether they want to reduce their gambling harms. They noted that some of the CBT interventions tested in the RCTs included in the NMA included an initial session of motivational interviewing. Based on the available evidence and their clinical considerations, they decided to make a weaker ('consider') recommendation for motivational interviewing, in order to encourage people who are unsure or have reservations about starting treatment for gambling-related harms, or to strengthen people's commitment to change.

Pairwise meta-analysis

The evidence for the outcomes of time spent gambling, gambling expenditure, psychological wellbeing, personal, social and life functioning, and physical and mental health related quality of life, and follow-up outcomes of gambling symptoms severity and frequency of gambling were presented as pairwise analyses. The committee reviewed the outcomes where clinically important and statistically significant difference has been identified but noted that the results were all from single studies, and more than half of the studies had fewer than 100 participants.

In terms of money spent gambling there was some evidence of benefits for guided self-help compared to self-help, self-help compared to waitlist, guided self-help compared to waitlist, individual CBT compared to waitlist, group CBT plus treatment as usual compared to attention placebo, and behavioural therapy when compared to individual CBT. For time spent gambling there was some evidence of benefits for self-help compared to waitlist, and group CBT plus treatment as usual compared to attention placebo. The committee agreed that these interventions were successful in treating harmful gambling but that the limited evidence was not sufficient to use as a basis for a recommendation on its own. That said, the committee did note that there may be benefits in terms of money spent gambling from some of these treatments which also appeared to be effective based on outcomes shown in the NMA. Therefore, the committee used this evidence to support the recommendation on offering group CBT.

For the other non-gambling outcomes such as depression, anxiety, psychological wellbeing and quality of life, there was some evidence of benefits for individual CBT compared to treatment as usual, group CBT plus treatment as usual compared to attention placebo, and self-help and guided self-help compared to waitlist. The committee agreed that this was insufficient evidence to make a recommendation but noted that these data supported the results of the NMA that showed benefits for group and individual CBT. Follow-up outcomes for gambling symptom severity and gambling frequency showed some evidence of benefits for self-help compared to no treatment or waitlist, and group CBT compared to waitlist. The committee noted that maximum follow-up time for the follow-up outcomes was only 12-months, therefore agreed not to make recommendations for specific interventions based on long-term outcomes.

As there was limited evidence on the long-term effectiveness or the effect on increasing recovery capital for psychological interventions in treating harmful gambling, the committee agreed to make research recommendations on these 2 topics. Furthermore, the committee agreed that there was a lack of evidence for treatments for people who have experienced harmful gambling with co-morbid conditions and so made a research recommendation. Lastly, the committee agreed to make a further research recommendation as there was paucity of evidence of combinations of psychological or psychosocial treatments for harmful gambling. The descriptions of the 4 research recommendations can be found in appendix K.

Cost effectiveness and resource use

The systematic literature review identified one study conducted in New Zealand that compared low intensity combined cognitive behaviour + cue exposure therapy with motivational interviewing combined with a self-help workbook and follow-up telephone booster sessions for adults experiencing gambling-related harms and found no differences in costs or outcomes. This evidence was very limited and did not capture the whole range of available treatment options for adults experiencing gambling-related harms, was partially applicable to the UK context, and was characterised by potentially serious limitations. For these reasons it was not considered by the committee further, when making recommendations.

The committee considered the results of the economic analysis conducted for this guideline. This was informed by the NMA on gambling symptom severity conducted for the guideline, because there is evidence that gambling symptom severity has an impact on the magnitude of harmful gambling-related costs and utility values. In contrast, no evidence linking the frequency of harmful gambling with harmful gambling-related costs and utility values is available. For this reason, data on the NMA on gambling frequency were not considered in the economic model. In any case, the committee noted that gambling frequency is an aspect of gambling symptom severity, and, in this sense, its impact on costs and utilities is likely to have been indirectly incorporated in the model. The strengths and limitations of the NMA on gambling symptom severity characterise the guideline economic analysis as well. Only treatments that showed a higher mean effect on gambling symptom severity compared with

no treatment were included in the economic analysis; this meant that pure self-help was not included in the guideline economic model. Further to that, twelve-step group programme and couple therapies (and SSRIs, which were included in the NMA as a relevant comparator to psychological treatments that had been tested in RCTs) were not considered in the economic analysis due to very limited evidence base as they had been tested in study arms of 15 participants or fewer. Results of the guideline economic analysis were directly applicable to the NICE decision-making context, although QALY estimates were based on SF-6D ratings due to lack of evidence based on EQ-5D scores; however, evidence suggests that EQ-5D, which is the preferred measure by NICE, may be less sensitive in capturing changes in health-related quality of life of people experiencing gambling-related harms. On the other hand, two sets of costs associated with gambling-related harms were obtained from 2 UK studies, respectively, each with its own strengths and limitations, and are therefore directly relevant to the UK context. Intervention resource use was based on relevant information reported in the RCTs included in the NMA that informed the economic analysis, modified by the committee to reflect optimal routine delivery of these interventions in the UK. The economic analysis was undertaken from two separate perspectives, a narrower NHS and personal social services (PSS) perspective and a wider public sector perspective, as the committee advised that public sector beyond NHS/PSS bears the largest part of costs incurred by people experiencing gambling-related harms (for example, costs relating to the criminal justice system, housing and unemployment). The committee agreed that economic results from a public sector perspective should be given a higher weight when formulating recommendations. They also commented that the total costs associated with harmful gambling were likely underestimated in the economic analysis, due to lack of relevant data or because some costs lie outside the perspective of the analysis. For example, the economic analysis only partially considered costs associated with gambling-related crime and homelessness and did not consider costs associated with personal debt and bankruptcy, impact on education, as well as intangible costs associated with gambling-related harms, including, but not limited to, completed or attempted suicide, self-harm, emotional or physical distress, relationships breakdown, for the person, their family, friends and close others. The guideline economic analysis was overall characterised by minor limitations, as, despite the uncertainty around a number of input parameters, results were robust under most alternative scenarios explored. Therefore, the committee were confident to use the economic model's findings to support recommendations.

The results of the economic analysis suggested that group CBT, which had shown the highest effect on the NMA of gambling symptom severity, was also the most cost-effective treatment, and more cost-effective than no treatment, under any scenario and perspective explored. These findings supported a strong ('offer') recommendation on group CBT. The economic findings were based on group CBT being modelled as 9 x 90-minute sessions, delivered by 2 appropriately trained therapists to a group of 8 people, according to RCT available information, modified to reflect optimal routine delivery of this intervention in England. Based on this modelled resource use, the committee recommended that group therapy be delivered by 2 practitioners, at least one of whom has gambling-specific training and competence, usually within 8 to 10 sessions. The committee agreed that appropriately trained and competent therapists would help to address that people sometimes experience CBT as being stigmatising.

Motivational interviewing was shown to be the second most cost-effective treatment option and more cost-effective than no treatment under most scenarios explored, under either a NHS/PSS or a public sector perspective. The committee considered these results together with the relatively small and uncertain effects of motivational interviewing compared with no treatment in the NMA of gambling symptom severity and their own experience, and decided to make a weaker ('consider') recommendation for motivational interviewing, in order to encourage people who are unsure or have reservations about starting treatment for gambling-related harms or to strengthen people's commitment to change.

The committee noted that other face-to-face psychological treatments (individual CBT, individual behavioural therapy and counselling) appeared to be less cost-effective than no treatment when a narrow NHS/PSS perspective was adopted, but their cost-effectiveness increased as costs associated with gambling-related harms increased under a public sector perspective, and they were likely to be cost-effective compared with no treatment under this wider perspective, considering also that gambling-related cost figures used in the economic analysis were underestimates of the true costs incurred by people experiencing gambling-related harms. Based on clinical considerations described above, the committee expressed the view that the overall clinical and economic evidence for individual CBT was adequate to support a recommendation for individual CBT when group CBT was not possible or considered unsuitable for the person or not preferred by the person experiencing gambling-related harms. Based on the estimated resource use for individual CBT in the economic analysis, comprising 8 x 1-hour sessions delivered by an appropriately trained therapist, the committee recommended that individual CBT be delivered by a practitioner with gambling-specific training and competence (who would help to address that people sometimes experience CBT as being stigmatising) in 6 to 8 sessions. However, the committee did not wish to make a recommendation for behavioural therapy or counselling, as these had similar clinical and cost-effectiveness to individual CBT but their clinical effects were characterised by higher uncertainty and were based on a narrower evidence base; moreover, when considering the results for behavioural therapy, it was noted that this lacks the cognitive element of CBT which is considered important in treating people experiencing gambling-related harms.

Other factors the committee took into account

Funding sources

The funding sources for the studies included in this evidence review were:

- Any industry funding: Bucker 2018, Cunningham 2009, Cunningham 2012, Dowling 2021, Korman 2008, LaBrie 2012, Ladouceur 2001, Lee 2015, Luquiens 2016, Martens 2015, McIntosh 2016, Milton 2002, Neighbors 2015, Nilsson 2020, Rodda 2018, Smith 2015, Thomas 2017, Toneatto 2009/2016, Wittekind 2019
- No-industry funding: Abbott 2012/2018, Armstrong 2020, Bouchard 2017, Boudreault 2018, Bucker 2021, Campos 2016, Carlbring 2008, Cunningham 2019, Ede 2020, Grant 2009, Hodgins 2001/2004, Hodgins 2009, Hodgins 2019, Jonas 2020, Larimer 2012, Myrseth 2011, Oei 2018, Petry 2006, Petry 2008, Petry 2009, So 2020, Zhuang 2018
- Unclear funding source: Diskin 2009, Dowling 2007, Ladouceur 2003, Marceaux 2001, Myrseth 2009, Petry 2016, Wong 2015

The committee inspected the NMA base-case results as well as those of the sensitivity analyses that included only studies with no-industry funding. They noted that results were overall consistent between the two analyses, although the sensitivity analysis included a limited number of studies and comparisons. They also noted that bias adjustment analyses testing for bias associated with funding source (any industry / unclear funding) showed no statistical evidence of such bias, although they acknowledged that it is still possible that such bias exists, as the comparisons on which such bias could be tested were limited. Following these observations, the committee agreed to focus on the base-case NMA results in order to make recommendations.

Recommendations supported by this evidence review

This evidence review supports recommendations 1.5.12 to 1.5.15 and the research recommendations on long-term effectiveness of psychological treatments, effectiveness of psychological treatments in people with comorbidities, effectiveness of combination psychological treatments and effectiveness at increasing recovery capital.

References – included studies

Effectiveness

Abbott 2012

Abbott M, Bellringer M, Vandal A et al. (2012) Effectiveness of problem gambling brief telephone interventions: A randomised controlled trial.

Abbott 2018

Abbott, Max, Hodgins, David C, Bellringer, Maria et al. (2018) Brief telephone interventions for problem gambling: a randomized controlled trial. Addiction (Abingdon, England) 113(5): 883-895

Armstrong 2020

Armstrong, Tess, Rockloff, Matthew, Browne, Matthew et al. (2020) Training gamblers to re-think their gambling choices: How contextual analytical thinking may be useful in promoting safer gambling. Journal of Behavioral addictions 9(3): 766-784

Bouchard 2017

Bouchard, Stephane, Robillard, Genevieve, Giroux, Isabelle et al. (2017) Using Virtual Reality in the Treatment of Gambling Disorder: The Development of a New Tool for Cognitive Behavior Therapy. Frontiers in psychiatry 8: 27

Boudreault 2018

Boudreault, Catherine, Giroux, Isabelle, Jacques, Christian et al. (2018) Efficacy of a Self-Help Treatment for At-Risk and Pathological Gamblers. Journal of gambling studies 34(2): 561-580

Bucker 2018

Bucker, Lara, Bierbrodt, Julia, Hand, Iver et al. (2018) Effects of a depression-focused internet intervention in slot machine gamblers: A randomized controlled trial. PloS one 13(6): e0198859

Bucker 2021

Bucker, Lara, Gehlenborg, Josefine, Moritz, Steffen et al. (2021) A randomized controlled trial on a self-guided Internet-based intervention for gambling problems. Scientific reports 11(1): 13033

Campos 2016

Campos, Michael D, Rosenthal, Richard J, Chen, Qiaolin et al. (2016) A self-help manual for problem gamblers: The impact of minimal therapist guidance on outcome. International Journal of Mental Health and Addiction 14(4): 579-596

Carlbring 2008

Carlbring, Per and Smit, Filip (2008) Randomized trial of internet-delivered self-help with telephone support for pathological gamblers. Journal of consulting and clinical psychology 76(6): 1090-4

Cunningham 2019

Cunningham, John A, Godinho, Alexandra, Hodgins, David C (2019) Pilot randomized controlled trial of an online intervention for problem gamblers. Addictive Behaviors reports 9: 100175

Cunningham 2012

Cunningham, John A, Hodgins, David C, Toneatto, Tony et al. (2012) A randomized controlled trial of a personalized feedback intervention for problem gamblers. PloS one 7(2): e31586

Cunningham 2009

Cunningham, John A, Hodgins, David C, Toneatto, Tony et al. (2009) Pilot study of a personalized feedback intervention for problem gamblers. Behavior therapy 40(3): 219-24

Diskin 2009

Diskin, Katherine M and Hodgins, David C (2009) A randomized controlled trial of a single session motivational intervention for concerned gamblers. Behaviour research and therapy 47(5): 382-8

Dowling 2007

Dowling, Nicki; Smith, David; Thomas, Trang (2007) A comparison of individual and group cognitive-behavioural treatment for female pathological gambling. Behaviour research and therapy 45(9): 2192-202

Dowling 2021

Dowling, Nicki A, Merkouris, Stephanie S, Rodda, Simone N et al. (2021) GamblingLess: A Randomised Trial Comparing Guided and Unguided Internet-Based Gambling Interventions. Journal of clinical medicine 10(11)

Ede 2020

Ede, Moses Onyemaechi, Omeje, Joachim C, Ncheke, Damian Chijioke et al. (2020) Assessment of the Effectiveness of Group Cognitive Behavioural Therapy in Reducing Pathological Gambling. Journal of gambling studies 36(4): 1325-1339

Grant 2009

Grant, Jon E, Donahue, Christopher B, Odlaug, Brian L et al. (2009) Imaginal desensitisation plus motivational interviewing for pathological gambling: randomised controlled trial. The British journal of psychiatry : the journal of mental science 195(3): 266-7

Hodgins 2019

Hodgins, David C, Cunningham, John A, Murray, Robert et al. (2019) Online Self-Directed Interventions for Gambling Disorder: Randomized Controlled Trial. Journal of gambling studies 35(2): 635-651

Hodgins 2001

Hodgins, D C; Currie, S R; el-Guebaly, N (2001) Motivational enhancement and self-help treatments for problem gambling. Journal of consulting and clinical psychology 69(1): 50-7

Hodgins 2009

Hodgins, David C, Currie, Shawn R, Currie, Gillian et al. (2009) Randomized trial of brief motivational treatments for pathological gamblers: More is not necessarily better. Journal of consulting and clinical psychology 77(5): 950-960

Hodgins 2004

Hodgins, David C, Currie, Shawn, el-Guebaly, Nady et al. (2004) Brief motivational treatment for problem gambling: a 24-month follow-up. Psychology of addictive behaviors : journal of the Society of Psychologists in Addictive Behaviors 18(3): 293-6

Jonas 2020

Jonas, Benjamin, Leuschner, Fabian, Eiling, Anna et al. (2020) Web-Based Intervention and Email-Counseling for Problem Gamblers: Results of a Randomized Controlled Trial. Journal of gambling studies 36(4): 1341-1358

Korman 2008

Korman, Lorne, Collins, Jane, Littman-Sharp, Nina et al. (2008) Randomized control trial of an integrated therapy for comorbid anger and gambling. Psychotherapy research: journal of the Society for Psychotherapy Research 18(4): 454-65

Labrie 2012

Labrie, Richard A, Peller, Allyson J, Laplante, Debi A et al. (2012) A brief self-help toolkit intervention for gambling problems: a randomized multisite trial. The American journal of orthopsychiatry 82(2): 278-89

Ladouceur 2001

Ladouceur, R, Sylvain, C, Boutin, C et al. (2001) Cognitive treatment of pathological gambling. The Journal of nervous and mental disease 189(11): 774-80

Ladouceur 2003

Ladouceur, R, Sylvain, C, Boutin, C et al. (2003) Group therapy for pathological gamblers: a cognitive approach. Behaviour research and therapy 41(5): 587-96

Larimer 2012

Larimer, Mary E, Neighbors, Clayton, Lostutter, Ty W et al. (2012) Brief motivational feedback and cognitive behavioral interventions for prevention of disordered gambling: a randomized clinical trial. Addiction (Abingdon, England) 107(6): 1148-58

Lee 2015

Lee, Bonnie K and Awosoga, Olu (2015) Congruence Couple Therapy for Pathological Gambling: A Pilot Randomized Controlled Trial. Journal of gambling studies 31(3): 1047-68

Luquiens 2016

Luquiens, Amandine, Tanguy, Marie-Laure, Lagadec, Marthylle et al. (2016) The Efficacy of Three Modalities of Internet-Based Psychotherapy for Non-Treatment-Seeking Online Problem Gamblers: A Randomized Controlled Trial. Journal of medical Internet research 18(2): e36

Marceaux 2011

Marceaux, Janice C and Melville, Cameron L (2011) Twelve-step facilitated versus mapping-enhanced cognitive-behavioral therapy for pathological gambling: a controlled study. Journal of gambling studies 27(1): 171-90

Martens 2015

Martens, Matthew P, Arterberry, Brooke J, Takamatsu, Stephanie K et al. (2015) The efficacy of a personalized feedback-only intervention for at-risk college gamblers. Journal of consulting and clinical psychology 83(3): 494-9

McIntosh 2016

McIntosh, C C; Crino, R D; O'Neill, K (2016) Treating Problem Gambling Samples with Cognitive Behavioural Therapy and Mindfulness-Based Interventions: A Clinical Trial. Journal of gambling studies 32(4): 1305-1325

Milton 2002

Milton, Simon, Crino, Rocco, Hunt, Caroline et al. (2002) The effect of compliance-improving interventions on the cognitive-behavioural treatment of pathological gambling. Journal of gambling studies 18(2): 207-29

Myrseth 2009

Myrseth, Helga, Litlere, Irene, Stoylen, Inge Jarl et al. (2009) A controlled study of the effect of cognitive-behavioural group therapy for pathological gamblers. Nordic journal of psychiatry 63(1): 22-31

Myrseth 2011

Myrseth, Helga, Molde, Helge, Stoylen, Inge Jarl et al. (2011) A pilot study of CBT versus escitalopram combined with CBT in the treatment of pathological gamblers. International Gambling Studies 11(1): 121-141

Neighbors 2015

Neighbors, Clayton, Rodriguez, Lindsey M, Rinker, Dipali V et al. (2015) Efficacy of personalized normative feedback as a brief intervention for college student gambling: a randomized controlled trial. Journal of consulting and clinical psychology 83(3): 500-11

Nilsson 2019

Nilsson, A., Magnusson, K., Carlbring, P. et al. (2019) Behavioral couples therapy versus cognitive behavioral therapy for problem gambling: a randomized controlled trial. Addiction

Oei 2018

Oei, T P S; Raylu, N; Lai, W W (2018) Effectiveness of a Self Help Cognitive Behavioural Treatment Program for Problem Gamblers: A Randomised Controlled Trial. Journal of gambling studies 34(2): 581-595

Petry 2006

Petry, Nancy M, Ammerman, Yola, Bohl, Jaime et al. (2006) Cognitive-behavioral therapy for pathological gamblers. Journal of consulting and clinical psychology 74(3): 555-67

Petry 2016

Petry, Nancy M; Rash, Carla J; Alessi, Sheila M (2016) A randomized controlled trial of brief interventions for problem gambling in substance abuse treatment patients. Journal of consulting and clinical psychology 84(10): 874-86

Petry 2008

Petry, Nancy M, Weinstock, Jeremiah, Ledgerwood, David M et al. (2008) A randomized trial of brief interventions for problem and pathological gamblers. Journal of consulting and clinical psychology 76(2): 318-28

Petry 2009

Petry, Nancy M, Weinstock, Jeremiah, Morasco, Benjamin J et al. (2009) Brief motivational interventions for college student problem gamblers. Addiction (Abingdon, England) 104(9): 1569-78

Rodda 2018

Rodda, S. N, Dowling, N. A, Knaebe, B et al. (2018) Does SMS improve gambling outcomes over and above access to other e-mental health supports? A feasibility study. International Gambling Studies 18(2): 343-357

Smith 2015

Smith, David P, Battersby, Malcolm W, Harvey, Peter W et al. (2015) Cognitive versus exposure therapy for problem gambling: Randomised controlled trial. Behaviour research and therapy 69: 100-10

So 2020

So, Ryuhei, Furukawa, Toshi A, Matsushita, Sachio et al. (2020) Unguided Chatbot-Delivered Cognitive Behavioural Intervention for Problem Gamblers Through Messaging App: A Randomised Controlled Trial. Journal of gambling studies 36(4): 1391-1407

Thomas 2017

Thomas S, Jackson A, Browning C et al. (2017) Psychological treatments for problem gambling (PROGRESS) study final report.

Toneatto 2009

Toneatto, T. and Gunaratne, M. (2009) Does the treatment of cognitive distortions improve clinical outcomes for problem gambling?. Journal of Contemporary Psychotherapy 39(4): 221-229

Toneatto 2016

Toneatto, Tony (2016) Single-session interventions for problem gambling may be as effective as longer treatments: Results of a randomized control trial. Addictive behaviors 52: 58-65

Wittekind 2019

Wittekind, Charlotte E, Bierbrodt, Julia, Ludecke, Daniel et al. (2019) Cognitive bias modification in problem and pathological gambling using a web-based approach-avoidance task: A pilot trial. Psychiatry research 272: 171-181

Wong 2015

Wong, Daniel Fu Keung, Chung, Catherine Lai Ping, Wu, Janet et al. (2015) A Preliminary Study of an Integrated and Culturally Attuned Cognitive Behavioral Group Treatment for Chinese Problem Gamblers in Hong Kong. Journal of gambling studies 31(3): 1015-27

Zhuang 2018

Zhuang, X.Y., Wong, D.F.K., Ng, T.K. et al. (2018) Evaluating the Effectiveness of an Integrated Cognitive-Behavioural Intervention (CBI) Model for Male Problem Gamblers in Hong Kong: A Matched-Pair Comparison Design. Journal of gambling studies 34(3): 969-985

Economic

Bellringer 2021

1 Bellringer ME, Palmer du Preez K, Vandal AC, Janicot S, Ikeda T, Hodgins DC, Battersby M,
2 van Kessel K, Sullivan S, Riley B, Te Ao B, Henry N, Mauchline L, Landon J (2021).
3 Effectiveness of face-to-face gambling interventions: A randomised controlled trial. Auckland:
4 Auckland University of Technology, Gambling and Addictions Research Centre.

Appendices

Appendix A Review protocols

Review protocol for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Table 9: Review protocol

ID	Field	Content
0.	PROSPERO registration number	CRD42022356147
1.	Review title	Psychological and psychosocial interventions for harmful gambling: a systematic review and network meta-analysis
2.	Review question	What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?
3.	Objective	• To establish the effectiveness of psychological interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders) • To establish the effectiveness of psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)
4.	Searches	The following databases will be searched: • Applied Social Science Index and Abstracts (ASSIA) • Cumulative Index to Nursing and Allied Health Literature (CINAHL) • Cochrane Central Register of Controlled Trials (CENTRAL) • Cochrane Database of Systematic Reviews (CDSR) • Embase • Emcare

ID	Field	Content
		• Epistemonikos • Health Management Information Consortium (HMIC) • International Health Technology Assessment (INAHTA) • Medline and Medline In-Process • PsycInfo • Social Care Online • Social Policy and Practice • Social Sciences Citation Index Searches will be restricted by: • Date: 2000 onwards (see rationale under Section 10) • English language • Human studies Other searches: Inclusion lists of systematic reviews • Kings Fund reports • Campbell Collaboration • Gov.uk • National Grey Literature Collection • Be Gamble Aware • GamCare • Gambling Research Exchange Ontario • Gambling Commission • Advisory Board for Safer Gambling • Gambling Watch UK • Australian Gambling Research Centre • Gambling Compliance

ID	Field	Content
		• Gambling and Addictions Research Centre • Responsible Gambling Council • Victorian Responsible Gambling Foundation Additional search strategy information can be found in the attached pdf document (link provided below)
5.	Condition or domain being studied	Psychological and psychosocial treatment interventions for people participating in harmful gambling
6.	Population	Inclusion: People aged ≥ 18years old, currently participating in harmful gambling. Exclusion: • Children and young people <18 years old. • Gambling behaviour only occurring during manic episodes of people with bipolar disorder
7.	Intervention/Exposure/Test	1. Psychological interventions for the treatment of harmful gambling: • Cognitive & behavioural interventions and related techniques (including but not limited to cognitive behavioural therapy [CBT], cognitive restructuring technique and aversion therapies.) • Other psychotherapeutic interventions for harmful gambling (including but not limited to supportive counselling, harm reduction interventions and psychodrama and dramatherapy). • Trauma informed interventions for addiction (including but not limited to CBT based trauma interventions, eye movement desensitisation and Eriksonian hypnosis). • Neurological/ brain stimulation interventions (including but not limited to transcranial magnetic stimulation [TMS], deep brain stimulation and cognitive bias modification). • Residential treatment (including but not limited to short-term residential treatment, medium and long-term residential treatment and hybrid residential

ID	Field	Content
		treatment, such as Retreat and Counselling model). • Self-help, digital interventions and helplines (including but not limited to self-help literature and workbooks, personalised feedback interventions and gamification psychotherapy). 2. Psychosocial interventions for the treatment of harmful gambling: • Life and social skills-based interventions (including but not limited to assertiveness training, life skills training and functional communication training). • Family, systemic and significant other interventions (including but not limited to family therapies with varying styles depending on the theoretical underpinning, transgenerational models and the structural family model). • Community and peer support interventions (including but not limited to peer support groups, intentional peer support and SMART recovery). Combinations • A combination of 2 or more from the above categories (for example a psychological combined with a psychosocial treatment). • A pharmacological intervention combined with 1 of the above categories.
8.	Comparator/Reference standard/Confounding factors	Interventions compared with each other (psychological or psychosocial) or: • A pharmacological treatment • Treatment as usual • Placebo or sham treatment • No treatment (including wait-list controls)
9.	Types of study to be included	Include published full-text papers: • Systematic reviews of RCTs (for identification of further RCTs) • Experimental studies using a randomly assigned control group design (network meta-analysis will only include RCTs) • Experimental studies using a non-randomly assigned control group design with match comparison or another method of controlling for confounding

ID	Field	Content
		variables (non-RCTs will be considered in pairwise analyses).
10.	Other exclusion criteria	Inclusion: • Full text papers Exclusion: • Articles published before 2000 • Population-level gambling disorder interventions • Studies using qualitative methods only • Non-English language articles • Conference proceedings • Abstract only • Books and book chapters
11.	Context	Recommendations will apply in all settings where NHS-commissioned healthcare is provided for people who participate in harmful gambling.
12.	Primary outcomes (critical outcomes)	• Gambling symptom severity (assessed using validated scales such as the Problem Gambling Severity Index). Where studies report data for more than one symptom severity scale, all will be incorporated in the NMA. For the NMA, remission and response data will also be combined with gambling scale scores • Frequency of gambling sessions. For the NMA, data on gambling abstinence, and improvement as reduction in number of episodes, will also be included in this analysis. Time spent gambling may also be incorporated • Time spent gambling (if not possible to combine with frequency of gambling sessions above) • Gambling expenditure (this will not be included in the NMA) • Recovery capital (measured using validated tools such as the Life in Recovery Scale). • Psychological wellbeing (measured using scales such as the Warwick-Edinburgh Well Being Scale, the CORE-10 score and Psychclops).

ID	Field	Content
		• Personal, social and life functioning (measured using person centred, validated scales such as the Work and Social Adjustment Scale) • Adverse events such as suicide, self-harm, or unplanned acute mental health hospital admission.
13.	Secondary outcomes (important outcomes)	Physical and mental health related quality of life (measured using scales such as EQ 5D and SF-12).
14.	Data extraction (selection and coding)	• All references identified by the searches and from other sources will be uploaded into EPPI-Reviewer 5 and de-duplicated. • Titles and abstracts of the retrieved citations will be screened to identify studies that potentially meet the inclusion criteria outlined in the review protocol. • Dual or duplicate screening will be undertaken for 10% of items (90% agreement is required and disagreements will be resolved via discussion with the senior systematic reviewer). • Full versions of the selected studies will be obtained for assessment. Studies that fail to meet the inclusion criteria once the full version has been checked will be excluded at this stage. Each study excluded after checking the full version will be listed along with the reason for its exclusion. • The included and excluded studies lists will be circulated to the Topic Group for their comments. Resolution of disputes will be by discussion between the senior reviewer, Topic Advisor and Chair. • Data will be extracted into a standardised template created in Microsoft Excel, providing study reference, participant characteristics, intervention details, and outcome data. Data extraction will be double-coded.
15.	Risk of bias (quality) assessment	Risk of bias of individual studies will be assessed using the Cochrane risk of bias tool. The assessment will include: adequacy of randomisation (sufficient description of method, allocation concealment and baseline difference between groups); blinding (participants, intervention administrators, outcome assessors); attrition ('at risk of attrition bias' defined as drop-out >20% and completer analysis used, or a difference of >20% between groups); selective reporting bias (is the protocol registered, are all outcomes reported); other bias (for instance, conflict of interest in funding). Risk of bias assessments will be double-coded.

ID	Field	Content
16.	Strategy for data synthesis	Where possible, meta-analyses will be conducted using Cochrane Review Manager software with a preferred intention to treat analysis. It is considered likely that a random-effects model will be used for pairwise meta-analyses. A network meta-analysis in a Bayesian framework will be used to synthesise the data for all eligible interventions which are connected in a network of RCT comparisons. Interventions with similar effects will be grouped into classes and class effect models will be fitted [Dias 2018]. The relative effects of the interventions within each class will be assumed to be distributed around a common class mean with a within-class variance, permitting the borrowing of strength across interventions within each class. For the NMA, the random effects assumption will be assessed by comparing the fit of fixed and random class effects models, where the former assumes intervention effects within each class are the same (for example no within-class variability of effects). Continuous outcomes (SMDs) will be combined with dichotomous data to estimate intervention effects. The NMA will be restricted to gambling symptom severity, frequency of gambling sessions, and time spent gambling if it is not possible to combine this with frequency of gambling sessions. Due to particularly high attrition rates in some studies, data will be adjusted for the NMA using baseline observation carried forward for drop-outs (in studies reporting completer data), where feasible and appropriate.
17.	Analysis of sub-groups	For the NMA, the consistency of direct and indirect evidence will be assessed by fitting and comparing the fit of the NMA and unrelated mean effects (UME) models, the latter is equivalent to having separate, unrelated, meta-analyses for pairwise contrast [Dias 2011]. Each data point's contribution to the posterior mean residual deviance for the NMA model will be plotted against that for the UME model, to visually assess if specific data points are contributing to inconsistency. If the UME suggests there is evidence of inconsistency, node-split models will be fitted to assist in identifying loops of evidence with inconsistency [Dias 2010]. If the network structure allows, sensitivity analyses will be considered for the gambling

ID	Field	Content			
		symptom severity outcome, after excluding trials with any industry funding and unclear funding source, to explore whether inclusion of industry-funded studies may be biasing effects. However, it is acknowledged that this exercise may result in disconnected networks, given that the majority of trials are industry-funded or have an unclear funding source. Bias-adjusted analyses will be conducted: • for small study size, for the outcome of gambling symptom severity • that assumes bias (favouring the active interventions vs inactive interventions) for trials with any industry and unclear funding Threshold analysis will be conducted for the outcomes of gambling symptom severity and frequency, to assess the robustness of intervention recommendations due to bias [Phillippo 2018]			
18.	Type and method of review	☒	Intervention		
		☐	Diagnostic		
		☐	Prognostic		
		☐	Qualitative		
		☐	Epidemiologic		
		☐	Service Delivery		
		☐	Other (please specify)		
19.	Language	English			
20.	Country	England			
21.	Anticipated or actual start date	April 2022			
22.	Anticipated completion date	February 2024			
23.	Stage of review at time of this submission	Review stage		Started	Completed

ID	Field	Content		
		Preliminary searches	☑	☑
		Piloting of the study selection process	☑	☑
		Formal screening of search results against eligibility criteria	☑	☑
		Data extraction	☑	☑
		Risk of bias (quality) assessment	☑	☑
		Data analysis	☑	☑
24.	Named contact	**5a Named contact** National Institute for Health and Care Excellence (NICE) **5b Named contact e-mail** Gambling@nice.org.uk **5c Organisational affiliation of the review** National Institute for Health and Care Excellence (NICE)		
25.	Review team members	NICE technical team		
26.	Funding sources/sponsor	This systematic review is being completed by NICE, which receives funding from the Department of Health and Social Care.		
27.	Conflicts of interest	All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be		

ID	Field	Content	
		published with the final guideline.	
28.	Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines: the manual. Members of the guideline committee are available on the NICE website: https://www.nice.org.uk/guidance/indevelopment/gid-ng10210.	
29.	Other registration details	N/A	
30.	Reference/URL for published protocol	crd.york.ac.uk/prospero/display_record.php?ID=CRD42022356147	
31.	Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include standard approaches such as: • notifying registered stakeholders of publication • publicising the guideline through NICE's newsletter and alerts • issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.	
32.	Keywords	Harmful gambling; Intervention; Treatment; Recovery; Psychosocial; Psychological	
33.	Details of existing review of same topic by same authors	N/A	
34.	Current review status	☒	Ongoing
		☐	Completed but not published
		☐	Completed and published
		☐	Completed, published and being updated
		☐	Discontinued
35.	Additional information	N/A	
36.	Details of final publication	www.nice.org.uk	

CDSR: Cochrane Database of Systematic Reviews; CENTRAL: Cochrane Central Register of Controlled Trials; CORE-10: Clinical outcomes in routine evaluation; EQ-5D: EuroQol health related quality of life (5 domains); GRADE: Grading of Recommendations Assessment, Development and Evaluation; HTA: Health Technology Assessment;

MID: minimally important difference; NGA: National Guideline Alliance; NHS: National health service; NICE: National Institute for Health and Care Excellence; PHQ-9: Patient health questionnaire-9; PROSPERO: International prospective register of systematic reviews; RCT: randomised controlled trial; RoB: risk of bias; SD: standard deviation; N/A: not applicable; ROBINS-I: risk of bias In non-randomized studies of interventions; ROBIS: risk of bias in systematic reviews; SD: standard deviation SF-12: 12-item short form survey

Appendix B Literature search strategies

Literature search strategies for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Effectiveness searches

Database: Applied Social Science Index and Abstracts (ASSIA)

Date of last search: 07/11/2022

#	Searches
	AB,TI (gambl* or betting or bet or bets or wager* or "gaming machine*" or "slot machine*" or "fruit machine*" or "poker machine*" or "lottery machine*" or "lotteries machine*" or "gaming terminal*" or "slot terminal*" or "fruit terminal*" or "poker terminal*" or "lottery terminal*" or "lotteries terminal*" or pokies or pokey or puggy or fruities)
AND	AB,TI (psycho* or therap* or artmouth e* or cognitive or behaviour* or behavior* or CBT or aversi* or counsel* or "motivational interview*" or "harm reduction" or Psychodrama or dramatherap* or "eye movement" or EMDR or hypno* or "electric stimulat*" or electrostimulat* or electrotherapy or transcranial* or "brain stimulation" or artmouth e* or TMS or "cognitive bias modification" or retreat or retreats or "self help" or "self care" or "self manage*" or "self directed" or "self guided" or "web based" or "internet based" or "phone based" or app or apps or hotline* or helpline* or "help line*" or "web support*" or "personali* feedback" or "personali* feed back" or gamif* or psychosocial or "psycho social" or "social skill" or "social skills" or assertiveness or "community support" or "social support" or "support program*" or "support group*" or "peer support" or "SMART recovery" or "relapse prevention" or "prevent* relapse" or "secondary prevention" or "recovery capital" or "mutual aid" or "after care" or aftercare or "followup treatment" or "follow up treatment" or "support therapy" or mindfulness or "self compassion" or mentor* or "systemic* intervention*" or finance* or banking or budget* or "self exclu*" or "voluntary exclu*" or "restrict* access" or Gamban or "support mechanism*" or "support model*" or "post resident*" or postresident* or "post treatment" or posttreatment or "relapse program*" or "recovery college*" or "cognitive artmouth *" or biofeedback or neurofeedback or "autogenic training" or meditate or meditation or "crisis intervention*" or "transaction analysis" or "role play" or "role playing" or "breathing exercise*" or qigong or "tai ji" or "tai chi" or yoga or "therapeutic touch" or "node link mapping")
AND	Additional limits – Date: From January 01 2000

Database: Cochrane Central Register of Controlled Trials (CENTRAL) and Cochrane Database of Systematic Reviews (CDSR)

Date of last search: 07/11/2022

#	Searches
#1	MeSH descriptor: [Gambling] this term only
#2	gambl*:ti,ab
#3	betting:ti,ab
#4	(bet or bets):ti,ab
#5	wager*:ti,ab
#6	((gaming or gambling or slot or fruit or poker or lottery or lotteries) near/5 (machine* or terminal*)):ti,ab
#7	(pokies or pokey or puggy or fruities):ti,ab
#8	((dice or card or cards or roulette or blackjack or poker or baccarat or crap or craps or keno or casino* or bingo or bookmaker* or "book maker" or bookie* or lottery or lotteries or lotto or "scratch card*" or scratchcard* or raffle or raffles or artmouth * or "amusement arcade*" or slot or slots) near/5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)):ti,ab
#9	((game or games or gaming or gamer*) near/5 (money or monetization or monetisation or monetary)):ti,ab
#10	("loot box*" or lootbox*):ti,ab
#11	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10
#12	MeSH descriptor: [Psychotherapy] explode all trees
#13	MeSH descriptor: [Mind-Body Therapies] explode all trees
#14	(psycho* near/5 (intervention* or treat* or therap*)):ti,ab
#15	((cogniti* or behavio*) near/5 (intervention* or treat* or therap* or technique*)):ti,ab
#16	CBT:ti,ab
#17	(aversi* near/3 (therap* or treat* or learn*)):ti,ab
#18	(artmouth e* or psychodynamic* or psychoanal*):ti,ab
#19	MeSH descriptor: [Counseling] explode all trees
#20	counsel*:ti,ab
#21	(artmout* near/3 interview*):ti,ab
#22	MeSH descriptor: [Harm Reduction] this term only
#23	(harm* near/3 (reduc* or minimi*)):ti,ab

#	Searches
#24	MeSH descriptor: [Psychodrama] explode all trees
#25	(psychodrama* or “psycho drama*”):ti,ab
#26	(drama* near/3 therap*):ti,ab
#27	dramatherap*:ti,ab
#28	(addict* near/5 (intervention* or treat* or therap* or rehab*)):ti,ab
#29	(trauma* near/5 (intervention* or treat* or therap* or rehab*)):ti,ab
#30	(eye* near/3 mov* near/5 (desensiti* or de-sensiti* or process* or reprocess* or therap* or program* or reprogram*)):ti,ab
#31	EMDR:ti,ab
#32	hypno*:ti,ab
#33	MeSH descriptor: [Electric Stimulation] this term only
#34	MeSH descriptor: [Electric Stimulation Therapy] this term only
#35	MeSH descriptor: [Transcranial Magnetic Stimulation] this term only
#36	MeSH descriptor: [Transcranial Direct Current Stimulation] this term only
#37	MeSH descriptor: [Deep Brain Stimulation] this term only
#38	(stimulat* near/5 (intervention* or treat* or therap* or rehab*)):ti,ab
#39	((neurolo* or brain* or transcranial*) near/3 stimulat*):ti,ab
#40	artmouth e*:ti,ab
#41	TMS:ti,ab
#42	(cognit* near/3 bias* near/3 modif*):ti,ab
#43	((resident* or inpatient) near/5 (intervention* or treat* or therap* or rehab*)):ti,ab
#44	(retreat or retreats):ti,ab
#45	MeSH descriptor: [Self-Management] this term only
#46	MeSH descriptor: [Self Care] this term only
#47	MeSH descriptor: [Self-Help Groups] this term only
#48	(self near/5 (help* or care or manag* or direct* or guid*)):ti,ab
#49	MeSH descriptor: [Internet-Based Intervention] this term only
#50	((digital* or computer* or online or web or internet or tele* or mobile or phone* or app or apps) near/5 intervention*):ti,ab
#51	MeSH descriptor: [Hotlines] this term only
#52	(hotline* or helpline* or “help line*”):ti,ab
#53	(web near/3 (service* or support*)):ti,ab
#54	(personali* near/3 (feedback or “feed back” or intervention*)):ti,ab
#55	gamif*:ti,ab
#56	((psychosocial* or “psycho social*”) near/5 (intervention* or treat* or therap* or rehab*)):ti,ab
#57	MeSH descriptor: [Social Skills] this term only
#58	MeSH descriptor: [Assertiveness] this term only
#59	((life or social*) near/3 skill* near/5 (intervention* or treat* or therap* or rehab* or train*)):ti,ab
#60	((assertive* or function* or communicat*) near/5 (intervention* or treat* or therap* or rehab* or train*)):ti,ab
#61	((parent or parents or parental or mother or mothers or father or fathers or son or sons or daughter* or sibling* or brother* or sister* or grandparent* or grandfather* or grandmother* or family or families or relatives or cousin* or uncle* or aunt or aunts or auntie* or caregiver* or carer* or friend* or spouse* or husband* or wife or wives or couple or couples or partner or partners or boyfriend* or girlfriend*) near/5 (intervention* or treat* or therap* or rehab* or train* or model*)):ti,ab
#62	((affected or significant) near/3 other* near/5 (intervention* or treat* or therap* or rehab* or train* or model*)):ti,ab
#63	(“loved one*” near/5 (intervention* or treat* or therap* or rehab* or train* or model*)):ti,ab
#64	MeSH descriptor: [Community Support] this term only
#65	MeSH descriptor: [Social Support] this term only
#66	((communit* or neighbor* or neighbour* or religious* or social* or cultur* or ethnic*) near/5 support*):ti,ab
#67	(support* near/5 (organization* or organisation* or program* or group*)):ti,ab
#68	(peer* near/3 (support* or intervention*)):ti,ab
#69	(SMART near/3 recover*):ti,ab
#70	MeSH descriptor: [Secondary Prevention] this term only
#71	((prevent* or avoid*) near/5 (relaps* or recur* or dropout or “drop* out” or second*)):ti,ab
#72	(recover* near/3 capital*):ti,ab
#73	(mutual* near/3 aid*):ti,ab
#74	MeSH descriptor: [Aftercare] this term only
#75	((after* or followup or “follow* up”) near/3 care):ti,ab
#76	aftercare:ti,ab
#77	((followup or “follow* up”) near/3 treat*):ti,ab
#78	(support* near/5 therap*):ti,ab
#79	MeSH descriptor: [Mindfulness] this term only
#80	mindful*:ti,ab
#81	(self near/3 (compass* or forgiv*)):ti,ab
#82	MeSH descriptor: [Mentoring] this term only
#83	MeSH descriptor: [Mentors] this term only
#84	mentor*:ti,ab
#85	((marital* or marriage*) near/5 therap*):ti,ab
#86	(systemic* near/5 (intervention* or treat* or therap* or rehab* or model*)):ti,ab
#87	MeSH descriptor: [Banking, Personal] this term only
#88	MeSH descriptor: [Budgets] this term only
#89	((artmou* or bank* or money or spend* or cash or budget*) near/5 (intervention* or manag* or plan* or train* or educat* or limit* or restrict*)):ti,ab
#90	((self or volunt*) near/5 exclu*):ti,ab

#	Searches
#91	(access* near/3 restrict*):ti,ab
#92	Gamban:ti,ab
#93	((artmou* or bank* or money or spend* or cash or budget*) near/5 (digital* or computer* or online or web or internet or tele* or mobile or phone* or app or apps)):ti,ab
#94	(support* near/5 (react* or mechanism* or intervention* or model*)):ti,ab
#95	(post near/5 (resident* or treat* or intervention* or therap* or rehab*)):ti,ab
#96	(postresident* or posttreat* or postintervention* or artmouth * or postrehab*):ti,ab
#97	(relaps* near/5 (program* or educat* or train* or learn* or teach* or volunteer* or occupation* or work* or job* or employ* or intervention*)):ti,ab
#98	(recover* near/3 college*):ti,ab
#99	((animal* or equine or art or anger or acceptance or commitment* or implosive or "virtual reality" or relaxation or dance or emotion* or gestalt or horticultur* or mentalisation or mentalization or music* or artmouth* or play or reality or schema or socioenvironmental or "socio environmental" or milieu or "mind body" or laugh*) near/3 therap*):ti,ab
#100	(chronotherapy* or bibliotherapy* or logotherap*):ti,ab
#101	(cognitive near/3 (artmouth * or remediat* or artmou*)):ti,ab
#102	(feedback near/3 (artmouth * or sensory or neuro*)):ti,ab
#103	(biofeedback or neurofeedback):ti,ab
#104	((autogenic or sensitivity or desensitisation or desensitization or sensitisation or sensitization) near/3 train*):ti,ab
#105	artmout*:ti,ab
#106	((crisis or crises) near/3 intervention*):ti,ab
#107	(transaction* near/3 analys*):ti,ab
#108	"role play*":ti,ab
#109	(breath* near/3 (artmout* or therap*)):ti,ab
#110	(qigong or "tai ji" or "tai chi" or yoga):ti,ab
#111	(mental* near/3 (heal or heals or healing)):ti,ab
#112	(therap* near/3 touch*):ti,ab
#113	(node* near/3 link* near/3 map*):ti,ab
#114	#12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #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 or #42 or #43 or #44 or #45 or #46 or #47 or #48 or #49 or #50 or #51 or #52 or #53 or #54 or #55 or #56 or #57 or #58 or #59 or #60 or #61 or #62 or #63 or #64 or #65 or #66 or #67 or #68 or #69 or #70 or #71 or #72 or #73 or #74 or #75 or #76 or #77 or #78 or #79 or #80 or #81 or #82 or #83 or #84 or #85 or #86 or #87 or #88 or #89 or #90 or #91 or #92 or #93 or #94 or #95 or #96 or #97 or #98 or #99 or #100 or #101 or #102 or #103 or #104 or #105 or #106 or #107 or #108 or #109 or #110 or #111 or #112 or #113
#115	#11 and #114
#116	#11 and #114 with Cochrane Library publication date Between Jan 2000 and Jun 2022

Database: Cumulative Index to Nursing and Allied Health Literature (CINAHL)

Date of last search: 07/11/2022

#	Searches
S1	TI (gambl* or betting or bet or bets or wager* or "gaming machine*" or "slot machine*" or "fruit machine*" or "poker machine*" or "lottery machine*" or "lotteries machine*" or "gaming terminal*" or "slot terminal*" or "fruit terminal*" or "poker terminal*" or "lottery terminal*" or "lotteries terminal*" or pokies or pokey or puggy or fruities) Limiters – Published Date: 20000101-20221231
S2	TI (psycho* or therap* or artmouth e* or cognitive or behaviour* or behavior* or CBT or aversi* or counsel* or "motivational interview*" or "harm reduction" or Psychodrama or dramatherap* or "eye movement" or EMDR or hypno* or "electric stimulat*" or electrostimulat* or electrotherapy or transcranial* or "brain stimulation" or artmouth e* or TMS or "cognitive bias modification" or retreat or retreats or "self help" or "self care" or "self manage*" or "self directed" or "self guided" or "web based" or "internet based" or "phone based" or app or apps or hotline* or helpline* or "help line*" or "web support*" or "personali* feedback" or "personali* feed back" or gamif* or psychosocial or "psycho social" or "social skill" or "social skills" or assertiveness or "community support" or "social support" or "support program*" or "support group*" or "peer support" or "SMART recovery" or "relapse prevention" or "prevent* relapse" or "secondary prevention" or "recovery capital" or "mutual aid" or "after care" or aftercare or "followup treatment" or "follow up treatment" or "support therapy" or mindfulness or "self compassion" or mentor* or "systemic* intervention*" or finance* or banking or budget* or "self exclu*" or "voluntary exclu*" or "restrict* access" or Gamban or "support mechanism*" or "support model*" or "post resident*" or postresident* or "post treatment" or posttreatment or "relapse program*" or "recovery college*" or "cognitive artmouth *" or biofeedback or neurofeedback or "autogenic training" or meditate or meditation or "crisis intervention*" or "transaction analysis" or "role play" or "role playing" or "breathing exercise*" or qigong or "tai ji" or "tai chi" or yoga or "therapeutic touch" or "node link mapping") Limiters – Published Date: 20000101-20221231
S3	S1 and S2

Database: Embase

Date of last search: 07/11/2022

#	Searches
1	GAMBLING/
2	PATHOLOGICAL GAMBLING/
3	gambl*.ti,ab.

#	Searches
4	betting.ti,ab.
5	(bet or bets).ti,ab.
6	wager*.ti,ab.
7	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
8	(pokies or pokey or puggy or fruities).ti,ab.
9	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
10	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
11	(loot box* or lootbox*).ti,ab.
12	or/1-11
13	exp PSYCHOTHERAPY/
14	exp ALTERNATIVE MEDICINE/
15	(psycho* adj5 (intervention? Or treat* or therap*)).ti,ab.
16	((cogniti* or behavio*) adj5 (intervention? Or treat* or therap* or technique?)).ti,ab.
17	CBT.ti,ab.
18	(aversi* adj3 (therap* or treat* or learn*)).ti,ab.
19	(artmouth e* or psychodynamic? Or psychoanal*).ti,ab.
20	exp COUNSELING/
21	counsel*.ti,ab.
22	(artmout* adj3 interview*).ti,ab.
23	HARM REDUCTION/
24	(harm* adj3 (reduc* or minimi*)).ti,ab.
25	(psychodrama* or psycho drama*).ti,ab.
26	(drama* adj3 therap*).ti,ab.
27	dramatherap*.ti,ab.
28	(addict* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
29	(trauma* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
30	(eye? Adj3 mov* adj5 (desensiti* or de-sensiti* or process* or reprocess* or therap* or program* or reprogram*)).ti,ab.
31	EMDR.ti,ab.
32	hypno*.ti,ab.
33	ELECTROSTIMULATION/
34	ELECTROTHERAPY/
35	exp TRANSCRANIAL MAGNETIC STIMULATION/
36	TRANSCRANIAL DIRECT CURRENT STIMULATION/
37	BRAIN DEPTH STIMULATION/
38	(stimulat* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
39	((neurolo* or brain? Or transcranial*) adj3 stimulat*).ti,ab.
40	artmouth e*.ti,ab.
41	TMS.ti,ab.
42	(cognit* adj3 bias* adj3 modif*).ti,ab.
43	((resident* or inpatient) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
44	retreat?.ti,ab.
45	SELF CARE/
46	SELF HELP/
47	(self adj5 (help* or care or manag* or direct* or guid*)).ti,ab.
48	WEB-BASED INTERVENTION/
49	((digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?) adj5 intervention?).ti,ab.
50	HOTLINE/
51	(hotline? Or helpline? Or help line?).ti,ab.
52	(web adj3 (service? Or support*)).ti,ab.
53	(personali* adj3 (feedback or feed back or intervention?)).ti,ab.
54	gamif*.ti,ab.
55	PSYCHOSOCIAL CARE/
56	((psychosocial* or psycho social*) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
57	SOCIAL COMPETENCE/
58	ASSERTIVENESS/
59	((life or social*) adj3 skill? Adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
60	((assertive* or function* or communicat*) adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
61	((parent? Or parental or mother? Or father? Or son? Or daughter? Or sibling? Or brother? Or sister? Or grandparent? Or grandfather? Or grandmother? Or family or families or relatives or cousin? Or uncle? Or aunt? Or auntie? Or caregiver? Or carer? Or friend? Or spouse? Or husband? Or wife or wives or couple or couples or partner or partners or boyfriend? Or girlfriend?) adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
62	((affected or significant) adj3 other? Adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
63	(loved one* adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
64	SOCIAL SUPPORT/
65	((communit* or neighbo?r* or religious* or social* or cultur* or ethnic*) adj5 support*).ti,ab.
66	exp SUPPORT GROUP/
67	(support* adj5 (organization? Or organisation? Or program* or group?)).ti,ab.
68	(peer? Adj3 (support* or intervention*)).ti,ab.

#	Searches
69	(SMART adj3 recover*).ti,ab.
70	SECONDARY PREVENTION/
71	((prevent* or avoid*) adj5 (relaps* or recur* or dropout or drop* out or second*)).ti,ab.
72	(recover* adj3 capital*).ti,ab.
73	(mutual* adj3 aid*).ti,ab.
74	AFTERCARE/
75	((after* or followup or follow* up) adj3 care).ti,ab.
76	aftercare.ti,ab.
77	((followup or follow* up) adj3 treat*).ti,ab.
78	(support* adj5 therap*).ti,ab.
79	mindful*.ti,ab.
80	(self adj3 (compass* or forgiv*)).ti,ab.
81	MENTORING/
82	MENTOR/
83	mentor*.ti,ab.
84	((marital* or marriage?) adj5 therap*).ti,ab.
85	(systemic* adj5 (intervention? Or treat* or therap* or rehab* or model?)).ti,ab.
86	BANK ACCOUNT/
87	BUDGET/
88	((artmou* or bank* or money or spend* or cash or budget*) adj5 (intervention? Or manag* or plan* or train* or educat* or limit* or restrict*)).ti,ab.
89	((self or volunt*) adj5 exclu*).ti,ab.
90	(access* adj3 restrict*).ti,ab.
91	Gamban.ti,ab.
92	((artmou* or bank* or money or spend* or cash or budget*) adj5 (digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?)).ti,ab.
93	(support* adj5 (react* or mechanism? Or intervention? Or model*)).ti,ab.
94	(post adj5 (resident* or treat* or intervention? Or therap* or rehab*)).ti,ab.
95	(postresident* or posttreat* or postintervention? Or artmouth * or postrehab*).ti,ab.
96	(relaps* adj5 (program* or educat* or train* or learn* or teach* or volunteer* or occupation* or work* or job? Or employ* or intervention?)).ti,ab.
97	(recover* adj3 college?).ti,ab.
98	((animal? Or equine or art or anger or acceptance or commitment? Or implosive or virtual reality or relaxation or dance or emotion* or gestalt or horticultur* or mentali?ation or music* or artmouth* or play or reality or schema or socioenvironmental or socio environmental or milieu or mind body or laugh*) adj3 therap*).ti,ab.
99	(chronotherapy* or bibliotherapy* or logotherap*).ti,ab.
100	(cognitive adj3 (artmouth * or remediat* or artmou*)).ti,ab.
101	(feedback adj3 (artmouth * or sensory or neuro*)).ti,ab.
102	(biofeedback or neurofeedback).ti,ab.
103	((autogenic or sensitivity or desensiti?ation or sensiti?ation) adj3 train*).ti,ab.
104	exp MEDITATION/
105	artmout*.ti,ab.
106	CRISIS INTERVENTION/
107	(cris?s adj3 intervention?).ti,ab.
108	(transaction* adj3 analys*).ti,ab.
109	role play*.ti,ab.
110	exp BREATHING EXERCISE/
111	(breath* adj3 (artmout* or therap*)).ti,ab.
112	TAI CHI/
113	exp YOGA/
114	(qigong or tai ji or tai chi or yoga).ti,ab.
115	(mental* adj3 (heal? Or healing)).ti,ab.
116	(therap* adj3 touch*).ti,ab.
117	(node? Adj3 link* adj3 map*).ti,ab.
118	or/13-117
119	12 and 118
120	limit 119 to artmou language
121	limit 120 to yr=”2000 -Current”
122	letter.pt. or LETTER/
123	note.pt.
124	editorial.pt.
125	CASE REPORT/ or CASE STUDY/
126	(letter or comment*).ti.
127	or/122-126
128	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
129	127 not 128
130	ANIMAL/ not HUMAN/
131	NONHUMAN/
132	exp ANIMAL EXPERIMENT/
133	exp EXPERIMENTAL ANIMAL/
134	ANIMAL MODEL/

#	Searches
135	exp RODENT/
136	(rat or rats or mouse or mice).ti.
137	or/129-136
138	121 not 137
139	SYSTEMATIC REVIEW/
140	META-ANALYSIS/
141	(meta analy* or metanaly* or metaanaly*).ti,ab.
142	((systematic or evidence) adj2 (review* or overview*)).ti,ab.
143	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
144	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
145	(search* adj4 literature).ab.
146	(medline or pubmed or artmout or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
147	((pool* or combined) adj2 (data or trials or studies or results)).ab.
148	artmout.jw.
149	or/139-148
150	random*.ti,ab.
151	factorial*.ti,ab.
152	(crossover* or cross over*).ti,ab.
153	((doubl* or singl*) adj blind*).ti,ab.
154	(assign* or artmout* or volunteer* or placebo*).ti,ab.
155	CROSSOVER PROCEDURE/
156	SINGLE BLIND PROCEDURE/
157	RANDOMIZED CONTROLLED TRIAL/
158	DOUBLE BLIND PROCEDURE/
159	or/150-158
160	EPIDEMIOLOGY/ or CONTROLLED STUDY/ or exp CASE CONTROL STUDY/ or PROSPECTIVE STUDY/ or RETROSPECTIVE STUDY/ or COHORT ANALYSIS/ or FOLLOW UP/ or CROSS-SECTIONAL STUDY/ or exp CLINICAL TRIAL/ or COMPARATIVE STUDY/
161	(control and study).mp.
162	program.mp.
163	or/160-162
164	(ANIMAL/ not HUMAN/) or EDITORIAL/ or REVIEW/ or META-ANALYSIS/ or CONSENSUS/ or PRACTICE GUIDELINE/
165	hi.fs. or case report.mp.
166	or/164-165
167	163 not 166
168	138 and 149
169	138 and 159
170	138 and 167
171	or/168-170

Database: Emcare

Date of last search: 07/11/2022

#	Searches
1	GAMBLING/
2	PATHOLOGICAL GAMBLING/
3	gambl*.ti,ab.
4	betting.ti,ab.
5	(bet or bets).ti,ab.
6	wager*.ti,ab.
7	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
8	(pokies or pokey or puggy or fruities).ti,ab.
9	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
10	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
11	(loot box* or lootbox*).ti,ab.
12	or/1-11
13	exp PSYCHOTHERAPY/
14	exp ALTERNATIVE MEDICINE/
15	(psycho* adj5 (intervention? Or treat* or therap*)).ti,ab.
16	((cogniti* or behavio*) adj5 (intervention? Or treat* or therap* or technique?)).ti,ab.
17	CBT.ti,ab.
18	(aversi* adj3 (therap* or treat* or learn*)).ti,ab.
19	(artmouth e* or psychodynamic? Or psychoanal*).ti,ab.
20	exp COUNSELING/
21	counsel*.ti,ab.
22	(artmout* adj3 interview*).ti,ab.

#	Searches
23	HARM REDUCTION/
24	(harm* adj3 (reduc* or minimi*)).ti,ab.
25	(psychodrama* or psycho drama*).ti,ab.
26	(drama* adj3 therap*).ti,ab.
27	dramatherap*.ti,ab.
28	(addict* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
29	(trauma* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
30	(eye? Adj3 mov* adj5 (desensiti* or de-sensiti* or process* or reprocess* or therap* or program* or reprogram*)).ti,ab.
31	EMDR.ti,ab.
32	hypno*.ti,ab.
33	ELECTROSTIMULATION/
34	ELECTROTHERAPY/
35	exp TRANSCRANIAL MAGNETIC STIMULATION/
36	TRANSCRANIAL DIRECT CURRENT STIMULATION/
37	BRAIN DEPTH STIMULATION/
38	(stimulat* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
39	((neurolo* or brain? Or transcranial*) adj3 stimulat*).ti,ab.
40	artmouth e*.ti,ab.
41	TMS.ti,ab.
42	(cognit* adj3 bias* adj3 modif*).ti,ab.
43	((resident* or inpatient) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
44	retreat?.ti,ab.
45	SELF CARE/
46	SELF HELP/
47	(self adj5 (help* or care or manag* or direct* or guid*)).ti,ab.
48	WEB-BASED INTERVENTION/
49	((digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?) adj5 intervention?).ti,ab.
50	HOTLINE/
51	(hotline? Or helpline? Or help line?).ti,ab.
52	(web adj3 (service? Or support*)).ti,ab.
53	(personali* adj3 (feedback or feed back or intervention?)).ti,ab.
54	gamif*.ti,ab.
55	PSYCHOSOCIAL CARE/
56	((psychosocial* or psycho social*) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
57	SOCIAL COMPETENCE/
58	ASSERTIVENESS/
59	((life or social*) adj3 skill? Adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
60	((assertive* or function* or communicat*) adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
61	((parent? Or parental or mother? Or father? Or son? Or daughter? Or sibling? Or brother? Or sister? Or grandparent? Or grandfather? Or grandmother? Or family or families or relatives or cousin? Or uncle? Or aunt? Or auntie? Or caregiver? Or carer? Or friend? Or spouse? Or husband? Or wife or wives or couple or couples or partner or partners or boyfriend? Or girlfriend?) adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
62	((affected or significant) adj3 other? Adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
63	(loved one* adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
64	SOCIAL SUPPORT/
65	((communit* or neighbo?r* or religious* or social* or cultur* or ethnic*) adj5 support*).ti,ab.
66	exp SUPPORT GROUP/
67	(support* adj5 (organization? Or organisation? Or program* or group?)).ti,ab.
68	(peer? Adj3 (support* or intervention*)).ti,ab.
69	(SMART adj3 recover*).ti,ab.
70	SECONDARY PREVENTION/
71	((prevent* or avoid*) adj5 (relaps* or recur* or dropout or drop* out or second*)).ti,ab.
72	(recover* adj3 capital*).ti,ab.
73	(mutual* adj3 aid*).ti,ab.
74	AFTERCARE/
75	((after* or followup or follow* up) adj3 care).ti,ab.
76	aftercare.ti,ab.
77	((followup or follow* up) adj3 treat*).ti,ab.
78	(support* adj5 therap*).ti,ab.
79	mindful*.ti,ab.
80	(self adj3 (compass* or forgiv*)).ti,ab.
81	MENTORING/
82	MENTOR/
83	mentor*.ti,ab.
84	((marital* or marriage?) adj5 therap*).ti,ab.
85	(systemic* adj5 (intervention? Or treat* or therap* or rehab* or model?)).ti,ab.
86	BANK ACCOUNT/
87	BUDGET/
88	((artmou* or bank* or money or spend* or cash or budget*) adj5 (intervention? Or manag* or plan* or train* or educat* or limit* or restrict*)).ti,ab.
89	((self or volunt*) adj5 exclu*).ti,ab.

#	Searches
90	(access* adj3 restrict*).ti,ab.
91	Gamban.ti,ab.
92	((artmou* or bank* or money or spend* or cash or budget*) adj5 (digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?)).ti,ab.
93	(support* adj5 (react* or mechanism? Or intervention? Or model*)).ti,ab.
94	(post adj5 (resident* or treat* or intervention? Or therap* or rehab*)).ti,ab.
95	(postresident* or posttreat* or postintervention? Or artmouth * or postrehab*).ti,ab.
96	(relaps* adj5 (program* or educat* or train* or learn* or teach* or volunteer* or occupation* or work* or job? Or employ* or intervention?)).ti,ab.
97	(recover* adj3 college?).ti,ab.
98	((animal? Or equine or art or anger or acceptance or commitment? Or implosive or virtual reality or relaxation or dance or emotion* or gestalt or horticultur* or mentali?ation or music* or artmouth* or play or reality or schema or socioenvironmental or socio environmental or milieu or mind body or laugh*) adj3 therap*).ti,ab.
99	(chronotherapy* or bibliotherapy* or logotherap*).ti,ab.
100	(cognitive adj3 (artmouth * or remediat* or artmou*)).ti,ab.
101	(feedback adj3 (artmouth * or sensory or neuro*)).ti,ab.
102	(biofeedback or neurofeedback).ti,ab.
103	((autogenic or sensitivity or desensiti?ation or sensiti?ation) adj3 train*).ti,ab.
104	exp MEDITATION/
105	artmout*.ti,ab.
106	CRISIS INTERVENTION/
107	(cris?s adj3 intervention?).ti,ab.
108	(transaction* adj3 analys*).ti,ab.
109	role play*.ti,ab.
110	exp BREATHING EXERCISE/
111	(breath* adj3 (artmout* or therap*)).ti,ab.
112	TAI CHI/
113	exp YOGA/
114	(qigong or tai ji or tai chi or yoga).ti,ab.
115	(mental* adj3 (heal? Or healing)).ti,ab.
116	(therap* adj3 touch*).ti,ab.
117	(node? Adj3 link* adj3 map*).ti,ab.
118	or/13-117
119	12 and 118
120	limit 119 to artmou language
121	limit 120 to yr="2000 -Current"
122	letter.pt. or LETTER/
123	note.pt.
124	editorial.pt.
125	CASE REPORT/ or CASE STUDY/
126	(letter or comment*).ti.
127	or/122-126
128	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
129	127 not 128
130	ANIMAL/ not HUMAN/
131	NONHUMAN/
132	exp ANIMAL EXPERIMENT/
133	exp EXPERIMENTAL ANIMAL/
134	ANIMAL MODEL/
135	exp RODENT/
136	(rat or rats or mouse or mice).ti.
137	or/129-136
138	121 not 137
139	SYSTEMATIC REVIEW/
140	META-ANALYSIS/
141	(meta analy* or metanaly* or metaanaly*).ti,ab.
142	((systematic or evidence) adj2 (review* or overview*)).ti,ab.
143	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
144	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
145	(search* adj4 literature).ab.
146	(medline or pubmed or artmout or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
147	((pool* or combined) adj2 (data or trials or studies or results)).ab.
148	artmout.jw.
149	or/139-148
150	random*.ti,ab.
151	factorial*.ti,ab.
152	(crossover* or cross over*).ti,ab.
153	((doubl* or singl*) adj blind*).ti,ab.
154	(assign* or artmout* or volunteer* or placebo*).ti,ab.
155	CROSSOVER PROCEDURE/

#	Searches
156	SINGLE BLIND PROCEDURE/
157	RANDOMIZED CONTROLLED TRIAL/
158	DOUBLE BLIND PROCEDURE/
159	or/150-158
160	EPIDEMIOLOGY/ or CONTROLLED STUDY/ or exp CASE CONTROL STUDY/ or PROSPECTIVE STUDY/ or RETROSPECTIVE STUDY/ or COHORT ANALYSIS/ or FOLLOW UP/ or CROSS-SECTIONAL STUDY/ or exp CLINICAL TRIAL/ or COMPARATIVE STUDY/
161	(control and study).mp.
162	program.mp.
163	or/160-162
164	(ANIMAL/ not HUMAN/) or EDITORIAL/ or REVIEW/ or META-ANALYSIS/ or CONSENSUS/ or PRACTICE GUIDELINE/
165	[hi.fs. or case report.mp.]
166	or/164-165
167	163 not 166
168	138 and 149
169	138 and 159
170	138 and 167
171	or/168-170

Database: Epistemonikos

Date of last search: 07/11/2022

#	Searches
	title:((gambl* OR betting OR bet OR bets OR wager* OR “gaming machine*” OR “slot machine*” OR “fruit machine*” OR “poker machine*” OR “lottery machine*” OR “lotteries machine*” OR “gaming terminal*” OR “slot terminal*” OR “fruit terminal*” OR “poker terminal*” OR “lottery terminal*” OR “lotteries terminal*” OR pokies OR pokey OR puggy OR fruities) AND (psycho* or therap* or artmouth e* or cognitive or behaviour* or behavior* or CBT or aversi* or counsel* or “motivational interview*” or “harm reduction” or Psychodrama or dramatherap* or “eye movement” or EMDR or hypno* or “electric stimulat*” or electrostimulat* or electrotherapy or transcranial* or “brain stimulation” or artmouth e* or TMS or “cognitive bias modification” or retreat or retreats or “self help” or “self care” or “self manage*” or “self directed” or “self guided” or “web based” or “internet based” or “phone based” or app or apps or hotline* or helpline* or “help line*” or “web support*” or “personali* feedback” or “personali* feed back” or gamif* or psychosocial or “psycho social” or “social skill” or “social skills” or assertiveness or “community support” or “social support” or “support program*” or “support group*” or “peer support” or “SMART recovery” or “relapse prevention” or “prevent* relapse” or “secondary prevention” or “recovery capital” or “mutual aid” or “after care” or aftercare or “followup treatment” or “follow up treatment” or “support therapy” or mindfulness or “self compassion” or mentor* or “systemic* intervention*” or finance* or banking or budget* or “self exclu*” or “voluntary exclu*” or “restrict* access” or Gamban or “support mechanism*” or “support model*” or “post resident*” or postresident* or “post treatment” or posttreatment or “relapse program*” or “recovery college*” or “cognitive artmouth *” or biofeedback or neurofeedback or “autogenic training” or meditate or meditation or “crisis intervention*” or “transaction analysis” or “role play” or “role playing” or “breathing exercise*” or qigong or “tai ji” or “tai chi” or yoga or “therapeutic touch” or “node link mapping”)) Publication year: 2000-2022

Database: Health Information Management Consortium (HMIC)

Date of last search: 07/11/2022

#	Searches
1	GAMBLING/
2	GAMBLERS/
3	GAMBLING MACHINES/
4	AMUSEMENT ARCADES/
5	CASINOS/
6	BOOKMAKERS/
7	LOTTERIES/
8	NATIONAL LOTTERY/
9	gambl*.ti,ab.
10	betting.ti,ab.
11	(bet or bets).ti,ab.
12	wager*.ti,ab.
13	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
14	(pokies or pokey or puggy or fruities).ti,ab.
15	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
16	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
17	(loot box* or lootbox*).ti,ab.
18	or/1-17
19	exp PSYCHOTHERAPY/
20	exp COMPLEMENTARY MEDICINE/
21	(psycho* adj5 (intervention? Or treat* or therap*)).ti,ab.

#	Searches
22	((cogniti* or behavio*) adj5 (intervention? Or treat* or therap* or technique?)).ti,ab.
23	CBT.ti,ab.
24	(aversi* adj3 (therap* or treat* or learn*)).ti,ab.
25	(artmouth e* or psychodynamic? Or psychoanal*).ti,ab.
26	exp COUNSELLING/
27	COUNSELLING SERVICES/
28	counsel*.ti,ab.
29	(artmout* adj3 interview*).ti,ab.
30	HARM REDUCTION/
31	(harm* adj3 (reduc* or minimi*)).ti,ab.
32	(psychodrama* or psycho drama*).ti,ab.
33	(drama* adj3 therap*).ti,ab.
34	dramatherap*.ti,ab.
35	(addict* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
36	(trauma* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
37	(eye? Adj3 mov* adj5 (desensiti* or de-sensiti* or process* or reprocess* or therap* or program* or reprogram*)).ti,ab.
38	EMDR.ti,ab.
39	HYPNOSIS/
40	hypno*.ti,ab.
41	ELECTROTHERAPY/
42	(stimulat* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
43	((neurolo* or brain? Or transcranial*) adj3 stimulat*).ti,ab.
44	artmouth e*.ti,ab.
45	TMS.ti,ab.
46	(cognit* adj3 bias* adj3 modif*).ti,ab.
47	((resident* or inpatient) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
48	retreat?.ti,ab.
49	SELF MANAGEMENT/
50	exp SELF CARE/
51	SELF HELP/
52	SELF HELP ORGANISATIONS/
53	SELF HELP HEALTH ORGANISATIONS/
54	SELF HELP GROUPS/
55	SELF HELP CLUBS/
56	(self adj5 (help* or care or manag* or direct* or guid*)).ti,ab.
57	((digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?) adj5 intervention?).ti,ab.
58	(hotline? Or helpline? Or help line?).ti,ab.
59	(web adj3 (service? Or support*)).ti,ab.
60	(personali* adj3 (feedback or feed back or intervention?)).ti,ab.
61	gamif*.ti,ab.
62	((psychosocial* or psycho social*) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
63	SOCIAL SKILLS TRAINING/
64	ASSERTIVENESS TRAINING/
65	((life or social*) adj3 skill? Adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
66	((assertive* or function* or communicat*) adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
67	((parent? Or parental or mother? Or father? Or son? Or daughter? Or sibling? Or brother? Or sister? Or grandparent? Or grandfather? Or grandmother? Or family or families or relatives or cousin? Or uncle? Or aunt? Or auntie? Or caregiver? Or carer? Or friend? Or spouse? Or husband? Or wife or wives or couple or couples or partner or partners or boyfriend? Or girlfriend?) adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
68	((affected or significant) adj3 other? Adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
69	(loved one* adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
70	SOCIAL SUPPORT/
71	SUPPORT GROUPS/
72	((communit* or neighbo?r* or religious* or social* or cultur* or ethnic*) adj5 support*).ti,ab.
73	(support* adj5 (organization? Or organisation? Or program* or group?)).ti,ab.
74	(peer? Adj3 (support* or intervention*)).ti,ab.
75	(SMART adj3 recover*).ti,ab.
76	((prevent* or avoid*) adj5 (relaps* or recur* or dropout or drop* out or second*)).ti,ab.
77	(recover* adj3 capital*).ti,ab.
78	(mutual* adj3 aid*).ti,ab.
79	AFTER CARE/
80	MEDICAL AFTER CARE/
81	PSYCHIATRIC AFTER CARE/
82	((after* or followup or follow* up) adj3 care).ti,ab.
83	aftercare.ti,ab.
84	((followup or follow* up) adj3 treat*).ti,ab.
85	(support* adj5 therap*).ti,ab.
86	mindful*.ti,ab.
87	(self adj3 (compass* or forgiv*)).ti,ab.
88	MENTORING/

#	Searches
89	mentor*.ti,ab.
90	((marital* or marriage?) adj5 therap*).ti,ab.
91	(systemic* adj5 (intervention? Or treat* or therap* or rehab* or model?)).ti,ab.
92	PERSONAL FINANCE/
93	BUDGETS/
94	FAMILY BUDGETS/
95	INDIVIDUAL BUDGETS/
96	((artmou* or bank* or money or spend* or cash or budget*) adj5 (intervention? Or manag* or plan* or train* or educat* or limit* or restrict*)).ti,ab.
97	((self or volunt*) adj5 exclu*).ti,ab.
98	(access* adj3 restrict*).ti,ab.
99	Gamban.ti,ab.
100	((artmou* or bank* or money or spend* or cash or budget*) adj5 (digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?)).ti,ab.
101	(support* adj5 (react* or mechanism? Or intervention? Or model*)).ti,ab.
102	(post adj5 (resident* or treat* or intervention? Or therap* or rehab*)).ti,ab.
103	(postresident* or posttreat* or postintervention? Or artmouth * or postrehab*).ti,ab.
104	(relaps* adj5 (program* or educat* or train* or learn* or teach* or volunteer* or occupation* or work* or job? Or employ* or intervention?)).ti,ab.
105	(recover* adj3 college?).ti,ab.
106	((animal? Or equine or art or anger or acceptance or commitment? Or implosive or virtual reality or relaxation or dance or emotion* or gestalt or horticultur* or mentali?ation or music* or artmouth* or play or reality or schema or socioenvironmental or socio environmental or milieu or mind body or laugh*) adj3 therap*).ti,ab.
107	(chronotherapy* or bibliotherapy* or logotherap*).ti,ab.
108	(cognitive adj3 (artmouth * or remediat* or artmou*)).ti,ab.
109	(feedback adj3 (artmouth * or sensory or neuro*)).ti,ab.
110	(biofeedback or neurofeedback).ti,ab.
111	((autogenic or sensitivity or desensiti?ation or sensiti?ation) adj3 train*).ti,ab.
112	artmout*.ti,ab.
113	(cris?s adj3 intervention?).ti,ab.
114	(transaction* adj3 analys*).ti,ab.
115	role play*.ti,ab.
116	BREATHING EXERCISES/
117	(breath* adj3 (artmout* or therap*)).ti,ab.
118	(qigong or tai ji or tai chi or yoga).ti,ab.
119	(mental* adj3 (heal? Or healing)).ti,ab.
120	(therap* adj3 touch*).ti,ab.
121	(node? Adj3 link* adj3 map*).ti,ab.
122	or/19-121
123	18 and 122
124	limit 123 to yr="2000 -Current"

Database: International Health Technology Assessment Database (INAHTA)

Date of last search: 07/11/2022

#	Searches
	All:(gamble or gambler or gamblers or gambling or gambled or betting or bet or bets or wager or wagers)
	AND Publication Year: 2000-2022

Database: MEDLINE ALL

Date of last search: 07/11/2022

#	Searches
1	GAMBLING/
2	gambl*.ti,ab.
3	betting.ti,ab.
4	(bet or bets).ti,ab.
5	wager*.ti,ab.
6	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
7	(pokies or pokey or puggy or fruities).ti,ab.
8	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
9	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
10	(loot box* or lootbox*).ti,ab.
11	or/1-10
12	exp PSYCHOTHERAPY/

#	Searches
13	exp MIND-BODY THERAPIES/
14	(psycho* adj5 (intervention? Or treat* or therap*)).ti,ab.
15	((cogniti* or behavio*) adj5 (intervention? Or treat* or therap* or technique?)).ti,ab.
16	CBT.ti,ab.
17	(aversi* adj3 (therap* or treat* or learn*)).ti,ab.
18	(artmouth e* or psychodynamic? Or psychoanal*).ti,ab.
19	exp COUNSELING/
20	counsel*.ti,ab.
21	(artmout* adj3 interview*).ti,ab.
22	HARM REDUCTION/
23	(harm* adj3 (reduc* or minimi*)).ti,ab.
24	exp PSYCHODRAMA/
25	(psychodrama* or psycho drama*).ti,ab.
26	(drama* adj3 therap*).ti,ab.
27	dramatherap*.ti,ab.
28	(addict* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
29	(trauma* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
30	(eye? Adj3 mov* adj5 (desensiti* or de-sensiti* or process* or reprocess* or therap* or program* or reprogram*)).ti,ab.
31	EMDR.ti,ab.
32	hypno*.ti,ab.
33	ELECTRIC STIMULATION/
34	ELECTRIC STIMULATION THERAPY/
35	TRANSCRANIAL MAGNETIC STIMULATION/
36	TRANSCRANIAL DIRECT CURRENT STIMULATION/
37	DEEP BRAIN STIMULATION/
38	(stimulat* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
39	((neurolo* or brain? Or transcranial*) adj3 stimulat*).ti,ab.
40	artmouth e*.ti,ab.
41	TMS.ti,ab.
42	(cognit* adj3 bias* adj3 modif*).ti,ab.
43	((resident* or inpatient) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
44	retreat?.ti,ab.
45	SELF-MANAGEMENT/
46	SELF CARE/
47	SELF-HELP GROUPS/
48	(self adj5 (help* or care or manag* or direct* or guid*)).ti,ab.
49	INTERNET-BASED INTERVENTION/
50	((digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?) adj5 intervention?).ti,ab.
51	HOTLINES/
52	(hotline? Or helpline? Or help line?).ti,ab.
53	(web adj3 (service? Or support*)).ti,ab.
54	(personali* adj3 (feedback or feed back or intervention?)).ti,ab.
55	gamif*.ti,ab.
56	((psychosocial* or psycho social*) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
57	SOCIAL SKILLS/
58	ASSERTIVENESS/
59	((life or social*) adj3 skill? Adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
60	((assertive* or function* or communicat*) adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
61	((parent? Or parental or mother? Or father? Or son? Or daughter? Or sibling? Or brother? Or sister? Or grandparent? Or grandfather? Or grandmother? Or family or families or relatives or cousin? Or uncle? Or aunt? Or auntie? Or caregiver? Or carer? Or friend? Or spouse? Or husband? Or wife or wives or couple or couples or partner or partners or boyfriend? Or girlfriend?) adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
62	((affected or significant) adj3 other? Adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
63	(loved one* adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
64	COMMUNITY SUPPORT/
65	SOCIAL SUPPORT/
66	((communit* or neighbo?r* or religious* or social* or cultur* or ethnic*) adj5 support*).ti,ab.
67	(support* adj5 (organization? Or organisation? Or program* or group?)).ti,ab.
68	(peer? Adj3 (support* or intervention*)).ti,ab.
69	(SMART adj3 recover*).ti,ab.
70	SECONDARY PREVENTION/
71	((prevent* or avoid*) adj5 (relaps* or recur* or dropout or drop* out or second*)).ti,ab.
72	(recover* adj3 capital*).ti,ab.
73	(mutual* adj3 aid*).ti,ab.
74	AFTERCARE/
75	((after* or followup or follow* up) adj3 care).ti,ab.
76	aftercare.ti,ab.
77	((followup or follow* up) adj3 treat*).ti,ab.
78	(support* adj5 therap*).ti,ab.
79	MINDFULNESS/

#	Searches
80	mindful*.ti,ab.
81	(self adj3 (compass* or forgiv*)).ti,ab.
82	MENTORING/
83	MENTORS/
84	mentor*.ti,ab.
85	((marital* or marriage?) adj5 therap*).ti,ab.
86	(systemic* adj5 (intervention? Or treat* or therap* or rehab* or model?)).ti,ab.
87	BANKING, PERSONAL/
88	BUDGETS/
89	((artmou* or bank* or money or spend* or cash or budget*) adj5 (intervention? Or manag* or plan* or train* or educat* or limit* or restrict*)).ti,ab.
90	((self or volunt*) adj5 exclu*).ti,ab.
91	(access* adj3 restrict*).ti,ab.
92	Gamban.ti,ab.
93	((artmou* or bank* or money or spend* or cash or budget*) adj5 (digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?)).ti,ab.
94	(support* adj5 (react* or mechanism? Or intervention? Or model*)).ti,ab.
95	(post adj5 (resident* or treat* or intervention? Or therap* or rehab*)).ti,ab.
96	(postresident* or posttreat* or postintervention? Or artmouth * or postrehab*).ti,ab.
97	(relaps* adj5 (program* or educat* or train* or learn* or teach* or volunteer* or occupation* or work* or job? Or employ* or intervention?)).ti,ab.
98	(recover* adj3 college?).ti,ab.
99	((animal? Or equine or art or anger or acceptance or commitment? Or implosive or virtual reality or relaxation or dance or emotion* or gestalt or horticultur* or mentali?ation or music* or artmouth* or play or reality or schema or socioenvironmental or socio environmental or milieu or mind body or laugh*) adj3 therap*).ti,ab.
100	(chronotherapy* or bibliotherapy* or logotherap*).ti,ab.
101	(cognitive adj3 (artmouth * or remediat* or artmou*)).ti,ab.
102	(feedback adj3 (artmouth * or sensory or neuro*)).ti,ab.
103	(biofeedback or neurofeedback).ti,ab.
104	((autogenic or sensitivity or desensiti?ation or sensiti?ation) adj3 train*).ti,ab.
105	artmout*.ti,ab.
106	(cris?s adj3 intervention?).ti,ab.
107	(transaction* adj3 analys*).ti,ab.
108	role play*.ti,ab.
109	(breath* adj3 (artmout* or therap*)).ti,ab.
110	(qigong or tai ji or tai chi or yoga).ti,ab.
111	(mental* adj3 (heal? Or healing)).ti,ab.
112	(therap* adj3 touch*).ti,ab.
113	(node? Adj3 link* adj3 map*).ti,ab.
114	or/12-113
115	11 and 114
116	limit 115 to artmou language
117	limit 116 to yr=”2000 -Current”
118	LETTER/
119	EDITORIAL/
120	NEWS/
121	exp HISTORICAL ARTICLE/
122	ANECDOTES AS TOPIC/
123	COMMENT/
124	CASE REPORT/
125	(letter or comment*).ti.
126	or/118-125
127	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
128	126 not 127
129	ANIMALS/ not HUMANS/
130	exp ANIMALS, LABORATORY/
131	exp ANIMAL EXPERIMENTATION/
132	exp MODELS, ANIMAL/
133	exp RODENTIA/
134	(rat or rats or mouse or mice).ti.
135	or/128-134
136	117 not 135
137	META-ANALYSIS/
138	META-ANALYSIS AS TOPIC/
139	(meta analy* or metanaly* or metaanaly*).ti,ab.
140	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
141	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
142	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
143	(search* adj4 literature).ab.
144	(medline or pubmed or artmout or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.

#	Searches
145	artmout.jw.
146	or/137-145
147	randomized controlled trial.pt.
148	controlled clinical trial.pt.
149	pragmatic clinical trial.pt.
150	randomi#ed.ab.
151	placebo.ab.
152	randomly.ab.
153	CLINICAL TRIALS AS TOPIC/
154	trial.ti.
155	or/147-154
156	exp EPIDEMIOLOGIC STUDIES/ or exp CLINICAL TRIAL/ or COMPARATIVE STUDY/
157	(control and study).mp.
158	program.mp.
159	or/156-158
160	(ANIMALS/ not HUMANS/) or COMMENT/ or EDITORIAL/ or exp REVIEW/ or META ANALYSIS/ or CONSENSUS/ or exp GUIDELINE/
161	hi.fs. or case report.mp.
162	or/160-161
163	159 not 162
164	136 and 146
165	136 and 155
166	136 and 163
167	or/164-166

Database: PsycInfo

Date of last search: 07/11/2022

#	Searches
1	GAMBLING/
2	GAMBLING DISORDER/
3	gambl*.ti,ab.
4	betting.ti,ab.
5	(bet or bets).ti,ab.
6	wager*.ti,ab.
7	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
8	(pokies or pokey or puggy or fruities).ti,ab.
9	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
10	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
11	(loot box* or lootbox*).ti,ab.
12	or/1-11
13	exp PSYCHOTHERAPY/
14	exp ADDICTION TREATMENT/
15	exp COGNITIVE BEHAVIOR THERAPY/
16	exp COGNITIVE TECHNIQUES/
17	exp CREATIVE ARTS THERAPY/
18	exp MAINTENANCE THERAPY/
19	exp RELAXATION THERAPY/
20	SOCIOTHERAPY/
21	TRAUMA-INFORMED CARE/
22	exp ALTERNATIVE MEDICINE/
23	MIND BODY THERAPY/
24	(psycho* adj5 (intervention? Or treat* or therap*)).ti,ab.
25	((cogniti* or behavio*) adj5 (intervention? Or treat* or therap* or technique?)).ti,ab.
26	CBT.ti,ab.
27	(aversi* adj3 (therap* or treat* or learn*)).ti,ab.
28	(artmouth e* or psychodynamic? Or psychoanal*).ti,ab.
29	exp COUNSELING/
30	counsel*.ti,ab.
31	(artmout* adj3 interview*).ti,ab.
32	HARM REDUCTION/
33	(harm* adj3 (reduc* or minimi*)).ti,ab.
34	(psychodrama* or psycho drama*).ti,ab.
35	(drama* adj3 therap*).ti,ab.
36	dramatherap*.ti,ab.
37	(addict* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.

#	Searches
38	(trauma* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
39	(eye? Adj3 mov* adj5 (desensiti* or de-sensiti* or process* or reprocess* or therap* or program* or reprogram*)).ti,ab.
40	EMDR.ti,ab.
41	exp HYPNOSIS/
42	hypno*.ti,ab.
43	ELECTRICAL STIMULATION/
44	exp ELECTRICAL BRAIN STIMULATION/
45	TRANSCRANIAL MAGNETIC STIMULATION/
46	(stimulat* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
47	((neurolo* or brain? Or transcranial*) adj3 stimulat*).ti,ab.
48	artmouth e*.ti,ab.
49	TMS.ti,ab.
50	(cognit* adj3 bias* adj3 modif*).ti,ab.
51	((resident* or inpatient) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
52	retreat?.ti,ab.
53	SELF-HELP TECHNIQUES/
54	exp SELF MANAGEMENT/
55	SELF-CARE/
56	(self adj5 (help* or care or manag* or direct* or guid*)).ti,ab.
57	DIGITAL INTERVENTIONS/
58	((digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?) adj5 intervention?).ti,ab.
59	HOT LINE SERVICES/
60	(hotline? Or helpline? Or help line?).ti,ab.
61	(web adj3 (service? Or support*)).ti,ab.
62	(personali* adj3 (feedback or feed back or intervention?)).ti,ab.
63	gamif*.ti,ab.
64	((psychosocial* or psycho social*) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
65	SOCIAL SKILLS TRAINING/
66	ASSERTIVENESS TRAINING/
67	((life or social*) adj3 skill? Adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
68	((assertive* or function* or communicat*) adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
69	((parent? Or parental or mother? Or father? Or son? Or daughter? Or sibling? Or brother? Or sister? Or grandparent? Or grandfather? Or grandmother? Or family or families or relatives or cousin? Or uncle? Or aunt? Or auntie? Or caregiver? Or carer? Or friend? Or spouse? Or husband? Or wife or wives or couple or couples or partner or partners or boyfriend? Or girlfriend?) adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
70	((affected or significant) adj3 other? Adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
71	(loved one* adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
72	SOCIAL SUPPORT/
73	SUPPORT GROUPS/
74	((communit* or neighbo?r* or religious* or social* or cultur* or ethnic*) adj5 support*).ti,ab.
75	(support* adj5 (organization? Or organisation? Or program* or group?)).ti,ab.
76	(peer? Adj3 (support* or intervention*)).ti,ab.
77	(SMART adj3 recover*).ti,ab.
78	RELAPSE PREVENTION/
79	((prevent* or avoid*) adj5 (relaps* or recur* or dropout or drop* out or second*)).ti,ab.
80	(recover* adj3 capital*).ti,ab.
81	(mutual* adj3 aid*).ti,ab.
82	AFTERCARE/
83	((after* or followup or follow* up) adj3 care).ti,ab.
84	aftercare.ti,ab.
85	POSTTREATMENT FOLLOWUP/
86	((followup or follow* up) adj3 treat*).ti,ab.
87	(support* adj5 therap*).ti,ab.
88	MINDFULNESS/
89	MINDFULNESS-BASED INTERVENTIONS/
90	mindful*.ti,ab.
91	SELF COMPASSION/
92	(self adj3 (compass* or forgiv*)).ti,ab.
93	MENTOR/
94	mentor*.ti,ab.
95	((marital* or marriage?) adj5 therap*).ti,ab.
96	(systemic* adj5 (intervention? Or treat* or therap* or rehab* or model?)).ti,ab.
97	BANKING/
98	PERSONAL FINANCE/
99	BUDGETS/
100	((artmou* or bank* or money or spend* or cash or budget*) adj5 (intervention? Or manag* or plan* or train* or educat* or limit* or restrict*)).ti,ab.
101	((self or volunt*) adj5 exclu*).ti,ab.
102	(access* adj3 restrict*).ti,ab.
103	Gamban.ti,ab.
104	((artmou* or bank* or money or spend* or cash or budget*) adj5 (digital* or computer* or online or web or internet or tele*

#	Searches
	or mobile or phone? Or app?)).ti,ab.
105	(support* adj5 (react* or mechanism? Or intervention? Or model*)).ti,ab.
106	(post adj5 (resident* or treat* or intervention? Or therap* or rehab*)).ti,ab.
107	(postresident* or posttreat* or postintervention? Or artmouth * or postrehab*).ti,ab.
108	(relaps* adj5 (program* or educat* or train* or learn* or teach* or volunteer* or occupation* or work* or job? Or employ* or intervention?)).ti,ab.
109	(recover* adj3 college?).ti,ab.
110	((animal? Or equine or art or anger or acceptance or commitment? Or implosive or virtual reality or relaxation or dance or emotion* or gestalt or horticultur* or mentali?ation or music* or artmouth* or play or reality or schema or socioenvironmental or socio environmental or milieu or mind body or laugh*) adj3 therap*).ti,ab.
111	(chronotherapy* or bibliotherapy* or logotherap*).ti,ab.
112	(cognitive adj3 (artmouth * or remediat* or artmou*)).ti,ab.
113	(feedback adj3 (artmouth * or sensory or neuro*)).ti,ab.
114	(biofeedback or neurofeedback).ti,ab.
115	((autogenic or sensitivity or desensiti?ation or sensiti?ation) adj3 train*).ti,ab.
116	MEDITATION/
117	artmout*.ti,ab.
118	CRISIS INTERVENTION/
119	(cris?s adj3 intervention?).ti,ab.
120	(transaction* adj3 analys*).ti,ab.
121	ROLE PLAYING/
122	ROLE PLAYING GAMES/
123	role play*.ti,ab.
124	(breath* adj3 (artmout* or therap*)).ti,ab.
125	YOGA/
126	(qigong or tai ji or tai chi or yoga).ti,ab.
127	(mental* adj3 (heal? Or healing)).ti,ab.
128	(therap* adj3 touch*).ti,ab.
129	(node? Adj3 link* adj3 map*).ti,ab.
130	or/13-129
131	12 and 130
132	limit 131 to artmou language
133	limit 132 to yr=”2000 -Current”
134	(meta analysis or “systematic review”).md. or META ANALYSIS/ or “SYSTEMATIC REVIEW”/
135	(meta analy* or metanaly* or metaanaly*).ti,ab.
136	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
137	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
138	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
139	(search* adj4 literature).ab.
140	artmout.jw.
141	((pool* or combined) adj2 (data or trials or studies or results)).ab.
142	(medline or pubmed or artmout or embase or psychlit or psyclit or cinahl or science citation index or bids or cancerlit).ab.
143	or/134-142
144	clinical trial.md. or Clinical trials/ or Randomized controlled trials/ or Randomized clinical trials/ or (assign* or artmout* or crossover* or cross over* or ((doubl* or singl*) adj blind*) or factorial* or placebo* or random* or volunteer* or trial?).ti,ab.
145	EPIDEMIOLOGY/ or PROSPECTIVE STUDIES/ or RETROSPECTIVE STUDIES/ or COHORT ANALYSIS/ or FOLLOWUP STUDIES/ or exp CLINICAL TRIALS/
146	(control and study).mp.
147	program.mp.
148	or/145-147
149	133 and 143
150	133 and 144
151	133 and 148
152	or/149-151
153	limit 152 to (“0100 journal” or “0110 peer-reviewed journal”)

Database: Social Care Online

Date of last search: 07/11/2022

#	Searches
	AllFields:’gamble or gambler or gamblers or gambling or gambled or betting or bet or bets or wager or wagers or “gaming machine” or “slot machine” or “fruit machine” or “poker machine” or “lottery machine” or “lotteries machine” or “gaming terminal” or “slot terminal” or “fruit terminal” or “poker terminal” or “lottery terminal” or “lotteries terminal” or pokies or pokey or puggy or fruities’
	AND AllFields:’psychological or therapy or therapies or psychotherapy or cognitive or behavioural or behavioral or CBT or counsel or counselling or “motivational interviewing” or “harm reduction” or Psychodrama or dramatherapy or “eye movement” or EMDR or hypnosis or “electric stimulation” or electrostimulation or electrotherapy or transcranial or “brain stimulation” or neuromodulation or TMS or “cognitive bias modification” or retreat or retreats or “self help” or “self care” or “self management” or “self directed” or “self guided” or “web based” or “internet based” or “phone based” or app or hotline or helpline or “help line” or “web support” or “personalized feedback” or “personalized feed back” or gamification or psychosocial or “psycho social” or

#	Searches
	"social skill" or assertiveness or "community support" or "social support" or "support program" or "support group" or "peer support" or "SMART recovery" or "relapse prevention" or "prevent relapse" or "secondary prevention" or "recovery capital" or "mutual aid" or "after care" or aftercare or "followup treatment" or "follow up treatment" or mindfulness or "self compassion" or mentor or mentoring or "systemic intervention" or finance or banking or budget or "self exclusion" or "voluntary exclusion" or "restricting access" or Gamban or "support mechanism" or "support model" or "post resident" or postresident or "post treatment" or posttreatment or "relapse program" or "recovery college" or "cognitive restructuring" or biofeedback or neurofeedback or "autogenic training" or meditate or meditation or "crisis intervention" or "transaction analysis" or "role play" or "role playing" or "breathing exercise" or qigong or "tai ji" or "tai chi" or yoga or "therapeutic touch" or "node link mapping"'
	AND PublicationYear:'2000 2022'

Database: Social Policy and Practice (SPP)

Date of last search: 07/11/2022

#	Searches
1	gambl*.ti,ab.
2	betting.ti,ab.
3	(bet or bets).ti,ab.
4	wager*.ti,ab.
5	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
6	(pokies or pokey or puggy or fruities).ti,ab.
7	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
8	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
9	(loot box* or lootbox*).ti,ab.
10	or/1-9
11	(psycho* adj5 (intervention? Or treat* or therap*)).ti,ab.
12	((cogniti* or behavio*) adj5 (intervention? Or treat* or therap* or technique?)).ti,ab.
13	CBT.ti,ab.
14	(aversi* adj3 (therap* or treat* or learn*)).ti,ab.
15	(artmouth e* or psychodynamic? Or psychoanal*).ti,ab.
16	counsel*.ti,ab.
17	(artmout* adj3 interview*).ti,ab.
18	(harm* adj3 (reduc* or minimi*)).ti,ab.
19	(psychodrama* or psycho drama*).ti,ab.
20	(drama* adj3 therap*).ti,ab.
21	dramatherap*.ti,ab.
22	(addict* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
23	(trauma* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
24	(eye? Adj3 mov* adj5 (desensiti* or de-sensiti* or process* or reprocess* or therap* or program* or reprogram*)).ti,ab.
25	EMDR.ti,ab.
26	hypno*.ti,ab.
27	(stimulat* adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
28	((neurolo* or brain? Or transcranial*) adj3 stimulat*).ti,ab.
29	artmouth e*.ti,ab.
30	TMS.ti,ab.
31	(cognit* adj3 bias* adj3 modif*).ti,ab.
32	((resident* or inpatient) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
33	retreat?.ti,ab.
34	(self adj5 (help* or care or manag* or direct* or guid*)).ti,ab.
35	((digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?) adj5 intervention?).ti,ab.
36	(hotline? Or helpline? Or help line?).ti,ab.
37	(web adj3 (service? Or support*)).ti,ab.
38	(personali* adj3 (feedback or feed back or intervention?)).ti,ab.
39	gamif*.ti,ab.
40	((psychosocial* or psycho social*) adj5 (intervention? Or treat* or therap* or rehab*)).ti,ab.
41	((life or social*) adj3 skill? Adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
42	((assertive* or function* or communicat*) adj5 (intervention? Or treat* or therap* or rehab* or train*)).ti,ab.
43	((parent? Or parental or mother? Or father? Or son? Or daughter? Or sibling? Or brother? Or sister? Or grandparent? Or grandfather? Or grandmother? Or family or families or relatives or cousin? Or uncle? Or aunt? Or auntie? Or caregiver? Or carer? Or friend? Or spouse? Or husband? Or wife or wives or couple or couples or partner or partners or boyfriend? Or girlfriend?) adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
44	((affected or significant) adj3 other? Adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
45	(loved one* adj5 (intervention? Or treat* or therap* or rehab* or train* or model?)).ti,ab.
46	((communit* or neighbo?r* or religious* or social* or cultur* or ethnic*) adj5 support*).ti,ab.
47	(support* adj5 (organization? Or organisation? Or program* or group?)).ti,ab.
48	(peer? Adj3 (support* or intervention*)).ti,ab.
49	(SMART adj3 recover*).ti,ab.
50	((prevent* or avoid*) adj5 (relaps* or recur* or dropout or drop* out or second*)).ti,ab.

#	Searches
51	(recover* adj3 capital*).ti,ab.
52	(mutual* adj3 aid*).ti,ab.
53	((after* or followup or follow* up) adj3 care).ti,ab.
54	aftercare.ti,ab.
55	((followup or follow* up) adj3 treat*).ti,ab.
56	(support* adj5 therap*).ti,ab.
57	mindful*.ti,ab.
58	(self adj3 (compass* or forgiv*)).ti,ab.
59	mentor*.ti,ab.
60	((marital* or marriage?) adj5 therap*).ti,ab.
61	(systemic* adj5 (intervention? Or treat* or therap* or rehab* or model?)).ti,ab.
62	((artmou* or bank* or money or spend* or cash or budget*) adj5 (intervention? Or manag* or plan* or train* or educat* or limit* or restrict*)).ti,ab.
63	((self or volunt*) adj5 exclu*).ti,ab.
64	(access* adj3 restrict*).ti,ab.
65	Gamban.ti,ab.
66	((artmou* or bank* or money or spend* or cash or budget*) adj5 (digital* or computer* or online or web or internet or tele* or mobile or phone? Or app?)).ti,ab.
67	(support* adj5 (react* or mechanism? Or intervention? Or model*)).ti,ab.
68	(post adj5 (resident* or treat* or intervention? Or therap* or rehab*)).ti,ab.
69	(postresident* or posttreat* or postintervention? Or artmouth * or postrehab*).ti,ab.
70	(relaps* adj5 (program* or educat* or train* or learn* or teach* or volunteer* or occupation* or work* or job? Or employ* or intervention?)).ti,ab.
71	(recover* adj3 college?).ti,ab.
72	((animal? Or equine or art or anger or acceptance or commitment? Or implosive or virtual reality or relaxation or dance or emotion* or gestalt or horticultur* or mentali?ation or music* or artmouth* or play or reality or schema or socioenvironmental or socio environmental or milieu or mind body or laugh*) adj3 therap*).ti,ab.
73	(chronotherapy* or bibliotherapy* or logotherap*).ti,ab.
74	(cognitive adj3 (artmouth * or remediat* or artmou*)).ti,ab.
75	(feedback adj3 (artmouth * or sensory or neuro*)).ti,ab.
76	(biofeedback or neurofeedback).ti,ab.
77	((autogenic or sensitivity or desensiti?ation or sensiti?ation) adj3 train*).ti,ab.
78	artmout*.ti,ab.
79	(cris?s adj3 intervention?).ti,ab.
80	(transaction* adj3 analys*).ti,ab.
81	role play*.ti,ab.
82	(breath* adj3 (artmout* or therap*)).ti,ab.
83	(qigong or tai ji or tai chi or yoga).ti,ab.
84	(mental* adj3 (heal? Or healing)).ti,ab.
85	(therap* adj3 touch*).ti,ab.
86	(node? Adj3 link* adj3 map*).ti,ab.
87	or/11-86
88	10 and 87
89	limit 88 to yr="2000 -Current"

Database: Social Science Citation Index (SSCI)

Date of last search: 07/11/2022

#	Searches
	(gambl* or betting or bet or bets or wager* or "gaming machine*" or "slot machine*" or "fruit machine*" or "poker machine*" or "lottery machine*" or "lotteries machine*" or "gaming terminal*" or "slot terminal*" or "fruit terminal*" or "poker terminal*" or "lottery terminal*" or "lotteries terminal*" or pokies or pokey or puggy or fruities) and (psycho* or therap* or artmouth e* or cognitive or behavioural or behavioral or CBT or aversi* or counsel* or "motivational interview*" or "harm reduction" or Psychodrama or dramatherap* or "eye movement" or EMDR or hypno* or "electric stimulat*" or electrostimulat* or electrotherapy or transcranial* or "brain stimulation" or artmouth e* or TMS or "cognitive bias modification" or retreat or retreats or "self help" or "self care" or "self manage*" or "self directed" or "self guided" or "web based" or "internet based" or "phone based" or app or apps or hotline* or helpline* or "help line*" or "web support*" or "personali* feedback" or "personali* feed back" or gamif* or psychosocial or "psycho social" or "social skill" or "social skills" or assertiveness or "community support" or "social support" or "support program*" or "support group*" or "peer support" or "SMART recovery" or "relapse prevention" or "prevent* relapse" or "secondary prevention" or "recovery capital" or "mutual aid" or "after care" or aftercare or "followup treatment" or "follow up treatment" or "support therapy" or mindfulness or "self compassion" or mentor* or "systemic* intervention*" or finance* or banking or budget* or "self exclu*" or "voluntary exclu*" or "restrict* access" or Gamban or "support mechanism*" or "support model*" or "post resident*" or postresident* or "post treatment" or posttreatment or "relapse program*" or "recovery college*" or "cognitive artmouth *" or biofeedback or neurofeedback or "autogenic training" or meditate or meditation or "crisis intervention*" or "transaction analysis" or "role play" or "role playing" or "breathing exercise*" or qigong or "tai ji" or "tai chi" or yoga or "therapeutic touch" or "node link mapping") (Title) Timespan: 2000-01-01 to 2022-07-01

Economics searches

Please note that a combined literature search was undertaken to cover the economics aspects of all the review questions in a single search.

Database: Applied Social Science Index and Abstracts (ASSIA)

Date of last search: 04/04/2023

#	Searches
	AB,TI (gambl* or betting or bet or bets or wager* or "gaming machine*" or "slot machine*" or "fruit machine*" or "poker machine*" or "lottery machine*" or "lotteries machine*" or "gaming terminal*" or "slot terminal*" or "fruit terminal*" or "poker terminal*" or "lottery terminal*" or "lotteries terminal*" or pokies or pokey or puggy or fruities)
AND	AB,TI(budget* OR cost* OR economic* OR pharmaco-economic* OR price* OR pricing* OR artmou* OR fee OR fees OR expenditure* OR saving* OR "value for money" OR "monetary value" OR " artmout* artmout*" OR " artmout* artmout*" OR fund OR funds OR funding* OR funded OR ration OR rations OR rationing* OR rationed or "quality of life" or "quality adjusted life" or "disability adjusted life" or "short form or shortform" or "health year equivalent*" or " artmouth health profile*" or "sickness impact profile*" or "health status indicator*" or "health artmou*" or " artmou* valu*" or " artmou* measur*" or "willingness to pay" or "standard gamble*" or "time trade off" or "time tradeoff" or "duke health profile" or "functional status questionnaire" or " artmouth coop functional health assessment*")
AND	Additional limits – Date: From January 2000

Database: Cochrane Central Register of Controlled Trials (CENTRAL)

Date of last search: 04/04/2023

#	Searches
#1	MeSH descriptor: [Gambling] this term only
#2	gambl*:ti,ab
#3	betting:ti,ab
#4	(bet or bets):ti,ab
#5	wager*:ti,ab
#6	((gaming or gambling or slot or fruit or poker or lottery or lotteries) near/5 (machine* or terminal*)):ti,ab
#7	(pokies or pokey or puggy or fruities):ti,ab
#8	((dice or card or cards or roulette or blackjack or poker or baccarat or crap or craps or keno or casino* or bingo or bookmaker* or "book maker" or bookie* or lottery or lotteries or lotto or "scratch card*" or scratchcard* or raffle or raffles or artmouth * or "amusement arcade*" or slot or slots) near/5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)):ti,ab
#9	((game or games or gaming or gamer*) near/5 (money or monetization or monetisation or monetary)):ti,ab
#10	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9
#11	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 with Cochrane Library publication date Between Jan 2000 and Mar 2022
#12	MeSH descriptor: [Economics] this term only
#13	MeSH descriptor: [Value of Life] this term only
#14	MeSH descriptor: [Costs and Cost Analysis] explode all trees
#15	MeSH descriptor: [Economics, Hospital] explode all trees
#16	MeSH descriptor: [Economics, Medical] explode all trees
#17	MeSH descriptor: [Resource Allocation] explode all trees
#18	MeSH descriptor: [Economics, Nursing] this term only
#19	MeSH descriptor: [Economics, Pharmaceutical] this term only
#20	MeSH descriptor: [Fees and Charges] explode all trees
#21	MeSH descriptor: [Budgets] explode all trees
#22	budget*:ti,ab
#23	cost*:ti,ab
#24	(economic* or pharmaco?economic*):ti,ab
#25	(price* or pricing*):ti,ab
#26	(artmou* or fee or fees or expenditure* or saving*):ti,ab
#27	(value near/2 (money or monetary)):ti,ab
#28	artmout* artmout*:ti,ab
#29	(fund or funds or funding* or funded):ti,ab
#30	(ration or rations or rationing* or rationed):ti,ab
#31	#12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30
#32	MeSH descriptor: [Value of Life] this term only
#33	MeSH descriptor: [Quality of Life] this term only
#34	"quality of life":ti
#35	((instrument or instruments) near/3 "quality of life"):ab
#36	MeSH descriptor: [Quality-Adjusted Life Years] this term only
#37	"quality adjusted life":ti,ab
#38	(qaly* or qald* or qale* or qtime* or "life year" or "life years"):ti,ab
#39	"disability adjusted life":ti,ab

#	Searches
#40	daly*:ti,ab
#41	(sf36 or “sf 36” or “short form 36” or “shortform 36” or “short form36” or shortform36 or “sf thirtysix” or sfthirtysix or “sfthirty six” or “sf thirty six” or “shortform thirtysix” or “shortform thirty six” or “short form thirtysix” or “short form thirty six”):ti,ab
#42	(sf6 or “sf 6” or “short form 6” or “shortform 6” or “sf six” or sfsix or “shortform six” or “short form six” or shortform6 or “short form6”):ti,ab
#43	(sf8 or “sf 8” or “sf eight” or sfeight or “shortform 8” or “shortform 8” or shortform8 or “short form8” or “shortform eight” or “short form eight”):ti,ab
#44	(sf12 or “sf 12” or “short form 12” or “shortform 12” or “short form12” or shortform12 or “sf twelve” or sftwelve or “shortform twelve” or “short form twelve”):ti,ab
#45	(sf16 or “sf 16” or “short form 16” or “shortform 16” or “short form16” or shortform16 or “sf sixteen” or sfsixteen or “shortform sixteen” or “short form sixteen”):ti,ab
#46	(sf20 or “sf 20” or “short form 20” or “shortform 20” or “short form20” or shortform20 or “sf twenty” or sftwenty or “shortform twenty” or “short form twenty”):ti,ab
#47	(hql or hqol or “h qol” or hrqol or “hr qol”):ti,ab
#48	(hye or hyes):ti,ab
#49	(health* near/2 year* near/2 equivalent*):ti,ab
#50	(pqol or qls):ti,ab
#51	(quality of wellbeing or “quality of well being” or “index of wellbeing” or “index of well being” or qwb):ti,ab
#52	“ artmouth health profile*”:ti,ab
#53	“sickness impact profile”:ti,ab
#54	MeSH descriptor: [Health Status Indicators] explode all trees
#55	(health near/3 (artmou* or status)):ti,ab
#56	(artmou* near/3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or weight)):ti,ab
#57	(preference* near/3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or instrument or instruments)):ti,ab
#58	artmouth *:ti,ab
#59	rosser:ti,ab
#60	“willingness to pay”:ti,ab
#61	“standard gamble*”:ti,ab
#62	(“time trade off” or “time tradeoff”):ti,ab
#63	tto:ti,ab
#64	(hui or hui1 or hui2 or hui3):ti,ab
#65	(eq or euroqol or “euro qol” or eq5d or “eq 5d” or euroqual or “euro qual”):ti,ab
#66	“duke health profile”:ti,ab
#67	“functional status questionnaire”:ti,ab
#68	“ artmouth coop functional health assessment*”:ti,ab
#69	#32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47 or #48 or #49 or #50 or #51 or #52 or #53 or #54 or #55 or #56 or #57 or #58 or #59 or #60 or #61 or #62 or #63 or #64 or #65 or #66 or #67 or #68
#70	#11 and #31
#71	#11 and #69
#72	#70 or #71

Database: Cumulative Index to Nursing and Allied Health Literature (CINAHL)

Date of last search: 04/04/2023

#	Searches
S1	TI (gambl* or betting or bet or bets or wager* or “gaming machine*” or “slot machine*” or “fruit machine*” or “poker machine*” or “lottery machine*” or “lotteries machine*” or “gaming terminal*” or “slot terminal*” or “fruit terminal*” or “poker terminal*” or “lottery terminal*” or “lotteries terminal*” or pokies or pokey or puggy or fruities) Limiters – Publication Year: 2000-
S2	TI (budget* OR cost* OR economic* OR pharmaco-economic* OR price* OR pricing* OR artmou* OR fee OR fees OR expenditure* OR saving* OR “value for money” OR “monetary value” OR “ artmout* artmout*” OR “ artmout* artmout*” OR fund OR funds OR funding* OR funded OR ration OR rations OR rationing* OR rationed or “quality of life” or “quality adjusted life” or “disability adjusted life” or “short form or shortform” or “health year equivalent*” or “ artmouth health profile*” or “sickness impact profile*” or “health status indicator*” or “health artmou*” or “ artmou* valu*” or “ artmou* measur*” or “willingness to pay” or “standard gamble*” or “time trade off” or “time tradeoff” or “duke health profile” or “functional status questionnaire” or “ artmouth coop functional health assessment*”) Limiters – Publication Year: 2000-
S3	S1 and S2

Database: Embase

Date of last search: 04/04/2023

#	Searches
1	GAMBLING/
2	PATHOLOGICAL GAMBLING/
3	(gambl* not standard gamble).ti,ab.
4	betting.ti,ab.
5	(bet or bets).ti,ab.
6	wager*.ti,ab.

#	Searches
7	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
8	(pokies or pokey or puggy or fruities).ti,ab.
9	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
10	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
11	or/1-10
12	limit 11 to artmou language
13	limit 12 to yr="2000 -Current"
14	letter.pt. or LETTER/
15	note.pt.
16	editorial.pt.
17	CASE REPORT/ or CASE STUDY/
18	(letter or comment*).ti.
19	or/14-18
20	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
21	19 not 20
22	ANIMAL/ not HUMAN/
23	NONHUMAN/
24	exp ANIMAL EXPERIMENT/
25	exp EXPERIMENTAL ANIMAL/
26	ANIMAL MODEL/
27	exp RODENT/
28	(rat or rats or mouse or mice).ti.
29	or/21-28
30	13 not 29
31	HEALTH ECONOMICS/
32	exp ECONOMIC EVALUATION/
33	exp HEALTH CARE COST/
34	exp FEE/
35	BUDGET/
36	FUNDING/
37	RESOURCE ALLOCATION/
38	budget*.ti,ab.
39	cost*.ti,ab.
40	(economic* or pharmaco?economic*).ti,ab.
41	(price* or pricing*).ti,ab.
42	(artmou* or fee or fees or expenditure* or saving*).ti,ab.
43	(value adj2 (money or monetary)).ti,ab.
44	artmout* artmout*.ti,ab.
45	(fund or funds or funding* or funded).ti,ab.
46	(ration or rations or rationing* or rationed).ti,ab.
47	or/31-46
48	SOCIOECONOMICS/
49	exp QUALITY OF LIFE/
50	quality of life.ti,kw.
51	((instrument or instruments) adj3 quality of life).ab.
52	QUALITY-ADJUSTED LIFE YEAR/
53	quality adjusted life.ti,ab,kw.
54	(qaly* or qald* or qale* or qtime* or life year or life years).ti,ab,kw.
55	disability adjusted life.ti,ab,kw.
56	daly*.ti,ab,kw.
57	(sf36 or sf 36 or short form 36 or shortform 36 or short form36 or shortform36 or sf thirtysix or sfthirtysix or sfthirty six or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab,kw.
58	(sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six or shortform6 or short form6).ti,ab,kw.
59	(sf8 or sf 8 or sf eight or sfeight or shortform 8 or shortform 8 or shortform8 or short form8 or shortform eight or short form eight).ti,ab,kw.
60	(sf12 or sf 12 or short form 12 or shortform 12 or short form12 or shortform12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab,kw.
61	(sf16 or sf 16 or short form 16 or shortform 16 or short form16 or shortform16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab,kw.
62	(sf20 or sf 20 or short form 20 or shortform 20 or short form20 or shortform20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab,kw.
63	(hql or hqol or h qol or hrqol or hr qol).ti,ab,kw.
64	(hye or hyes).ti,ab,kw.
65	(health* adj2 year* adj2 equivalent*).ti,ab,kw.
66	(pqol or qls).ti,ab,kw.
67	(quality of wellbeing or quality of well being or index of wellbeing or index of well being or qwb).ti,ab,kw.
68	NOTTINGHAM HEALTH PROFILE/

#	Searches
69	artmouth health profile*.ti,ab,kw.
70	SICKNESS IMPACT PROFILE/
71	sickness impact profile.ti,ab,kw.
72	HEALTH STATUS INDICATOR/
73	(health adj3 (artmou* or status)).ti,ab,kw.
74	(artmou* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or weight)).ti,ab,kw.
75	(preference* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or instrument or instruments)).ti,ab,kw.
76	artmouth *.ti,ab,kw.
77	rosser.ti,ab,kw.
78	willingness to pay.ti,ab,kw.
79	standard gamble*.ti,ab,kw.
80	(time trade off or time tradeoff).ti,ab,kw.
81	tto.ti,ab,kw.
82	(hui or hui1 or hui2 or hui3).ti,ab,kw.
83	(eq or euroqol or euro qol or eq5d or eq 5d or euroqual or euro qual).ti,ab,kw.
84	duke health profile.ti,ab,kw.
85	functional status questionnaire.ti,ab,kw.
86	artmouth coop functional health assessment*.ti,ab,kw.
87	or/48-86
88	30 and 47
89	30 and 87
90	88 or 89

Database: Emcare

Date of last search: 04/04/2023

#	Searches
1	GAMBLING/
2	PATHOLOGICAL GAMBLING/
3	(gambl* not standard gamble).ti,ab.
4	betting.ti,ab.
5	(bet or bets).ti,ab.
6	wager*.ti,ab.
7	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
8	(pokies or pokey or puggy or fruities).ti,ab.
9	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
10	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
11	or/1-10
12	limit 11 to artmou language
13	limit 12 to yr=”2000 -Current”
14	letter.pt. or LETTER/
15	note.pt.
16	editorial.pt.
17	CASE REPORT/ or CASE STUDY/
18	(letter or comment*).ti.
19	or/14-18
20	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
21	19 not 20
22	ANIMAL/ not HUMAN/
23	NONHUMAN/
24	exp ANIMAL EXPERIMENT/
25	exp EXPERIMENTAL ANIMAL/
26	ANIMAL MODEL/
27	exp RODENT/
28	(rat or rats or mouse or mice).ti.
29	or/21-28
30	13 not 29
31	HEALTH ECONOMICS/
32	exp ECONOMIC EVALUATION/
33	exp HEALTH CARE COST/
34	exp FEE/
35	BUDGET/
36	FUNDING/
37	RESOURCE ALLOCATION/
38	budget*.ti,ab.

#	Searches
39	cost*.ti,ab.
40	(economic* or pharmaco?economic*).ti,ab.
41	(price* or pricing*).ti,ab.
42	(artmou* or fee or fees or expenditure* or saving*).ti,ab.
43	(value adj2 (money or monetary)).ti,ab.
44	artmout* artmout*.ti,ab.
45	(fund or funds or funding* or funded).ti,ab.
46	(ration or rations or rationing* or rationed).ti,ab.
47	or/31-46
48	SOCIOECONOMICS/
49	exp QUALITY OF LIFE/
50	quality of life.ti,kw.
51	((instrument or instruments) adj3 quality of life).ab.
52	QUALITY-ADJUSTED LIFE YEAR/
53	quality adjusted life.ti,ab,kw.
54	(qaly* or qald* or qale* or qtime* or life year or life years).ti,ab,kw.
55	disability adjusted life.ti,ab,kw.
56	daly*.ti,ab,kw.
57	(sf36 or sf 36 or short form 36 or shortform 36 or short form36 or shortform36 or sf thirtysix or sfthirtysix or sfthirty six or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab,kw.
58	(sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six or shortform6 or short form6).ti,ab,kw.
59	(sf8 or sf 8 or sf eight or sfeight or shortform 8 or shortform 8 or shortform8 or short form8 or shortform eight or short form eight).ti,ab,kw.
60	(sf12 or sf 12 or short form 12 or shortform 12 or short form12 or shortform12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab,kw.
61	(sf16 or sf 16 or short form 16 or shortform 16 or short form16 or shortform16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab,kw.
62	(sf20 or sf 20 or short form 20 or shortform 20 or short form20 or shortform20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab,kw.
63	(hql or hqol or h qol or hrqol or hr qol).ti,ab,kw.
64	(hye or hyes).ti,ab,kw.
65	(health* adj2 year* adj2 equivalent*).ti,ab,kw.
66	(pqol or qls).ti,ab,kw.
67	(quality of wellbeing or quality of well being or index of wellbeing or index of well being or qwb).ti,ab,kw.
68	NOTTINGHAM HEALTH PROFILE/
69	artmouth health profile*.ti,ab,kw.
70	SICKNESS IMPACT PROFILE/
71	sickness impact profile.ti,ab,kw.
72	HEALTH STATUS INDICATOR/
73	(health adj3 (artmou* or status)).ti,ab,kw.
74	(artmou* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or weight)).ti,ab,kw.
75	(preference* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or instrument or instruments)).ti,ab,kw.
76	artmouth *.ti,ab,kw.
77	rosser.ti,ab,kw.
78	willingness to pay.ti,ab,kw.
79	standard gamble*.ti,ab,kw.
80	(time trade off or time tradeoff).ti,ab,kw.
81	tto.ti,ab,kw.
82	(hui or hui1 or hui2 or hui3).ti,ab,kw.
83	(eq or euroqol or euro qol or eq5d or eq 5d or euroqual or euro qual).ti,ab,kw.
84	duke health profile.ti,ab,kw.
85	functional status questionnaire.ti,ab,kw.
86	artmouth coop functional health assessment*.ti,ab,kw.
87	or/48-86
88	30 and 47
89	30 and 87
90	88 or 89

Database: Health Information Management Consortium (HMIC)

Date of last search: 04/04/2023

#	Searches
1	GAMBLING/
2	GAMBLERS/
3	GAMBLING MACHINES/
4	AMUSEMENT ARCADES/
5	CASINOS/
6	BOOKMAKERS/

#	Searches
7	LOTTERIES/
8	NATIONAL LOTTERY/
9	(gambl* not standard gamble).ti,ab.
10	betting.ti,ab.
11	(bet or bets).ti,ab.
12	wager*.ti,ab.
13	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
14	(pokies or pokey or puggy or fruities).ti,ab.
15	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
16	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
17	or/1-16
18	limit 17 to yr="2000 -Current"
19	exp ECONOMICS/
20	exp COSTS/
21	exp FEES/
22	exp BUDGETS/
23	RESOURCE ALLOCATION/
24	budget*.ti,ab.
25	cost*.ti,ab.
26	(economic* or pharmaco?economic*).ti,ab.
27	(price* or pricing*).ti,ab.
28	(artmou* or fee or fees or expenditure* or saving*).ti,ab.
29	(value adj2 (money or monetary)).ti,ab.
30	artmout* artmout*.ti,ab.
31	(fund or funds or funding* or funded).ti,ab.
32	(ration or rations or rationing* or rationed).ti,ab.
33	or/19-32
34	"QUALITY OF LIFE"/
35	QUALITY-ADJUSTED LIFE YEARS/
36	HEALTH STATUS MEASURES/
37	HEALTH SERVICE INDICATORS/
38	quality of life.ti.
39	((instrument or instruments) adj3 quality of life).ab.
40	quality adjusted life.ti,ab.
41	(qaly* or qald* or qale* or qtime* or life year or life years).ti,ab.
42	disability adjusted life.ti,ab.
43	daly*.ti,ab.
44	(sf36 or sf 36 or short form 36 or shortform 36 or short form36 or shortform36 or sf thirtysix or sfthirtysix or sfthirty six or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab.
45	(sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six or shortform6 or short form6).ti,ab.
46	(sf8 or sf 8 or sf eight or sfeight or shortform 8 or shortform 8 or shortform8 or short form8 or shortform eight or short form eight).ti,ab.
47	(sf12 or sf 12 or short form 12 or shortform 12 or short form12 or shortform12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab.
48	(sf16 or sf 16 or short form 16 or shortform 16 or short form16 or shortform16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab.
49	(sf20 or sf 20 or short form 20 or shortform 20 or short form20 or shortform20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab.
50	(hql or hqol or h qol or hrqol or hr qol).ti,ab.
51	(hye or hyes).ti,ab.
52	(health* adj2 year* adj2 equivalent*).ti,ab.
53	(pqol or qls).ti,ab.
54	(quality of wellbeing or quality of well being or index of wellbeing or index of well being or qwb).ti,ab.
55	artmouth health profile*.ti,ab.
56	sickness impact profile.ti,ab.
57	(health adj3 (artmou* or status)).ti,ab.
58	(artmou* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or weight)).ti,ab.
59	(preference* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or instrument or instruments)).ti,ab.
60	artmouth *.ti,ab.
61	rosser.ti,ab.
62	willingness to pay.ti,ab.
63	standard gamble*.ti,ab.
64	(time trade off or time tradeoff).ti,ab.
65	tto.ti,ab.
66	(hui or hui1 or hui2 or hui3).ti,ab.
67	(eq or euroqol or euro qol or eq5d or eq 5d or euroqual or euro qual).ti,ab.
68	duke health profile.ti,ab.

#	Searches
69	functional status questionnaire.ti,ab.
70	artmouth coop functional health assessment*.ti,ab.
71	or/34-70
72	18 and 33
73	18 and 71
74	72 or 73

Database: International Health Technology Assessment Database (INAHTA)

Date of last search: 04/04/2023

#	Searches
	All:(gamble or gambler or gamblers or gambling or gambled or betting or bet or bets or wager or wagers)
	AND Publication Year: 2000-2022

Database: MEDLINE ALL

Date of last search: 04/04/2023

#	Searches
1	GAMBLING/
2	(gambl* not standard gamble).ti,ab.
3	betting.ti,ab.
4	(bet or bets).ti,ab.
5	wager*.ti,ab.
6	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
7	(pokies or pokey or puggy or fruities).ti,ab.
8	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
9	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
10	or/1-9
11	limit 10 to artmou language
12	limit 11 to yr="2000 -Current"
13	LETTER/
14	EDITORIAL/
15	NEWS/
16	exp HISTORICAL ARTICLE/
17	ANECDOTES AS TOPIC/
18	COMMENT/
19	CASE REPORT/
20	(letter or comment*).ti.
21	or/13-20
22	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
23	21 not 22
24	ANIMALS/ not HUMANS/
25	exp ANIMALS, LABORATORY/
26	exp ANIMAL EXPERIMENTATION/
27	exp MODELS, ANIMAL/
28	exp RODENTIA/
29	(rat or rats or mouse or mice).ti.
30	or/23-29
31	12 not 30
32	ECONOMICS/
33	VALUE OF LIFE/
34	exp "COSTS AND COST ANALYSIS"/
35	exp ECONOMICS, HOSPITAL/
36	exp ECONOMICS, MEDICAL/
37	exp RESOURCE ALLOCATION/
38	ECONOMICS, NURSING/
39	ECONOMICS, PHARMACEUTICAL/
40	exp "FEES AND CHARGES"/
41	exp BUDGETS/
42	budget*.ti,ab.
43	cost*.ti,ab.
44	(economic* or pharmaco?economic*).ti,ab.
45	(price* or pricing*).ti,ab.
46	(artmou* or fee or fees or expenditure* or saving*).ti,ab.
47	(value adj2 (money or monetary)).ti,ab.

#	Searches
48	artmout* artmout*.ti,ab.
49	(fund or funds or funding* or funded).ti,ab.
50	(ration or rations or rationing* or rationed).ti,ab.
51	ec.fs.
52	or/32-51
53	"VALUE OF LIFE"/
54	QUALITY OF LIFE/
55	quality of life.ti,kf.
56	((instrument or instruments) adj3 quality of life).ab.
57	QUALITY-ADJUSTED LIFE YEARS/
58	quality adjusted life.ti,ab,kf.
59	(qaly* or qald* or qale* or qtime* or life year or life years).ti,ab,kf.
60	disability adjusted life.ti,ab,kf.
61	daly*.ti,ab,kf.
62	(sf36 or sf 36 or short form 36 or shortform 36 or short form36 or shortform36 or sf thirtysix or sfthirtysix or sfthirty six or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab,kf.
63	(sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six or shortform6 or short form6).ti,ab,kf.
64	(sf8 or sf 8 or sf eight or sfeight or shortform 8 or shortform 8 or shortform8 or short form8 or shortform eight or short form eight).ti,ab,kf.
65	(sf12 or sf 12 or short form 12 or shortform 12 or short form12 or shortform12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab,kf.
66	(sf16 or sf 16 or short form 16 or shortform 16 or short form16 or shortform16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab,kf.
67	(sf20 or sf 20 or short form 20 or shortform 20 or short form20 or shortform20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab,kf.
68	(hql or hqol or h qol or hrqol or hr qol).ti,ab,kf.
69	(hye or hyes).ti,ab,kf.
70	(health* adj2 year* adj2 equivalent*).ti,ab,kf.
71	(pqol or qls).ti,ab,kf.
72	(quality of wellbeing or quality of well being or index of wellbeing or index of well being or qwb).ti,ab,kf.
73	artmouth health profile*.ti,ab,kf.
74	sickness impact profile.ti,ab,kf.
75	exp HEALTH STATUS INDICATORS/
76	(health adj3 (artmou* or status)).ti,ab,kf.
77	(artmou* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or weight)).ti,ab,kf.
78	(preference* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or instrument or instruments)).ti,ab,kf.
79	artmouth *.ti,ab,kf.
80	rosser.ti,ab,kf.
81	willingness to pay.ti,ab,kf.
82	standard gamble*.ti,ab,kf.
83	(time trade off or time tradeoff).ti,ab,kf.
84	tto.ti,ab,kf.
85	(hui or hui1 or hui2 or hui3).ti,ab,kf.
86	(eq or euroqol or euro qol or eq5d or eq 5d or euroqual or euro qual).ti,ab,kf.
87	duke health profile.ti,ab,kf.
88	functional status questionnaire.ti,ab,kf.
89	artmouth coop functional health assessment*.ti,ab,kf.
90	or/53-89
91	31 and 52
92	31 and 90
93	91 or 92

Database: NHS Economic Evaluation Database (NHS EED)

Date of last search: 04/04/2023

#	Searches
1	MeSH DESCRIPTOR GAMBLING IN NHSEED
2	(gambl*) TI IN NHSEED
3	(betting) IN NHSEED
4	(bet or bets) IN NHSEED
5	(wager*) IN NHSEED
6	(((gaming or gambling or slot or fruit or poker or lottery or lotteries) near5 (machine* or terminal*))) IN NHSEED
7	(pokies or pokey or puggy or fruities) IN NHSEED
8	(((dice or card or cards or roulette or blackjack or poker or baccarat or crap or craps or keno or casino* or bingo or bookmaker* or book maker or bookie* or lottery or lotteries or lotto or scratch card* or scratchcard* or raffle or raffles or artmouth * or amusement arcade* or slot*) near5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose))) IN NHSEED
9	(((game or games or gaming or gamer*) near5 (money or monetization or monetisation or monetary))) IN NHSEED

#	Searches
10	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9

Database: PsycInfo

Date of last search: 04/04/2023

#	Searches
1	GAMBLING/
2	GAMBLING DISORDER/
3	(gambl* not standard gamble).ti,ab.
4	betting.ti,ab.
5	(bet or bets).ti,ab.
6	wager*.ti,ab.
7	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
8	(pokies or pokey or puggy or fruities).ti,ab.
9	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
10	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
11	or/1-10
12	limit 11 to artmou language
13	limit 12 to yr=”2000 -Current”
14	(letter or editorial or comment reply).dt. or case report/
15	(letter or comment*).ti.
16	or/14-15
17	exp randomized controlled trial/
18	random*.ti,ab.
19	or/17-18
20	16 not 19
21	animal.po.
22	(rat or rats or mouse or mice).ti.
23	or/20-22
24	13 not 23
25	ECONOMICS/
26	HEALTH CARE ECONOMICS/
27	exp “COSTS AND COST ANALYSIS”/
28	RESOURCE ALLOCATION/
29	budget*.ti,ab.
30	cost*.ti,ab.
31	(economic* or pharmaco?economic*).ti,ab.
32	(price* or pricing*).ti,ab.
33	(artmou* or fee or fees or expenditure* or saving*).ti,ab.
34	(value adj2 (money or monetary)).ti,ab.
35	artmout* artmout*.ti,ab.
36	(fund or funds or funding* or funded).ti,ab.
37	(ration or rations or rationing* or rationed).ti,ab.
38	or/25-37
39	“QUALITY OF LIFE”/
40	“HEALTH RELATED QUALITY OF LIFE”/
41	quality of life.ti.
42	((instrument or instruments) adj3 quality of life).ab.
43	quality adjusted life.ti,ab.
44	(qaly* or qald* or qale* or qtime* or life year or life years).ti,ab.
45	disability adjusted life.ti,ab.
46	daly*.ti,ab.
47	(sf36 or sf 36 or short form 36 or shortform 36 or short form36 or shortform36 or sf thirtysix or sfthirtysix or sfthirty six or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab.
48	(sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six or shortform6 or short form6).ti,ab.
49	(sf8 or sf 8 or sf eight or sfeight or shortform 8 or shortform 8 or shortform8 or short form8 or shortform eight or short form eight).ti,ab.
50	(sf12 or sf 12 or short form 12 or shortform 12 or short form12 or shortform12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab.
51	(sf16 or sf 16 or short form 16 or shortform 16 or short form16 or shortform16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab.
52	(sf20 or sf 20 or short form 20 or shortform 20 or short form20 or shortform20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab.
53	(hql or hqol or h qol or hrqol or hr qol).ti,ab.
54	(hye or hyes).ti,ab.
55	(health* adj2 year* adj2 equivalent*).ti,ab.
56	(pqol or qls).ti,ab.

#	Searches
57	(quality of wellbeing or quality of well being or index of wellbeing or index of well being or qwb).ti,ab.
58	artmouth health profile*.ti,ab.
59	sickness impact profile.ti,ab.
60	(health adj3 (artmou* or status)).ti,ab.
61	(artmou* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or weight)).ti,ab.
62	(preference* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or instrument or instruments)).ti,ab.
63	artmouth *.ti,ab.
64	rosser.ti,ab.
65	willingness to pay.ti,ab.
66	standard gamble*.ti,ab.
67	(time trade off or time tradeoff).ti,ab.
68	tto.ti,ab.
69	(hui or hui1 or hui2 or hui3).ti,ab.
70	(eq or euroqol or euro qol or eq5d or eq 5d or euroqual or euro qual).ti,ab.
71	duke health profile.ti,ab.
72	functional status questionnaire.ti,ab.
73	artmouth coop functional health assessment*.ti,ab.
74	or/39-73
75	24 and 38
76	24 and 74
77	75 or 76
78	limit 77 to (“0100 journal” or “0110 peer-reviewed journal”)

Database: Social Care Online

Date of last search: 04/04/2023

#	Searches
	AllFields: ‘gamble or gambler or gamblers or gambling or gambled or betting or bet or bets or wager or wagers or “gaming machine” or “slot machine” or “fruit machine” or “poker machine” or “lottery machine” or “lotteries machine” or “gaming terminal” or “slot terminal” or “fruit terminal” or “poker terminal” or “lottery terminal” or “lotteries terminal” or pokies or pokey or puggy or fruities’
	AND AllFields: ‘budget or cost or economic or pharmaco-economic or price or pricing or finance or fee or fees or expenditure or saving or “value for money” or “monetary value” or “allocate resource” or “resource allocation” or fund or funds or funding or funded or ration or rations or rationing or rationed’ or “quality of life” or “quality adjusted life” or “disability adjusted life” or “short form or shortform” or “health year equivalent” or “sickness impact profile” or “health status indicator” or “health utility” or “utility value” or “utility measure” or “standard gamble” or “time trade off” or “time tradeoff”’
	AND PublicationYear:’2000 2020’

Database: Social Policy and Practice (SPP)

Date of last search: 04/04/2023

#	Searches
1	(gambl* not standard gamble).ti,ab.
2	betting.ti,ab.
3	(bet or bets).ti,ab.
4	wager*.ti,ab.
5	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? Or terminal?)).ti,ab.
6	(pokies or pokey or puggy or fruities).ti,ab.
7	((dice or card? Or roulette or blackjack or poker or baccarat or crap or craps or keno or casino? Or bingo or bookmaker? Or book maker or bookie? Or lottery or lotteries or lotto or scratch card? Or scratchcard? Or raffle or raffles or artmouth * or amusement arcade? Or slot?) adj5 (money or monetization or monetisation or monetary or currency or currencies or cryptocurrency or cryptocurrencies or reward* or win or wins or winning* or loss or losses or lose)).ti,ab.
8	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
9	or/1-8
10	limit 9 to yr=”2000 -Current”
11	budget*.ti,ab.
12	cost*.ti,ab.
13	(economic* or pharmaco?economic*).ti,ab.
14	(price* or pricing*).ti,ab.
15	(artmou* or fee or fees or expenditure* or saving*).ti,ab.
16	(value adj2 (money or monetary)).ti,ab.
17	artmout* artmout*.ti,ab.
18	(fund or funds or funding* or funded).ti,ab.
19	(ration or rations or rationing* or rationed).ti,ab.
20	or/11-19
21	quality of life.ti.
22	((instrument or instruments) adj3 quality of life).ab.
23	quality adjusted life.ti,ab.

#	Searches
24	(qaly* or qald* or qale* or qtime* or life year or life years).ti,ab.
25	disability adjusted life.ti,ab.
26	daly*.ti,ab.
27	(sf36 or sf 36 or short form 36 or shortform 36 or short form36 or shortform36 or sf thirtysix or sfthirtysix or sfthirty six or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab.
28	(sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six or shortform6 or short form6).ti,ab.
29	(sf8 or sf 8 or sf eight or sfeight or shortform 8 or shortform 8 or shortform8 or short form8 or shortform eight or short form eight).ti,ab.
30	(sf12 or sf 12 or short form 12 or shortform 12 or short form12 or shortform12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab.
31	(sf16 or sf 16 or short form 16 or shortform 16 or short form16 or shortform16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab.
32	(sf20 or sf 20 or short form 20 or shortform 20 or short form20 or shortform20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab.
33	(hql or hqol or h qol or hrqol or hr qol).ti,ab.
34	(hye or hyes).ti,ab.
35	(health* adj2 year* adj2 equivalent*).ti,ab.
36	(pqol or qls).ti,ab.
37	(quality of wellbeing or quality of well being or index of wellbeing or index of well being or qwb).ti,ab.
38	artmouth health profile*.ti,ab.
39	sickness impact profile.ti,ab.
40	(health adj3 (artmou* or status)).ti,ab.
41	(artmou* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or weight)).ti,ab.
42	(preference* adj3 (valu* or measur* or health or life or artmout* or elicit* or disease or score* or instrument or instruments)).ti,ab.
43	artmouth *.ti,ab.
44	rosser.ti,ab.
45	willingness to pay.ti,ab.
46	standard gamble*.ti,ab.
47	(time trade off or time tradeoff).ti,ab.
48	tto.ti,ab.
49	(hui or hui1 or hui2 or hui3).ti,ab.
50	(eq or euroqol or euro qol or eq5d or eq 5d or euroqual or euro qual).ti,ab.
51	duke health profile.ti,ab.
52	functional status questionnaire.ti,ab.
53	artmouth coop functional health assessment*.ti,ab.
54	or/21-53
55	10 and 20
56	10 and 54
57	55 or 56

Database: Social Science Citation Index (SSCI)

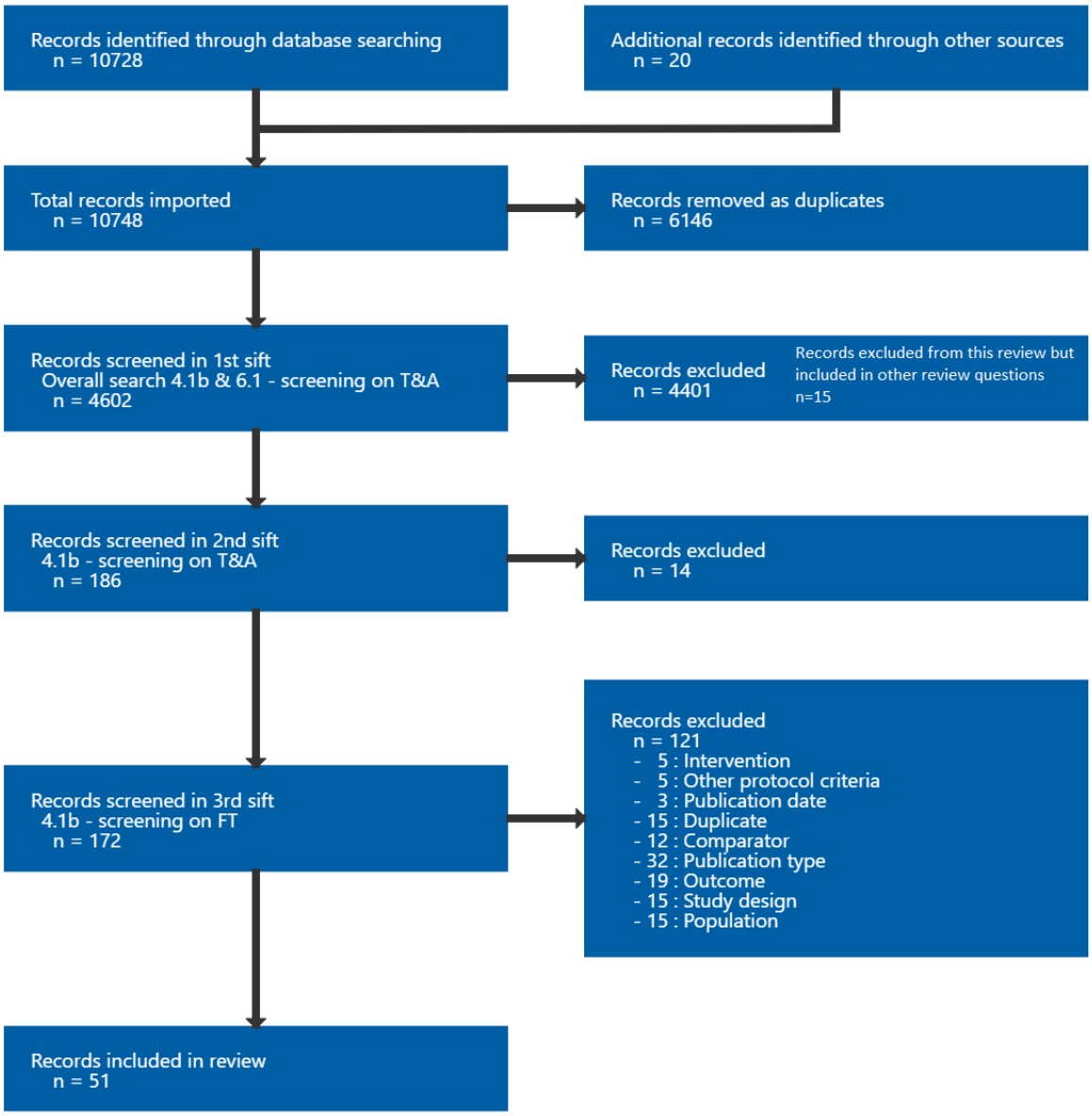
Date of last search: 04/04/2023

#	Searches
	(gambl* or betting or bet or bets or wager* or “gaming machine*” or “slot machine*” or “fruit machine*” or “poker machine*” or “lottery machine*” or “lotteries machine*” or “gaming terminal*” or “slot terminal*” or “fruit terminal*” or “poker terminal*” or “lottery terminal*” or “lotteries terminal*” or pokies or pokey or puggy or fruities) and (budget* OR cost* OR economic* OR pharmaco-economic* OR price* OR pricing* OR artmou* OR fee OR fees OR expenditure* OR saving* OR “value for money” OR “monetary value” OR “ artmout* artmout*” OR “ artmout* artmout*” OR fund OR funds OR funding* OR funded OR ration OR rations OR rationing* OR rationed or “quality of life” or “quality adjusted life” or “disability adjusted life” or “short form or shortform” or “health year equivalent*” or “ artmouth health profile*” or “sickness impact profile*” or “health status indicator*” or “health artmou*” or “ artmou* valu*” or “ artmou* measur*” or “willingness to pay” or “standard gamble*” or “time trade off” or “time tradeoff” or “duke health profile” or “functional status questionnaire” or “ artmouth coop functional health assessment*”) (Title) Timespan: 2000-01-01 to 2022-03-24

Appendix C Effectiveness evidence study selection

Study selection for: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Figure 5: Study selection flow chart



Appendix D Evidence tables

Evidence tables for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Please refer to the evidence tables in supplement 3: psychological treatment evidence tables.

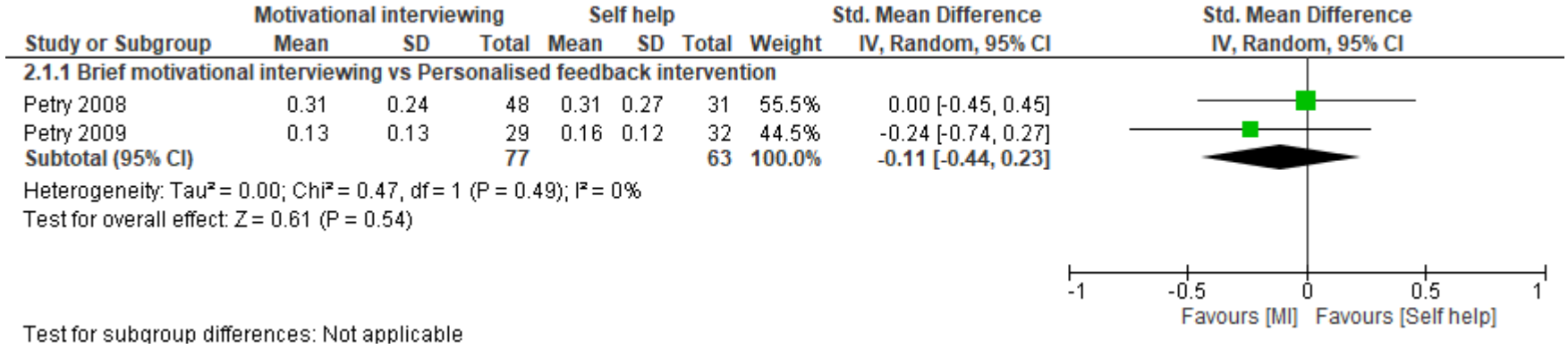
Appendix E Forest plots

Forest plots for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

This section includes forest plots only for outcomes that are meta-analysed. Outcomes from single studies are not presented here; the quality assessment for such outcomes is provided in the GRADE profiles in appendix F.

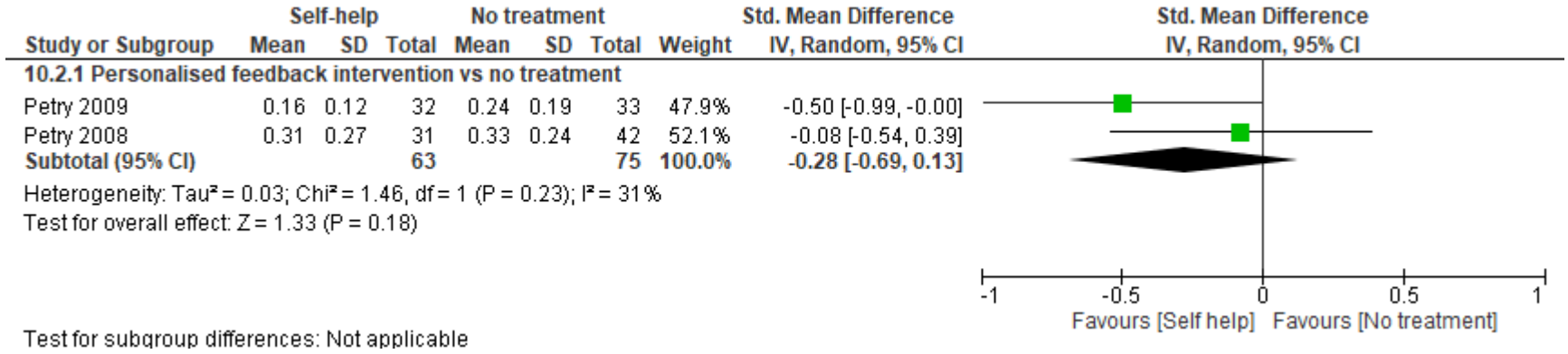
Gambling symptom severity and gambling frequency at follow-up: Comparison 2 – Motivational interviewing vs self-help

Figure 2: Motivational interviewing vs Self-help – Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow up



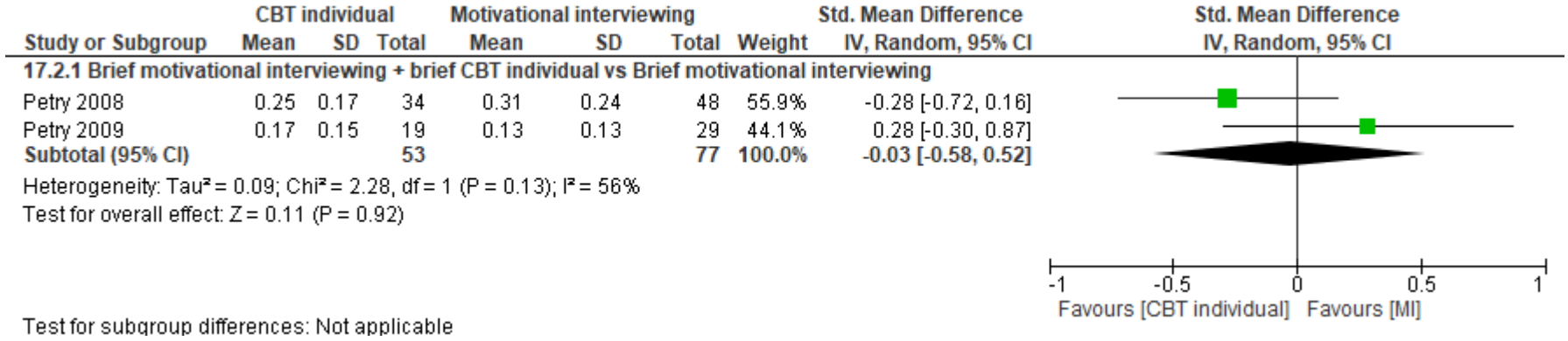
Gambling symptom severity and gambling frequency at follow-up: Comparison 8 – Self-help vs no treatment

Figure 3: Self-help vs no treatment – Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow up



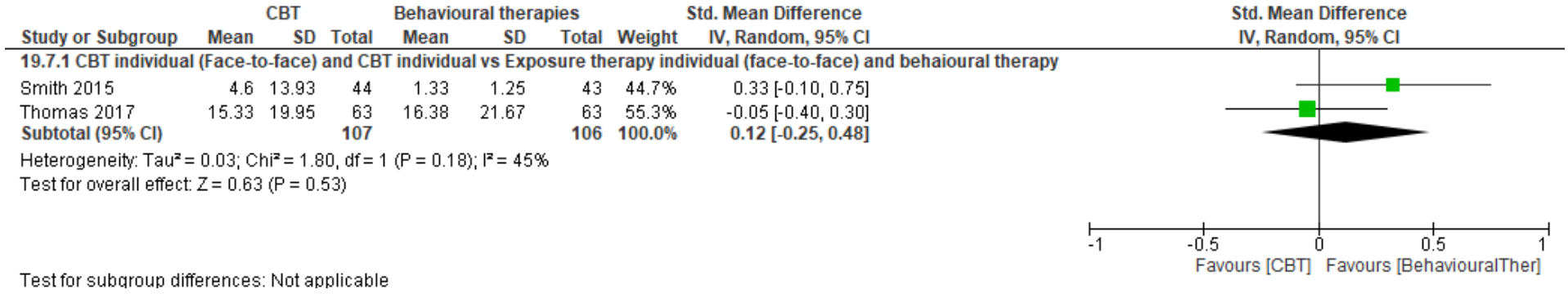
Gambling symptom severity and gambling frequency at follow-up: Comparison 15 – Individual CBT vs motivational interviewing

Figure 4: Individual CBT vs motivational interviewing – Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow



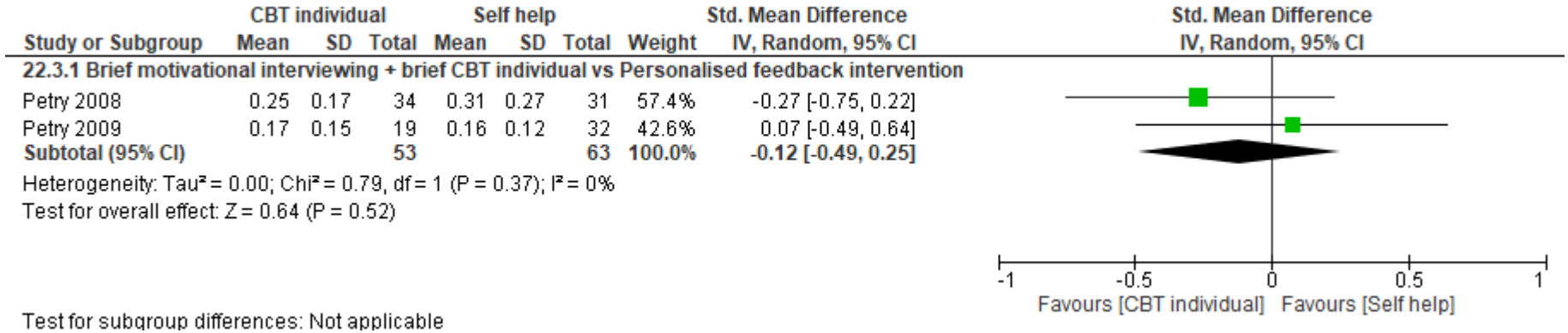
Gambling symptom severity and gambling frequency at follow-up: Comparison 16 – Individual CBT vs behavioural therapy

Figure 5: Individual CBT vs behavioural therapy – Time spent gambling (hours per 4 weeks) at 6 months follow-up



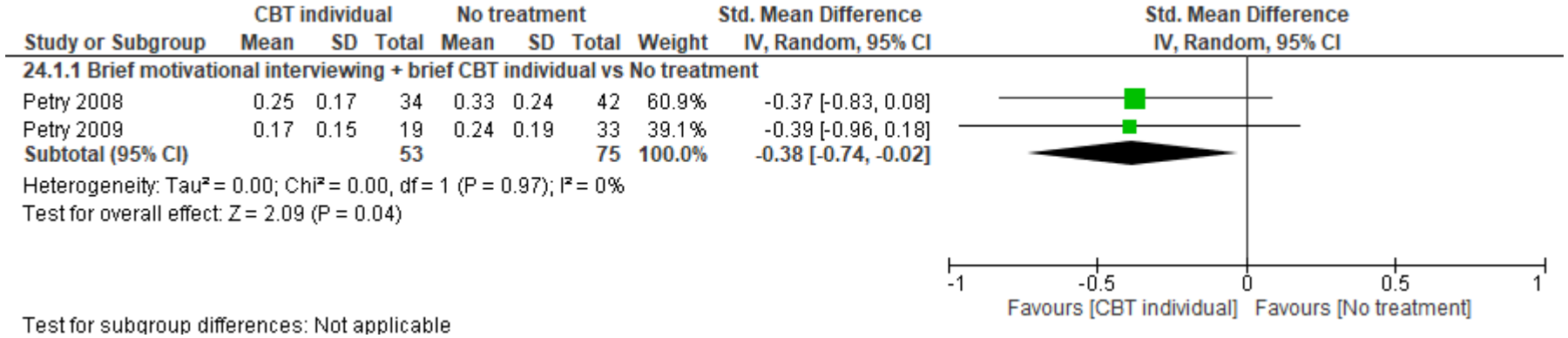
Gambling symptom severity and gambling frequency at follow-up: Comparison 19 – Individual CBT vs self-help

Figure 6: CBT individual vs Self-help – Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow up



Gambling symptom severity and gambling frequency at follow-up: Comparison 21 – Individual CBT vs no treatment

Figure 7: Individual CBT vs no treatment – Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow up



Gambling expenditure at endpoint and follow-up: Comparison 10 – Self-help (with no or minimal support) vs waitlist

Figure 8: Self-help vs waitlist – Money spent gambling over time interval (money spent, lower is better) at endpoint (13 weeks post-randomisation)

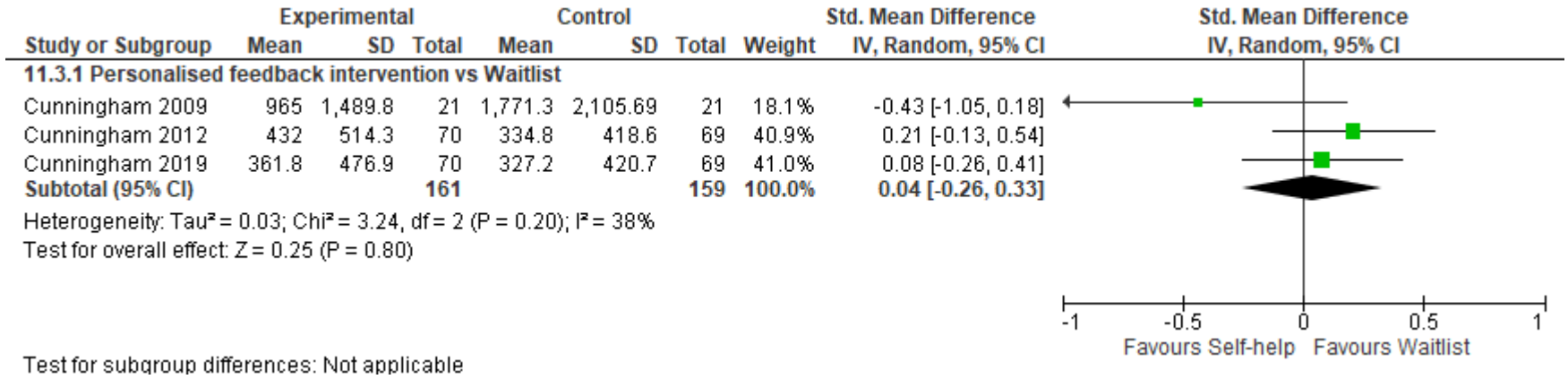
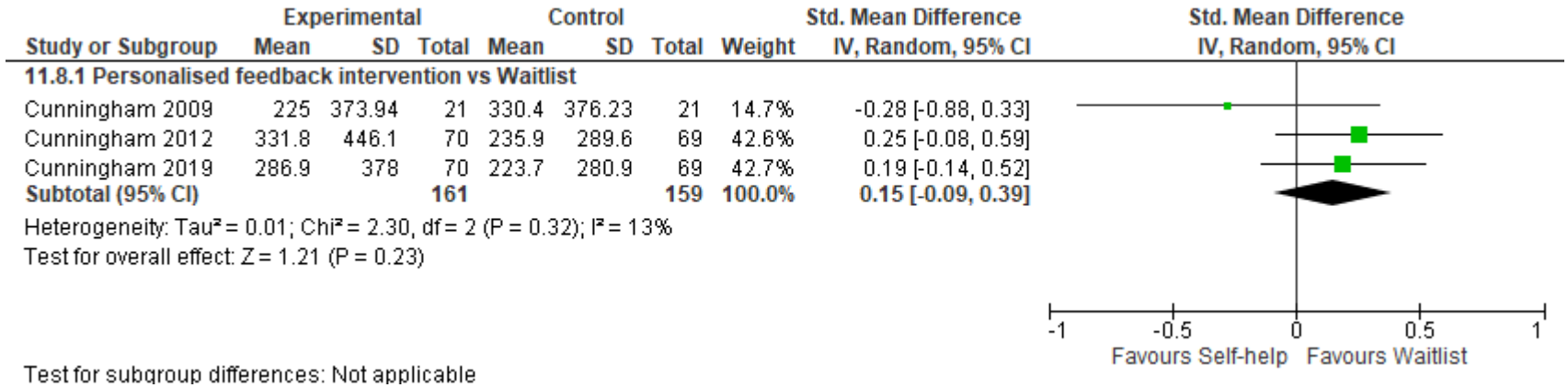
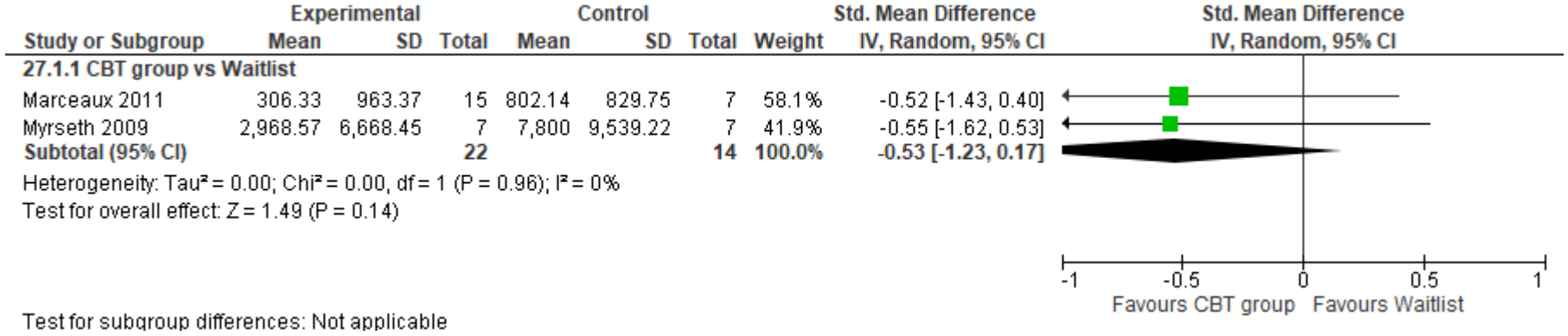


Figure 9: Self-help vs waitlist – Money spent gambling per individual unit (largest amount spent in a day, lower is better) at endpoint (13 weeks post-randomisation)



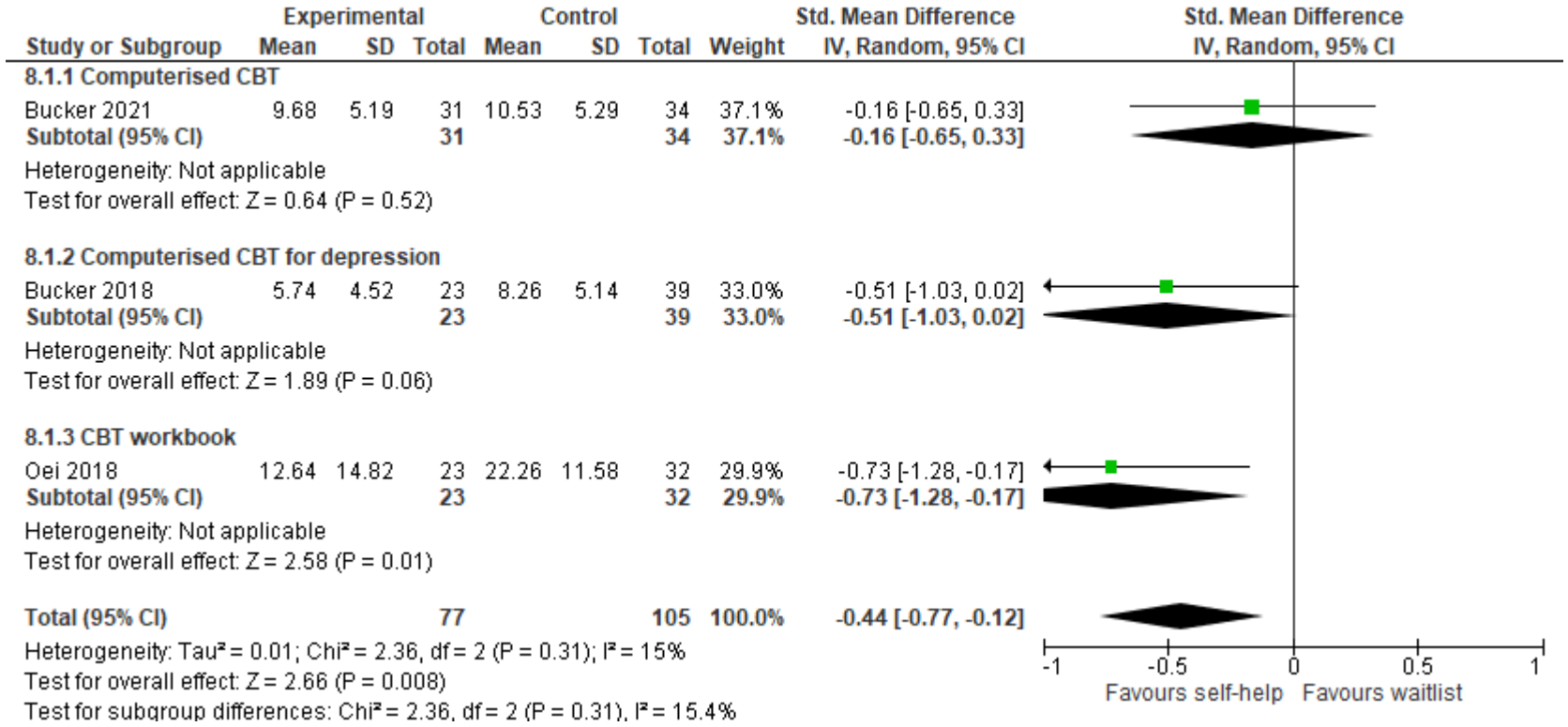
Gambling expenditure at endpoint and follow-up: Comparison 22 – Self-help (with no or minimal support) vs waitlist

Figure 10: Group CBT vs waitlist – Money spent gambling over time interval (money spent, lower is better) at endpoint (8 weeks post-randomisation)



Other (non-gambling) outcomes: Comparison 7- Self-help (with no or minimal support) vs waitlist

Figure 11: Self-help vs waitlist – Depression symptoms at endpoint (Better indicated by lower values)


Experimental
Control
Std. Mean Difference
Std. Mean Difference
Study or Subgroup Mean SD Total Mean SD Total Weight IV, Random, 95% CI
IV, Random, 95% CI
8.1.1 Computerised CBT
Bucker 2021 9.68 5.19 31 10.53 5.29 34 37.1% -0.16 [-0.65, 0.33]
Subtotal (95% CI) 31 34 37.1% -0.16 [-0.65, 0.33]
Heterogeneity: Not applicable
Test for overall effect: Z = 0.64 (P = 0.52)
8.1.2 Computerised CBT for depression
Bucker 2018 5.74 4.52 23 8.26 5.14 39 33.0% -0.51 [-1.03, 0.02]
Subtotal (95% CI) 23 39 33.0% -0.51 [-1.03, 0.02]
Heterogeneity: Not applicable
Test for overall effect: Z = 1.89 (P = 0.06)
8.1.3 CBT workbook
Oei 2018 12.64 14.82 23 22.26 11.58 32 29.9% -0.73 [-1.28, -0.17]
Subtotal (95% CI) 23 32 29.9% -0.73 [-1.28, -0.17]
Heterogeneity: Not applicable
Test for overall effect: Z = 2.58 (P = 0.01)
Total (95% CI) 77 105 100.0% -0.44 [-0.77, -0.12]
Heterogeneity: Tau² = 0.01; Chi² = 2.36, df = 2 (P = 0.31); I² = 15%
Test for overall effect: Z = 2.66 (P = 0.008)
Test for subgroup differences: Chi² = 2.36, df = 2 (P = 0.31), I² = 15.4%
-1
-0.5
0
0.5
1
Favours self-help
Favours waitlist

Appendix F GRADE tables

GRADE tables for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

GRADE tables for gambling symptom severity and gambling frequency at follow-up

Table 10. Comparison 1: Evidence profile for comparison between motivational interviewing and individual counselling

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**Counselling individual**	**Relative (95% CI)**	**Absolute**		
Gambling symptoms severity as measured by the 12-item G-SAS at 6 months follow-up (better indicated by lower values) – Motivational interviewing vs Counselling												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	62	61	Not estimable	SMD 0.36 lower (0.72 to 0.01 lower)	VERY LOW	CRITICAL
Gambling symptoms severity (measured using 12-item G-SAS, better indicated by lower values) at 12 months follow up – Motivational interviewing vs Counselling												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	59	62	Not estimable	SMD 0.04 lower (0.4 lower to 0.31 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 6 months follow up – Motivational interviewing vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	62	61	Not estimable	SMD 0.04 lower (0.39 lower to 0.32 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 12 months follow up – Motivational interviewing vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	59	62	Not estimable	SMD 0.16 higher (0.2 lower to 0.51 higher)	VERY LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 6 months follow up – Motivational interviewing vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	62	61	Not estimable	SMD 0.02 higher (0.33 lower to 0.38 higher)	LOW	CRITICAL

Gambling frequency (sessions per 4 weeks) at 12 months follow up – Motivational interviewing vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	59	62	Not estimable	SMD 0.19 higher (0.16 lower to 0.55 higher)	VERY LOW	CRITICAL

CI: confidence interval; G-SAS: gambling symptom assessment scale; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 11: Comparison 2: Evidence profile for comparison between motivational interviewing and self-help (with no or minimal support)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**Self-help (with no or minimal support)**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow up – Brief motivational interviewing vs Personalised feedback intervention (Better indicated by lower values)												
2[3]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	77	63	Not estimable	SMD 0.11 lower (0.44 lower to 0.23 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 7 months follow up – Brief motivational interviewing vs Personalised feedback intervention (Better indicated by lower values)												
1 (Petry 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	Serious[2]	none	29	32	Not estimable	SMD 0.06 lower (0.56 lower to 0.45 higher)	VERY LOW	CRITICAL

ASI: addiction severity index; CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] Petry 2008; Petry 2009

Table 12: Comparison 3: Evidence profile for comparison between motivational interviewing and guided self-help

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**Guided self-help**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity (measured using (9-item PGSI, better indicated by lower values) at 3months follow up – Brief motivational interviewing vs Brief motivational interviewing + CBT workbook combined with CBT workbook with support (Better indicated by lower values)												

1 (Abbott 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	71	160	Not estimable	SMD 0.2 higher (0.08 lower to 0.48 higher)	LOW	CRITICAL
Gambling symptom severity (measured using (9-item PGSI, better indicated by lower values) at 6months follow up – Brief motivational interviewing vs Brief motivational interviewing + CBT workbook combined with CBT workbook with support (Better indicated by lower values)												
1 (Abbott 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	66	149	Not estimable	SMD 0.23 higher (0.06 lower to 0.52 higher)	VERY LOW	CRITICAL
Gambling frequency at 6 months follow up (days per 4 weeks) – Brief motivational interviewing vs Brief motivational interviewing + CBT workbook combined with CBT workbook with support (Better indicated by lower values)												
1 (Abbott 2018)[3]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	66	151	Not estimable	SMD 0.02 higher (0.27 lower to 0.31 higher)	LOW	CRITICAL
Gambling frequency at 11 months follow up (days per 4 weeks) – Brief motivational interviewing vs CBT workbook + support (Better indicated by lower values)												
1 (Hodgins 2009)[3]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	73	65	Not estimable	SMD 0.03 lower (0.36 lower to 0.31 higher)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; PGSI: problem gambling severity index; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] This is summary of the results of the other time points (see evidence table)

Table 13: Comparison 4: Evidence profile for comparison between motivational interviewing and attention placebo

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**Attention placebo**	**Relative (95% CI)**	**Absolute**		
Gambling frequency (days per 4 weeks) at 3months follow up – Brief motivational interviewing vs Brief semi-structured interview (Better indicated by lower values)												
1 (Diskin 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	39	Not estimable	SMD 0.46 lower (0.9 to 0.01 lower)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 6months follow up – Brief motivational interviewing vs Brief semi-structured interview (Better indicated by lower values)												
1 (Diskin 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	39	Not estimable	SMD 0.38 lower (0.82 lower to 0.06 higher)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 12months follow up – Brief motivational interviewing vs Brief semi-structured interview (Better indicated by lower values)												
1 (Diskin	randomised	very	no serious	no serious	serious[2]	none	42	39	Not	SMD 0.45 lower (0.9 to	VERY	CRITICAL

2009)	trials	serious[1]	inconsistency	indirectness					estimable	0.01 lower)	LOW	

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 14: Comparison 5: Evidence profile for comparison between Self-help (with no or minimal support) and guided self-help

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Self-help (with no or minimal support)**	**Guided self-help**	**Relative (95% CI)**	**Absolute**		
Gambling severity change at 1 months follow up – Personalised feedback + CBT workbook vs CBT workbook with email (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	60	8	Not estimable	SMD 0.08 lower (0.82 lower to 0.66 higher)	VERY LOW	CRITICAL
Gambling frequency change at 1 months follow up (sessions per 4 weeks) – Personalised feedback + CBT workbook vs CBT workbook with email (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	557	301	Not estimable	SMD 0.01 lower (0.15 lower to 0.13 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 11months follow up – CBT workbook vs CBT workbook + support (Better indicated by lower values)												
1 (Hodgins 2009)[3]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	67	65	Not estimable	SMD 0 higher (0.34 lower to 0.34 higher)	LOW	CRITICAL
Abstinence (days abstinent in 13 weeks) at 11months follow up – CBT workbook vs CBT workbook + support (Better indicated by higher values)												
1 (Hodgins 2009)[4]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	23/82 (28%)	25/84 (29.8%)	RR 0.94 (0.58 to 1.52)	18 fewer per 1000 (from 125 fewer to 155 more)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 2 MIDs
[3] This is summary of the results of the other time points (see evidence table)

Table 15: Comparison 6: Comparison between self-help (with no or minimal support) and attention placebo

Quality assessment	No of patients	Effect	Quality	Importance

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Self-help (with no or minimal support)	Attention placebo	Relative (95% CI)	Absolute		
Gambling symptom severity (GPI) at 3 months follow up – Personalised feedback intervention vs Attention control (Better indicated by lower values)												
1 (Neighbors 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	112	114	Not estimable	SMD 0.06 lower (0.32 lower to 0.2 higher)	LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB2

Table 16: Comparison 7: Evidence profile for comparison between self-help (with no or minimal support) + TAU vs TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Self-help (with no or minimal support +TAU)**	**TAU**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 2 months follow up – Behaviour change SMS + accessing internet MH services vs Accessing internet MH services (Better indicated by lower values)												
1 (Rodda 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	50	50	Not estimable	SMD 0.07 lower (0.46 lower to 0.32 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 2 months follow up – Behaviour change SMS + accessing internet MH services vs Accessing internet MH services (Better indicated by lower values)												
1 (Rodda 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	50	50	Not estimable	SMD 0.1 higher (0.29 lower to 0.5 higher)	LOW	CRITICAL
Gambling symptom severity (measured using 16-item SOGS, better indicated by lower values) at 4 months follow up – CBT workbook + referral to GA group vs Referral to GA (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	84	63	Not estimable	SMD 0.02 higher (0.3 lower to 0.35 higher)	LOW	CRITICAL
Gambling symptom severity (measured using 16-item SOGS, better indicated by lower values) at 8 months follow up – CBT workbook + referral to GA group vs Referral to GA (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	84	63	Not estimable	SMD 0.13 higher (0.2 lower to 0.45 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 4 months follow up – CBT workbook + referral to GA group vs TAU (Better indicated by lower values)												

1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	84	63	Not estimable	SMD 0.26 lower (0.59 lower to 0.07 higher)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 8 months follow up – CBT workbook + referral to GA group vs Referral to GA (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	84	63	Not estimable	SMD 0.14 lower (0.47 lower to 0.19 higher)	LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference; TAU: treatment as usual
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 2 MIDs
[3] 95% CI crosses 1 MID

Table 17: Comparison 8: Evidence profile for comparison between self-help (with no or minimal support) and no treatment

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Self-help (with no or minimal support)**	**No treatment**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 4 months follow up – Computerised personalised feedback intervention vs no treatment (Better indicated by lower values)												
1 (Cunningham 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	127	155	Not estimable	SMD 0.05 higher (0.19 lower to 0.28 higher)	LOW	CRITICAL
Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow up – Personalised feedback intervention vs no treatment (Better indicated by lower values)												
2[4]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	63	75	Not estimable	SMD 0.28 lower (0.69 lower to 0.13 higher)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 4months follow-up - Computerised personalised feedback intervention vs no treatment (Better indicated by lower values)												
1 (Cunningham 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	127	155	Not estimable	SMD 0.1 higher (0.13 lower to 0.33 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 7 months follow up - Personalised feedback intervention vs no treatment (Better indicated by lower values)												
1 (Petry 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	32	33	Not estimable	SMD 0.51 lower (1 to 0.01 lower)	VERY LOW	CRITICAL
Remission SOGS cut off of 2 at 7months follow up - Personalised feedback intervention vs no treatment (Better indicated by higher values)												

1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	8/37 (21.6%)	6/48 (12.5%)	RR 1.73 (0.66 to 4.55)	91 more per 1000 (from 42 fewer to 444 more)	VERY LOW	CRITICAL

ASI: addiction severity index; CI: confidence interval; G-SAS: gambling symptom assessment scale; SMD: standardised mean difference; RR: risk ratio
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MIDs
[4] Petry 2008; Petry 2009

Table 18: Comparison 9: Evidence profile for comparison between self-help (with no or minimal support) and waitlist

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Self-help (with no or minimal support)**	**Waitlist**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity change at 1 months follow up - Personalised feedback + CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	60	45	Not estimable	SMD 0.11 lower (0.5 lower to 0.28 higher)	VERY LOW	CRITICAL
Gambling frequency change (sessions per 4 weeks) at 1 months follow up - Personalised feedback + CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	557	264	Not estimable	SMD 0.07 higher (0.08 lower to 0.22 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 2months follow-up - Psychoeducational material x2 vs Waitlist (Better indicated by lower values)												
1 (LaBrie 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	213	102	Not estimable	SMD 0.29 lower (0.53 to 0.05 lower)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 3 months follow up - Self-help (Personalised feedback combined) vs Waitlist (Better indicated by lower values)												
1 (Cunningham 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	140	69	Not estimable	SMD 0.05 higher (0.24 lower to 0.33 higher)	LOW	CRITICAL
Abstinence (N in 1 week) at 2 months follow up - Psychoeducational material x2 vs Waitlist (Better indicated by higher values)												
1 (LaBrie 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	130/213 (61%)	42/102 (41.2%)	RR 1.48 (1.15 to 1.91)	198 more per 1000 (from 62 more to 375 more)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; RR: risk ratio; SMD: standardised mean difference

[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 19: Comparison 10: Evidence profile for comparison between guided self-help and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Guided self-help	TAU	Relative (95% CI)	Absolute		
Gambling symptom severity measured using (9-item PGSI, better indicated by lower values) at 3 months follow up - Combined Brief motivational interviewing + CBT workbook with CBT workbook with support vs Information referral (Better indicated by lower values)												
1 (Abbott 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	156	85	Not estimable	SMD 0.1 lower (0.37 lower to 0.16 higher)	LOW	CRITICAL
Gambling symptom severity measured using (9-item PGSI, better indicated by lower values) at 9 months follow up - Combined Brief motivational interviewing + CBT workbook with CBT workbook with support vs Information referral (Better indicated by lower values)												
1 (Abbott 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	149	76	Not estimable	SMD 0.13 lower (0.41 lower to 0.14 higher)	LOW	CRITICAL
Gambling frequency at 3months follow-up (days per 4 weeks) - Combined Brief motivational interviewing + CBT workbook with CBT workbook with support vs Information referral (Better indicated by lower values)												
1 (Abbott 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	169	92	Not estimable	SMD 0.1 higher (0.16 lower to 0.35 higher)	LOW	CRITICAL
Gambling frequency at 6months follow up (days per 4 weeks) - Combined Brief motivational interviewing + CBT workbook with CBT workbook with support vs Information referral (Better indicated by lower values)												
1 (Abbott 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	151	78	Not estimable	SMD 0.01 lower (0.28 lower to 0.26 higher)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; PGSI: problem gambling severity index; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2

Table 20: Comparison 11: Evidence profile for comparison between guided self-help and waitlist

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Guided self-help	Waitlist	Relative (95% CI)	Absolute		

Gambling symptom severity change at 1 months follow up - CBT workbook with email vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	8	45	Not estimable	SMD 0.04 lower (0.8 lower to 0.71 higher)	VERY LOW	CRITICAL
Gambling frequency change (sessions per 4 weeks) at 1 months follow up - CBT workbook with email vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	301	264	Not estimable	SMD 0.08 higher (0.09 lower to 0.24 higher)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 2 MID's

Table 21: Comparison 12: Evidence profile for comparison between group CBT and 12-step programme

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT group**	**12 step group programme**	**Relative (95% CI)**	**Absolute**		
Diagnostic criteria (DSM-IV) at 6months follow-up - CBT group vs 12 step facilitated group therapy (Better indicated by lower values)												
1 (Marceaux 2011)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	15	11	Not estimable	SMD 0.44 higher (0.35 lower to 1.23 higher)	VERY LOW	CRITICAL
Remission DSM-IV cut off of 4 at 6 months follow up - CBT group vs 12 step facilitated group therapy (Better indicated by higher values)												
1 (Marceaux 2011)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	11/15 (73.3%)	10/11 (90.9%)	RR 0.81 (0.56 to 1.15)	173 fewer per 1000 (from 400 fewer to 136 more)	VERY LOW	CRITICAL
Abstinence (days abstinent) at 6 months follow up - CBT group vs 12 step facilitated group therapy (Better indicated by higher values)												
1 (Marceaux 2011)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	8/15 (53.3%)	8/11 (72.7%)	RR 0.73 (0.4 to 1.33)	196 fewer per 1000 (from 436 fewer to 240 more)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; RR: risk ratio
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 22: Comparison 13: Evidence profile for comparison between group CBT and waitlist

Quality assessment	No of patients	Effect	Quality	Importance

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT group	Waitlist	Relative (95% CI)	Absolute		
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 1 month follow up - CBT group vs Waitlist (Better indicated by lower values)												
1 (Ede 2020)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	20	20	Not estimable	SMD 7.16 lower (8.92 to 5.39 lower)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; G-SAS: gambling symptom assessment scale; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 2 MID's

Table 23: Comparison 14: Evidence profile for comparison between individual CBT and group CBT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual (face-to-face)	CBT group (face-to-face)	Relative (95% CI)	Absolute		
Time spent gambling (min per week) at 6months follow up - CBT individual (face-to-face) vs CBT group (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	10	15	Not estimable	SMD 0.34 higher (0.47 lower to 1.14 higher)	VERY LOW	CRITICAL
Gambling frequency (sessions per week) at 6months follow up - CBT individual (face-to-face) vs CBT group (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	10	15	Not estimable	SMD 0.24 higher (0.56 lower to 1.05 higher)	VERY LOW	CRITICAL
Remission (DSM-IV cut off of 4) at 6 months follow up - CBT individual (face-to-face) vs CBT group (Better indicated by higher values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	9/14 (64.3%)	9/17 (52.9%)	RR 1.21 (0.67 to 2.2)	111 more per 1000 (from 175 fewer to 635 more)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; RR: risk ratio
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 24: Comparison 15: Evidence profile for comparison between individual CBT and motivational interviewing

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of	Inconsistency	Indirectness	Imprecision	Other	CBT	Motivational	Relative	Absolute		

		bias				considerations	individual	interviewing	(95% CI)			
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 6 months follow up – CBT individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	63	62	Not estimable	SMD 0.16 higher (0.19 lower to 0.51 higher)	VERY LOW	CRITICAL
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 12 months follow up – CBT individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	59	59	Not estimable	SMD 0.01 higher (0.35 lower to 0.37 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 6 months follow up – CBT individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	62	Not estimable	SMD 0.04 higher (0.31 lower to 0.39 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 12 months follow up – CBT individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	59	59	Not estimable	SMD 0.28 lower (0.64 lower to 0.09 higher)	VERY LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 6 months follow up – CBT individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	62	Not estimable	SMD 0 higher (0.35 lower to 0.35 higher)	LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 12 months follow up – CBT individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	59	59	Not estimable	SMD 0.43 lower (0.79 to 0.06 lower)	VERY LOW	CRITICAL
Gambling frequency (% of days in 4 weeks) at 12 months follow up – CBT individual vs Motivational interviewing (Better indicated by lower values)												
1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[4]	none	25	22	Not estimable	SMD 0.06 higher (0.51 lower to 0.64 higher)	VERY LOW	CRITICAL
Abstinence (days abstinent) at 12 months follow up - CBT individual vs Motivational interviewing (Better indicated by higher values)												
1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[4]	none	5/25 (20%)	3/22 (13.6%)	RR 1.47 (0.4 to 5.44)	64 more per 1000 (from 82 fewer to 605	VERY LOW	CRITICAL

										more)		
Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow up - Brief motivational interviewing + brief CBT individual vs Brief motivational interviewing (Better indicated by lower values)												
2[5]	randomised trials	very serious[1]	serious[3]	no serious indirectness	very serious[4]	none	53	77	Not estimable	SMD 0.03 lower (0.58 lower to 0.52 higher)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 7 months follow up - Brief motivational interviewing + brief CBT individual vs Brief motivational interviewing (Better indicated by lower values)												
1 (Petry 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[4]	none	19	29	Not estimable	SMD 0.08 higher (0.5 lower to 0.66 higher)	VERY LOW	CRITICAL
Remission (SOGS cut off of 2) at 7months follow up - Brief motivational interviewing + brief CBT individual vs Brief motivational interviewing (Better indicated by higher values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[4]	none	7/40 (17.5%)	7/55 (12.7%)	RR 1.38 (0.52 to 3.61)	48 more per 1000 (from 61 fewer to 332 more)	VERY LOW	CRITICAL

ASI: addiction severity index; CBT: cognitive behavioural therapy; CI: confidence interval; G-SAS: gambling symptom assessment scale; SMD: standardised mean difference; SOGS: south oaks gambling screen; RR: risk ratio
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] Serious heterogeneity unexplained as protocol indicated no subgroup analysis
[4] 95% CI crosses 2 MIDs
[5] Petry 2008; Petry 2009

Table 25: Comparison 16: Evidence profile for comparison between individual CBT and behavioural therapies

Quality assessment							**No of patients**		**Effect**		**Quality**	**Importance**
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT individual**	**Behavioural therapies**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity (measured using 21-item VGS, better indicated by lower values) at 1 months follow up - CBT individual (Face-to-face) vs Exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.13 lower (0.55 lower to 0.29 higher)	VERY LOW	CRITICAL
Gambling symptom severity (measured using PGSI) at 3 months follow up (Better indicated by lower values) - Brief CBT vs Dialectical behaviour therapy (Better indicated by lower values)												
1 (Korman 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	22	20	Not estimable	SMD 1.36 higher (0.68 to 2.03 higher)	VERY LOW	CRITICAL
Gambling symptom severity (VGS) at 3 months follow up - CBT individual (Face-to-face) and Brief CBT vs Exposure therapy individual (face-to-face) and Dialectical behaviour therapy												

(Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.14 lower (0.56 lower to 0.28 higher)	VERY LOW	CRITICAL
Gambling symptom severity (measured using 21-item VGS, better indicated by lower values) at 6 months follow up - CBT individual (Face-to-face) vs Exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.14 lower (0.56 lower to 0.28 higher)	VERY LOW	CRITICAL
Gambling symptoms severity (measured using 12-item G-SAS, better indicated by lower values) at 6 months follow up - Brief CBT + Behavioural therapy individual (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	63	Not estimable	SMD 0.06 lower (0.41 lower to 0.29 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 1 months follow up - CBT individual (Face-to-face) vs Exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.09 higher (0.33 lower to 0.51 higher)	VERY LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 3 months follow up - CBT individual (Face-to-face) vs Exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.14 higher (0.28 lower to 0.56 higher)	VERY LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 6 months follow up - CBT individual (Face-to-face) and CBT individual vs Exposure therapy individual (face-to-face) and behavioural therapy (Better indicated by lower values)												
2[4]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	107	106	Not estimable	SMD 0.12 higher (0.25 lower to 0.48 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 12 months follow up - Brief CBT + Behavioural therapy individual (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	59	55	Not estimable	SMD 0.1 lower (0.47 lower to 0.27 higher)	LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 6 months follow up - Brief CBT + Behavioural therapy individual (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	63	Not estimable	SMD 0.13 higher (0.22 lower to 0.48 higher)	LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 12 months follow up - Brief CBT + Behavioural therapy individual (Better indicated by lower values)												
1 (Thomas	randomised	very	no serious	no serious	serious[2]	none	59	55	Not	SMD 0.26 lower (0.62	VERY	CRITICAL

2017)	trials	serious[1]	inconsistency	indirectness					estimable	lower to 0.11 higher)	LOW	
Gambling frequency (% of days in 4 weeks) at 12 months follow up - CBT individual vs Behavioural therapy (Better indicated by lower values)												
1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	25	24	Not estimable	SMD 0.2 higher (0.36 lower to 0.76 higher)	VERY LOW	CRITICAL
Abstinence (days abstinent) at 12 months follow up - Brief CBT + Behavioural therapy individual (Better indicated by higher values)												
1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	5/25 (20%)	4/24 (16.7%)	RR 1.2 (0.37 to 3.94)	33 more per 1000 (from 105 fewer to 490 more)	VERY LOW	CRITICAL
Remission (PGSI cut-off of 7) at 3 months follow up - Brief CBT vs Dialectical behaviour therapy (Better indicated by higher values)												
1 (Korman 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	7/22 (31.8%)	20/20 (100%)	RR 0.33 (0.18 to 0.6)	670 fewer per 1000 (from 400 fewer to 820 fewer)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; G-SAS: gambling symptom assessment scale; SMD: standardised mean difference; RR: risk ratio; VGS: Victorian gambling scale
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MIDs
[4] Smith 2015; Thomas 2017

Table 26: Comparison 17: Evidence profile for comparison between individual CBT and guided self-help

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT individual**	**Guided self help**	**Relative (95% CI)**	**Absolute**		
Gambling frequency (days per 4 weeks) at 11 months follow up - Brief motivational interviewing + CBT workbook vs CBT workbook + support (Better indicated by lower values)												
1 (Hodgins 2009)[2]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	73	65	Not estimable	SMD 0.03 lower (0.36 lower to 0.31 higher)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] This is summary of the results of the other time points (see evidence table)

Table 27: Comparison 18: Evidence profile for comparison between individual CBT and self-help (with no or minimal support)

Quality assessment	No of patients	Effect	Quality	Importance

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual	Self-help (with no or minimal support +TAU)	Relative (95% CI)	Absolute		
Gambling symptom severity (measured using 16-item SOGS, better indicated by lower values) at 4 months follow up - Brief CBT individual + referral to GA group vs CBT workbook + referral to GA group (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	84	84	Not estimable	SMD 0.32 lower (0.63 to 0.02 lower)	VERY LOW	CRITICAL
Gambling symptom severity (measured using 16-item SOGS, better indicated by lower values) at 8 months follow up - Brief CBT individual + referral to GA group vs CBT workbook + referral to GA group (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	84	84	Not estimable	SMD 0.24 lower (0.54 lower to 0.06 higher)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 4 months follow up - Brief CBT individual + referral to GA group vs CBT workbook + referral to GA group (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	84	84	Not estimable	SMD 0.08 higher (0.23 lower to 0.38 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 8 months follow up - Brief CBT individual + referral to GA group vs CBT workbook + referral to GA group (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	84	84	Not estimable	SMD 0.01 higher (0.29 lower to 0.32 higher)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; G-SAS: gambling symptom assessment scale; SMD: standardised mean difference; SOGS: south oaks gambling screen; RR: risk ratio; TAU: treatment as usual
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 28: Comparison 19: Evidence profile for comparison between individual CBT and self-help (with no or minimal support)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT individual**	**Self-help (with no or minimal support)**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity (measured using 16-item SOGS, better indicated by lower values) at 22 months follow up - Brief motivational interviewing + brief CBT individual vs Personalised feedback intervention combined with Psychoeducational material (Better indicated by lower values)												
1 (Petry 2016)[1]	randomised trials	very serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	82	135	Not estimable	SMD 0 higher (0.27 lower to 0.27 higher)	LOW	CRITICAL

Gambling frequency (days per 4 weeks) at 22 months follow up - Brief motivational interviewing + brief CBT individual vs Personalised feedback intervention combined with Psychoeducational material (Better indicated by lower values)												
1 (Petry 2016)[1]	randomised trials	very serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	82	135	Not estimable	SMD 0.16 lower (0.43 lower to 0.12 higher)	LOW	CRITICAL
Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow up - Brief motivational interviewing + brief CBT individual vs Personalised feedback intervention (Better indicated by lower values)												
2[5]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	53	63	Not estimable	SMD 0.12 lower (0.49 lower to 0.25 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 7 months follow up - Brief motivational interviewing + brief CBT individual vs Personalised feedback intervention (Better indicated by lower values)												
1 (Petry 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	19	32	Not estimable	SMD 0.03 higher (0.54 lower to 0.6 higher)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 8 months follow up - Brief motivational interviewing + CBT workbook vs CBT workbook (Better indicated by lower values)												
1 (Hodgins 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	74	70	Not estimable	SMD 0.32 lower (0.65 lower to 0.01 higher)	VERY LOW	CRITICAL
Remission SOGS cut off of 2 at 7months follow up - Brief motivational interviewing + brief CBT individual vs Personalised feedback intervention (Better indicated by higher values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[4]	none	7/40 (17.5%)	8/37 (21.6%)	OR 0.77 (0.25 to 2.38)	41 fewer per 1000 (from 152 fewer to 180 more)	VERY LOW	CRITICAL

ASI: addiction severity index; CBT: cognitive behavioural therapy; CI: confidence interval; RR: risk ratio; SMD: standardised mean difference;
[1] This is summary of the results of the other time points (see evidence table)
[2] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[3] 95% CI crosses 1 MID
[4] 95% CI crosses 2 MIDs
[5] Petry 2008; Petry 2009

Table 29: Comparison 20: Evidence profile for comparison between individual CBT and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT individual**	**TAU**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity (measured using 16-item SOGS, better indicated by lower values) at 4 months follow up - Brief CBT individual + referral to GA group vs Referral to GA group (Better indicated by lower values)												

1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	84	63	Not estimable	SMD 0.32 lower (0.65 lower to 0.01 higher)	VERY LOW	CRITICAL
Gambling symptom severity (measured using 16-item SOGS, better indicated by lower values) at 8 months follow up - Brief CBT individual + referral to GA group vs Referral to GA group (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	84	63	Not estimable	SMD 0.11 lower (0.43 lower to 0.22 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 4 months follow up - Brief CBT individual + referral to GA group vs Referral to GA group (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	84	63	Not estimable	SMD 0.17 lower (0.5 lower to 0.15 higher)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 8 months follow up - Brief CBT individual + referral to GA group vs Referral to GA group (Better indicated by lower values)												
1 (Petry 2006)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	84	63	Not estimable	SMD 0.12 lower (0.45 lower to 0.2 higher)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; GA: gamblers anonymous; SMD: standardised mean difference; SOGS: south oaks gambling screen; TAU: treatment as usual

[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2

[2] 95% CI crosses 1 MID

Table 30: Comparison 21: Evidence profile for comparison between individual CBT and no treatment

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT individual**	**No treatment**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity (measured using 28-item ASI, better indicated by lower values) at 7 months follow up - Brief motivational interviewing + brief CBT individual vs No treatment (Better indicated by lower values)												
2[4]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	53	75	Not estimable	SMD 0.38 lower (0.74 to 0.02 lower)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 7 months follow up - Brief motivational interviewing + brief CBT individual vs No treatment (Better indicated by lower values)												
1 (Petry 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	19	33	Not estimable	SMD 0.45 lower (1.02 lower to 0.13 higher)	VERY LOW	CRITICAL
Remission SOGS cut off of 2 at 7months follow up - Brief motivational interviewing + brief CBT individual vs No treatment (Better indicated by higher values)												

1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	7/40 (17.5%)	6/48 (12.5%)	RR 1.4 (0.51 to 3.83)	50 more per 1000 (from 61 fewer to 354 more)	VERY LOW	CRITICAL

ASI: addiction severity index; CBT: cognitive behavioural therapy; CI: confidence interval; G; SMD: standardised mean difference; RR: risk ratio
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MIDs
[4] Petry 2008; Petry 2009

Table 31: Comparison 22: Evidence profile for comparison between behavioural therapies and motivational interviewing

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Behavioural therapies**	**Motivational interviewing**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity ((measured using 12-item G-SAS, better indicated by lower values) at 6 months follow up - Behavioural therapy individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	63	62	Not estimable	SMD 0.22 higher (0.14 lower to 0.57 higher)	VERY LOW	CRITICAL
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 12 months follow up - Behavioural therapy individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	55	59	Not estimable	SMD 0 higher (0.36 lower to 0.37 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 6 months follow up - Behavioural therapy individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	62	Not estimable	SMD 0.09 higher (0.26 lower to 0.44 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 12 months follow up - Behavioural therapy individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	55	59	Not estimable	SMD 0.2 lower (0.57 lower to 0.16 higher)	VERY LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 6 months follow up - Behavioural therapy individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	63	62	Not estimable	SMD 0.16 lower (0.51 lower to 0.19 higher)	VERY LOW	CRITICAL

Gambling frequency (sessions per 4 weeks) at 12 months follow up - Behavioural therapy individual vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	55	59	Not estimable	SMD 0.2 lower (0.56 lower to 0.17 higher)	VERY LOW	CRITICAL
Gambling frequency (% of days during 4 weeks) at 12 months follow up - Behavioural therapies vs Motivational interviewing (Better indicated by lower values)												
1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	24	22	Not estimable	SMD 0.12 lower (0.7 lower to 0.46 higher)	VERY LOW	CRITICAL
Abstinence (days abstinent) at 12 months follow up - Behavioural therapies vs Motivational interviewing (Better indicated by higher values)												
1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	4/24 (16.7%)	3/22 (13.6%)	RR 1.22 (0.31 to 4.86)	30 more per 1000 (from 94 fewer to 526 more)	VERY LOW	CRITICAL

CI: confidence interval; G-SAS: gambling symptom assessment scale; SMD: standardised mean difference; RR: risk ratio
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MIDs

Table 32: Comparison 23: Evidence profile for comparison between behavioural therapies and individual counselling

Quality assessment							**No of patients**		**Effect**		**Quality**	**Importance**
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Behavioural therapies**	**Counselling individual**	**Relative (95% CI)**	**Absolute**		
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 6 months follow up - Behavioural therapy individual vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	63	61	Not estimable	SMD 0.16 lower (0.51 lower to 0.2 higher)	VERY LOW	CRITICAL
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 12 months follow up - Behavioural therapy individual vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	55	62	Not estimable	SMD 0.04 lower (0.4 lower to 0.33 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 6 months follow up - Behavioural therapy individual vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	55	62	Not estimable	SMD 0.04 lower (0.4 lower to 0.33 higher)	LOW	CRITICAL

Time spent gambling (hours per 4 weeks) at 12 months follow up - Behavioural therapy individual vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	61	Not estimable	SMD 0.03 higher (0.32 lower to 0.38 higher)	LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 6 months follow up - Behavioural therapy individual vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	61	Not estimable	SMD 0.13 lower (0.49 lower to 0.22 higher)	LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 12 months follow up - Behavioural therapy individual vs Counselling (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	55	62	Not estimable	SMD 0 (0.36 lower to 0.36 higher)	LOW	CRITICAL

CI: confidence interval; G-SAS: gambling symptom assessment scale; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

GRADE tables for gambling expenditure at endpoint and follow-up

Table 33: Comparison 1: Evidence profile for comparison between motivational interviewing and group CBT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Motivational interviewing	CBT group (face-to-face)	Relative (95% CI)	Absolute		
Gambling expenditure (measured using Gambling Quantity and Perceived Norms [GQPN]: Gambling expenditure, lower is better) at endpoint (26 weeks post-randomisation) - Brief motivational interviewing vs CBT group (Better indicated by lower values)												
1 (Larimer 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	40	30	Not estimable	SMD 0.31 higher (0.17 lower to 0.78 higher)	VERY LOW	CRITICAL
Gambling frequency (measured using Gambling Quantity and Perceived Norms [GQPN]: Gambling frequency, lower is better) at endpoint (26 weeks post-randomisation) - Brief motivational interviewing vs CBT group (Better indicated by lower values)												
1 (Larimer 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	40	30	Not estimable	SMD 0.05 higher (0.43 lower to 0.52 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 34. Comparison 2: Evidence profile for comparison between motivational interviewing and individual counselling

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Motivational interviewing	Counselling individual (face-to-face)	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money lost, lower is better) at endpoint (12 weeks post-randomisation) - Motivational interviewing vs Client-centred therapy (CCT) (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	65	67	Not estimable	SMD 0.05 lower (0.39 lower to 0.29 higher)	LOW	CRITICAL
Money spent gambling over time interval (money lost, lower is better) at 6 months post-endpoint - Motivational interviewing vs Client-centred therapy (CCT) (Better indicated by lower values)												

1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	62	61	Not estimable	SMD 0.17 higher (0.19 lower to 0.52 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money lost, lower is better) at 12 months post-endpoint - Motivational interviewing vs Client-centred therapy (CCT) (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	59	62	Not estimable	SMD 0.12 higher (0.24 lower to 0.47 higher)	LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MIDs

Table 35. Comparison 3: Evidence profile for comparison between motivational interviewing and guided self-help

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**Guided self-help**	**Relative (95% CI)**	**Absolute**		
Money spent gambling per individual unit (money lost per gambling day, lower is better) at endpoint (13 weeks post-randomisation) - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook with support (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	78	185	Not estimable	SMD 0.19 higher (0.07 lower to 0.46 higher)	LOW	CRITICAL
Money spent gambling per individual unit (money lost per gambling day, lower is better) at 3 months post-endpoint - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook with support (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	78	170	Not estimable	SMD 0.15 higher (0.12 lower to 0.42 higher)	LOW	CRITICAL
Money spent gambling per individual unit (money lost per gambling day, lower is better) at 9 months post-endpoint - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook with support (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	66	151	Not estimable	SMD 0.24 higher (0.05 lower to 0.53 higher)	VERY LOW	CRITICAL
Gambling improvement (in money spent) at endpoint (13 weeks post-randomisation) - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook with support (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	73/112 (65.2%)	147/234 (62.8%)	OR 1.11 (0.69 to 1.77)	24 more per 1000 (from 90 fewer to 121 more)	VERY LOW	CRITICAL
Gambling improvement (in money spent) at 3 months post-endpoint - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook with support (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	68/112 (60.7%)	123/234 (52.6%)	OR 1.39 (0.88 to 2.2)	81 more per 1000 (from 32 fewer to	VERY LOW	CRITICAL

										183 more)		
Gambling improvement (in money spent) at 9 months post-endpoint - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook with support CBT workbook with support (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	56/112 (50%)	121/234 (51.7%)	OR 0.93 (0.6 to 1.47)	18 fewer per 1000 (from 126 fewer to 94 more)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; RR: risk ratio
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 36: Comparison 4: Evidence profile for comparison between motivational interviewing and self-help (with no or minimal support)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**Self-help (with no or minimal support)**	**Relative (95% CI)**	**Absolute**		
Money spent gambling over time interval (money spent, lower is better) at endpoint (8 weeks post-randomisation) - Brief motivational interviewing vs Personalised feedback intervention (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	52	35	Not estimable	SMD 0.46 higher (0.03 to 0.9 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 7 months post-endpoint - Brief motivational interviewing vs Personalised feedback intervention (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	48	31	Not estimable	SMD 0.36 higher (0.1 lower to 0.81 higher)	VERY LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 37: Comparison 5: Evidence profile for comparison between motivational interviewing and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**TAU**	**Relative (95% CI)**	**Absolute**		
Money spent gambling per individual unit (money lost per gambling day, lower is better) at endpoint (13 weeks post-randomisation) - Brief motivational interviewing vs Information + referral (Better indicated by lower values)												
1 (Abbott	randomised	very	no serious	no serious	no serious	none	88	100	Not	SMD 0.02 higher	LOW	CRITICAL

2012/2018)	trials	serious[1]	inconsistency	indirectness	imprecision				estimable	(0.27 lower to 0.3 higher)		
Money spent gambling per individual unit (money lost per gambling day, lower is better) at 3 months post-endpoint - Brief motivational interviewing vs Information + referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	78	92	Not estimable	SMD 0.23 higher (0.07 lower to 0.54 higher)	VERY LOW	CRITICAL
Money spent gambling per individual unit (money lost per gambling day, lower is better) at 9 months post-endpoint - Brief motivational interviewing vs Information + referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	66	78	Not estimable	SMD 0.13 higher (0.19 lower to 0.46 higher)	LOW	CRITICAL
Gambling improvement (in money spent) at endpoint (13 weeks post-randomisation) - Brief motivational interviewing vs Information + referral (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	73/112 (65.2%)	82/116 (70.7%)	OR 0.78 (0.44 to 1.36)	54 fewer per 1000 (from 192 fewer to 59 more)	VERY LOW	CRITICAL
Gambling improvement (in money spent) at 3 months post-endpoint - Brief motivational interviewing vs Information + referral (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	68/112 (60.7%)	66/116 (56.9%)	OR 1.17 (0.69 to 1.99)	38 more per 1000 (from 92 fewer to 155 more)	VERY LOW	CRITICAL
Gambling improvement (in money spent) at 9 months post-endpoint - Brief motivational interviewing vs Information + referral (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	56/112 (50%)	68/116 (58.6%)	OR 0.71 (0.42 to 1.19)	85 fewer per 1000 (from 213 fewer to 41 more)	VERY LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 38: Comparison 6: Evidence profile for comparison between motivational interviewing and attention placebo

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**Attention placebo**	**Relative (95% CI)**	**Absolute**		

Money spent gambling over time interval (money spent, lower is better) at endpoint (4 weeks posts-randomisation) - Brief motivational interviewing vs Brief semi-structured interview (Better indicated by lower values)												
1 (Diskin 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	39	Not estimable	SMD 0.45 lower (0.89 lower to 0 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 3 months post-endpoint - Brief motivational interviewing vs Brief semi-structured interview (Better indicated by lower values)												
1 (Diskin 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	39	Not estimable	SMD 0.42 lower (0.86 lower to 0.03 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 6 months post-endpoint - Brief motivational interviewing vs Brief semi-structured interview (Better indicated by lower values)												
1 (Diskin 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	39	Not estimable	SMD 0.29 lower (0.73 lower to 0.15 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 12 months post-endpoint - Brief motivational interviewing vs Brief semi-structured interview (Better indicated by lower values)												
1 (Diskin 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	39	Not estimable	SMD 0.41 lower (0.85 lower to 0.03 higher)	VERY LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 39: Comparison 7: Evidence profile for comparison between motivational interviewing and no treatment

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**No treatment**	**Relative (95% CI)**	**Absolute**		
Gambling expenditure (measured using Gambling Quantity and Perceived Norms [GQPN]: Gambling expenditure, lower is better) at endpoint (26 weeks post-randomisation) - Brief motivational interviewing vs No treatment (Better indicated by lower values)												
1 (Larimer 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	40	41	Not estimable	SMD 0.04 higher (0.39 lower to 0.48 higher)	LOW	CRITICAL
Gambling frequency (measured using Gambling Quantity and Perceived Norms [GQPN]: Gambling frequency, lower is better) at endpoint (26 weeks post-randomisation) - Brief motivational interviewing vs No treatment (Better indicated by lower values)												
1 (Larimer 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	40	41	Not estimable	SMD 0.25 lower (0.69 lower to 0.19 higher)	VERY LOW	CRITICAL

Money spent gambling over time interval (money spent, lower is better) at endpoint (8 weeks post-randomisation) - Brief motivational interviewing vs No treatment (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	52	47	Not estimable	SMD 0.18 lower (0.57 lower to 0.22 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 7 months post-endpoint - Brief motivational interviewing vs No treatment (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	48	42	Not estimable	SMD 0.07 lower (0.49 lower to 0.34 higher)	LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 40: Comparison 8: Evidence profile for comparison between guided self-help and self-help (with no or minimal support)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Self-help (with no or minimal support)**	**Waitlist**	**Relative (95% CI)**	**Absolute**		
Money spent gambling over time interval (money lost, lower is better) at endpoint (8 weeks post-randomisation) - Computerised CBT with support vs Computerised CBT (Better indicated by lower values)												
1 (Dowling 2021)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	28	22	Not estimable	SMD 0.14 higher (0.42 lower to 0.7 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money lost, lower is better) at 1 month post-endpoint - Computerised CBT with support vs Computerised CBT (Better indicated by lower values)												
1 (Dowling 2021)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	29	26	Not estimable	SMD 0.65 lower (1.2 to 0.11 lower)	VERY LOW	CRITICAL
Money spent gambling over time interval (money lost, lower is better) at 22 months post-endpoint - Computerised CBT with support vs Computerised CBT (Better indicated by lower values)												
1 (Dowling 2021)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	30	28	Not estimable	SMD 0.23 lower (0.74 lower to 0.29 higher)	VERY LOW	CRITICAL

Change money spent gambling over time interval (money lost, lower is better) at endpoint (6 weeks post-randomisation) - CBT workbook with email support vs Personalised feedback intervention + CBT workbook (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	301	557	Not estimable	SMD 0 higher (0.14 lower to 0.14 higher)	LOW	CRITICAL
Change money spent gambling over time interval (money lost, lower is better) at 1-month post-endpoint - CBT workbook with email support vs Personalised feedback intervention + CBT workbook (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	301	557	Not estimable	SMD 0.07 lower (0.21 lower to 0.07 higher)	LOW	CRITICAL
Change money spent gambling per individual unit (money lost per gambling session) at endpoint (6 weeks post-randomisation) - CBT workbook with email support vs Personalised feedback intervention + CBT workbook (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	301	557	Not estimable	SMD 0.16 higher (0.02 to 0.3 higher)	LOW	CRITICAL
Change money spent gambling per individual unit (money lost per gambling session) at 1-month post-endpoint - CBT workbook with email support vs Personalised feedback intervention + CBT workbook (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	301	557	Not estimable	SMD 0.05 lower (0.19 lower to 0.09 higher)	LOW	CRITICAL
Money spent gambling over time interval (money lost, lower is better) at endpoint (4 weeks post-randomisation) - Brief motivational interviewing + CBT workbook vs CBT workbook (Better indicated by lower values)												
1 (Hodgins 2001/2004)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	31	33	Not estimable	SMD 0.38 lower (0.11 lower to 0.88 higher)	VERY LOW	CRITICAL
Change money spent gambling per individual unit (money lost per gambling day) at endpoint (4 weeks post-randomisation) - Brief motivational interviewing + CBT workbook vs CBT workbook (Better indicated by lower values)												
1 (Hodgins 2001/2004)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	31	33	Not estimable	SMD 0.6 lower (0.1 to 1.1 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; RR: risk ratio

[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 41: Comparison 9: Evidence profile for comparison between self-help (with no or minimal support) and attention placebo

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Self-help (with no or minimal support)	Attention placebo	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money spent, lower is better) at endpoint (5 weeks post-randomisation) - Computerised analytical training vs Computerised gambling trivia questions (Better indicated by lower values)												
1 (Armstrong 2020)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	44	Not estimable	SMD 0.16 lower (0.58 lower to 0.27 higher)	VERY LOW	CRITICAL
Money spent gambling per individual unit (money lost per gambling day, lower is better) at endpoint (5 weeks post-randomisation) - Computerised analytical training vs Computerised gambling trivia questions (Better indicated by lower values)												
1 (Armstrong 2020)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	44	Not estimable	SMD 0.17 lower (0.59 lower to 0.25 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at endpoint (13 weeks post-randomisation) - Personalised feedback intervention vs Attention-control (non-gambling) feedback (Better indicated by lower values)												
1 (Neighbors 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	113	114	Not estimable	SMD 0.16 lower (0.43 lower to 0.1 higher)	LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 3 months post-endpoint - Personalised feedback intervention vs Attention-control (non-gambling) feedback (Better indicated by lower values)												
1 (Neighbors 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	112	114	Not estimable	SMD 0.24 lower (0.5 lower to 0.02 higher)	VERY LOW	CRITICAL
Gambling frequency (measured using Gambling Quantity and Perceived Norms [GQPN]: Gambling frequency, lower is better) at endpoint (13 weeks post-randomisation) - Personalised feedback intervention vs Attention-control (non-gambling) feedback (Better indicated by lower values)												
1 (Neighbors 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	113	114	Not estimable	SMD 0.14 higher (0.12 lower to 0.4 higher)	LOW	CRITICAL

Gambling frequency (measured using Gambling Quantity and Perceived Norms [GQPN]: Gambling frequency, lower is better) at 3 months post-endpoint - Personalised feedback intervention vs Attention-control (non-gambling) feedback (Better indicated by lower values)												
1 (Neighbors 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	113	114	Not estimable	SMD 0.1 higher (0.16 lower to 0.36 higher)	LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 42: Comparison 10: Evidence profile for comparison between self-help (with no or minimal support) and waitlist

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Self-help (with no or minimal support)**	**Waitlist**	**Relative (95% CI)**	**Absolute**		
Money spent gambling over time interval (money lost, lower is better) at endpoint (4 weeks post-randomisation) - CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Hodgins 2001/2004)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	33	34	Not estimable	SMD 0.04 lower (0.52 lower to 0.44 higher)	VERY LOW	CRITICAL
Change money spent gambling over time interval (money lost, lower is better) at endpoint (6 weeks post-randomisation) - Personalised feedback intervention vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	293	264	Not estimable	SMD 0.13 higher (0.04 lower to 0.3 higher)	LOW	CRITICAL
Change money spent gambling over time interval (money lost, lower is better) at endpoint (6 weeks post-randomisation) - CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	264	264	Not estimable	SMD 0.12 higher (0.05 lower to 0.3 higher)	LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at endpoint (13 weeks post-randomisation) - Personalised feedback intervention vs Waitlist (Better indicated by lower values)												
3[4]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	161	159	Not estimable	SMD 0.04 higher (0.26 lower to 0.33 higher)	LOW	CRITICAL
Change money spent gambling over time interval (money lost, lower is better) at 1 month post-endpoint - Personalised feedback intervention vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	293	264	Not estimable	SMD 0.14 higher (0.03 lower to 0.3 higher)	LOW	CRITICAL

Change money spent gambling over time interval (money lost, lower is better) at 1 month post-endpoint - CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	264	264	Not estimable	SMD 0.09 higher (0.08 lower to 0.26 higher)	LOW	CRITICAL
Money spent gambling per individual unit (money lost per gambling day, lower is better) at endpoint (4 weeks post-randomisation) - CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Hodgins 2001/2004)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	33	21	Not estimable	SMD 0.65 lower (1.21 to 0.09 lower)	VERY LOW	CRITICAL
Change money spent gambling per individual unit (money lost per gambling session, lower is better) at endpoint (6 weeks post-randomisation) - Personalised feedback intervention vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	293	264	Not estimable	SMD 0.17 higher (0.01 to 0.34 higher)	LOW	CRITICAL
Change money spent gambling per individual unit (money lost per gambling session, lower is better) at endpoint (6 weeks post-randomisation) - CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	264	264	Not estimable	SMD 0.16 higher (0.01 lower to 0.33 higher)	LOW	CRITICAL
Money spent gambling per individual unit (money spent on gambling per day, lower is better) at endpoint (6 weeks post-randomisation) - CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Oei 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	32	Not estimable	SMD 0.06 higher (0.47 lower to 0.6 higher)	VERY LOW	CRITICAL
Money spent gambling per individual unit (largest amount spent in a day, lower is better) at endpoint (13 weeks post-randomisation) - Personalised feedback intervention vs Waitlist (Better indicated by lower values)												
3[4]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	161	159	Not estimable	SMD 0.15 higher (0.09 lower to 0.39 higher)	LOW	CRITICAL
Change money spent gambling per individual unit (money lost per gambling session, lower is better) at 1 month post-endpoint - Personalised feedback intervention vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	293	264	Not estimable	SMD 0.13 higher (0.04 lower to 0.29 higher)	LOW	CRITICAL
Change money spent gambling per individual unit (money lost per gambling session, lower is better) at 1 month post-endpoint - CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	264	264	Not estimable	SMD 0.12 higher (0.05 lower to 0.29 higher)	LOW	CRITICAL

Money spent gambling per individual unit (largest amount spent in a day, lower is better) at 3 months post-endpoint - Personalised feedback intervention vs Waitlist (Better indicated by lower values)												
1 (Cunningham 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	70	69	Not estimable	SMD 0.25 higher (0.08 lower to 0.59 higher)	VERY LOW	CRITICAL
Gambling improvement (in money spent) at endpoint (6 weeks post-randomisation) - CBT workbook vs Waitlist (Better indicated by higher values)												
1 (Hodgins 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	35/82 (42.7%)	29/65 (44.6%)	OR 0.92 (0.48 to 1.78)	20 fewer per 1000 (from 167 fewer to 143 more)	VERY LOW	CRITICAL
Gambling frequency (measured using study-specific ordinal frequency scale) at endpoint (6 weeks post-randomisation) - CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Oei 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	23	32	Not estimable	SMD 1.24 lower (1.82 to 0.65 lower)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference;
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's
[4] Cunningham 2009; Cunningham 2012; Cunningham 2019

Table 43: Comparison 11: Evidence profile for comparison between self-help (with no or minimal support) and no treatment

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Self-help (with no or minimal support)**	**No treatment**	**Relative (95% CI)**	**Absolute**		
Money spent gambling over time interval (money spent, lower is better) at endpoint (13 weeks post-randomisation) - Personalised feedback intervention + Psychoeducational materials vs No treatment (Better indicated by lower values)												
1 (Martens 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	224	109	Not estimable	SMD 0.19 lower (0.42 lower to 0.04 higher)	LOW	CRITICAL
Change money spent gambling over time interval (money spent, lower is better) at endpoint (4 weeks post-randomisation) - Chatbot-delivered CBT vs No treatment (Better indicated by lower values)												
1 (So 2020)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	96	101	Not estimable	SMD 0.09 lower (0.37 lower to 0.19 higher)	LOW	CRITICAL

Money spent gambling over time interval (money spent, lower is better) at endpoint (8 weeks post-randomisation) - Personalised feedback intervention vs No treatment (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	35	47	Not estimable	SMD 0.67 lower (1.12 to 0.22 lower)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 7 months post-endpoint - Personalised feedback intervention vs No treatment (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	31	42	Not estimable	SMD 0.41 lower (0.88 lower to 0.06 higher)	VERY LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 44: Comparison 12: Evidence profile for comparison between guided self-help and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Guided self-help**	**TAU**	**Relative (95% CI)**	**Absolute**		
Money spent gambling per individual unit (money lost per gambling day, lower is better) at endpoint (13 weeks post-randomisation) - Brief motivational interviewing and CBT workbook + CBT workbook with support vs Information + referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	175	100	Not estimable	SMD 0.01 lower (0.25 lower to 0.24 higher)	LOW	CRITICAL
Money spent gambling per individual unit (money lost per gambling day, lower is better) at 3 months post-endpoint - Brief motivational interviewing and CBT workbook + CBT workbook with support vs Information + referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	160	92	Not estimable	SMD 0.18 higher (0.08 lower to 0.44 higher)	LOW	CRITICAL
Money spent gambling per individual unit (money lost per gambling day, lower is better) at 9 months post-endpoint - Brief motivational interviewing and CBT workbook + CBT workbook with support vs Information + referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	139	78	Not estimable	SMD 0.04 higher (0.23 lower to 0.32 higher)	LOW	CRITICAL
Gambling improvement (in money spent) at endpoint (13 weeks post-randomisation) - Brief motivational interviewing and CBT workbook + CBT workbook with support vs Information + referral (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	139/228 (61%)	82/116 (70.7%)	OR 0.65 (0.4 to 1.05)	96 fewer per 1000 (from 216 fewer to 10	VERY LOW	CRITICAL

										more)		
Gambling improvement (in money spent) at 3 months post-endpoint - Brief motivational interviewing and CBT workbook + CBT workbook with support vs Information + referral (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	128/228 (56.1%)	66/116 (56.9%)	OR 0.97 (0.62 to 1.52)	7 fewer per 1000 (from 119 fewer to 98 more)	VERY LOW	CRITICAL
Gambling improvement (in money spent) at 9 months post-endpoint - Brief motivational interviewing and CBT workbook + CBT workbook with support vs Information + referral (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[3]	no serious inconsistency	no serious indirectness	serious[2]	none	111/228 (48.7%)	68/116 (58.6%)	OR 0.67 (0.43 to 1.05)	99 fewer per 1000 (from 208 fewer to 12 more)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; RR: risk ratio
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 45: Comparison 13: Evidence profile for comparison between guided self-help and waitlist

Quality assessment							**No of patients**		**Effect**		**Quality**	**Importance**
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Guided self-help**	**Waitlist**	**Relative (95% CI)**	**Absolute**		
Money spent gambling over time interval (money lost, lower is better) at endpoint (6 weeks post-randomisation) - CBT workbook with email support vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	301	264	Not estimable	SMD 0.13 higher (0.04 lower to 0.3 higher)	LOW	CRITICAL
Change money spent gambling over time interval (money lost, lower is better) at 1-month post-endpoint - CBT workbook with email support vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	301	264	Not estimable	SMD 0.08 higher (0.08 lower to 0.25 higher)	LOW	CRITICAL
Change money spent gambling per individual unit (money lost per gambling session, lower is better) at endpoint (6 weeks post-randomisation) - CBT workbook with email support vs Waitlist (Better indicated by lower values)												
1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	301	264	Not estimable	SMD 0.19 higher (0.02 to 0.35 higher)	LOW	CRITICAL
Money spent gambling per individual unit (money lost per gambling session, lower is better) at 1-month post-endpoint - CBT workbook with email support vs Waitlist (Better indicated by lower values)												

1 (Luquiens 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	301	264	Not estimable	SMD 0.13 higher (0.04 lower to 0.3 higher)	LOW	CRITICAL
Change money spent gambling over time interval (money lost, lower is better) at endpoint (4 weeks post-randomisation) - Brief motivational interviewing + CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Hodgins 2001/2004)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	31	34	Not estimable	SMD 0.44 lower (0.94 lower to 0.05 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at endpoint (11 weeks post-randomisation) - CBT workbook with support vs Waitlist (Better indicated by lower values)												
1 (Boudreault 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	27	27	Not estimable	SMD 0.38 lower (0.92 lower to 0.16 higher)	VERY LOW	CRITICAL
Money spent gambling per individual unit (money lost per gambling day, lower is better) at endpoint (4 weeks post-randomisation) - Brief motivational interviewing + CBT workbook vs Waitlist (Better indicated by lower values)												
1 (Hodgins 2001/2004)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	31	34	Not estimable	SMD 0.63 lower (1.12 to 0.13 lower)	VERY LOW	CRITICAL
Money spent gambling per individual unit (highest single stake, lower is better) at endpoint (13 weeks post-randomisation) - Computerised counselling with support vs Waitlist (Better indicated by lower values)												
1 (Jonas 2020)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	54	57	Not estimable	SMD 0.66 lower (1.04 to 0.28 lower)	VERY LOW	CRITICAL
Money spent gambling per individual unit (highest single stake, lower is better) at endpoint (13 weeks post-randomisation) - Psychoeducational materials with email support vs Waitlist (Better indicated by lower values)												
1 (Jonas 2020)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	56	57	Not estimable	SMD 0.53 lower (0.91 to 0.16 lower)	VERY LOW	CRITICAL
Gambling improvement (in money spent) at endpoint (6 weeks post-randomisation) - Brief motivational interviewing + CBT workbook vs Waitlist (Better indicated by higher values)												
1 (Hodgins 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	38/83 (45.8%)	29/65 (44.6%)	OR 1.05 (0.55 to 2.01)	12 more per 1000 (from 139 fewer to 172 more)	VERY LOW	CRITICAL
Gambling improvement (in money spent) at endpoint (6 weeks post-randomisation) - CBT workbook with support vs Waitlist (Better indicated by higher values)												
1 (Hodgins 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	36/84 (42.9%)	29/65 (44.6%)	OR 0.93 (0.48 to 1.79)	18 fewer per 1000 (from 167 fewer to 144 more)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference

[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2

[2] 95% CI crosses 1 MID

[3] 95% CI crosses 2 MID's

Table 46: Comparison 14: Evidence profile for comparison between individual CBT and SSRIs

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual (face-to-face)	SSRIs	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money lost, lower is better) at endpoint (8 weeks post-randomisation) - Brief CBT individual (face-to-face) vs Escitalopram (Better indicated by lower values)												
1 (Myrseth 2011)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	15	15	Not estimable	SMD 0.41 lower (1.14 lower to 0.31 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; SSRI: Selective serotonin reuptake inhibitors
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 47: Comparison 15: Evidence profile for comparison between individual CBT and motivational interviewing

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual (face-to-face)	Motivational interviewing	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money lost, lower is better) at endpoint (12 weeks post-randomisation) - Brief CBT individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	62	65	Not estimable	SMD 0.15 higher (0.19 lower to 0.5 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money lost, lower is better) at 6 months post-endpoint - Brief CBT individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	62	Not estimable	SMD 0.08 lower (0.43 lower to 0.27 higher)	LOW	CRITICAL
Money spent gambling over time interval (money lost, lower is better) at 12 months post-endpoint - Brief CBT individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	59	59	Not estimable	SMD 0.2 lower (0.56 lower to 0.17 higher)	VERY LOW	CRITICAL
Money spent gambling per individual unit (money spent per gambling day, lower is better) at endpoint (10 weeks post-randomisation) - Brief CBT individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												

1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	25	22	Not estimable	SMD 0.16 lower (0.74 lower to 0.41 higher)	VERY LOW	CRITICAL
Money spent gambling per individual unit (money spent per gambling day, lower is better) at 12 months post-endpoint - Brief CBT individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												
1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	25	22	Not estimable	SMD 0.23 lower (0.8 lower to 0.35 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at endpoint (8 weeks post-randomisation) - Brief motivational interviewing + brief CBT individual (face-to-face) vs Brief motivational interviewing (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	38	52	Not estimable	SMD 0.18 lower (0.6 lower to 0.24 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 7 months post-endpoint - Brief motivational interviewing + brief CBT individual (face-to-face) vs Brief motivational interviewing (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	48	Not estimable	SMD 0.14 lower (0.58 lower to 0.3 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 48: Comparison 16: Evidence profile for comparison between individual CBT and group CBT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT individual (face-to-face)**	**CBT group (face-to-face)**	**Relative (95% CI)**	**Absolute**		
Money spent gambling over time interval (money spent, lower is better) at endpoint (12 weeks post-randomisation) - CBT individual (face-to-face) vs CBT group (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	10	15	Not estimable	SMD 1.19 lower (2.07 to 0.32 lower)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 6 months post-endpoint - CBT individual (face-to-face) vs CBT group (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	10	15	Not estimable	SMD 0.2 higher (0.61 lower to 1 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference;

[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 49: Comparison 17: Evidence profile for comparison between individual CBT and individual counselling

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual	Counselling individual	Relative (95% CI)	Absolute		
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 6 months follow up - Brief CBT individual vs Client centred therapy (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	63	61	Not estimable	SMD 0.22 lower (0.57 lower to 0.14 higher)	VERY LOW	CRITICAL
Gambling symptom severity (measured using 12-item G-SAS, better indicated by lower values) at 12 months follow up - Brief CBT individual vs Client centred therapy (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	59	62	Not estimable	SMD 0.04 lower (0.39 lower to 0.32 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 6 months follow up - Brief CBT individual vs Client centred therapy (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	61	Not estimable	SMD 0.01 lower (0.36 lower to 0.34 higher)	LOW	CRITICAL
Time spent gambling (hours per 4 weeks) at 12 months follow up - Brief CBT individual vs Client centred therapy (Better indicated by lower values)												
1 (Thomas 2017)	observational studies	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	59	62	Not estimable	SMD 0.12 lower (0.47 lower to 0.24 higher)	LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 6 months follow up - Brief CBT individual vs Client centred therapy (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	61	Not estimable	SMD 0.02 higher (0.33 lower to 0.37 higher)	LOW	CRITICAL
Gambling frequency (sessions per 4 weeks) at 12 months follow up - Brief CBT individual vs Client centred therapy (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	59	62	Not estimable	SMD 0.24 lower (0.6 lower to 0.11 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; G-SAS: gambling symptom assessment scale; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 50: Comparison 18: Evidence profile for comparison between individual CBT and self-help (with no or minimal support)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual	Self help (with no or minimal support)	Relative (95% CI)	Absolute		
Gambling symptom severity (measured using 16-item SOGS, better indicated by lower values) at 22 months follow up - Brief motivational interviewing + brief CBT individual vs Personalised feedback intervention combined with Psychoeducational material (Better indicated by lower values)												
1 (Petry 2016)[1]	randomised trials	very serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	82	135	Not estimable	SMD 0 higher (0.27 lower to 0.27 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 22 months follow up - Brief motivational interviewing + brief CBT individual vs Personalised feedback intervention combined with Psychoeducational material (Better indicated by lower values)												
1 (Petry 2016)[1]	randomised trials	very serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	82	135	Not estimable	SMD 0.16 lower (0.43 lower to 0.12 higher)	LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 7 months follow up - Brief motivational interviewing + brief CBT individual vs Personalised feedback intervention (Better indicated by lower values)												
1 (Petry 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	19	32	Not estimable	SMD 0.03 higher (0.54 lower to 0.6 higher)	VERY LOW	CRITICAL
Gambling frequency (days per 4 weeks) at 8 months follow up - Brief motivational interviewing + CBT workbook vs CBT workbook (Better indicated by lower values)												
1 (Hodgins 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	74	70	Not estimable	SMD 0.32 lower (0.65 lower to 0.01 higher)	VERY LOW	CRITICAL
Remission SOGS cut off of 2 at 7months follow up - Brief motivational interviewing + brief CBT individual vs Personalised feedback intervention (Better indicated by higher values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[4]	none	7/40 (17.5%)	8/37 (21.6%)	OR 0.77 (0.25 to 2.38)	41 fewer per 1000 (from 152 fewer to 180 more)	VERY LOW	CRITICAL

ASI: addiction severity index; CBT: cognitive behavioural therapy; CI: confidence interval; RR: risk ratio; SMD: standardised mean difference;
[1] This is summary of the results of the other time points (see evidence table)
[2] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[3] 95% CI crosses 1 MID
[4] 95% CI crosses 2 MID's
[5] Petry 2008; Petry 2009

Table 51: Comparison 19: Evidence profile for comparison between individual CBT and waitlist

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual (face-to-face)	Waitlist	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money spent, lower is better) at endpoint (26 weeks post-randomisation) - CBT individual (face-to-face) vs Waitlist (Better indicated by lower values)												
1 (Ladouceur 2001)	randomised trials	very serious1	no serious inconsistency	no serious indirectness	serious[2]	none	35	29	Not estimable	SMD 0.71 lower (1.21 to 0.2 lower)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at endpoint (12 weeks post-randomisation) - CBT individual (face-to-face) vs Waitlist (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious1	no serious inconsistency	no serious indirectness	serious2	none	10	15	Not estimable	SMD 1.09 lower (1.95 to 0.22 lower)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 52: Comparison 20: Evidence profile for comparison between individual CBT and no treatment

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual (face-to-face)	No treatment	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money spent, lower is better) at endpoint (8 weeks post-randomisation) - Brief motivational interviewing + brief CBT individual (face-to-face) vs No treatment (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	38	47	Not estimable	SMD 0.4 lower (0.83 lower to 0.04 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at 7 months post-endpoint - Brief motivational interviewing + brief CBT individual (face-to-face) vs No treatment (Better indicated by lower values)												
1 (Petry 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	42	Not estimable	SMD 0.21 lower (0.66 lower to 0.25 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference;
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 53: Comparison 21: Evidence profile for comparison between group CBT and 12-step group programme

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT group (face-to-face)	12 step group programme	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money spent lower is better) at endpoint (8 weeks post-randomisation) - CBT group vs 12 step facilitated group therapy (Better indicated by lower values)												
1 (Marceaux 2011)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	15	11	Not estimable	SMD 0.34 higher (0.44 lower to 1.12 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference;
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 54: Comparison 22: Evidence profile for comparison between group CBT and waitlist

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT group (face-to-face)	Waitlist	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money spent, lower is better) at endpoint (8 weeks post-randomisation) - CBT group vs Waitlist (Better indicated by lower values)												
2[4]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	22	14	Not estimable	SMD 0.53 lower (1.23 lower to 0.17 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (money spent, lower is better) at endpoint (12 weeks post-randomisation) - CBT group vs Waitlist (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	15	15	Not estimable	SMD 0.58 lower (1.32 lower to 0.15 higher)	VERY LOW	CRITICAL
Gambling improvement (in money spent) at endpoint (8 weeks post-randomisation) - CBT group vs Waitlist (Better indicated by higher values)												
1 (Myrseth 2011)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	2/7 (28.6%)	2/7 (28.6%)	OR 1 (0.1 to 10.17)	0 fewer per 1000 (from 247 fewer to 517 more)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference;
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's
[4] Marceaux 2011; Myrseth 2009

Table 55. Comparison 23: Evidence profile for comparison between group CBT and no treatment

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT group (face-to-face)	No treatment	Relative (95% CI)	Absolute		
Gambling expenditure (measured using Gambling Quantity and Perceived Norms [GQPN]: Gambling expenditure, lower is better) at endpoint (26 weeks post-randomisation) - CBT group vs No treatment (Better indicated by lower values)												
1 (Larimer 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	30	41	Not estimable	SMD 0.34 lower (0.81 lower to 0.13 higher)	VERY LOW	CRITICAL
Gambling frequency (measured using Gambling Quantity and Perceived Norms [GQPN]: Gambling frequency, lower is better) at endpoint (26 weeks post-randomisation) - CBT group vs No treatment (Better indicated by lower values)												
1 (Larimer 2012)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	30	41	Not estimable	SMD 0.32 lower (0.8 lower to 0.15 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference;
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 56: Comparison 24: Evidence profile for comparison between group CBT + TAU and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT group (face-to-face) + TAU	TAU	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money spent, lower is better) at endpoint (10 weeks post-randomisation) - CBT group + routine individual counselling vs Routine individual counselling (Better indicated by lower values)												
1 (Wong 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	15	16	Not estimable	SMD 0 higher (0.7 lower to 0.7 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; TAU: treatment as usual
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 2 MID's

Table 57: Comparison 25: Evidence profile for comparison between group CBT + TAU and attention placebo

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT group + TAU	Attention placebo	Relative (95% CI)	Absolute		

Money spent gambling over time period (money spent, lower is better) at endpoint (time not reported) - CBT group + TAU vs Social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.36 lower (0.79 lower to 0.07 higher)	VERY LOW	CRITICAL
Money spent gambling over time period (money spent, lower is better) at 6 months post-endpoint - CBT group + TAU vs Social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.6 lower (1.04 to 0.16 lower)	VERY LOW	CRITICAL
Frequency of gambling (for non-RCT) (sessions, lower is better) at endpoint (time not reported) at 6 months post-endpoint - CBT group + TAU vs Social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.33 lower (0.76 lower to 0.1 higher)	VERY LOW	CRITICAL
Frequency of gambling (for non-RCT) (sessions, lower is better) at 6 months post-endpoint - CBT group + TAU vs Social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.4 lower (0.83 lower to 0.04 higher)	VERY LOW	CRITICAL
Time spent gambling continuous data (for non-RCT) (hours, lower is better) at endpoint (time not reported) - CBT group + TAU vs Social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.51 lower (0.94 to 0.08 lower)	VERY LOW	CRITICAL
Time spent gambling continuous data (for non-RCT) (hours, lower is better) at 6 months post-endpoint - CBT group + TAU vs Social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.57 lower (1.01 to 0.14 lower)	VERY LOW	CRITICAL
Gambling symptom severity scale (for non-RCT) (South Oaks Gambling Screen, lower is better) at endpoint (time not reported) - CBT group + TAU vs Social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.87 lower (1.32 to 0.42 lower)	VERY LOW	CRITICAL
Gambling symptom severity scale (for non-RCT) (South Oaks Gambling Screen, lower is better) at 6 months post-endpoint - CBT group + TAU vs Social activity group (Better indicated by lower values)												

1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	42	42	Not estimable	SMD 1.2 lower (1.66 to 0.73 lower)	LOW	CRITICAL
Remission (for non-RCT) (measured using South Oaks Gambling Screen) at endpoint (time not reported) - CBT group + TAU vs Social activity group (Better indicated by higher values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious	none	17/42 (40.5%)	7/42 (16.7%)	OR 3.4 (1.23 to 9.42)	238 more per 1000 (from 31 more to 487 more)	VERY LOW	CRITICAL
Remission (for non-RCT) (measured using South Oaks Gambling Screen) at 6 months post-endpoint - CBT group + TAU vs Social activity group (Better indicated by higher values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	21/42 (50%)	5/42 (11.9%)	OR 7.4 (2.43 to 22.51)	381 more per 1000 (from 128 more to 634 more)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; TAU: treatment as usual; RR: risk ratio
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 58: Comparison 26: Evidence profile for comparison between self-help (with no or minimal support) + TAU and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Self-help (with no or minimal support) + TAU**	**TAU**	**Relative (95% CI)**	**Absolute**		
Money spent gambling over time period (money spent, lower is better) at endpoint (6 weeks post-randomisation) - Behaviour change SMS + accessing internet mental health service vs Accessing internet mental health service (Better indicated by lower values)												
1 (Rodda 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	50	50	Not estimable	SMD 0.02 lower (0.41 lower to 0.38 higher)	LOW	CRITICAL
Money spent gambling over time period (money spent, lower is better) at 2 months post-endpoint - Behaviour change SMS + accessing internet mental health service vs Accessing internet mental health service (Better indicated by lower values)												
1 (Rodda 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	50	50	Not estimable	SMD 0.35 lower (0.75 lower to 0.04 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; TAU: treatment as usual
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 59: Comparison 27: Evidence profile for comparison between behavioural therapies and individual CBT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Behavioural therapies individual (face-to-face)	CBT individual (face-to-face)	Relative (95% CI)	Absolute		
Money spent gambling over time interval (percentage of income spent, lower is better) at endpoint (14 weeks post-randomisation) - Dialectical behavior therapy (DBT), modified for anger and addiction vs Brief CBT individual (face-to-face) (Better indicated by lower values)												
1 (Korman 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	Not estimable	SMD 0.6 lower (1.22 lower to 0.02 higher)	VERY LOW	CRITICAL
Money spent gambling over time interval (percentage of income spent, lower is better) at 3 months post-endpoint - Dialectical behavior therapy (DBT), modified for anger and addiction vs Brief CBT individual (face-to-face) (Better indicated by lower values)												
1 (Korman 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	Not estimable	SMD 0.74 lower (1.37 to 0.11 lower)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 60: Comparison 28: Evidence profile for comparison between behavioural therapies and motivational interviewing

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Behavioural therapies individual (face-to-face)	Motivational interviewing	Relative (95% CI)	Absolute		
Money spent gambling over time interval (money lost, lower is better) at endpoint (12 weeks post-randomisation) - Behavioural therapy individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	66	65	Not estimable	SMD 0.03 higher (0.31 lower to 0.38 higher)	LOW	CRITICAL
Money spent gambling over time interval (money lost, lower is better) at 6 months post-endpoint - Behavioural therapy individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	63	62	Not estimable	SMD 0.04 higher (0.31 lower to 0.39 higher)	LOW	CRITICAL

Money spent gambling over time interval (money lost, lower is better) at 12 months post-endpoint - Behavioural therapy individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	55	59	Not estimable	SMD 0.18 lower (0.55 lower to 0.19 higher)	VERY LOW	CRITICAL
Money spent gambling per individual unit (money spent per gambling day, lower is better) at endpoint (10 weeks post-randomisation) - Behavioural therapy individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												
1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	24	22	Not estimable	SMD 0.08 higher (0.5 lower to 0.65 higher)	VERY LOW	CRITICAL
Money spent gambling per individual unit (money spent per gambling day, lower is better) at 12 months post-endpoint – Behavioural therapy individual (face-to-face) vs Motivational interviewing (Better indicated by lower values)												
1 (Toneatto 2009/2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	24	22	Not estimable	SMD 0.12 higher (0.46 lower to 0.69 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 61: Comparison 29: Evidence profile for comparison between behavioural therapies and individual counselling

Quality assessment							**No of patients**		**Effect**		**Quality**	**Importance**
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Behavioural therapies individual (face-to-face)**	**Counselling individual (face-to-face)**	**Relative (95% CI)**	**Absolute**		
Money spent gambling over time interval (money lost, lower is better) at endpoint (12 weeks post-randomisation) - Behavioural therapy individual (face-to-face) vs Client-centred therapy (CCT) (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	66	67	Not estimable	SMD 0.01 lower (0.35 lower to 0.33 higher)	LOW	CRITICAL
Money spent gambling over time interval (money lost, lower is better) at 6 months post-endpoint - Behavioural therapy individual (face-to-face) vs Client-centred therapy (CCT) (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	63	61	Not estimable	SMD 0.19 higher (0.17 lower to 0.54	VERY LOW	CRITICAL

										higher)		
Money spent gambling over time interval (money lost, lower is better) at 12 months post-endpoint - Behavioural therapy individual (face-to-face) vs Client-centred therapy (CCT) (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	55	62	Not estimable	SMD 0.2 lower (0.56 lower to 0.17 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

GRADE tables for other (non-gambling) outcomes at endpoint and follow-up

Table 62: Comparison 1: Evidence profile for comparison between individual CBT and waitlist

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual (face-to-face)	Waitlist	Relative (95% CI)	Absolute		
Depression symptoms as measured by the Back Depression Inventory at endpoint - CBT individual (face-to-face) (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	10	15	Not estimable	SMD 0.78 lower (1.62 lower to 0.05 higher)	VERY LOW	CRITICAL
State anxiety as measured by State-Trait Anxiety Inventory at endpoint - CBT individual (face-to-face) (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	10	15	Not estimable	SMD 0.55 lower (1.37 lower to 0.26 higher)	VERY LOW	CRITICAL
Trait anxiety as measured by State-Trait Anxiety Inventory at endpoint - CBT individual (face-to-face) (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	10	15	Not estimable	SMD 0.69 lower (1.52 lower to 0.13 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference;
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 63: Comparison 2: Evidence profile for comparison between individual CBT and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT individual (face-to-face) versus TAU	TAU	Relative (95% CI)	Absolute		
Depression symptoms as measured by the Hamilton Rating Scale for Depression at endpoint - Brief CBT individual (face-to-face) (Better indicated by lower values)												
1 (Grant 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	33	35	Not estimable	SMD 0.68 lower (1.17 to 0.19 lower)	VERY LOW	CRITICAL
Anxiety symptoms as measured by Hospital Anxiety and Depression Scale at endpoint - Brief CBT individual (face-to-face) (Better indicated by lower values)												

1 (Grant 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	33	35	Not estimable	SMD 0.71 lower (1.21 to 0.22 lower)	VERY LOW	CRITICAL
Functional impairment as measured by Sheehan Disability Scale at endpoint - Brief CBT individual (face-to-face) (Better indicated by lower values)												
1 (Grant 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	33	35	Not estimable	SMD 0.95 lower (1.45 to 0.45 lower)	VERY LOW	CRITICAL
Quality of life as measured by Quality of Life Inventory at endpoint - Brief CBT individual (face-to-face) (Better indicated by lower values)												
1 (Grant 2009)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	33	35	Not estimable	SMD 0.57 higher (0.09 to 1.06 higher)	VERY LOW	IMPORTANT

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; TAU: treatment as usual
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 64: Comparison 3: Evidence profile for comparison between individual CBT and behavioural therapies

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT individual (face-to-face)**	**Behavioural therapy**	**Relative (95% CI)**	**Absolute**		
Psychological distress as measured by the Kessler 10 scale at endpoint - CBT individual (face-to-face) versus exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.12 lower (0.54 lower to 0.3 higher)	VERY LOW	CRITICAL
Psychological distress as measured by the Kessler 10 scale at 1-month follow-up - CBT individual (face-to-face) versus exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.12 lower (0.54 lower to 0.3 higher)	VERY LOW	CRITICAL
Psychological distress as measured by the Kessler 10 scale at 3-month follow-up - CBT individual (face-to-face) versus exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.11 lower (0.53 lower to 0.31 higher)	VERY LOW	CRITICAL
Psychological distress as measured by the Kessler 10 scale at 6-month follow-up - CBT individual (face-to-face) versus exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith	randomised	very	no serious	no serious	serious[2]	none	44	43	Not	SMD 0.08 lower (0.5	VERY	CRITICAL

2015)	trials	serious[2]	inconsistency	indirectness					estimable	lower to 0.34 higher)	LOW	
Functional impairment as measured by the Work and Social Adjustment Scale at endpoint - CBT individual (face-to-face) versus exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.13 lower (0.55 lower to 0.29 higher)	VERY LOW	IMPORTANT
Functional impairment as measured by the Work and Social Adjustment Scale at 1-month follow-up - CBT individual (face-to-face) versus exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	44	43	Not estimable	SMD 0.1 lower (0.52 lower to 0.32 higher)	VERY LOW	IMPORTANT
Functional impairment as measured by the Work and Social Adjustment Scale at 3-month follow-up - CBT individual (face-to-face) versus exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	44	43	Not estimable	SMD 0.05 lower (0.47 lower to 0.37 higher)	LOW	IMPORTANT
Functional impairment as measured by the Work and Social Adjustment Scale at 6-month follow-up - CBT individual (face-to-face) versus exposure therapy individual (face-to-face) (Better indicated by lower values)												
1 (Smith 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	44	43	Not estimable	SMD 0.04 lower (0.46 lower to 0.38 higher)	LOW	IMPORTANT

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 65: Comparison 4: Evidence profile for comparison between individual CBT and group CBT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT individual (face-to-face)**	**CBT group (face-to-face)**	**Relative (95% CI)**	**Absolute**		
Depression symptoms as measured by the Beck Depression Inventory at endpoint (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	10	15	Not estimable	SMD 0.4 lower (1.21 lower to 0.41 higher)	VERY LOW	CRITICAL
Depression symptoms as measured by the Beck Depression Inventory at 6-month follow-up (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	10	15	Not estimable	SMD 0.04 higher (0.76 lower to 0.84 higher)	VERY LOW	CRITICAL

State anxiety measured by the State-Trait Anxiety Inventory at endpoint (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	10	15	Not estimable	SMD 0.24 lower (1.04 lower to 0.57 higher)	VERY LOW	CRITICAL
State anxiety measured by the State-Trait Anxiety Inventory at 6-month follow-up (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	10	15	Not estimable	SMD 0.04 higher (0.76 lower to 0.84 higher)	VERY LOW	CRITICAL
Trait anxiety measured by the State-Trait Anxiety Inventory at endpoint (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	10	15	Not estimable	SMD 0.59 lower (1.41 lower to 0.23 higher)	VERY LOW	CRITICAL
Trait anxiety measured by the State-Trait Anxiety Inventory at 6-month follow-up (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	10	15	Not estimable	SMD 0.01 lower (0.81 lower to 0.79 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference;
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 66: Comparison 5: Evidence profile for comparison between group CBT and waitlist

Quality assessment							**No of patients**		**Effect**		**Quality**	**Importance**
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT group (face-to-face)**	**Waitlist**	**Relative (95% CI)**	**Absolute**		
Depression symptoms as measured by the Beck Depression Inventory at endpoint (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	15	15	Not estimable	SMD 0.43 lower (1.15 lower to 0.3 higher)	VERY LOW	CRITICAL
State anxiety as measured by the State-Trait Anxiety Inventory at endpoint (Better indicated by lower values)												
1 (Dowling 2007)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	15	15	Not estimable	SMD 0.4 lower (1.12 lower to 0.33 higher)	VERY LOW	CRITICAL
Trait anxiety as measured by the State-Trait Anxiety Inventory at endpoint (Better indicated by lower values)												
1 (Dowling	randomised	very	no serious	no serious	very	none	15	15	Not	SMD 0.2 lower (0.92 lower	VERY	CRITICAL

2007)	trials	serious[1]	inconsistency	indirectness	serious[3]				estimable	to 0.52 higher)	LOW		

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference;
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] 95% CI crosses 2 MID's

Table 67: Comparison 6: Evidence profile for comparison between group CBT + TAU and attention placebo

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**CBT group (face-to-face) + TAU**	**Attention placebo**	**Relative (95% CI)**	**Absolute**		
Depression symptoms as measured by the Depression, Anxiety and Stress Scales 21 item version at endpoint - CBT group + TAU versus social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.58 lower (1.01 to 0.14 lower)	VERY LOW	CRITICAL
Depression symptoms as measured by the Depression, Anxiety and Stress Scales 21 item version at 6-month follow-up - CBT group + TAU versus social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.82 lower (1.27 to 0.38 lower)	VERY LOW	CRITICAL
Anxiety symptoms as measured by the Depression, Anxiety and Stress Scales 21 item version at endpoint - CBT group + TAU versus social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	42	Not estimable	SMD 0.81 lower (1.26 to 0.37 lower)	VERY LOW	CRITICAL
Anxiety symptoms as measured by the Depression, Anxiety and Stress Scales 21 item version at 6-month follow-up - CBT group + TAU versus social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	42	42	Not estimable	SMD 1.04 lower (1.5 to 0.58 lower)	LOW	CRITICAL
Psychological distress measured by the Depression, Anxiety and Stress Scales 21 item version distress at endpoint - CBT group + TAU versus social activity group (Better indicated by lower values)												
1 (Zhuang	Non	very	no serious	no serious	serious[2]	none	42	42	Not	SMD 0.57 lower	VERY	CRITICAL

2018)	randomised trials	serious[1]	inconsistency	indirectness					estimable	(1.01 to 0.14 lower)	LOW	
Psychological distress as measured by the Depression, Anxiety and Stress Scales 21 item version at 6-month follow-up - CBT group + TAU versus social activity group (Better indicated by lower values)												
1 (Zhuang 2018)	Non randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	42	42	Not estimable	SMD 0.96 lower (1.42 to 0.51 lower)	LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; TAU: treatment as usual
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 68: Comparison 7: Evidence profile for comparison between self-help (with no or minimal support) and waitlist

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Self-help (with no or minimal support)**	**Waitlist**	**Relative (95% CI)**	**Absolute**		
Depression symptoms at endpoint (Better indicated by lower values)												
3[3]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	77	105	Not estimable	SMD 0.44 lower (0.77 to 0.12 lower)	VERY LOW	CRITICAL
Depression symptoms as measured by the Patient Health Questionnaire - 9 at endpoint - Computerised CBT (Better indicated by lower values)												
1 (Bucker 2021)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	31	34	Not estimable	SMD 0.16 lower (0.65 lower to 0.33 higher)	VERY LOW	CRITICAL
Depression symptoms as measured by the Patient Health Questionnaire - 9 at endpoint - Computerised CBT for depression (Better indicated by lower values)												
1 (Bucker 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	39	Not estimable	SMD 0.51 lower (1.03 lower to 0.02 higher)	VERY LOW	CRITICAL
Depression symptoms as measured by the Depression, Anxiety and Stress Scales 21 item version at endpoint - CBT workbook (Better indicated by lower values)												
1 (Oei 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	32	Not estimable	SMD 0.73 lower (1.28 to 0.17 lower)	VERY LOW	CRITICAL
Depression symptoms as measured by the Patient Health Questionnaire - 9 change score (at endpoint) - Computerised CBT for depression (Better indicated by lower values)												
1 (Bucker 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	39	Not estimable	SMD 0.34 lower (0.86 lower to 0.18 higher)	VERY LOW	CRITICAL

Anxiety symptoms at endpoint (Better indicated by lower values)												
2[4]	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	46	71	Not estimable	SMD 0.48 lower (0.86 to 0.1 lower)	VERY LOW	CRITICAL
Anxiety symptoms as measured by the General Anxiety Disorder Screener at endpoint - Computerised CBT for depression (Better indicated by lower values)												
1 (Bucker 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	39	Not estimable	SMD 0.34 lower (0.85 lower to 0.18 higher)	VERY LOW	CRITICAL
Anxiety symptoms as measured by the Depression, Anxiety and Stress Scales 21 item version at endpoint - CBT workbook (Better indicated by lower values)												
1 (Oei 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	32	Not estimable	SMD 0.64 lower (1.19 to 0.09 lower)	VERY LOW	CRITICAL
Anxiety symptoms as measured by the General Anxiety Disorder Screener change score (at endpoint) - Computerised CBT for depression (Better indicated by lower values)												
1 (Bucker 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	39	Not estimable	SMD 0.44 lower (0.96 lower to 0.08 higher)	VERY LOW	CRITICAL
Psychological distress as measured by the Depression, Anxiety and Stress Scales 21 item version at endpoint - CBT workbook (Better indicated by lower values)												
1 (Oei 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	32	Not estimable	SMD 0.8 lower (1.36 to 0.25 lower)	VERY LOW	CRITICAL
Psychological wellbeing as measured by the Satisfaction with Life Scale at endpoint - CBT workbook (Better indicated by lower values)												
1 (Oei 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	32	Not estimable	SMD 0.32 higher (0.22 lower to 0.86 higher)	VERY LOW	CRITICAL
Quality of life as measured by the World Health Organisation Quality of Life questionnaire at endpoint - CBT workbook (Better indicated by lower values)												
1 (Oei 2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	32	Not estimable	SMD 0.21 higher (0.32 lower to 0.75 higher)	VERY LOW	IMPORTANT

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID
[3] Bucker 2018; Bucker 2021; Oei 2018
[4] Bucker 2018; Oei 2018

Table 69: Comparison 8: Evidence profile for comparison between self-help (with no or minimal support) and attention placebo

Quality assessment	No of patients	Effect	Quality	Importance

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Self-help (with no or minimal support)	Attention placebo	Relative (95% CI)	Absolute		
Depression symptoms as measured bt the Patient Health Questionnaire - 9 at endpoint - Computerised attentional bias modification versus sham computerised attentional bias modification (Better indicated by lower values)												
1 (Wittekind 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	66	65	Not estimable	SMD 0.14 lower (0.49 lower to 0.2 higher)	LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2

Table 70: Comparison 9: Evidence profile for comparison between guided self-help and waitlist

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Guided self-help**	**Waitlist**	**Relative (95% CI)**	**Absolute**		
Depression symptoms as measured by the Hospital Anxiety and Depression Scale at endpoint - Computerised CBT with support (Better indicated by lower values)												
1 (Carlbring 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	32	Not estimable	SMD 0.68 lower (1.18 to 0.18 lower)	VERY LOW	CRITICAL
Anxiety symptoms as measured by the Hospital Anxiety and Depression Scale at endpoint - Computerised CBT with support (Better indicated by lower values)												
1 (Carlbring 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	32	Not estimable	SMD 0.52 lower (1.01 to 0.02 lower)	VERY LOW	CRITICAL
Psychological wellbeing as measured by the WHO-5 well-being index at endpoint - Combined: Computerised counselling with support/Psychoeducational materials with email support (Better indicated by lower values)												
1 (Jonas 2020)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	110	57	Not estimable	SMD 0.27 higher (0.05 lower to 0.6 higher)	VERY LOW	CRITICAL
Quality of life as measured by the Quality of Life Inventory at endpoint - Computerised CBT with support (Better indicated by higher values)												
1 (Carlbring 2008)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	32	Not estimable	SMD 0.72 higher (0.22 to 1.22 higher)	VERY LOW	IMPORTANT

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 71: Comparison 10: Evidence profile for comparison between guided self-help and self-help (with no or minimal support)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Guided self-help	Self-help (with no or minimal support)	Relative (95% CI)	Absolute		
Psychological distress as measured by the Kessler 10 scale at endpoint - Computerised CBT + support vs computerised CBT (Better indicated by lower values)												
1 (Dowling 2021)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	28	22	Not estimable	SMD 0.25 higher (0.31 lower to 0.81 higher)	VERY LOW	CRITICAL
Psychological distress as measured by the Kessler 10 scale at 1 month follow up - Computerised CBT + support vs computerised CBT (Better indicated by lower values)												
1 (Dowling 2021)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	29	26	Not estimable	SMD 0.21 lower (0.75 lower to 0.32 higher)	VERY LOW	CRITICAL
Psychological distress as measured by the Kessler 10 scale at 22 months follow up - Computerised CBT + support vs computerised CBT (Better indicated by lower values)												
1 (Dowling 2021)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	30	28	Not estimable	SMD 0.30 lower (0.82 lower to 0.21 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 72: Comparison 11: Evidence profile for comparison between group CBT and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	CBT group face to face	TAU	Relative (95% CI)	Absolute		
Depression as measured by the Depression, Anxiety and Stress Scales 21 item version at endpoint - CBT group + routine individual counselling vs Routine individual counselling (Better indicated by lower values)												
1 (Wong 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	15	16	Not estimable	SMD 0.17 lower (0.88 lower to 0.53 higher)	VERY LOW	CRITICAL
Anxiety as measured by the Depression, Anxiety and Stress Scales 21 item version at endpoint - CBT group + routine individual counselling vs Routine individual counselling (Better indicated by lower values)												
1 (Wong 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	15	16	Not estimable	SMD 0.57 lower (1.29 lower to 0.15 higher)	VERY LOW	CRITICAL
Psychological distress as measured by the Depression, Anxiety and Stress Scales 21 item version at endpoint - CBT group + routine individual counselling vs Routine individual												

counselling (Better indicated by lower values)												
1 (Wong 2015)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	15	16	Not estimable	SMD 0.20 higher (0.51 lower to 0.90 higher)	VERY LOW	CRITICAL

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; TAU: treatment as usual
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 2 MID's
[3] 95% CI crosses 1 MID

Table 73: Comparison 12: Evidence profile for comparison between motivational interviewing and guided self-help

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**Guided self-help**	**Relative (95% CI)**	**Absolute**		
Psychological distress as measured by the Kessler – 10 scale at endpoint - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook only (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	83	177	Not estimable	SMD 0.1 higher (0.16 lower to 0.37 higher)	LOW	CRITICAL
Psychological distress as measured by the Kessler – 10 scale at 3months follow up - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook only (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	73	160	Not estimable	SMD 0.02 lower (0.3 lower to 0.25 higher)	LOW	CRITICAL
Psychological distress as measured by the Kessler – 10 scale at 9months follow up - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook only (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	65	150	Not estimable	SMD 0.22 higher (0.07 lower to 0.51 higher)	VERY LOW	CRITICAL
Quality of Life as measured by the World Health Organisation Quality of Life questionnaire at endpoint - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook only (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	83	176	Not estimable	SMD 0.07 lower (0.33 lower to 0.19 higher)	LOW	IMPORTANT
Quality of Life as measured by the World Health Organisation Quality of Life questionnaire at 3 months follow up - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook only (Better indicated by higher values)												

1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	83	168	Not estimable	SMD 0.09 higher (0.18 lower to 0.35 higher)	LOW	IMPORTANT
Quality of Life as measured by the World Health Organisation Quality of Life questionnaire at 9 months follow up - Brief motivational interviewing vs Brief motivational interviewing and CBT workbook + CBT workbook only (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	65	149	Not estimable	SMD 0.18 lower (0.47 lower to 0.11 higher)	LOW	IMPORTANT

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 1 MID

Table 74: Comparison 13: Evidence profile for comparison between motivational interviewing and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Motivational interviewing**	**TAU**	**Relative (95% CI)**	**Absolute**		
Psychological distress as measured by the Kessler – 10 scale at endpoint - Brief motivational interviewing vs Information and referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	83	92	Not estimable	SMD 0.10 higher (0.20 lower to 0.39 higher)	LOW	CRITICAL
Psychological distress as measured by the Kessler – 10 scale at 3months follow up - Brief motivational interviewing vs Information and referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	73	87	Not estimable	SMD 0.09 lower (0.40 lower to 0.22 higher)	LOW	CRITICAL
Psychological distress as measured by the Kessler – 10 scale at 9 months follow up - Brief motivational interviewing vs Information and referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	65	78	Not estimable	SMD 0.11 higher (0.22 lower to 0.44 higher)	LOW	CRITICAL
Quality of Life as measured by the World Health Organisation Quality of Life questionnaire at endpoint - Brief motivational interviewing vs Information and referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	83	93	Not estimable	SMD 0.10 higher (0.19 lower to 0.40 higher)	LOW	IMPORTANT
Quality of Life as measured by the World Health Organisation Quality of Life questionnaire at 3 months follow up - Brief motivational interviewing vs Information and referral (Better indicated by lower values)												

1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	73	87	Not estimable	SMD 0.02 higher (0.29 lower to 0.33 higher)	LOW	IMPORTANT
Quality of Life as measured by the World Health Organisation Quality of Life questionnaire at 9 months follow-up - Brief motivational interviewing vs Information and referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	65	78	Not estimable	SMD 0.05 lower (0.38 lower to 0.28 higher)	LOW	IMPORTANT

CI: confidence interval;; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2
[2] 95% CI crosses 2 MID's

Table 75: Comparison 14: Evidence profile for comparison between guided self-help and TAU

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Guided self-help**	**TAU**	**Relative (95% CI)**	**Absolute**		
Psychological distress as measured by the Kessler – 10 scale at endpoint - Brief motivational interviewing and CBT workbook + CBT workbook only vs Information and referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	177	92	Not estimable	SMD 0.01 lower (0.26 lower to 0.24 higher)	LOW	CRITICAL
Psychological distress as measured by the Kessler – 10 scale at 3 months follow up - Brief motivational interviewing and CBT workbook + CBT workbook only vs Information and referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	160	87	Not estimable	SMD 0.06 lower (0.32 lower to 0.2 higher)	LOW	CRITICAL
Psychological distress as measured by the Kessler – 10 scale at 9 months follow up - Brief motivational interviewing and CBT workbook + CBT workbook only vs Information and referral (Better indicated by lower values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	150	78	Not estimable	SMD 0.09 lower (0.36 lower to 0.18 higher)	LOW	CRITICAL
Quality of Life as measured by the World Health Organisation Quality of Life questionnaire at endpoint - Brief motivational interviewing and CBT workbook + CBT workbook only vs Information and referral (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	176	93	Not estimable	SMD 0.18 higher (0.07 lower to 0.44 higher)	LOW	IMPORTANT
Quality of Life as measured by the World Health Organisation Quality of Life questionnaire at 3 months follow up - Brief motivational interviewing and CBT workbook + CBT workbook only vs Information and referral (Better indicated by higher values)												

1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	154	87	Not estimable	SMD 0.07 lower (0.33 lower to 0.19 higher)	LOW	IMPORTANT
Quality of Life as measured by the World Health Organisation Quality of Life questionnaire at 9 months follow up - Brief motivational interviewing and CBT workbook + CBT workbook only vs Information and referral (Better indicated by higher values)												
1 (Abbott 2012/2018)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	149	78	Not estimable	SMD 0.12 higher (0.15 lower to 0.39 higher)	LOW	IMPORTANT

CBT: cognitive behavioural therapy; CI: confidence interval; SMD: standardised mean difference; TAU: treatment as usual

[1] Very serious risk of bias in the evidence contributing to the outcomes as per RoB 2

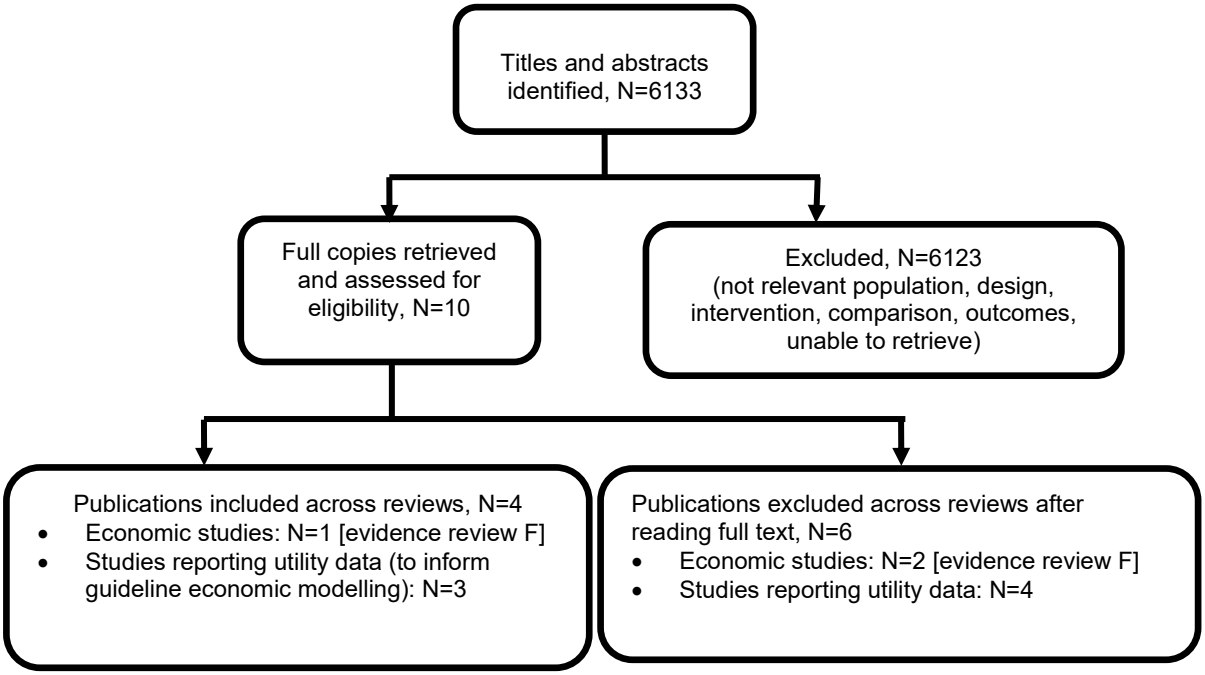
[2] 95% CI crosses 1 MID

Appendix G Economic evidence study selection

Study selection for: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Figure 6 shows the flow diagram of the selection process for economic evaluations of psychological and psychosocial interventions for people experiencing harmful gambling and any studies reporting related health state utility data.

Figure 6: Study selection flow chart



Appendix H Economic evidence tables

Economic evidence tables for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Table 76. Economic evidence table for psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)

Study ID Country Type of study	Interventions and comparators	Study population Study design Data sources	Costs and outcomes: description and values	Results: Cost-effectiveness	Comments
Bellringer et al. 2022 New Zealand Cost-consequence analysis	Face-to-face low intensity combined cognitive behaviour + cue exposure therapy (CBT) Face-to-face motivational interviewing combined with a self-help workbook and follow-up telephone booster sessions (MI+W+B)	Adults seeking help for problems with their own gambling (92.4% categorised as problem gamblers according to PGSI) RCT (n=227) Source of effectiveness and cost data: RCT Source of unit costs: national sources	Costs included: intervention (healthcare professional time including training, text messaging), GP visits, alcohol and drug treatment, other healthcare consultations, medications, hospital admissions and day care, including out-of-pocket expenses Total healthcare cost (95%CI): CBT: $1627 ($1445 to $1809) MI+W+B: $1645 ($1411 to $1879) Outcomes: Self-reported monthly average • number of days spent gambling (days gambled) • amount of money lost per day gambling (money lost) CBT vs MI+W+B: OR – days gambled (95%CI): 1.35 (0.34 to 5.39) OR – money lost (95%CI): 0.87 (0.31 to 2.40) [ORs adjusted for deprivation & employment]	Interventions had similar costs and benefits	• Perspective: health funder; social costs (money spent on gambling and financial debt) and loss of income reported separately • Currency: NZ$ • Cost year: likely 2021 • Time horizon: 12 months • Discounting: NA • Applicability: Partial • Quality: Potentially serious methodological limitations

Appendix I Economic model

Economic model for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Introduction – objective of economic modelling

The choice of treatment for adults who experience gambling-related harms was identified by the committee and the guideline health economist as an area with potentially major resource implications. The published economic evidence in this area is very limited, not directly applicable to the UK, and not covering the whole range of available treatments. On the other hand, there is adequate evidence on efficacy of treatments to inform primary economic modelling, obtained from a network meta-analysis (NMA) undertaken to inform this guideline. An economic model was therefore developed to assess the relative cost effectiveness of psychological and psychosocial treatments for adults who experience gambling-related harms in the UK.

Economic modelling methods

Population

The study population of the economic model comprised adults experiencing problem gambling, defined by a score of ≥8 on the Problem Gambling Severity Index (PGSI) or meeting ≥3 criteria in DSM-IV, who start psychological treatment for problem gambling in a specialist setting, although they may receive initial support and advice in a community setting or primary care. PGSI was selected as a measure of gambling behaviour and gambling symptom severity because of available data that link gambling symptom severity captured in PGSI scores with harmful gambling-related cost and utility data, which are essential in populating the economic model. It is nevertheless acknowledged that PGSI was originally designed as a population level tool and not as a clinical scale aiming to measure gambling symptom severity. At initiation of treatment, the study population was assumed to have a PGSI mean score of 18, based on available baseline PGSI score data (or score data on the Canadian Problem Gambling Index -CPGI-, which has the same scoring system) in the RCTs included in the NMA that informed the economic analysis, and 3 UK observational studies on treatment-seeking adults experiencing problem gambling: one study on 768 people seeking residential treatment for harmful gambling with the Gordon Moody Association between 2000 and 2015 (Sharman 2019); another study on 736 treatment-seeking individuals with gambling disorder who were assessed at the National Problem Gambling Clinic in London between 2011-2012 (Ronzitti 2016); and a final study reporting data on 1226 individuals seeking treatment again at the National Problem Gambling Clinic in London between 2011-2015 (Roberts et al., 2021). Table 77 shows the available baseline PGSI mean scores (and standard deviations). It can be seen that RCTs included in the NMA reported on average a lower baseline PGSI score (range 14.94 to 19.96) than the UK observational studies (range 19.69 to 22.50). In a deterministic sensitivity analysis, the PGSI score at initiation of treatment was varied between 8 and 27, to cover the full range of PGSI scores that adults with problem gambling (i.e. the study population) may have at presentation.

Based on inspection of the available data from the above described cohort studies and RCTs included in the guideline NMA, it was assumed that the study population's PGSI score at baseline had a normal distribution. The distribution was assumed to have 99% confidence intervals (95%CI) 10 to 26, so as to capture the whole range of PGSI scores reflecting problem gambling (minimum score 8 to maximum score 27).

Table 77. Baseline PGSI scores in RCTs of treatments for adults experiencing problem gambling that were included in the guideline NMA and UK studies of treatment-seeking adults who experience problem gambling

Source	Study	N	PGSI score at baseline: mean (standard deviation)
Guideline NMA	Abbot 2012/18	437	17.55 (5.13)
	Bouchard 2017	25	19.96 (3.35)
	Cunningham 2009	45	14.94 (5.30)
	Jonas 2020	167	16.26 (4.81)
	Korman 2008	42	15.26 (4.61)
	Oei 2018	23	16.04 (6.95)
	So 2020	197	16.80 (4.75)
UK studies on treatment-seeking adults experiencing problem gambling	Roberts 2021	415	21.51 (5.19)
	Ronzitti 2016	678	19.69 (5.07)
	Sharman 2019	155	22.50 (3.90)

The starting age of the cohorts considered in the economic model was set at 36 years, to reflect the mean age of treatment-seeking people experiencing gambling-related harms in three UK studies (Sharman 2019; Ronzitti 2016; Roberts 2021) and very close to the median age (35 years) of 7,072 clients treated by gambling services in Great Britain in 2021-2022 (GambleAware, 2022). This figure (36 years) is also very close to the mean age at first diagnosis of gambling disorder (36.5 years) in a cohort of 2,099 participants in a nationwide register study, who attended the Swedish inpatient and/or outpatient specialist health care system between 2005–2016 (Karlsson & Håkansson 2018). In sensitivity analysis, the cohorts' starting age was varied between 20 and 48 years, which is the age range for which there was evidence of a significant increase in mortality associated with gambling disorder.

The percentage of women in each cohort at the start of the model was estimated to be 7.50%, based on the proportion of women in the sample assessed in Roberts 2021, the largest study among the three UK studies on treatment-seeking adults experiencing problem gambling. This figure is very close to the 7.77% reported in Ronzitti 2016. In Sharman 2019 the study sample comprised males only due to the residential nature of treatment. This figure is overall consistent with data reported by Public Health England (2021) and the adult psychiatric morbidity household survey conducted in England that reported data on adults experiencing problem gambling (McManus 2009). Both reports suggested that the percentage of women experiencing gambling-related harms (who may subsequently seek treatment for their condition), is much smaller compared with men (below 10%). This figure was increased to 22.58% in sensitivity analysis, to reflect the proportion of women in people with gambling disorder attending specialist health care in the Swedish study by Karlsson & Håkansson (2018).

Determining the starting age and gender mix of the cohorts was necessary in order to estimate mortality risks in the model.

Interventions assessed

The range of interventions assessed in the economic analysis was determined by the availability of relevant clinical data included in the guideline systematic review of interventions for the treatment of adults who experience gambling-related harms. Network meta-analysis (NMA) was employed for synthesis of the available efficacy data (see appendix L). The economic analysis conducted for this guideline assessed psychological treatments that were considered in the NMA of change in gambling symptom severity. This was decided because there is evidence that gambling symptom severity has an impact on

the magnitude of harmful gambling-related costs and utility values. In contrast, no evidence linking the frequency of harmful gambling with harmful gambling-related costs and utility values is available. For this reason, data on the NMA on gambling frequency were not considered in the economic model.

The economic analysis considered only treatment classes that showed higher mean effect on gambling symptom severity compared with no treatment (which was used as the reference treatment). Couple interventions and the twelve-step group programme were not considered in the economic analysis as they had been tested on only 8 and 11 RCT participants in the NMA, and this evidence was deemed inadequate to support a practice recommendation. One intervention was selected as an exemplar from each treatment class, in order to estimate intervention costs. The selection was based on the size (volume) of the evidence base for each intervention within a class. Based on these criteria, the following interventions for adults experiencing harmful gambling were considered in the economic analysis:

- Individual cognitive behavioural therapy (CBT)
- Individual behavioural therapy
- Individual counselling
- Group CBT
- Motivational interviewing
- Guided self-help
- No treatment, which served as the reference treatment, and currently represents standard care for the majority of adults experiencing gambling-related harms in England.

Model structure

A hybrid decision-analytic model consisting of a decision-tree followed by a three-state Markov model was constructed using Microsoft Office Excel 2016. The model estimated the total costs and benefits associated with provision of effective treatment options in adults experiencing problem gambling. The structure of the model, which aimed to simulate the course of harmful gambling and relevant clinical practice in the UK, was driven by the availability of clinical data.

According to the model structure, hypothetical cohorts of adults experiencing problem gambling were initiated on each of the treatment options assessed, including no treatment. The duration of a full course of psychological treatment varied between 4 and 12 weeks. The timepoint of effect measurement in the studies included in the NMA that informed the economic analysis ranged from 4 to 26 weeks, with an average of 10 weeks. For modelling purposes relating to the measurement of the endpoint effect and the estimation of QALYs, the duration of a full course of treatment was assumed to be 3 months (12 weeks), without this assumption affecting related resource use and total estimated intervention cost for each intervention. Some people in the cohort might discontinue treatment early and not complete treatment, but since the model utilised intention-to-treat efficacy data from the base-case NMA (either extracted from the included studies, where available, or imputed using BOCF), it captured the treatment effects on all people initiating treatment, both those who completed treatment and those who discontinued treatment early. Following a course of treatment, people in each cohort either died or, based on their PGSI score at treatment endpoint, moved to one of the following: they continued experiencing problem gambling (PGSI score ≥ 8), or they did not meet criteria for problem gambling but were at moderate risk of problem gambling (PGSI score 3-7) or were at low risk of problem gambling (PGSI score 1-2) or were at no risk of problem gambling (PGSI score 0). After that point, people were entered into the Markov component of the economic model, in either the ‘problem gambling’ or the ‘no problem gambling’ health states, depending on their state at the end of the decision-tree. In each cycle of the Markov model, they could remain in the same health state or move between the two states of ‘problem gambling’ and ‘no problem gambling’ or move to the

death state (absorbing state). Within the 'no problem gambling' state in the Markov model, it was assumed that a percentage of people were at low or moderate risk for problem gambling (defined by a score of 1-2 or 3-7 on the PGSI, respectively) or at no risk for problem gambling (defined by a score of 0 on the PGSI). This assumption was necessary in order to attach appropriate costs and QALYs associated with low/moderate risk and no risk of problem gambling in the 'no problem gambling' health states.

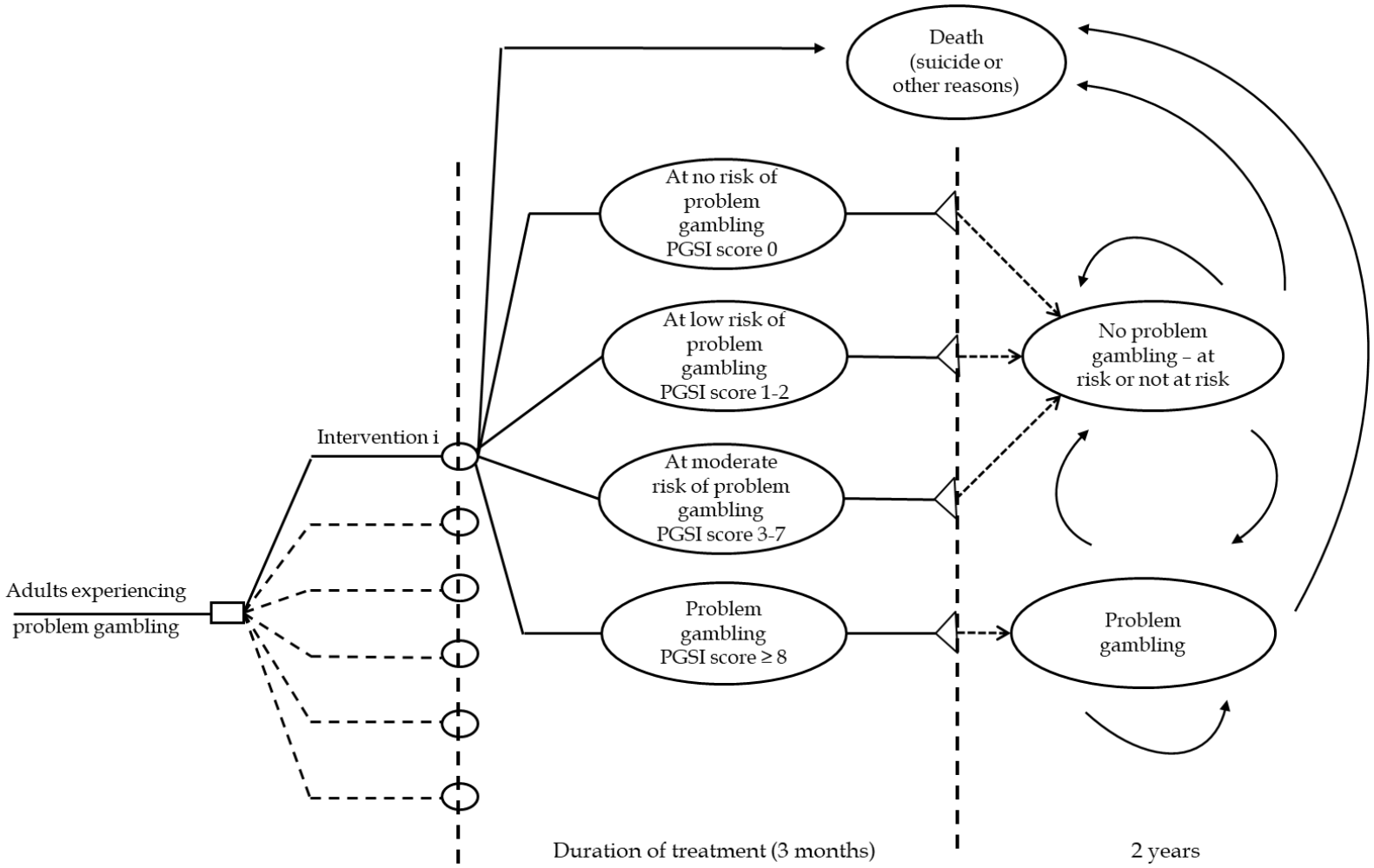
The Markov component of the model was run in yearly cycles over 2 years. A half-cycle correction was applied. Due to lack of long-term comparative clinical data, transitions between the 'problem gambling' and 'no problem gambling' health states in the Markov component of the model were assumed to be independent of the intervention received at the decision-tree part of the model. The transition probability to the death state depended on the status of each person in the population regarding problem gambling (i.e. being above or below the cut-off threshold of a PGSI sore of 8).

The time horizon of the analysis was 2 years and 3 months, consisting of the 3 months of the decision tree and another 2 years in the Markov component of the economic model. This time frame was considered to be adequate to capture longer-term costs and effects of treatment, without significant extrapolation over the course of problem gambling.

In a scenario analysis, for people who died because of suicide, we estimated their lifetime QALY loss beyond the time horizon of the model. This was achieved by a two-state Markov model, with a one-year cycle, that considered the states of 'alive' and 'dead' over the persons' hypothetical lifetime, had they not die because of suicide, assuming that, if they did not die, they would be experiencing the mortality risk and health-related quality of life (HRQoL) of the general population. This lifetime QALY loss was estimated only for people who died because of suicide, and not due to other reasons, to capture losses specifically associated with suicide. Moreover, people dying due to reasons other than suicide are likely to have other underlying conditions and therefore, had they not died, they would have been expected to experience different mortality risks and HRQoL than those of the general population.

The structure of the economic model for interventions for adults experiencing problem gambling is shown in Figure 7.

Figure 7. Schematic diagram of the economic model structure: interventions for people who experience problem gambling



Perspectives, costs and outcomes considered in the analysis

The economic analysis adopted the perspective of the NHS and personal social services (PSS), as recommended by NICE (NICE, 2014). In addition, a public sector perspective was considered, as the majority of costs associated with problem gambling are borne to services beyond NHS and PSS, within the wider public sector. NHS and PSS costs consisted of intervention costs (healthcare professional time and equipment/infrastructure required for self-help interventions), costs associated with suicide events (including costs to family and/or friends), other costs incurred following management of gambling-related harms and other co-morbidities (such as GP and hospitalisation costs), and costs associated with management of specific comorbidities such as depression, alcohol dependence and illicit drug use. Other public sector costs comprised coroner costs following a suicide; criminal justice system costs relating to imprisonment of offenders among the study population and/or police call-out costs; and other government costs that included statutory homelessness costs and welfare/unemployment benefits associated with gambling-related harms. All costs were expressed in 2022 prices, uplifted, where necessary, using the NHS cost inflation index for NHS costs (Jones 2023) and the consumer price inflation index for non-NHS costs (Office for National Statistics 2022a).

The measure of outcome was the Quality Adjusted Life Year (QALY), which incorporated utilities associated with the health states of problem gambling and no problem gambling and a utility decrement reflecting a lower quality of life in the lead up to a completed suicide event. In sensitivity analysis, lifetime QALY losses associated with years lost due to suicide were also considered.

Efficacy data and allocation of people in each cohort to problem gambling-related health states

Relative efficacy data

Relative effects on efficacy of every treatment class versus no treatment (which served as the reference) were obtained from the guideline NMA on the gambling symptom severity outcome, which synthesised data from different gambling scales as well as data on the number of diagnostic criteria met on DSM. The NMA output was the standardised mean difference (SMD) regarding the gambling symptom severity change from baseline (CFB). Details on the methods and results of the NMA, which was conducted in WinBUGS 1.4.3 (Lunn 2000; Spiegelhalter 2003) is provided in appendix L. For the economic analysis, outputs of the first 100,000 iterations undertaken in WinBUGS were discarded and another 300,000 iterations were run, thinned by 30, so as to obtain 10,000 iterations that populated the economic model.

The relative effects obtained from the base-case NMA (which included the full set of studies) that were used to populate the economic model are provided in Table 78.

Table 78. Results of the NMA: SMD of gambling symptom change from baseline in adults experiencing problem gambling

Treatment	N randomised	Mean SMD (95% CrI) vs no treatment
Individual CBT	592	-0.54 (-1.12 to 0.04)
Individual behavioural therapy	136	-0.58 (-1.50 to 0.33)
Individual counselling	76	-0.43 (-1.66 to 0.80)
Group CBT	121	-1.08 (-1.83 to -0.34)
Motivational interviewing	303	-0.29 (-0.90 to 0.33)
Guided self-help	644	-0.11 (-0.76 to 0.55)

Absolute effect (PGSI score) of reference (no treatment) at treatment endpoint

The absolute effect of no treatment in terms of the final PGSI score at treatment (study) endpoint was estimated using data from a Canadian study that examined the trajectory of gambling symptom severity over a 18-month period, among a sample of non-treatment seeking/attending problem gamblers recruited from the community (N=204) interested in quitting or reducing gambling (Kushnir 2018). The study sample had a mean age of 42 years and 60% were males. The study sample and setting were judged by the committee to be relevant to the UK context; data from this study were thus used to inform the guideline economic analysis, due to lack of relevant UK data. The study employed mixed effects regression models to assess the change in gambling severity (measured using the PGSI), frequency and amount gambled over the course of a 12-month period in the absence of formal treatment, and revealed a reduction in the PGSI score overtime. The mixed effects model variables used to estimate the PGSI score of no treatment at 3 months (treatment endpoint) are shown in Table 79. So, for a baseline PGSI score of 18, the PGSI score at 3 months can be estimated as: -0.43 + 2.32 + (1.00 x 18) + (-0.49 x 18) = 11.07.

Table 79. Mixed-effects regression model results for PGSI score change at 3 months (Kushnir 2018)

Effect	Estimate	P value
Intercept	-0.43	0.614
Time: 3 months (reference: baseline)	2.32	0.060
Baseline PGSI	1.00	<0.0001
Baseline PGSI x 3 months (reference: baseline)	-0.49	<0.0001

Absolute effects (PGSI scores) of active treatments at treatment endpoint

The PGSI score of each active treatment at treatment endpoint was estimated in 2 steps:

1. The mean difference (MD) in PGSI score of each active treatment versus no treatment at treatment endpoint (at 3 months) was estimated by multiplying the SMD of gambling symptom severity CFB of each treatment versus no treatment, as estimated in the NMA, by the standard deviation (SD) of the PGSI score, estimated using available data in Table 77, which reports SD values of PGSI scores at presentation/start of treatment. An average value of SD=4.91 was used, which was assumed to be unchanged over time and treatment due to lack of good quality time- and treatment-specific data. In deterministic sensitivity analysis, SD was varied from 3.35 to 6.95, which are the minimum and maximum values of SD obtained from the data in Table 77.
2. The MD estimated for each active treatment was added onto the PGSI score of no treatment at treatment endpoint, so that, at treatment endpoint:

$$PGSI_A = PGSI_{NT} + SMD_{AvsNT} \times SD$$

where $PGSI_A$ the mean PGSI score of people receiving treatment A at treatment endpoint, $PGSI_{NT}$ the mean PGSI score of people receiving no treatment at treatment (study) endpoint, SMD_{AvsNT} the SMD of treatment A versus no treatment obtained from the NMA, and SD the standard deviation (spread) of the PGSI scores.

Allocating people in each cohort to problem gambling-related health states at treatment endpoint

To estimate the proportion of people post-treatment experiencing problem gambling (PGSI≥8), at moderate risk of problem gambling (PGSI=3-7), at low risk of problem gambling (PGSI=1-2) and at no risk of problem gambling (PGSI=0), we assumed a normal distribution of PGSI scores around the mean PGSI value estimated for each treatment, with a SD = 4.91, common for all treatments (and including no treatment). In different scenarios explored in

sensitivity analysis, we assumed a gamma distribution or a log-normal distribution around the post-treatment PGSI scores, to capture the potential positive skewness of these scores. Moreover, the SD value (spread) may have a strong impact on people's allocation to different health states, as a small SD means that people are distributed closer to the mean of the distribution and a large SD allows a distribution further away from the mean value. For this reason a sensitivity analysis was undertaken, where the SD was varied from 3.35 to 6.95, which are the minimum and maximum values of SD obtained from the data in Table 77.

It is acknowledged that, depending on the mean PGSI score of each treatment at treatment endpoint, under the base-case analysis which assumed a normal distribution of PGSI scores, some people may be allocated to a negative PGSI score (<0), which is not plausible. These people were allocated to a score of 0 on the PGSI (reflecting floor effects) and therefore to be at no risk of problem gambling.

Annual transition probabilities between remission and relapse health states

The transition probabilities between the two health states of remission (no problem gambling) and relapse (problem gambling), which were assumed to be the same across treatments due to lack of long-term differential effectiveness data, were obtained from a longitudinal 2-year French study that aimed to assess changes in problem gambling behaviour, which recruited participants from an outpatient addiction treatment centre, gambling establishments and through the press (Bruneau 2016). The study included 571 participants. Participants were evaluated for their status regarding problem gambling using DSM-IV at baseline, end of year 1 and end of year 2. Problem gambling was defined as meeting ≥3 criteria on DSM-IV. At baseline, the study included non-problem gamblers (n=251), problem gamblers without treatment (n=156), and problem gamblers seeking treatment (n=164). For every year, the study reported transitions between 'problem gambling' and 'no problem gambling' status, as well as number of participants in each state who dropped out of the study. Transitions in year 1 and transitions in year 2 were combined to estimate the annual transition probabilities between the health states, due to the limited data available for each year. People in the 'problem gambling' state who dropped out of the study were conservatively assumed not to remit. People in the 'no problem gambling' state who dropped out of the study were conservatively assumed to relapse. Based on the reported transition data and the above assumptions about the transitions of people dropping-out of the study, the annual probabilities of 'problem gambling to no-problem gambling' (remission) and of 'no problem gambling to problem gambling' (relapse) were estimated to be 0.25 and 0.42, respectively.

In sensitivity analysis, these figures were ranged by ±20% to explore their impact on the results of the economic analysis.

Detailed transition probabilities between the states of problem gambling, at risk of problem gambling, and at no risk of problem gambling have also been reported in a large-scale longitudinal Australian general population study on gambling and health, conducted between 2008 and 2012, which followed 7,148 participants from a prevalence survey over 3 years. (Victorian Responsible Gambling Foundation, 2014). This study was considered as a potential source of information for the Markov component of the economic model, however, it was deemed not to be appropriate for the following reasons: (1) at initiation of the longitudinal study, only 42 people had problem gambling, so the sample size of the population of interest in this study was very small; (2) people at low or moderate risk of problem gambling and those at no risk of problem gambling in the study may have never experienced problem gambling, and therefore their transition probabilities are not relevant to the economic model's study population (3) the treatment status of study participants was unknown; and (4) although the study followed people over 3 years, transitions were reported in relation to people's initial status (year 0), and therefore it was not possible to follow transitions between health states in years 1-2 and years 2-3. For these reasons, this study was not possible to use as a source of transition probability data in the economic analysis.

Allocation of people within the remission health state in the Markov model

Allocation (proportions) of people to the states of no risk / low risk / moderate risk of problem gambling within the remission health state in the Markov model was assumed to be equal to that estimated for no treatment at treatment endpoint (at the end of the decision-tree component of the model), due to lack of other relevant data.

Mortality

Problem gambling is associated with an increased risk of mortality relative to the general population. Karlsson and Håkansson 2018 compared mortality due to suicide and due to all causes between a cohort of 2,099 participants in a nationwide register study who had gambling disorder and attended the Swedish inpatient and/or outpatient specialist health care system in 2005–2016 and the general Swedish population in 2016. The authors reported significantly higher mortality due to any cause and due to suicide in men and women with gambling disorder aged 20-49 years, compared with the general population.

The standardised mortality ratios for gambling disorder, relative to adults in the general population, were applied onto annual age- and sex-specific mortality data due to any cause and due to suicide for the general population in England for 2019, (that is, pre-pandemic) (obtained from Office for National Statistics, 2021 & 2022b), to estimate the respective absolute annual mortality risks in people experiencing problem gambling within the decision-tree and also within each cycle of the Markov model. These increased risks were applied only over the time period they were experiencing problem gambling. People not experiencing problem gambling (i.e. people at risk of problem gambling and people not at risk of problem gambling) during the decision-tree or in any Markov cycle were assumed to carry the mortality risks (due to any cause and suicide) of the general UK population.

Mortality due to suicide was estimated as part of the mortality due to any reason, in order to attach additional costs to deaths (and lifetime QALY losses beyond the time horizon of the analysis) due to suicide, as well as utility losses prior to suicide. For simplicity, the mortality risks applied in the 3 months of the decision-tree were the same to those applied in the first year of the Markov model (so, for a cohort of people aged 36 years at the start of the model, the mortality risks associated with 36 years were applied over the 3 months of the decision-tree and the 1st year of the Markov model, whereas the mortality risks associated with 37 years were applied over the 2nd year of the Markov model).

It needs to be noted that Karlsson and Håkansson 2018 reported increased mortality risks in men and women with gambling disorder (pathological gambling) versus the general population, whereas the economic analysis modelled costs and outcomes in people with problem gambling and those at risk of (but not meeting criteria for) problem gambling, due to availability of relevant data. Gambling disorder is defined by a score of ≥5 on DSM-IV or meeting ≥4 criteria on DSM-V, whereas problem gambling is defined by a score of ≥8 on PGSI or meeting ≥3 criteria in DSM-IV. By applying the mortality data on gambling disorder from Karlsson and Håkansson 2018 onto people with problem gambling in the model, mortality in people with problem gambling may have been overestimated. However, this was necessary as no alternative mortality data specific to people experiencing problem gambling were available. This is acknowledged as a limitation of the analysis.

Utility data and estimation of quality adjusted life years (QALYs)

In order to express outcomes in the form of QALYs, the health states of the economic model (problem gambling, no problem gambling) need to be linked to appropriate utility scores. Utility scores represent the health-related quality of life (HRQoL) associated with specific health states on a scale from 0 (death) to 1 (perfect health); they are estimated using preference-based measures that capture people's preferences on the HRQoL experienced in the health states under consideration.

The systematic review of utility data on harmful gambling-related heath states identified 3 studies reporting utility data that met inclusion criteria (Browne 2022; Kohler 2014; Moayeri 2020). There were 4 studies that were excluded after obtaining full text, and these are reported in appendix J, together with reasons for exclusion.

Browne 2022 reported utility scores derived from a sample of 2,603 adult Australian residents (57.4% males, mean age 47.5 years) participating in an online survey in 2021-2022, who had gambled in the past 12 months. Gambling included participating in at least one of the follow activities: race betting, electronic gaming machines (pokies), casino table games, sports betting, informal private betting for money, Keno, bingo, esports betting, and fantasy sports betting. Participants were screened on the Short Gambling Harms Screen (SGHS) and the Problem Gambling Severity Index (PGSI) and also completed the SF-12 which was converted to SF-6D scores (Brazier & Roberts 2004); however, it was unclear if the UK tariff was used. Utility data relating to gambling health states determined by the PGSI were useful for the guideline economic analysis, as PGSI has been widely used to determine severity in people experiencing gambling-related harms and has also been used by the Office for Health Improvement and Disparities (OHID) when estimating costs associated with gambling-related harms. The authors reported utility data for the whole sample of people who had gambled in the past 12 months (n = 2603), as well as utility decrements for people at low risk of problem gambling (PGSI score 1-2, n = 399), people at moderate risk of problem gambling (PGSI score 3-7, n = 438), and people experiencing problem gambling (PGSI score 8+, n = 435), adjusted for comorbidity.

Kohler 2014 reported mean SF-6D utility scores derived from 52 adults experiencing pathological gambling recruited from treatment centres in Western Switzerland and 93 controls representative of the Swiss population in terms of age, gender and educational level. Pathological gambling had already been identified as a problem by the treatment centres but the Lie/Bet questionnaire was used to validate the treatment centre's diagnosis. Participants completed the SF-12 which was subsequently converted to a SF-6D utility score (UK tariff). The study reported a utility score for the state of pathological gambling and a utility score for the sample of the general Swiss population.

Moayeri 2020 reported utility data from 15,144 respondents to the annual national Household Income and Labour Dynamics in Australia (HILDA) survey who provided data on the Problem Gambling Severity Index (PGSI). Participants also completed the SF-36 which was converted to a SF-6D utility score based on the UK algorithm (Brazier 2002). The study reported utility data as well as utility decrements for people at no risk of problem gambling (PGSI score 0, n=14,014), people at low risk of problem gambling (PGSI score 1-2, n = 602), people at moderate risk of problem gambling (PGSI score 3-7, n = 371), and for people experiencing problem gambling (PGSI score 8+, n = 157), adjusted for socio-demographic factors.

An overview of the study characteristics, the methods used to define health states, and the health-state utility values reported by each of the 3 included studies is provided in Table 80.

Table 80: Summary of available health-state utility data for harmful gambling

Study	Definition of health states	Utility measure, valuation method, population valuing	Health states & corresponding utility scores or utility decrements	
Browne 2022	A sample of 2,603 adult Australian residents (57.4% males, mean age 47.5 years) participating in an online survey in 2021-2022, who had gambled in the past 12 months. Gambling included participating in at least one of the follow activities: race betting, electronic gaming machines (pokies), casino table games, sports betting, informal private betting for money, Keno, bingo, esports betting, and fantasy sports betting. Participants were screened on the Short Gambling Harms Screen (SGHS) and the Problem Gambling Severity Index (PGSI) and also completed the SF-12 which was converted to SF-6D score. Findings relating to gambling severity measured by the PGSI score are reported here.	SF-6D (derived from SF-12), SG, adult general population (country unclear)	**Health state – based on PGSI score (comorbidity controlled)** Whole sample (n = 2603) No problem, score 0 (n = 1331) Low risk, score 1-2 (n = 399) Moderate risk, score 3-7 (n = 438) Problem gambling, score 8+ (n = 435)	**Mean (SE)** **0.769** **0.795*** **- 0.005 (0.006)** **- 0.050 (0.006)** **- 0.099 (0.007)** ***estimated**
Kohler 2014	52 adults experiencing pathological gambling recruited from treatment centres in Western Switzerland and 93 controls representative of the Swiss population in terms of age, gender and educational level. Pathological gambling had already been identified as a problem by the centres; the Lie/Bet questionnaire was used to validate the treatment centre's diagnosis. Participants completed the SF-12 which was converted to SF-6D utility score.	SF-6D (derived from SF-12), SG, UK adult general population	**Health state** Pathologial gambling (n = 52) No pathological gambling (n = 93)	**Mean (SD)** **0.623 (0.089)** **0.742 (0.113)**
Moayeri 2020	15,144 respondents to the annual national Household Income and Labour Dynamics in Australia (HILDA) survey who provided data for the Problem Gambling Severity Index (PGSI) screening questionnaire. Participants also completed the SF-36 which was converted to a SF-6D score.	SF-6D (derived from SF-36), SG, UK adult general population	**Health state – based on PGSI score (socio-demographics controlled for utility decrements)** No problem, score 0 (n = 14014) Low risk, score 1-2 (n = 602) Moderate risk, score 3-7 (n = 371) Problem gambling, score 8+ (n = 157)	**Mean (SE)** **0.759 (0.002)** **-0.016 (0.007)** **-0.037 (0.009)** **-0.102 (0.015)**

PGSI: Problem Gambling Severity Index; SD: standard deviation; SE: standard error; SG: standard gamble

According to NICE guidance on the selection of utility values for use in cost-utility analysis (NICE 2022a), the measurement of changes in HRQoL should be reported directly from people with the condition examined, or, if this is not possible, by their carers, and the valuation of health states should be based on public preferences elicited using a choice-based method (such as the time trade-off or standard gamble), in a representative sample of the UK population. NICE recommends the EQ-5D (Brooks 1996; Dolan 1997) as the preferred measure of HRQoL in adults for use in cost-utility analysis.

None of the available data were based on EQ-5D ratings. Instead, all were based on SF-6D utility values (derived either from SF-36 or SF-12 ratings). Kohler 2014 reported only data for people experiencing pathological gambling and those not experiencing pathological gambling; these data were not considered further as they did not capture the health states considered in the guideline economic model. In contrast, the data from both Browne 2022 and Moayeri 2020 reported utility data (including utility decrements) for people at no risk of problem gambling, at low risk of problem gambling, at moderate risk of problem gambling and experiencing problem gambling, as determined by PSGI scores. Both were directly relevant to the health states considered in the guideline economic analysis. The reported utility decrements were similar between the two studies. Browne 2022 did not report clearly whether the UK SF-6D values were used. In contrast, Moayeri 2 020reported UK SF-6D values which were directly relevant to the UK population. Therefore, the latter study was selected to inform the guideline economic analysis.

Changes in utility when transitioning between health states were assumed to occur linearly over the time period of the change. When running the probabilistic analysis, utility values of more severe levels of gambling were not allowed to become higher than those of less severe levels. In iterations where the utility of a health state was estimated to be higher than the utility of the immediately previous (less severe) health state, the former was forced to equal the latter.

A short-term utility loss prior to suicide was estimated in line with the economic analysis undertaken to inform the NICE guideline on preventing suicide in community and custodial settings (NICE 2018). According to the economic report of that guideline (Eniss & Pollit 2018), a utility loss of 0.15 was assumed to occur over 10 weeks before suicide occurred, based on expert opinion, resulting in a one-off QALY loss of 0.03, associated with suicide.

In addition, to estimate the lifetime QALY loss of people who died due to suicide, which was explored in a scenario analysis, age-and gender-specific EQ-5D-derived utility values for the UK population were used (Kind 1999). These are shown in Table 81.

Table 81. Utility values of the general UK population - EQ-5D ratings (Kind 1999)

Age	Utility mean (SE)	
	Men	Women
Under 25	0.94 (0.01)	0.94 (0.01)
25 to 34	0.93 (0.01)	0.93 (0.01)
35 to 44	0.91 (0.01)	0.91 (0.01)
45 to 54	0.84 (0.02)	0.85 (0.01)
55 to 64	0.78 (0.02)	0.81 (0.02)
65 to 74	0.78 (0.02)	0.78 (0.02)
75+	0.75 (0.03)	0.71 (0.02)

Intervention resource use and costs

Intervention costs were estimated by combining resource use associated with each intervention with appropriate unit costs. Interventions were costed from the NHS perspective

(assuming they are provided or commissioned by NHS) but it is possible that they are provided by 3rd sector (voluntary organisations and charities).

Resource use estimates of each psychological therapy in terms of intended and mean (actually attended) number and duration of sessions, mode of delivery and number of therapists and participants in the case of group CBT were determined by resource use data described in respective RCTs included in the guideline NMA that informed the economic analysis, modified by the committee to represent optimal clinical practice in the UK. For costing purposes, for group CBT, the mean number of sessions attended was assumed to be equal to the intended number of sessions, as participants missing group sessions are not replaced and therefore they incur the full intervention cost, whether they attend all sessions or part of them.

Therapist unit costs were estimated using a combination of data derived from national sources and included wages/salary, salary on-costs, capital and other overheads, qualification costs, and the cost of monthly supervision. In estimating the unit cost of each type of therapist per hour of client contact, the ratio of direct (face-to-face) to indirect time (reflecting time for preparation of therapeutic sessions and other administrative tasks) of the therapist was also taken into account. This ratio of direct to indirect time was based on a previously published estimate used to inform the NICE guideline on Depression in adults (NICE 2022b).

High intensity psychological interventions were assumed to be delivered by agenda for change (AfC) band 7 therapists, who, for costing purposes and according to routine practice in gambling treatment services, were assumed to be clinical psychologists. Group CBT was assumed to be delivered by two AfC band 7 clinical psychologists. Lower intensity psychological interventions (guided self-help and motivational interviewing) were assumed to be delivered by AfC band 6 therapists, who, for costing purposes and according to routine practice in gambling treatment services, were assumed to be mental health nurses. These assumptions were based on the committee's expert advice regarding the optimal delivery of psychological interventions in routine gambling treatment services, although it is acknowledged that there may be variation in the types of therapists delivering psychological interventions across gambling treatment service settings in England.

Unit cost elements associated with wages/salary, salary on-costs, capital and other overheads were obtained, for each salary band level, from national data on community-based scientific and professional staff (Jones 2023).

The qualification cost of a mental health nurse was obtained from Jones 2023. The qualification cost of a clinical psychologist was taken from NHS England and Health Education England (2016), uplifted to 2022 prices using the NHS cost inflation index (Jones 2023) and annuitised using the formula reported in Netten 1998, assuming a useful working life of 23 years, a time from obtaining the qualification until retirement of 42 years, and an equal distribution of the useful working life over the period until retirement, due to lack of specific information on this distribution.

Other ongoing training costs of healthcare professionals delivering psychological interventions were not considered, due to lack of relevant data.

According to the British Association for Behavioural and Cognitive Therapies (2022), full-time therapists should receive regular individual supervision with a mean duration of 1.5 hour per month, or group supervision with a longer mean duration in groups of no more than 6 participants. Based on this information and extrapolating to all psychological treatments, supplemented with the committee's expert advice, the supervision cost estimated for band 7 clinical psychologists comprised 1.5 hour of individual supervision per month, delivered by a band 8a clinical psychologist. Band 6 mental health nurses were assumed to receive 2 hours of individual supervision per month plus 2 hours of group supervision in groups of 4 by a band 7 clinical psychologist. The supervision cost included the cost of the supervisor's time,

but not the cost of the supervised therapist's time, as this is already included in the unit cost of each therapist (and considered in the direct to indirect time ratio).

The unit costs of AfC band 7 and band 6 therapists were estimated to be £134 and £107 per hour of direct contact with the client, respectively. An overview of the cost elements that were taken into account in the estimation of therapist unit costs are shown in Table 82.

Table 82. Unit cost band 6 and band 7 therapists delivering psychological treatments for gambling-related harms (2022 prices)

Cost element	Band 6	Band 7	Source
Wages - salary – annual	£36415	£43793	Jones et al., 2023; costs for qualified nurses (AfC Band 6) and community-based scientific and professional staff (AfC band 7)
Salary on-costs – annual	£11017	£13515	
Overheads, staff – annual	£14841	£20703	
Overheads, non-staff - annual	£21534	£30038	
Capital overheads – annual	£5366	£6317	
Qualifications - annuitised	£8502	£15879	Based on the annuitized qualification cost of a nurse (Band 6) (Jones 2023) and the qualification cost of a clinical psychologist (Band 7), estimated from the 3-year training cost of clinical psychologist (NHS England and Health Education England 2016), annuitised using the formula by Netten 1998, assuming a useful working life of 23 years, a time up to retirement of 42 years, and equal distribution of useful working life over the period until retirement.
Supervision - annual	£1923	£1371	Assuming, for band 6 therapists, 2 hours of individual supervision and 2 hours of supervision in groups of 4 per month for a period of 41.4 weeks (working time per year) by a Band 7 clinical psychologist; and, for band 7 therapists, 1.5 hour of individual supervision per month, for a period of 42.6 weeks (working time per year), delivered by a Band 8a clinical psychologist, based on the British Association for Behavioural and Cognitive Therapies (2022)
SUM of unit costs	**£99845**	**£131616**	
Working time (hours/year)	1553	1635	Jones 2023
Total cost per hour	**£64**	**£81**	
Ratio of direct to indirect time*	60-to-40		NICE 2022b
Cost/hour of direct contact	**£107**	**£134**	

** Ratio of face-to-face time to time for preparation and other administrative tasks*
AfC: agenda for change

In addition to the healthcare professional's time, the intervention costs of guided self-help included the cost of the provider of digital mental health programmes and related equipment required for their delivery (personal computers [PCs] and capital overheads), as, in the majority of studies, self-help was delivered via computerised programmes. The cost of provision of a computerised CBT programme per client by the main provider of digital mental health programmes comprises a fixed fee of £41, which is independent of the number of sessions attended (expert advice). The annual costs of hardware and capital overheads (room where personal computers and laptops are located) were based on reported estimates made for the economic analysis undertaken to inform the NICE Technology Appraisal on computerised CBT for depression and anxiety (£1,452 in 2022 prices; Kaltenthaler 2006).

Assuming that one PC will serve 50 people experiencing gambling-related harms per year, this leads to a hardware and capital overheads cost per user of £29. It must be noted that if users of such programmes can access them from home, a mobile phone or a public library, then the cost of hardware and capital overheads to the NHS is zero.

Details on the resource use and total costs of psychological interventions, assuming full and actual attendance, are provided in Table 83.

Table 83: Intervention costs of psychological therapies for adults experiencing problem gambling considered in the guideline economic analysis (2022 prices)

Intervention	Resource use details (intended number of sessions)	Total intervention cost per person (full attendance)	Assumptions on actual resource use	Mean intervention cost per person (according to completion rates)
Individual CBT	8 x 1 hr individual sessions delivered by a Band 7 therapist	£1073	50% attend 8 sessions, 25% attend 5-7 sessions, 15% attend 3-4 sessions, 10% attend 1-2 sessions Mean number of sessions attended: 6.18	£828
Individual behavioural therapy	9 x 1 hr group sessions delivered by a band 7 therapist	£1207	50% attend 9 sessions, 25% attend 5-8 sessions, 15% attend 3-4 sessions, 10% attend 1-2 sessions Mean number of sessions attended: 6.80	£912
Individual counselling	9 x 1 hr group sessions delivered by a band 7 therapist	£805	60% attend 6 sessions, 25% attend 3-5 sessions, 15% attend 1-2 sessions Mean number of sessions attended: 4.83	£647
Group CBT	9 x 90 min group sessions delivered by 2 Band 7 therapists to 8 participants per group	£453	Every person (100%) incurs the cost of 9 sessions, whether they miss sessions or not	£453
Motivational interviewing	2 x 1 hr individual sessions (16 hours) delivered by a band 6 therapist	£214	80% attend 2 sessions, 20% attend 1 session Mean number of sessions attended: 1.80	£192
Guided self-help	Fixed cost of provider of digital mental health programmes £41 per person (expert opinion) plus cost of hardware & capital overheads £29 per person (based on Kaltenthaler et al., 2006) plus 8 x 15 min support sessions (e.g. via email or telephone call) by a band 6 therapist	£284	Therapist delivers 8 x 15 min support sessions on average	£284
No treatment	No related resource use	£0	No related resource use	£0
CBT: cognitive behavioural therapy				

Costs associated with gambling-related harms

Costs associated with gambling-related harms were obtained from two recently published UK reports that independently estimated harmful gambling-related costs to the NHS and the wider public sector. The first report, published by Public Health England and updated by the Office for Health Improvement and Disparities [OHID] (2023), aimed to estimate the annual economic burden of gambling-related harm in England. Using the Problem Gambling Severity Index (PGSI) to determine the severity of gambling, the report estimated total costs associated with low or moderate risk of problem gambling (PGSI score 1-2 and 3-7, respectively), and problem gambling (PGSI score 8+) in England. Reported costs comprised excess costs between a defined harmful gambling group compared to the non-gambler population. The other report, published by the National Institute of Economic and Social Research (Bhattacharjee 2023), aimed to estimate the annual fiscal burden to the Exchequer that is associated with harms arising from problem gambling (defined as meeting ≥3 criteria on the DSM-IV) compared with people experiencing at-risk gambling (defined as meeting 1-2 criteria on the DSM-IV); people at risk of problem gambling were the reference population, i.e. estimated costs comprised excess costs between people experiencing problem gambling and people experiencing at-risk gambling, as people experiencing at-risk gambling did not show statistically significant differences in resource use compared with the general population. Both reports acknowledged that their estimated reported excess costs are associated with gambling-related harms, but it was not possible to determine whether there was causal association between gambling-related harms and the estimated costs. In both reports, costs were estimated using evidence from a range of sources including longitudinal studies, meta-analyses, or surveys and/or further modelling and statistical analysis, each with different strengths and limitations. Given the different approaches, sources and methodologies used in the two reports, as well as some potential overlap in the estimated cost categories, it was deemed inappropriate to combine the cost estimates reported in each study in the same analysis. Instead, the cost estimates of each report have been utilised in separate analyses. The two sets of cost estimates associated with problem gambling are from this point onwards referred to, for simplicity, as ‘OHID costs’ and ‘NIESR costs’.

OHID cost set

The study by the Office for Health Improvement and Disparities (2023) estimated and reported the following costs associated with gambling-related harms:

- Direct costs to government
  - Health: costs associated with management of depression, alcohol dependence and illicit drug use
  - Employment: unemployment benefits
  - Financial: statutory homelessness
  - Criminal activity: imprisonment
- Wider excess societal costs
  - Societal cost of suicide (in terms of total years of life lost, and, subsequently, lifetime QALY losses)
  - Societal cost of depression (in terms of QALY losses)

The guideline economic analysis utilised only information on the direct costs to government associated with gambling-related harms. Life-year and QALY losses associated with gambling-related harms have already been considered in the guideline economic analysis, and therefore incorporating the excess societal costs of suicide (life years and QALYs lost) and depression (QALYs lost) as reported by OHID would lead to double-counting. Moreover, OHID estimated societal costs associated with suicide and depression by applying a societal value of a QALY of £70,000 and a 1.5% annual discount rate (lowered to 1.3% after 30 years), which are not consistent with NICE principles and the reference case (NICE 2014).

Other costs to the government associated with gambling-related harms, such as costs relating to education and healthcare costs associated with suicide and suicide attempts as well as with other health problems (such as anxiety and stress, non-suicidal self-harm, other mental and physical health conditions) were not estimated by OHID due to reported lack of relevant data. Excess costs to the individual, their family and close others, such as productivity losses, financial losses and bankruptsy, physical, emotional or psychological distress, relationship breakdown or problems, were acknowledged but not estimated. Below is a summary of costs associated with gambling-related harms that were estimated by OHID and were subsequently used in the guideline economic analysis.

In order to estimate the mean cost per person at risk of problem gambling and the mean cost per person experiencing problem gambling for each cost category, the respective total cost reported by OHID for each population was divided by the number of people within each group in England, as estimated by OHID. According to OHID, in England, the number of people at low- and moderate-risk of problem gambling was estimated to be 1,213,830 + 377,242 = 1,591,072 whereas the number of people experiencing problem gambling was estimated to be 168,149.

Healthcare cost incurred by treatment of people with depression associated with gambling-related harms

There is evidence that people at moderate risk of problem gambling or experiencing problem gambling are at increased odds to experience major depressive disorder, after adjusting for sociodemographic variables. The OHID report utilised these data as well data on the prevalence of depression in the adult population in England, the estimated number of people at moderate risk of problem gambling and those experiencing problem gambling, and the annual total healthcare cost of an individual suffering from depression (rather than just the cost of treating their depression), including primary care (GP time), secondary care and prescription costs. By combining available data and after appropriate adjustments, OHID reported a total excess healthcare cost associated with depression of £51.6 million and £62.5 million for people at moderate risk of problem gambling and people experiencing problem gambling, respectively. People at low risk of problem gambling were assumed to incur zero excess healthcare costs associated with depression, as no evidence was found that this group is at increased odds to experience depression compared with the general population. Divided by the number of people at risk of problem gambling and those experiencing problem gambling, respectively, the estimated mean cost is £32.43 per person at risk of problem gambling and £372.29 per person experiencing problem gambling.

The authors highlighted that evidence on the association between problem gambling and depression was derived from cross-sectional studies and no causal relationship could be established. They also noted that the estimated cost may have been underestimated, given that the excess cases associated with depression are likely to be a mix of both minor and major depressive episodes, and an individual may have more than one depressive episode. Moreover, the authors identified evidence of a significant increase in anxiety issues associated with at-risk or problem gambling, which were not included in their analysis, suggesting that there may be excess cases and costs of other mental health issues associated with gambling-related harms.

Other NHS costs incurred by people experiencing gambling-related harms

The only NHS cost incurred by people experiencing problem gambling that was estimated by OHID was the annual total healthcare cost of an individual experiencing problem gambling and suffering from depression. According to the OHID report, only 2.7% of people experiencing problem gambling accessed treatment in 2020 to 2021, potentially reflecting a lack of access to gambling treatment services in England. On the other hand, the authors admitted that there may be significant under-reporting of gambling as a reason for hospital admissions, which may be applicable to other treatment services and settings. An older study

(Thorley 2016) estimated that the average person experiencing problem gambling sees more often a GP for a mental health complaint, uses more mental health services and has an increased inpatient stay rate compared with an average person in the general population. Furthermore, according to Hospital Episode Statistics for 2021-2022 (NHS Digital 2022a) there were 136 admissions for the diagnosis of pathological gambling (ICD-10 code f63.0) of which only 6 had this as the primary diagnosis, and 231 admissions for the diagnosis of gambling and betting (ICD-10 code Z72.6), of which none had gambling and betting as the primary diagnosis. In addition to showing a very low number of admissions due to problem gambling, these data suggest that almost all patients were diagnosed with another health condition as the primary diagnosis and were likely treated for this condition prior or in parallel to receiving treatment for gambling. There were also 14 outpatient attendances where pathological gambling was a diagnosis and 5 outpatient attendances where gambling and betting was a diagnosis (NHS Digital 2022b). In any case, these data suggest very low treatment activity and, subsequently, NHS costs associated with treatment of people experiencing problem gambling.

The OHID analysis did not include direct costs of gambling treatment in their estimates, due to severe limitations in the relevant data and also in order to avoid double-counting with other healthcare costs already estimated, such as costs of treating people experiencing problem gambling and suffering from depression. For the same reason (to avoid double-counting), data from Thorley 2016 and NHS Digital 2022a and 2022b were not used to estimate further healthcare costs associated with problem gambling for use in the guideline economic analysis that utilised the OHID dataset.

Local authority cost incurred by treatment of alcohol dependence associated with gambling-related harms

There is evidence that harmful gambling is associated with increased odds of alcohol dependence in adults aged 18-20 years after adjusting for sociodemographic variables. The OHID report utilised these data as well as data on the prevalence of alcohol dependence in the adult population in England, the number of people in community treatment for alcohol dependence, the estimated number of people at low/moderate risk of problem gambling and those experiencing problem gambling, and local authority data on expenditure on substance misuse treatment, as community alcohol treatment is funded by local authorities through the public health grant. By combining available data, OHID reported a total excess local authority cost associated with community treatment of alcohol dependence of £3.5 million for the total population of people experiencing gambling-related harms, both those at risk and those experiencing problem gambling. As the evidence did not differentiate between these two groups regarding the risk of alcohol dependence, this excess cost was divided by the total population of people experiencing gambling-related harms to obtain an estimated mean excess cost of £1.99 per person. Using alternative assumptions in sensitivity analysis, OHID reported an estimate of £51.8 million for the total excess local authority cost associated with community treatment of alcohol dependence in people experiencing gambling-related harms, which translates to £29.44 per person. Uncertainty around costs has been addressed in a deterministic sensitivity analysis, where all costs associated with gambling-related harms have been varied by ±50%.

It needs to be noted that this analysis did not consider the costs of NHS treatment. The authors noted that the evidence on the association of alcohol dependence with harmful gambling came from a Canadian study on young adults, which did not differentiate between people at risk of and people experiencing problem gambling. Also, due to lack of more detailed data, the authors assumed that the prevalence rate of alcohol dependence is equal across all age groups in the general population and in people experiencing gambling-related harms. The analysis assumed that an individual engaging in harmful gambling who is alcohol dependent has the same behavioural characteristics as other alcohol dependent individuals. Finally, costs associated with crime or lost productivity due to alcohol dependence were not included in the cost estimate.

Local authority cost incurred by treatment of illicit drug use associated with harmful gambling

There is evidence that young adults (aged 17-24 years) at risk of or experiencing problem gambling are at increased odds of engaging to illicit drug use (i.e. use of cocaine, crack and other illicit drugs). The OHID report utilised these data as well data on the age-standardised prevalence of harmful gambling in England, the prevalence of illicit drug use in England, and the annual cost per individual in community drug misuse treatment for opiates and/or crack cocaine use, which is funded by local authorities through the public health grant. By combining available data, OHID reported a total excess local authority cost associated with community treatment of illicit drug use in those 16-24 years of £1.5 million and £0.3 million for people at risk of problem gambling and people experiencing problem gambling, respectively. Divided by the number of people at risk of problem gambling and those experiencing problem gambling, respectively, the estimated mean cost is £0.94 per person at risk of problem gambling and £1.78 per person experiencing problem gambling in the population of young adults aged 16-24 years. Using alternative assumptions in sensitivity analysis, OHID reported an estimate of £84.3 million for the total excess local authority cost associated with community treatment of illicit drug use for the whole population of people at risk of problem gambling and people experiencing problem gambling, which, if applied proportionately, translates to a mean cost of £44.15 per person at risk of problem gambling and £83.56 per person experiencing problem gambling. This uncertainty around costs has been addressed in a deterministic sensitivity analysis, where all costs associated with gambling-related harms have been varied by ±50%.

This analysis did not consider the costs of NHS treatment. The authors reported that the total estimated cost was likely to be an underestimate The results present only a partial picture of the total cost, given that the increased odds of illicit drug use was reported for a cohort of adults aged 17-24 and applied to those experiencing gambling-related harms aged 16-24, and the total cost reflected treatment of illicit opiates and crack cocaine use only. The analysis assumed that an individual engaging in harmful gambling who uses opiates and/or crack cocaine has the same behavioural characteristics as other illicit drug users who do not experience gambling-related harms. Finally, costs associated with crime or lost productivity due to illicit drug use were not included in the cost estimate.

Cost of statutory homeless services associated with harmful gambling

There is evidence that the percentage of people at low- and moderate-risk of problem gambling and those experiencing problem gambling is higher within the service-accessing homeless population compared with the general population in England. OHID analysis considered the percentage of people being at risk of or experiencing problem gambling before becoming homeless, to explore the possible causal relationship between problem gambling and homelessness. Subsequently, it looked at the number of successful statutory homeless applications under the prevention duty recorded by the Department for Levelling Up, Housing and Communities (DLUHC), the estimated number of people at low/moderate risk of problem gambling and those experiencing problem gambling, and the cost per statutory homeless application, including the costs of a court desk scheme, temporary accommodation, and administration costs of a new letting. By combining available data, OHID reported a total excess homeless service cost of £12.7 million and £36.3 million for people at risk of problem gambling and people experiencing problem gambling, respectively. Divided by the respective number of people within each category, the estimated mean cost is £7.98 per person at risk of problem gambling and £215.88 per person experiencing problem gambling. Using alternative assumptions in sensitivity analysis, OHID reported an estimate of £67.8 million for the total excess homeless service cost for the whole population of people at risk of problem gambling and those experiencing problem gambling, which, if applied proportionately, translates to a mean cost of £11.04 per person at risk of problem gambling and £298.71 per person experiencing problem gambling. As mentioned above, this uncertainty around costs has been addressed in deterministic sensitivity analysis.

The authors acknowledged that this cost included statutory homeless applications only and did not consider the association between people who sleep rough who are experiencing gambling-related harms, due to lack of relevant data. Costs were estimated using data from people experiencing gambling-related harms who accessed 3 housing services in London, and these data may not be representative of the English population. Finally, the sample of people analysed focused only on the males accessing homeless services, because the respective sample size of females was very small in the relevant literature; for this reason, the estimated cost figure was considered an underestimate of the true cost of gambling-related homelessness.

Unemployment benefits associated with harmful gambling

There is evidence that harmful gambling is associated with unemployment and lack of educational qualifications. However, appropriate data that would allow estimation of relevant costs are very limited. The OHID analysis focused on the estimation of the financial costs to government as a result of unemployment associated with harmful gambling, using evidence on the increased probability of a person experiencing problem gambling claiming unemployment benefits compared to a person not experiencing problem gambling, which includes people at no, low and medium risk of problem gambling. OHID also used estimates of the total number of claims due to lack of employment during 2019-2020 and the estimated number of people experiencing problem gambling. By combining available data and after making a number of assumptions regarding unemployment claims, OHID reported a total excess cost to the government regarding unemployment benefits approximating £77.0 million for people experiencing problem gambling. Divided by the respective number of people experiencing problem gambling, the estimated mean cost was £457.93 per person experiencing problem gambling.

Unemployment benefits for people engaging in at-risk gambling (low and moderate risk) were not estimated due to lack of relevant evidence for this group. Also, the authors estimated costs in an indirect way and under a set of assumptions due to lack of a national registry of unemployment claims.

Criminal activity: imprisonment associated with harmful gambling

There is some evidence of an association between problem gambling and criminal activities, as there is a higher proportion of people who are experiencing problem gambling in prison populations than there is in the non-prison population. However, according to OHID, despite the link between gambling and offending, the literature has not established a clear causal association. The OHID analysis estimated the direct cost of imprisonment incurred by the prison population that have committed offences associated with problem gambling in England. Using the national prevalence rates of problem gambling in the population, data on the number of people in the prison population who have linked their offence to problem gambling, and direct costs of imprisonment, OHID reported a total excess cost to the government regarding imprisonment associated with problem gambling approximating £167.3 million. Divided by the respective number of people experiencing problem gambling, the estimated mean cost was £994.95 per person experiencing problem gambling.

Imprisonment costs for people engaging in at-risk gambling (low and moderate risk) were not estimated due to lack of relevant evidence for this group. The authors estimated costs using survey data, where participants self-reported the crimes for which they were serving sentences. The analysis only focused on the direct financial costs to the government of imprisonment, and not on the wider societal costs of crime. Only costs associated with crimes leading to conviction were estimated and the impact of crime to victims was not considered, meaning that the estimated cost was an underestimate of the true cost of gambling-related crime.

NIESR cost set

The study by the National Institute for Economic and Social Research (Bhattacharjee 2023) estimated and reported the following direct costs to the government associated with gambling-related harms:

- Health: primary (general practitioner consultation for mental health) and secondary (hospitalisation)
- Housing: statutory homelessness support
- Criminal activity: police call out and court appearance
- Welfare: universal credit

To estimate these costs, the authors carried out analyses and applied quantitative modelling techniques using data from the UK Wealth and Assets Survey (WAS) (Office for National Statistics, 2019) and the 2007 Adult Psychiatric Morbidity Survey (McManus 2009), to estimate the range of healthcare, homelessness and crime services used by those experiencing problem gambling, and associated costs.

Healthcare costs (primary and secondary) associated with problem gambling

Logistic regression on APMS data suggested a statistically significant association between problem gambling and both GP consultations for mental health reasons and being a hospital inpatient (for both physical and mental health reasons). Using published research data for the UK, the authors estimated that a person in the general population visits their GP 1.2 times on average per year for a mental health complaint. By combining these data with the results of logistic regression, the authors estimated that people experiencing problem gambling visit their GP for a mental health problem 3.2 times per year, and people at risk for problem gambling visit their GP for the same reason 1.7 times per year, resulting in an estimated figure of 1.5 additional visits to the GP for a mental health complaint that can be attributed to problem gambling relative to at risk of problem gambling. Multiplying this by the unit cost of a GP visit, the authors reported an excess annual cost of £57 (2022 prices) per person experiencing problem gambling associated with GP consultations for a mental health problem. Using similar methodology, the authors estimated an excess cost of £1,200 per person experiencing problem gambling associated with hospitalisation for mental or physical health issues.

Cost of homelessness support associated with problem gambling

Logistic regression results indicated a statistically significant chance of a person experiencing problem gambling being 3.5 times more likely to be homeless. The chance of a person at risk of problem gambling was non-significant compared with the general population. Using published research data, which suggest that the probability of an average person being homeless is 0.004, the authors estimated that, on average, the chance of being homeless is 0.01 for a person experiencing problem gambling and essentially 0 for someone experiencing at-risk gambling. By multiplying this figure by the cost of homelessness support, obtained from national sources, the authors estimated an annual homelessness support cost of £43 per person experiencing problem gambling.

Criminal activity cost associated with problem gambling

Logistic regression showed a statistically significant association between problem gambling and being likely to commit a crime involving the police as well as being involved in a court appearance. Applying the results of logistic regression to the average number of crimes per person of 0.09 per year, estimated from national crime statistics, the authors estimated that a person experiencing problem gambling on average commits 0.39 crimes per year, and a person experiencing at-risk gambling on average commits 0.15 crimes per year, which suggests a difference of 0.24. Using national sources, the authors identified the unit costs for

a police call out and a court visit (due to committed crime), which, multiplied by 0.24, resulted in an annual cost of £85 for police call out and £24 for court appearance per person experiencing problem gambling.

Welfare costs associated with problem gambling

The authors used the UK Wealth and Assets Survey data on welfare/benefits income of individuals and households and employed further microsimulation modelling techniques to measure gambling behaviour (problem gambling or at risk or not at risk of problem gambling), in order to estimate the annual welfare costs (universal credit) associated with problem gambling, which amounted to £2300 per person experiencing problem gambling.

The reported OHID and NIESR costs associated with gambling-related harms that were utilised in the guideline economic analysis are shown in Table 84. By combining the 2 different cost sets with the two different perspectives adopted by the guideline economic analysis (NHS/PSS perspective and public sector perspective), 4 analyses were undertaken a. using the OHID cost set and a NHS/PSS perspective; b. using the OHID cost set and a public sector perspective; c. using the NIESR cost set and a NHS/PSS perspective; and d. using the NIESR cost set and a public sector perspective. Each analysis utilised appropriate cost elements from each report, according to the perspective adopted.

People moving between two health states in a model cycle were assumed to incur 50% of the costs associated with each health state.

In a sensitivity analysis, all costs associated with problem gambling or at risk of problem gambling were varied by ±50%.

Table 84. Mean annual excess costs to the government associated with gambling-related harms (2022 prices)

Source	Cost element	Annual excess cost per person for each health state		Perspective where cost utilised
		Problem gambling	At risk of problem gambling	
'OHID COST' Office for Health Improvement and Disparities (2023). Total reported excess cost divided by the number of people within each group in England. Excess cost relative to 'at no risk of problem gambling'	NHS cost - treatment of depression	£372	£32	NHS/PSS & public sector
	Local authority cost - treatment of alcohol dependence	£2	£2	NHS/PSS & public sector
	Local authority cost - treatment of illicit drug use	£2	£1	NHS/PSS & public sector
	Statutory homeless services	£216	£8	Public sector
	Unemployment benefit	£458	NR	Public sector
	Criminal justice system cost - imprisonment	£995	NR	Public sector
	Total (annual) OHID NHS/PSS excess cost	**£376**	**£35**	NHS/PSS
	Total (annual) OHID public sector excess cost	**£2045**	**£43**	Public sector
'NIESR COST' Bhattacharjee 2023. Excess cost relative to 'at risk of problem gambling'	NHS - mental health consultation	£57	NA	NHS/PSS & public sector
	NHS - hospitalisation	£1,200	NA	NHS/PSS & public sector
	Crime - police call out	£85	NA	Public sector
	Crime – court	£24	NA	Public sector
	Housing - homelessness support	£43	NA	Public sector
	Welfare - universal credit	£2300	NA	Public sector
	Total (annual) NIESR NHS/PSS excess cost	**£1257**	NA	NHS/PSS
	Total (annual) NIESR public sector excess cost	**£3709**	NA	Public sector

NA: non-applicable; NHS: National Health Service; NIESR: National Institute of Economic and Social Research; NR: not reported; NHS: national health service; OHID: Office for Health Improvement and Disparities

Costs associated with completed suicide

Costs associated with a completed suicide were applied in the model in line with the economic analysis undertaken to inform the NICE guideline on preventing suicide in community and custodial settings (NICE 2018). According to the economic report of that guideline (Eniss & Pollit, 2018), the economic analysis utilised the NHS cost of a completed suicide, estimated after making assumptions on the associated resource use of secondary care for ambulance use, A&E visit, hospital non-elective admission and dead on arrival. Moreover, for each suicide a local authority coroner cost and a police call-out cost were used. The estimated costs per completed suicide uplifted to 2022 prices were £1,106 to the NHS, £640 for the local authority coroner service and £734 for police call out.

In addition, in a sensitivity analysis, the healthcare cost of a completed suicide incurred by family and/or friends (£1,485 per family member or friend in 2022 prices) was included, in line with the NICE guideline on preventing suicide in community and custodial settings (NICE 2018), which had considered, in a scenario analysis, the healthcare and societal costs (productivity losses) incurred by family and friends, following an event of completed suicide. The cost figure had been obtained from an Australian study (Comans 2013) due to lack of relevant UK data, and had been multiplied by 6 as it had been assumed that, on average, 6 family members and/or friends incurred these bereavement healthcare costs.

Details on the estimated costs associated with completed suicide that were utilised in the guideline economic analysis are provided in Table 85.

Table 85. Mean costs associated with completed suicide (2022 prices)

Cost element	Cost	Perspective where cost utilitised	Source
Base-case analysis			Economic report (Eniss & Pollit, 2018) of the NICE guideline on preventing suicide in community and custodial settings (NICE 2018)
NHS cost of completed suicide (secondary care for ambulance use, A&E visit, hospital non-elective admission and dead on arrival)	£1093	○ NHS/PSS ○ Public sector	
Local authority coroner cost of completed suicide	£640	○ Public sector	
Criminal justice system - police call out for a suicide	£734	○ Public sector	
Total cost	**£2467**	○ Public sector	
Sensitivity analysis			
NHS cost of completed suicide incurred by family and/or friends (bereavement cost)	**£8911**	○ NHS/PSS ○ Public sector	

Discounting

Costs and benefits were discounted at an annual rate of 3.5% as recommended by NICE (2014).

Handling uncertainty

Model input parameters were synthesised in a probabilistic analysis, in which input parameters were assigned probabilistic distributions (rather than being expressed as point estimates); this approach allowed more comprehensive consideration of the uncertainty characterising the input parameters and captured the non-linearity characterising the economic model structure. Subsequently, 10000 iterations were performed, each drawing

random values out of the distributions fitted onto the model input parameters. Results (mean costs and QALYs for each intervention) were averaged across the 10000 iterations. This exercise provides more accurate estimates than those derived from a deterministic analysis (which utilises the mean value of each input parameter, ignoring any uncertainty around the mean), by capturing the non-linearity characterising the economic model structure (Briggs 2006).

The distributions of the relative effects of all treatments versus no treatment (SMD) were obtained from the respective NMAs, defined directly from values recorded in each of the 10,000 iterations used after thinning the 300,000 iterations performed in WinBUGS. The distribution of people's PGSI scores at treatment initiation was given a normal distribution. The distribution of people's PGSI scores at treatment endpoint were given a normal distribution in the base-case analysis, while a gamma distribution and log-normal distribution were tested in sensitivity analysis, to explore whether and how the potential positive skewness of post-treatment symptom scores might impact on the results. SMRs were given a log-normal distribution. Beta distribution was assigned to the following parameters: the proportion of women in the cohorts; the probabilities of remission and relapse in the Markov component of the model; all utility values, after applying the method of moments on data reported in the relevant literature.

Uncertainty in psychological intervention costs was taken into account by assigning probability distributions to the number of individually delivered psychological therapy sessions (except guided self-help), based on intervention completion data, data on the mean number of sessions reported in the RCTs that informed the economic analysis, and further assumptions. The number of therapist sessions per person attending group psychological interventions was not assigned a probability distribution because the number of group sessions remains the same and the full cost is incurred, whether a participant attends the full course of treatment or a lower number of sessions. For guided self-help, the number of sessions was not given a distribution, given that clients complete sessions in their own time. Instead, the time spent by the therapist per session, for example, answering emails, was given a normal distribution. The unit costs of therapists delivering psychological interventions were also assigned a normal distribution.

Costs associated with problem or at risk of problem gambling and completed suicide were assigned a gamma distribution.

Table 86 reports the mean values of all input parameters utilised in the economic model and provides details on the types of distributions assigned to each input parameter and the methods employed to define their range.

Table 86. Input parameters (deterministic values and probability distributions) that informed the economic model of treatments for people experiencing problem gambling

Input parameter	Mean deterministic value	Probability distribution	Source of data – comments
General characteristics of population			Based on available PGSI score data in the RCTs included in the guideline NMA and 3 UK observational studies on treatment-seeking adults experiencing PG (Ronzitti 2016, Roberts 2021 & Sharman 2019). Estimates on proportion of women in the cohort also consistent with data reported in Public Health England 2021 and McManus 2007
PGSI score at initiation	18	Normal: 99%CI 10 to 26	
Starting age of cohort (years)	36	No distribution	
Proportion of women	0.08	Beta: α=98; β=1,128	
Standardised mean difference in the gambling symptom severity change from baseline (CFB) versus no treatment			
CBT individual	-0.54	95% CrI: -1.12 to 0.04	Guideline NMA; distribution based on 10,000 iterations
Behavioural therapy individual	-0.58	95% CrI: -1.50 to 0.33	
Counselling individual	-0.43	95% CrI: -1.66 to 0.80	
CBT group	-1.08	95% CrI: -1.83 to -0.34	
Motivational interviewing	-0.29	95% CrI: -0.90 to 0.33	
Guided self-help	-0.11	95% CrI: -0.76 to 0.55	
Change in PGSI score for no treatment At treatment endpoint	-0.43 + 2.32 + initial PGSI -0.49 x initial PGSI	No distribution	Formula based on mixed effects model reported in a Canadian study (Kushnir 2018)
Annual transition probabilities			Bruneau 2016 (French study), using 2-year transition data, assuming that people in the 'PG' state dropping out did not remit, and people in the 'no PG' state dropping out relapsed.
Remission (PG to no PG)	0.250	Beta: α=101; β=303	
Relapse (no PG to PG)	0.420	Beta: α=198; β=273	
Mortality (20-49 years old)			Karlsson and Håkansson 2018 (Swedish study)
<u>General</u>		Log-normal	
SMR – GD vs general population, men	4.6	95% CI 2.7 to 6.5	
SMR – GD vs general population, women	10.5	95% CI 2.7 to 18.2	
<u>For suicide</u>			
SMR – GD vs general population, men	14.3	95% CI 6.5 to 22.0	

Input parameter	Mean deterministic value	Probability distribution	Source of data – comments
SMR – GD vs general population, women	30.1	95% CI 12.2 to 62.6	
Baseline mortality due to any reason Baseline morality due to suicide	Age/sex specific	No distribution Normal distribution	General mortality statistics and mortality due to suicide for England in 2019 (Office for National Statistics, 2021 & 2022b)
Utility values		Beta distribution	
No problem, PGSI 0	0.759	α=34,708.12; β=11,020.63	Moayeri 2020 (Australian study); distribution estimated based on method of moments
Low risk, PGSI 0-1 - decrement	0.016	α=5.12; β=315.18	
Moderate risk, PGSI 3-7 - decrement	0.037	α=16.24; β=422.65	
Problem gambling, PGSI 8+ - decrement	0.102	α=41.42; β=364.67	
QALY loss prior to suicide	0.029	α=2.9; β=97.1	Eniss & Pollit 2018 (UK stuudy); distribution based on assumption
Intervention costs – resource use <u>Number of sessions</u>			Number of sessions and probabilities assigned based on resource use and completion rate data reported in the RCTs included in the guideline NMA, supplemented by further assumptions. No distribution in the number of group CBT sessions was assumed, as participants missing group sessions are not replaced. Distribution of therapist's time in guided self-help based on assumption; fixed digital therapy provider (expert opinion) + capital cost (Kaltenthaler 2006) of £70 added to the intervention cost. Details on psychological treatment costs are shown in Table 83.
CBT individual	6.18	0.50: 8, 0.25: 5-7 0.15: 3-4, 0.10: 1-2	
Behavioural therapy individual	6.80	0.50: 9, 0.25: 5-8 0.15: 3-4, 0.10: 1-2	
Counselling individual	4.83	0.60: 6, 0.25: 3-5 0.15: 1-2	
CBT group	9	No distribution	
Motivational interviewing	1.8	0.80: 2, 0.20: 1	
Guided self-help	8	No distribution	
<u>Therapist time/guided self-help session (min)</u>	15	Normal: 99%CI 5 to 25	
Intervention costs - unit costs			Jones 2023; qualification costs for clinical psychologists from NHS England and Health Education England (2016); details in Table 82; distribution based on assumption
Band 7 clinical psychologist unit cost	£134	Normal, SE=0.05*mean	
Band 6 mental health unit cost	£107	Normal, SE=0.05*mean	
Costs associated with problem gambling <u>OHID costs (excess relative to no risk of PG)</u>		Gamma distribution	
PG state			
NHS - Depression	£372	SE=0.30*mean	
LA alcohol dependence treatment	£2	SE=0.30*mean	Office for Health Improvement and Disparities (2023); distribution based on assumption

Input parameter	Mean deterministic value	Probability distribution	Source of data – comments
LA illicit drug use treatment	£2	SE=0.30*mean	
Statutory homelessness	£216	SE=0.30*mean	
Unemployment benefit	£458	SE=0.30*mean	
Imprisonment	£995	SE=0.30*mean	
At risk of PG			
NHS - Depression	£32	SE=0.30*mean	
LA alcohol dependence treatment	£2	SE=0.30*mean	
LA illicit drug use treatment	£1	SE=0.30*mean	
Statutory homelessness	£8	SE=0.30*mean	
<u>NIESR costs (excess relative to at risk of PG)</u>			
NHS - mental health consultation	£57	SE=0.30*mean	Bhattacharjee 2023; distribution based on assumption
NHS - hospitalisation	£1200	SE=0.30*mean	
Crime - police call out	£85	SE=0.30*mean	
Crime - court	£24	SE=0.30*mean	
Housing - homelessness support	£43	SE=0.30*mean	
Welfare - universal credit	£2300	SE=0.30*mean	
Costs associated with completed suicide		Gamma distribution	Eniss & Pollit (2018), uplifted to 2022 prices using the NHS cost inflation index (Jones 2023) & the consumer price inflation index for non-NHS costs (Office for National Statistics 2022a). Distribution based on assumption.
NHS	£1093	SE = 0.10*mean	
Coroner	£640	SE = 0.10*mean	
Police call-out	£734	SE = 0.10*mean	
NHS cost to family and/or friends (SA only)	£8911	SE = 0.10*mean	
Annual discount rate	0.035	No distribution	Applied to both costs and outcomes. NICE, 2014

CBT: cognitive behavioural therapy; CI: confidence intervals; CrI: credible intervals; GD: gambling disorder; LA: local authority; NIESR: National Institute of Economic and Social Research; PGSI: problem gambling severity index; NHS: national health service; OHID: Office for Health Improvement and Disparities; PG: problem gambling; SA: sensitivity analysis; SE: standard error; SMR: standardised mortaliy ratio

A number of deterministic sensitivity analyses were also employed to explore the impact of parameters with higher uncertainty around their mean values as well as the impact of alternative hypotheses on the results. The following scenarios were explored:

- The PGSI score at treatment initiation was varied between 8 and 27, to cover the full range of PGSI scores that adults with problem gambling (the study population) may have at presentation.
- The cohorts' starting age was varied between 20 and 48 years, which is the age range for which there was evidence of a significant increase in mortality associated with gambling disorder.
- The proportion of women in the cohort was increased to 22.58% to reflect the proportion of women in people with gambling disorder attending specialist health care in Karlsson & Håkansson 2018.
- The SD value (spread) that determined the mean difference in the PGSI score between each treatment and no treatment, and also the distribution of people around the treatment endpoint mean PGSI score, was varied from 3.35 to 6.95, which were the minimum and maximum values of SD obtained from RCTs reporting PGSI data included in the guideline NMA.
- Post-treatment PGSI scores of people receiving each treatment were assumed to have a gamma distribution or a log-normal distribution, to allow for potential positive skewness of these scores.
- The annual probability of remission in the Markov model component was varied by ±20%.
- The annual risk of relapse in the Markov model component was varied by ±20%.
- Costs associated with the states of problem gambling and at risk of problem gambling were varied by ±50%.
- A NHS cost to family and/or friends associated with bereavement was applied to each completed suicide. Each completed suicide was assumed to affect 6 family members and/or friends, leading to a cost of £8,911per completed suicide incurred by family/friends.

Finally, a scenario probabilistic analysis included the lifetime QALY loss associated with completed suicides in the estimation of total QALYs resulting from each treatment option.

Presentation of the results

For each treatment, mean intervention costs, mean costs associated with problem gambling, mean costs associated with suicide, total costs and total QALYs (as well as lifetime QALY losses from suicide, where relevant) are presented for each treatment, averaged across the 10,000 model iterations. For each treatment option, the Net Monetary Benefit (NMB) was estimated for each iteration and averaged across the 10,000 iterations, estimated by the formula

$$NMB = E \bullet \lambda - C$$

where E and C are the effects (QALYs) and total costs, respectively, of each treatment option, and λ represents the monetarised value of each QALY, set at the NICE lower cost-effectiveness threshold of £20000/QALY (NICE, 2014). The treatment with the highest NMB is the most cost-effective option (Fenwick 2001).

Results are also graphically presented in cost effectiveness planes; each treatment is placed on this graph according to its incremental costs and QALYs compared with no treatment, which is placed at the origin. The dotted line indicates the NICE lower cost-effectiveness threshold of £20,000/QALY. Treatments below this line are more cost-effective than no treatment. Treatments above the line are not cost-effective compared with no treatment.

The probability of the most cost-effective treatment being the most cost-effective option at the NICE lower cost effectiveness threshold of £20000/QALY is provided, calculated as the proportion of iterations (out of the 10,000 iterations run) in which the most cost-effective treatment has had the highest NMB among all treatments considered in the analysis. The mean (95%CI) ranking by cost-effectiveness is reported for each treatment (out of 10,000 iterations), where a rank of 1 suggests that a treatment is the most cost-effective amongst all evaluated treatment options. Finally, the cost-effectiveness acceptability frontier (CEAF) has been plotted, showing the treatment with the highest mean NMB over different cost-effectiveness thresholds (λ), and the probability that this treatment is the most cost-effective among those assessed (Fenwick 2001).

Validation of the economic model

The economic model (including the conceptual model and the identification and selection of input parameters) was developed by the health economist in collaboration with members of the committee. As part of the model validation, all inputs and model formulae were systematically checked; the model was tested for logical consistency by setting input parameters to null and extreme values and examining whether results changed in the expected direction. The base-case results and results of sensitivity analyses were discussed with the committee to confirm their plausibility.

Economic modelling results

Use of OHID cost set – NHS/PSS perspective

Results are shown in Table 87. Treatments are ordered from the most to the least cost-effective. Group CBT was the most cost-effective treatment, followed by no treatment. All other treatments were less cost-effective than no treatment. The probability of group CBT being the most cost-effective option at the NICE lower threshold of £20000/QALY was 0.63.

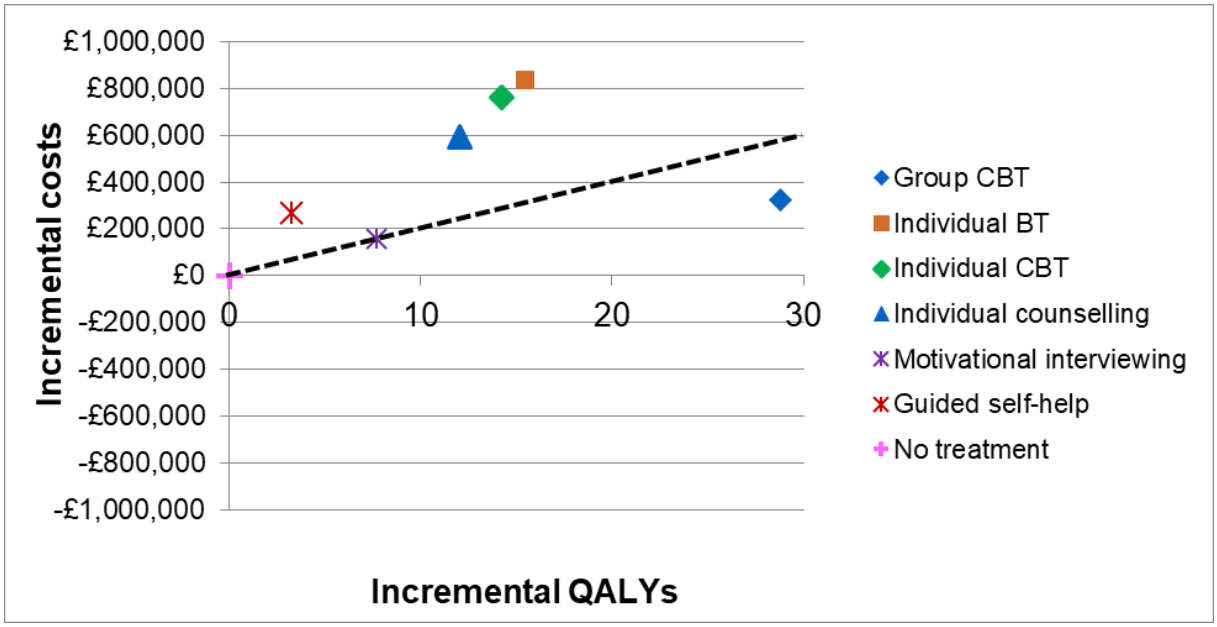
Table 87. Results of economic modelling. OHID cost set – NHS/PSS perspective

Treatment	Mean per person						Mean ranking (95%CI)
	NMB	QALYs	Cost				
			Interv	PG	Suic	Total	
CBT group	£29527	1.523	£453	£477	£4	£933	1.67 (1 to 5)
No treatment	£29271	1.494	£0	£607	£5	£612	2.91 (1 to 6)
Motivational interviewing	£29269	1.502	£193	£572	£5	£769	3.03 (1 to 5)
Guided self-help	£29069	1.497	£283	£592	£5	£879	4.47 (2 to 7)
Counselling individual	£28921	1.506	£646	£553	£4	£1203	4.88 (1 to 7)
CBT individual	£28793	1.508	£829	£542	£4	£1375	5.50 (1 to 7)
BT individual	£28744	1.510	£908	£537	£4	£1449	5.54 (1 to 7)

BT: behavioural therapy; CBT: cognitive behavioural therapy; Interv: intervention; NMB: net monetary benefit; PG: problem gambling; QALY: quality-adjusted life year; Suic: suicide

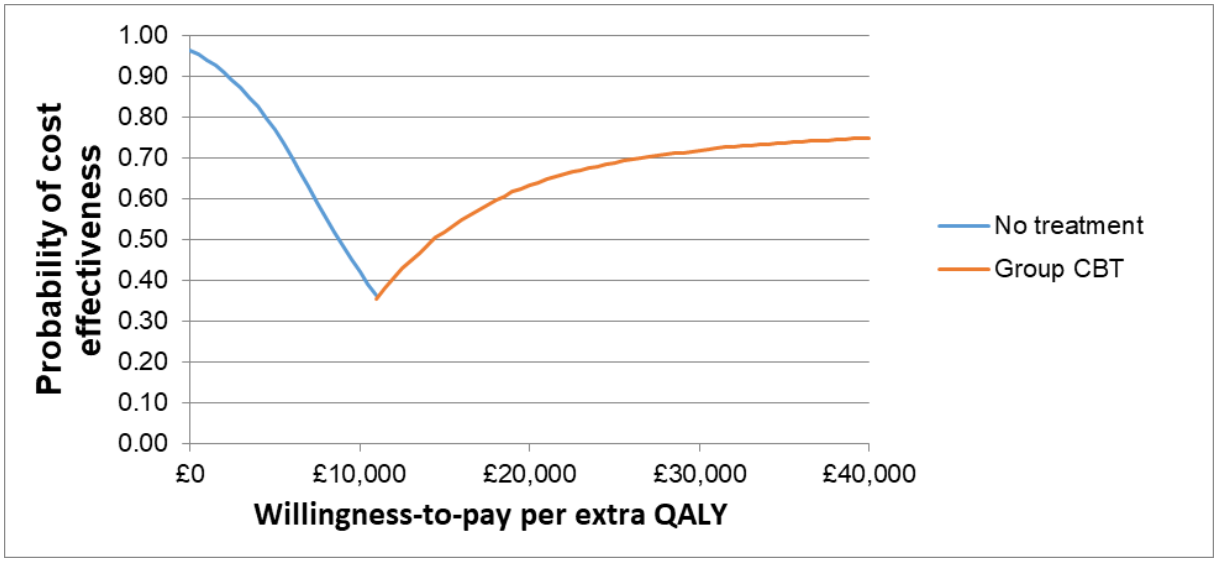
Figure 8 provides the cost effectiveness plane. The CEAF of the analysis is shown in Figure 9. It can be seen that no treatment is the most cost-effective option for cost-effectiveness thresholds up to £11,000/QALY. From that point on, group CBT becomes the most cost-effective treatment option at a low probability at £11000/QALY, which reaches 0.63 at £20000/QALY.

Figure 8. Cost-effectiveness plane. OHID cost set – NHS/PSS perspective.



Results for 1,000 adults experiencing problem gambling
BT: behavioural therapy; CBT: cognitive behavioural therapy; QALY: quality-adjusted life year

Figure 9. Cost-effectiveness acceptability frontier. OHID cost set – NHS/PSS perspective



CBT: cognitive behavioural therapy; QALY: quality-adjusted life year

Results were overall robust to alternative scenarios explored through deterministic sensitivity analysis, with the exception of motivational interviewing, which became more cost-effective than no treatment and second more cost-effective option after group CBT in most scenarios explored (Table 88), including increasing the starting age of the cohort at ≥47 years, reducing the PGSI score at treatment initiation at 17 or below, increasing the SD (spread) around the PGSI score at ≥5.5, reducing the probability of remission or the risk of relapse by 20%, increasing the costs associated with problem gambling by 50%, and also assuming either gamma or log-normal distribution of the post-treatment PGSI scores. When the PGSI score at treatment initiation reached 27 (the highest possible score, translating into the highest gambling symptom severity that PGSI can capture), then all treatments were less cost-effective than no treatment. All other scenarios explored in sensitivity analysis had no impact on the cost-effectiveness of active treatments relative to no treatment.

Table 88. Results of deterministic sensitivity analysis. OHID cost set – NHS/PSS perspective

Base-case deterministic analysis		Starting age of cohort = 47 years		PGSI score at treatment initiation = 17		PGSI score at initiation = 27	
Treatment	**NMB**	**Treatment**	**NMB**	**Treatment**	**NMB**	**Treatment**	**NMB**
CBT group	£29548	CBT group	£29396	CBT group	£29630	No treatment	£28888
No treatment	£29252	MI	£29052	MI	£29320	CBT group	£28847
MI	£29241	No treatment	£29051	No treatment	£29319	MI	£28762
Guided SH	£29032	Guided SH	£28835	Guided SH	£29104	Guided SH	£28625
Counselling	£28877	Counselling	£28694	Counselling	£28959	Counselling	£28347
CBT individual	£28780	CBT individual	£28602	CBT individual	£28864	CBT individual	£28207
BT individual	£28723	BT individual	£28546	BT individual	£28807	BT individual	£28137
SD = 5.5		**20% reduction in probability of remission**		**20% reduction in risk of relapse**		**50% increase in PG costs**	
Treatment	**NMB**	**Treatment**	**NMB**	**Treatment**	**NMB**	**Treatment**	**NMB**
CBT group	£29644	CBT group	£29489	CBT group	£29692	CBT group	£29312
MI	£29323	MI	£29147	MI	£29325	MI	£28953
No treatment	£29322	No treatment	£29146	No treatment	£29316	No treatment	£28947
Guided SH	£29107	Guided SH	£28930	Guided SH	£29103	Guided SH	£28733
Counselling	£28964	Counselling	£28788	Counselling	£28971	Counselling	£28597
CBT individual	£28870	CBT individual	£28696	CBT individual	£28882	CBT individual	£28508
BT individual	£28813	BT individual	£28640	BT individual	£28828	BT individual	£28453
Gamma distribution of post-treatment PGSI scores		**Log-normal distribution of post-treatment PGSI scores**					
Treatment	**NMB**	**Treatment**	**NMB**				
CBT group	£29617	CBT group	£29670				
MI	£29266	MI	£29270				
No treatment	£29227	No treatment	£29202				
Guided SH	£29026	Guided SH	£29011				
Counselling	£28922	Counselling	£28939				
CBT individual	£28839	CBT individual	£28867				
BT individual	£28785	BT individual	£28816				

Results shown only for scenarios that changed the cost-effectiveness of active treatments relative to no treatment.
In each scenario, no treatment is highlighted in yellow; treatments highlighted in green are more cost-effective than no treatment; treatments highlighted in orange are less cost-effective than no treatment.
BT: behavioural therapy; CBT: cognitive behavioural therapy; MI: motivational interviewing; NMB: net monetary benefit; PG: problem gambling; SH: self-help

When lifetime QALY losses resulting from completed suicide events were included in the analysis, motivational interviewing became the second most cost-effective option, just above no treatment. The other treatment options remained less cost-effective than no treatment (Table 89).

Table 89. Results of scenario analysis that included lifetime QALY losses due to suicide. OHID cost set – NHS/PSS perspective

Treatment	Mean per person				
	NMB	QALYs			Total cost
		Gained	Lost due to suicide	Total	
CBT group	£28384	1.523	-0.057	1.466	£933
Motivational interviewing	£27813	1.502	-0.073	1.429	£769
No treatment	£27699	1.494	-0.079	1.416	£612
Guided self-help	£27546	1.497	-0.076	1.421	£879
Counselling individual	£27529	1.506	-0.070	1.437	£1203

Treatment	Mean per person				
	NMB	QALYs			Total cost
		Gained	Lost due to suicide	Total	
CBT individual	£27435	1.508	-0.068	1.440	£1375
BT individual	£27404	1.510	-0.067	1.443	£1449

BT: behavioural therapy; CBT: cognitive behavioural therapy; NMB: net monetary benefit; PG: problem gambling; QALY: quality-adjusted life year

Use of OHID cost set – Public sector perspective

Results are shown in Table 90. Treatments are ordered from the most to the least cost-effective. Group CBT was the most cost-effective treatment, followed by motivational interviewing and then no treatment. All other treatments were less cost-effective than no treatment. The probability of group CBT being the most cost-effective option at the NICE lower threshold of £20000/QALY was 0.76.

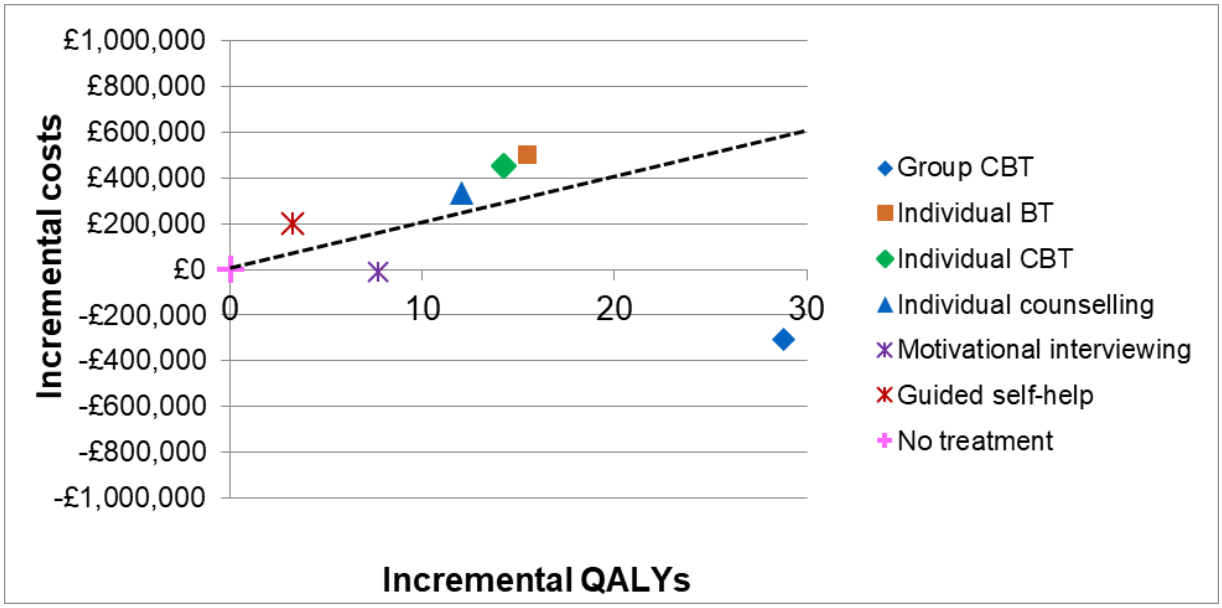
Table 90. Results of economic modelling. OHID cost set – Public sector perspective

Treatment	Mean per person						Mean ranking (95%CI)
	NMB	QALYs	Cost				
			Interv	PG	Suic	Total	
CBT group	£27549	1.523	£453	£2450	£8	£2911	1.40 (1 to 4)
Motivational interviewing	£26833	1.502	£192	£3002	£10	£3205	3.39 (1 to 6)
No treatment	£26666	1.494	£0	£3206	£11	£3217	4.07 (2 to 7)
Counselling individual	£26577	1.506	£646	£2892	£10	£3548	4.51 (1 to 7)
Guided self-help	£26536	1.497	£283	£3119	£11	£3412	4.83 (2 to 7)
CBT individual	£26500	1.508	£829	£2830	£10	£3668	4.92 (2 to 7)
BT individual	£26478	1.510	£908	£2798	£10	£3716	4.87 (1 to 7)

BT: behavioural therapy; CBT: cognitive behavioural therapy; Interv: intervention; NMB: net monetary benefit; PG: problem gambling; QALY: quality-adjusted life year; Suic: suicide

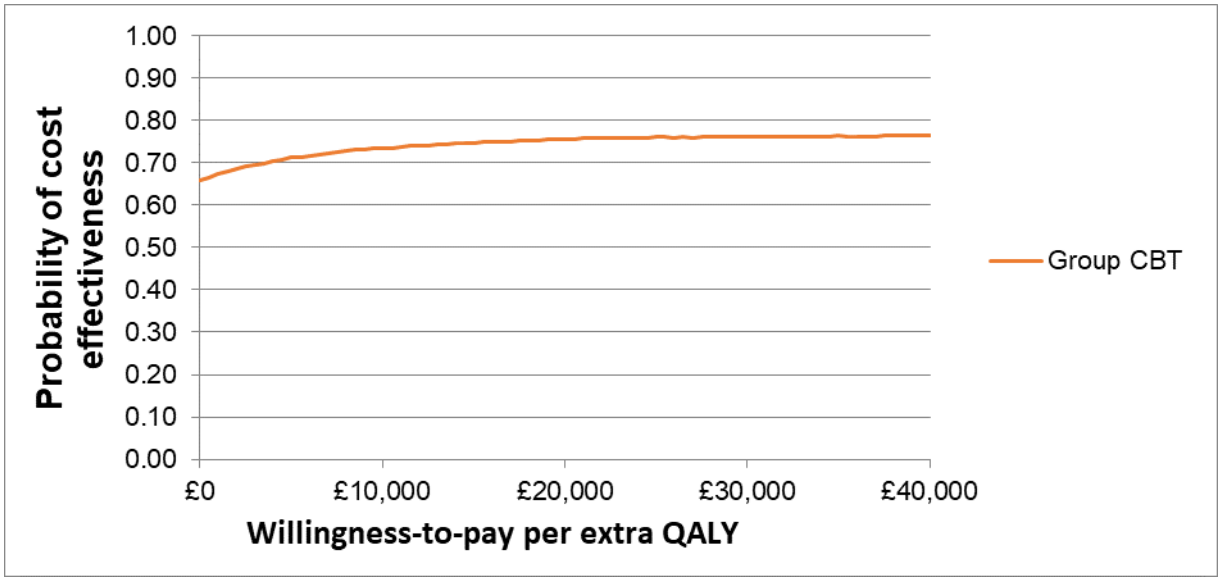
Figure 10 provides the cost effectiveness plane. The CEAF of the analysis is shown in Figure 11. Group CBT is the most cost-effective option at any cost-effectiveness threshold, with a high probability that exceeds 0.65 at any threshold.

Figure 10. Cost-effectiveness plane. OHID cost set – Public sector perspective



Results for 1,000 adults experiencing problem gambling
BT: behavioural therapy; CBT: cognitive behavioural therapy; QALY: quality-adjusted life year

Figure 11. Cost-effectiveness acceptability frontier. OHID cost set – Public sector perspective



CBT: cognitive behavioural therapy; QALY: quality-adjusted life year

Results were robust to most scenarios explored through deterministic sensitivity analysis (Table 91). When the gambling symptom severity at treatment initiation increased and the PGSI score was set at ≥25, group CBT was the only cost-effective treatment compared with no treatment. All active treatments except guided self-help became more cost-effective than no treatment when costs associated with problem gambling increased by 50%, and when a gamma or log-normal distribution was assumed for the post-treatment PGSI scores. All other scenarios explored in sensitivity analysis had no impact on the cost-effectiveness of active treatments relative to no treatment.

Table 91. Results of deterministic sensitivity analysis. OHID cost set – Public sector perspective

Base-case deterministic analysis	PGSI score at initiation = 25	50% increase in PG costs

Treatment	NMB	Treatment	NMB	Treatment	NMB
CBT group	£27588	CBT group	£26554	CBT group	£26374
MI	£26776	No treatment	£26041	MI	£25258
No treatment	£26624	MI	£26020	CBT individual	£25048
Counselling	£26494	Guided SH	£25813	BT individual	£25028
CBT individual	£26472	Counselling	£25665	Counselling	£25025
Guided SH	£26462	CBT individual	£25584	No treatment	£25008
BT individual	£26438	BT individual	£25534	Guided SH	£24880

Gamma distribution of post-treatment PGSI scores		Log-normal distribution of post-treatment PGSI scores	
Treatment	NMB	Treatment	NMB
CBT group	£27804	CBT group	£27921
MI	£26885	MI	£26900
CBT individual	£26655	CBT individual	£26719
Counselling	£26646	BT individual	£26700
BT individual	£26630	Counselling	£26688
No treatment	£26627	No treatment	£26584
Guided SH	£26504	Guided SH	£26480

Results shown only for scenarios that changed the cost-effectiveness of active treatments relative to no treatment.
In each scenario, no treatment is highlighted in yellow; treatments highlighted in green are more cost-effective than no treatment; treatments highlighted in orange are less cost-effective than no treatment.
BT: behavioural therapy; CBT: cognitive behavioural therapy; MI: motivational interviewing; NMB: net monetary benefit; PG: problem gambling; SH: self-help

When lifetime QALY losses resulting from completed suicide events were included in the analysis, all treatments except guided self-help became more cost-effective than no treatment. The order of treatments in order of cost-effectiveness was group CBT, motivational interviewing, individual counselling, individual CBT, individual behavioural therapy, no treatment and guided self-help (Table 92).

Table 92. Results of scenario analysis that included lifetime QALY losses due to suicide. OHID cost set – Public sector perspective

Treatment	Mean per person				
	NMB	QALYs			Total cost
		Gained	Lost due to suicide	Total	
CBT group	£26407	1.523	-0.057	1.466	£2911
Motivational interviewing	£25376	1.502	-0.073	1.429	£3205
Counselling individual	£25184	1.506	-0.070	1.437	£3548
CBT individual	£25141	1.508	-0.068	1.440	£3668
BT individual	£25137	1.510	-0.067	1.443	£3716
No treatment	£25094	1.494	-0.079	1.416	£3217
Guided self-help	£25013	1.497	-0.076	1.421	£3412

BT: behavioural therapy; CBT: cognitive behavioural therapy; NMB: net monetary benefit; PG: problem gambling; QALY: quality-adjusted life year

Use of NIESR cost set – NHS/PSS perspective

Results are shown in Table 93. Group CBT was the most cost-effective treatment, followed by motivational interviewing and then no treatment. All other treatments were less cost-effective than no treatment. The probability of group CBT being the most cost-effective option at the NICE lower threshold of £20,000/QALY was 0.73.

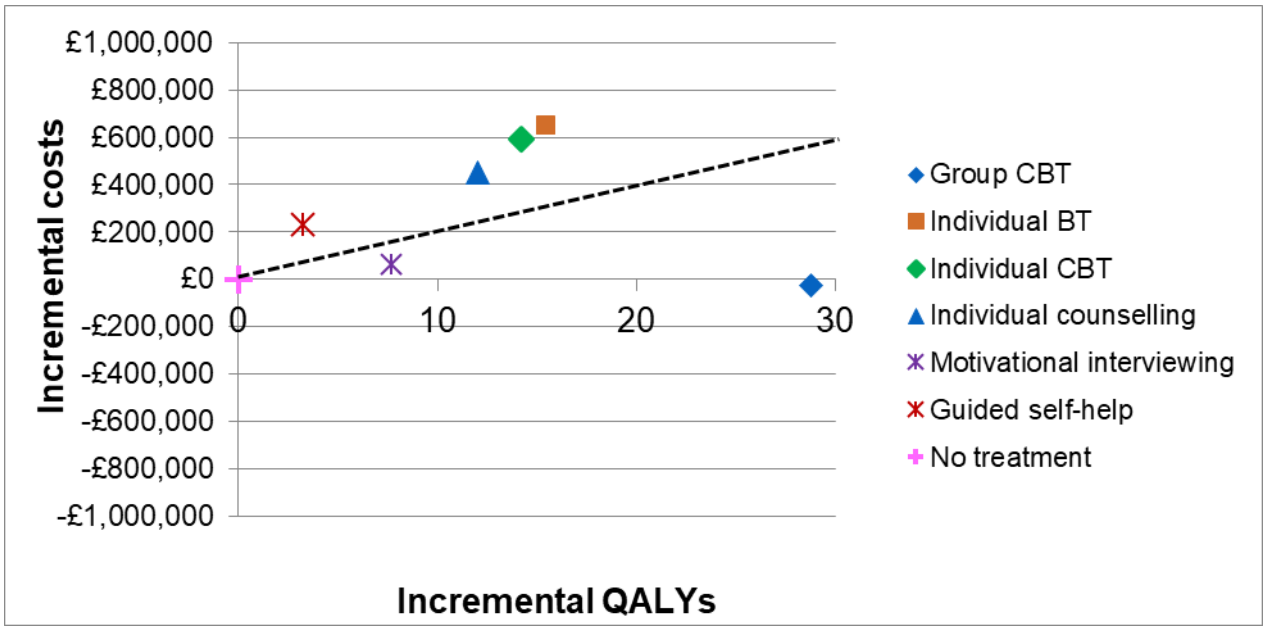
Table 93. Results of economic modelling. NIESR cost set – NHS/PSS perspective

Treatment	Mean per person						Mean ranking (95%CI)
	NMB	QALYs	Cost				
			Interv	PG	Suic	Total	
CBT group	£28522	1.523	£453	£1482	£4	£1938	1.46 (1 to 4)
Motivational interviewing	£28011	1.502	£193	£1829	£5	£2026	3.23 (1 to 6)
No treatment	£27922	1.494	£0	£1956	£5	£1961	3.63 (1 to 7)
Guided self-help	£27759	1.497	£283	£1902	£5	£2190	4.67 (2 to 7)
Counselling individual	£27716	1.506	£646	£1758	£4	£2409	4.65 (1 to 7)
CBT individual	£27615	1.508	£829	£1721	£4	£2553	5.20 (2 to 7)
BT individual	£27579	1.510	£908	£1702	£4	£2614	5.17 (1 to 7)

BT: behavioural therapy; CBT: cognitive behavioural therapy; Interv: intervention; NMB: net monetary benefit; PG: problem gambling; QALY: quality-adjusted life year; Suic: suicide

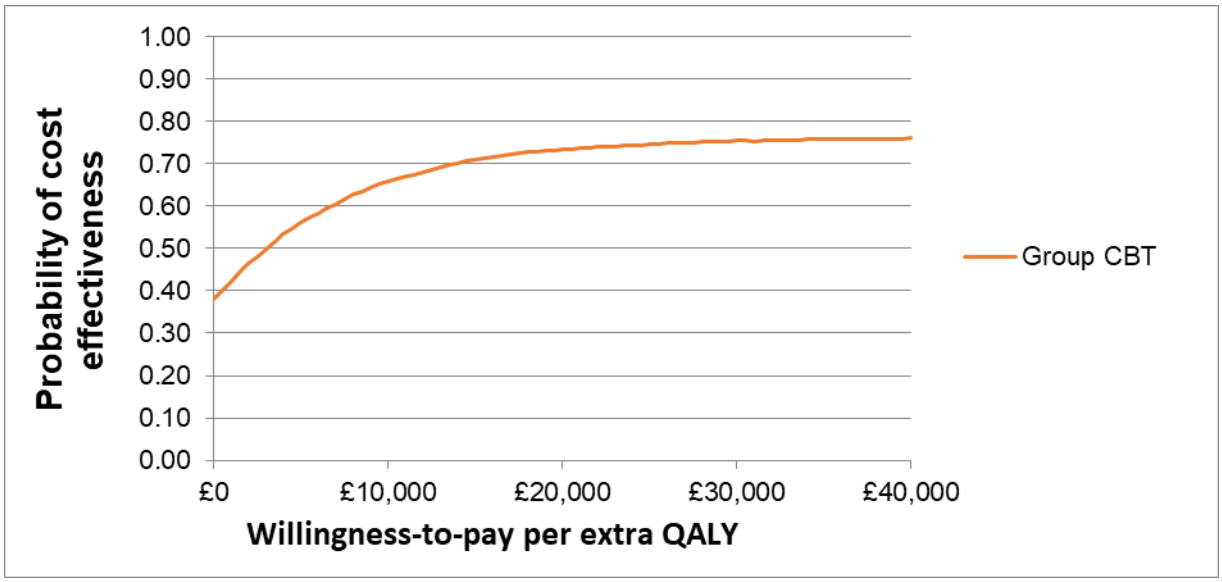
Figure 12 provides the cost effectiveness plane. The CEAF of the analysis is shown in Figure 13. Group CBT is the most cost-effective option at any cost-effectiveness threshold, with a probability that starts at around 0.40 at a zero cost-effectiveness threshold, reaching 0.73 at a £20,000/QALY threshold.

Figure 12. Cost-effectiveness plane. NIESR cost set – NHS/PSS perspective



Results for 1,000 adults experiencing problem gambling
BT: behavioural therapy; CBT: cognitive behavioural therapy; QALY: quality-adjusted life year

Figure 13. Cost-effectiveness acceptability frontier. NIESR cost set – NHS/PSS perspective



CBT: cognitive behavioural therapy; QALY: quality-adjusted life year

Results were robust under all scenarios explored through deterministic sensitivity analysis (Table 94), with one exception: when gambling symptom severity at treatment initiation increased and the PGSI score was set at ≥23, group CBT was the only cost-effective treatment compared with no treatment. All other scenarios explored in sensitivity analysis had no impact on the cost-effectiveness of active treatments relative to no treatment.

Table 94. Results of deterministic sensitivity analysis. NIESR cost set – NHS/PSS perspective

Base-case deterministic analysis		PGSI score at initiation = 23	
Treatment	**NMB**	**Treatment**	**NMB**
CBT group	£28,554	CBT group	£27,959
MI	£27,970	No treatment	£27,525
No treatment	£27,892	MI	£27,505
Guided SH	£27,703	Guided SH	£27,299
Counselling	£27,651	Counselling	£27,147
CBT individual	£27,595	CBT individual	£27,060
BT individual	£27,550	BT individual	£27,007

Results shown only for scenarios that changed the cost-effectiveness of active treatments relative to no treatment.
In each scenario no treatment is highlighted in yellow; treatments highlighted in green are more cost-effective than no treatment; treatments highlighted in orange are less cost-effective than no treatment.
BT: behavioural therapy; CBT: cognitive behavioural therapy; MI: motivational interviewing; NMB: net monetary benefit; PG: problem gambling; SH: self-help

Considering lifetime QALY losses resulting from completed suicide did not have an impact on the results. Group CBT remained the most cost-effective option, followed by motivational interviewing and no treatment. The other treatments remained less cost-effective than no treatment (Table 95).

Table 95. Results of scenario analysis that included lifetime QALY losses due to suicide. NIESR cost set – NHS/PSS perspective

Treatment	Mean per person				
	NMB	QALYs			Total cost
		Gained	Lost due to suicide	Total	
CBT group	£27379	1.523	-0.057	1.466	£1938
Motivational interviewing	£26555	1.502	-0.073	1.429	£2026

Treatment	Mean per person				
	NMB	QALYs			Total cost
		Gained	Lost due to suicide	Total	
No treatment	£26350	1.494	-0.079	1.416	£1961
Counselling individual	£26323	1.506	-0.070	1.437	£2409
CBT individual	£26256	1.508	-0.068	1.440	£2553
BT individual	£26239	1.510	-0.067	1.443	£2614
Guided self-help	£26235	1.497	-0.076	1.421	£2190

BT: behavioural therapy; CBT: cognitive behavioural therapy; NMB: net monetary benefit; PG: problem gambling; QALY: quality-adjusted life year

Use of NIESR cost set – Public sector perspective

Results are shown in Table 96. Group CBT was the most cost-effective treatment, followed by motivational interviewing, individual counselling, individual behavioural therapy, individual CBT, and no treatment. Guided self-help was less cost-effective than no treatment. The probability of group CBT being the most cost-effective option at the NICE lower threshold of £20000/QALY was 0.76.

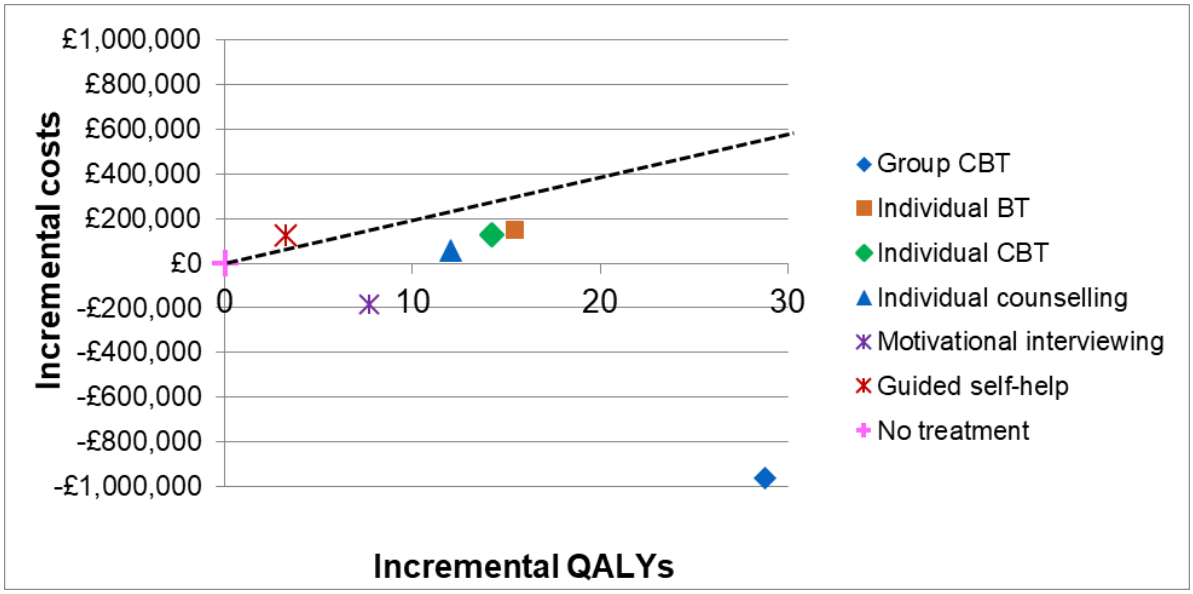
Table 96. Results of economic modelling. NIESR cost set – Public sector perspective

Treatment	Mean per person						Mean ranking (95%CI)
	NMB	QALYs	Cost				
			Interv	PG	Suic	Total	
CBT group	£25630	1.523	£453	£4369	£8	£4830	1.39 (1 to 4)
Motivational interviewing	£24443	1.502	£192	£5392	£10	£5594	3.68 (1 to 7)
Counselling individual	£24285	1.506	£646	£5183	£10	£5839	4.36 (1 to 7)
BT individual	£24261	1.510	£908	£5015	£10	£5932	4.39 (1 to 7)
CBT individual	£24259	1.508	£829	£5071	£10	£5909	4.40 (2 to 7)
No treatment	£24105	1.494	£0	£5767	£11	£5778	4.72 (2 to 7)
Guided self-help	£24048	1.497	£283	£5606	£11	£5900	5.06 (2 to 7)

BT: behavioural therapy; CBT: cognitive behavioural therapy; Interv: intervention; NMB: net monetary benefit; PG: problem gambling; QALY: quality-adjusted life year; Suic: suicide

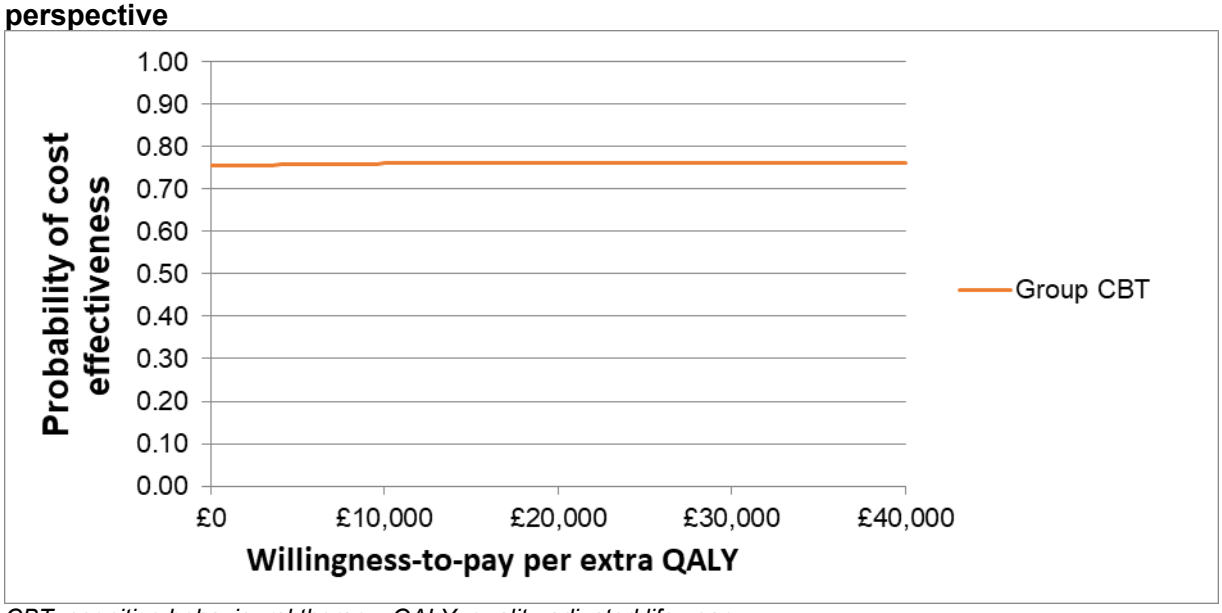
Figure 14 provides the cost effectiveness plane. The CEAF of the analysis is shown in Figure 15. Group CBT is the most cost-effective option at any cost-effectiveness threshold, with a high probability of 0.75 that is independent of the value of the cost-effectiveness threshold.

Figure 14. Cost-effectiveness plane. NIESR cost set – Public sector perspective



Results for 1,000 adults experiencing problem gambling
BT: behavioural therapy; CBT: cognitive behavioural therapy; QALY: quality-adjusted life year

Figure 15. Cost-effectiveness acceptability frontier. NIESR cost set – Public sector perspective



CBT: cognitive behavioural therapy; QALY: quality-adjusted life year

Results were sensitive to an increase in the PGSI score at treatment initiation, a reduction in the SD (spread) around the PGSI score, and a 50% decrease in costs associated with PGSI (Table 97). When the PGSI score at treatment initiation was increased to 21, then three treatments were cost-effective versus no treatment: group CBT, followed by motivational interviewing and individual CBT. Between a PGSI score of 22 and 26 at treatment initiation, group CBT followed by motivational interviewing were cost-effective versus no treatment. At a PGSI score of 27 at treatment initiation, only group CBT was cost-effective versus no treatment. When the SD around the PGSI score was reduced to 3.6, counselling became less cost-effective than no treatment; when it was further reduced to 3.5, individual behavioural therapy was no longer cost-effective versus no treatment; and when it was reduced to 3.4, only group CBT followed by motivational interviewing was cost-effective versus no treatment. A 50% reduction of costs resulted in group CBT, followed by motivational interviewing, being the only active treatments that were cost-effective versus no

treatment. All other scenarios explored in sensitivity analysis had no impact on the cost-effectiveness of active treatments relative to no treatment.

Table 97. Results of deterministic sensitivity analysis. NIESR cost set – Public sector perspective

Base-case deterministic analysis		PGSI score at treatment initiation = 21		PGSI score at treatment initiation = 22		PGSI score at initiation = 27	
Treatment	**NMB**	**Treatment**	**NMB**	**Treatment**	**NMB**	**Treatment**	**NMB**
CBT group	£25687	CBT group	£25032	CBT group	£24811	CBT group	£23788
MI	£24359	MI	£23804	MI	£23644	No treatment	£23054
CBT individual	£24215	CBT individual	£23591	No treatment	£23469	MI	£23053
BT individual	£24205	No treatment	£23591	CBT individual	£23402	Guided SH	£22832
Counselling	£24160	BT individual	£23573	Counselling	£23389	Counselling	£22714
No treatment	£24040	Counselling	£23565	BT individual	£23381	CBT individual	£22652
Guided SH	£23936	Guided SH	£23445	Guided SH	£23309	BT individual	£22609
SD = 3.4		**SD = 3.5**		**SD = 3.6**		**50% reduction in PG costs**	
Treatment	**NMB**	**Treatment**	**NMB**	**Treatment**	**NMB**	**Treatment**	**NMB**
CBT group	£24957	CBT group	£25022	CBT group	£25084	CBT group	£27852
MI	£23753	MI	£23802	MI	£23849	MI	£27086
No treatment	£23549	CBT individual	£23589	CBT individual	£23644	No treatment	£26948
CBT individual	£23532	No treatment	£23586	BT individual	£23627	Counselling	£26796
BT individual	£23514	BT individual	£23572	No treatment	£23623	Guided SH	£26781
Counselling	£23510	Counselling	£23564	Counselling	£23615	CBT individual	£26767
Guided SH	£23400	Guided SH	£23442	Guided SH	£23483	BT individual	£26731

Results shown only for scenarios that changed the cost-effectiveness of active treatments relative to no treatment.
In each scenario no treatment is highlighted in yellow; treatments highlighted in green are more cost-effective than no treatment; treatments highlighted in orange are less cost-effective than no treatment.
BT: behavioural therapy; CBT: cognitive behavioural therapy; MI: motivational interviewing; NMB: net monetary benefit; PG: problem gambling; SH: self-help

When lifetime QALY losses resulting from completed suicide events were included in the analysis, the ranking of treatments in places 3-5 changed. Group CBT remained the most cost-effective option followed by motivational interviewing, individual behavioural therapy, individual CBT, individual counselling, and then no treatment. Guided self-help remained less cost-effective than no treatment (Table 98).

Table 98. Results of scenario analysis that included lifetime QALY losses due to suicide. NIESR cost set – Public sector perspective

Treatment	Mean per person				
	NMB	QALYs			Total cost
		Gained	Lost due to suicide	Total	
CBT group	£24487	1.523	-0.057	1.466	£1938
Motivational interviewing	£22987	1.502	-0.073	1.429	£2026
BT individual	£22921	1.510	-0.067	1.443	£2614
CBT individual	£22900	1.508	-0.068	1.440	£2553
Counselling individual	£22893	1.506	-0.070	1.437	£2409
No treatment	£22533	1.494	-0.079	1.416	£1961
Guided self-help	£22525	1.497	-0.076	1.421	£2190

BT: behavioural therapy; CBT: cognitive behavioural therapy; NMB: net monetary benefit; PG: problem gambling; QALY: quality-adjusted life year

Discussion – conclusions, strengths and limitations of economic analysis

The economic analysis conducted to inform this guideline assessed the cost effectiveness of a range of psychological and psychosocial treatments for adults experiencing problem gambling. The range of assessed treatments was determined by the availability of efficacy data obtained from the NMA that was conducted to inform this guideline. Only treatments showing a higher mean effect than no treatment in the outcome of gambling symptom severity were included in the analysis. Gambling symptom severity in the study population was represented by PGSI scores; this was decided because PGSI scores have been used to determine gambling symptom severity states (PGSI score 8+ for problem gambling; PGSI score 3-7 for moderate risk of problem gambling; PGSI score 1-2 for low risk of problem gambling; PGSI score 0 for no risk of problem gambling), which, in turn, have been linked to utility values and costs associated with harmful gambling in the published literature. The analysis considered two different perspectives, a NHS/PSS perspective, recommended for the NICE reference case, and a public sector perspective, as the largest part of costs incurred by people experiencing gambling-related harms is borne to wider public sector services, beyond NHS/PSS (for example, costs relating to the criminal justice system, housing and unemployment). Two sets of costs were used in separate probabilistic analyses, obtained from two recent UK reports: the 'OHID' cost set (Office for Health Improvement and Disparities, 2023) and the 'NIESR' cost set (Bhattacharjee et al., 2023). Extensive deterministic sensitivity analysis tested alternative values and model assumptions. Parameters tested through deterministic sensitivity analysis included the study cohort's starting age, gender mix and gambling symptom severity (PGSI score) at treatment initiation, the SD value (spread) around the PGSI scores and the type of distribution of post-treatment PGSI scores (from normal, which was assumed in the base-case analysis, to gamma or log-normal, which are positively skewed), the annual probabilities of remission and relapse in the 2 years after end of treatment, the costs associated with gambling-related harms, and the NHS cost to family and/or friends associated with bereavement following a completed suicide. Moreover, a probabilistic scenario analysis included the lifetime QALY loss associated with completed suicides in the estimation of total QALYs of each treatment option.

Group CBT was the most cost-effective treatment and more cost-effective than no treatment under all perspectives, cost sets used, sensitivity and scenario analyses, with one single exception: under a NHS/PSS scenario, using the OHID cost set and assuming a PGSI score of 27 at treatment initiation (which reflects the highest gambling symptom severity captured by PGSI), group CBT was less cost-effective than no treatment (but still ranked in a higher position than the other active treatment options). Its probability of being the most cost-effective option exceeded 0.60 under all perspectives and cost sets used.

Motivational interviewing was the second most cost-effective treatment, following group CBT, and more cost-effective than no treatment in the majority of analyses. This result was sensitive to the initial PGSI score and the perspective and magnitude of the costs associated with gambling-related harms: a higher gambling symptom severity, represented by higher PGSI scores, and lower costs associated with gambling-related harms led to motivational interviewing becoming less cost-effective than no treatment. This was observed in the following analyses: use of the OHID cost set under a NHS/PSS perspective, both in the base-case analysis and when the PGSI score at initiation was 27; use of the OHID cost set under a public sector perspective, when the PGSI score at initiation was ≥25; use of the NIESR cost set under a NHS/PSS perspective, when the PGSI score at initiation was ≥23.

The other individual high intensity treatments (individual CBT, individual behavioural therapy, counselling) were less cost-effective than no treatment in all scenarios tested under a NHS/PSS perspective, apparently because their clinical effectiveness and the associated cost-savings resulting from a reduction in gambling symptom severity were not high enough to offset their higher intervention costs compared with other treatment options. However, they were more cost-effective than no treatment in several analyses conducted under a public

sector perspective, which accounted for higher cost-savings to the public sector resulting from provision of these treatments that were adequate to offset their intervention costs. Individual high intensity treatments were cost-effective compared with no treatment in the following scenarios tested under a public sector perspective: a. using the OHID cost set, when a 50% increase in costs associated with gambling-related harms was assumed, when a gamma or log-normal distribution of post-treatment PGSI scores was assumed, and when lifetime QALY losses due to completed suicide were included in the estimation of total QALYs; b. using the NIESR cost set (the reported costs of which were higher than the OHID set reported respective costs), in the base-case analysis and most sensitivity analyses, except when a 50% reduction in harmful gambling-related costs was assumed, when a high PGSI score at treatment initiation was assumed (≥21-22) and when a low SD (spread) around PGSI scores was assumed (≤3.5-3.6).

Guided self-help was not cost-effective relative to no treatment under any analysis (probabilistic or deterministic).

The analysis utilised clinical effectiveness parameters derived from the guideline NMA. This methodology enabled evidence synthesis from both direct and indirect comparisons between interventions, and allowed simultaneous inference on all treatments examined in pair-wise trial comparisons while respecting randomisation (Caldwell 2005; Lu & Ades 2004). The quality and limitations of RCTs considered in the NMA have unavoidably impacted on the quality of the economic model clinical input parameters. For example, economic results may have been affected by reporting and publication bias.

The economic model did not consider treatment discontinuation in the model structure. However, for the NMA that informed the economic analysis, ITT continuous data were extracted, where available, and, where this was not possible, completer data were adjusted assuming baseline observation carried forward (BOCF). This means that discontinuation has been implicitly taken into account in the economic model outcomes. Moreover, the analysis took into account the completion rates of the interventions assessed in the RCTs included in the NMA, so that the number of sessions reflected, to some extent, the attrition rates characterising each treatment.

PGSI scores were used to express gambling symptom severity in the model and determine harmful gambling-related health states, for convenience, as harmful gambling-related health states determined by PGSI scores have been linked to utility values and costs. It is, however, acknowledged that PGSI was originally designed as a population level tool and not as a clinical scale that aims to measure gambling symptom severity. Using PGSI scores to assess post-treatment gambling symptom severity may be in principle problematic in clinical practice or research, as PGSI is designed to measure gambling behaviour over the last 12 months, and this would lead to capturing symptoms over a period often long before treatment initiation; however, RCTs that have used PGSI to assess the severity of post-treatment gambling symptoms tend to utilise modified versions of PGSI, capturing shorter periods of time such as over the last 3 months or even over the last 4 weeks. In any case, this issue is not directly relevant to the model and does not constitute a limitation of the model per se, since the model ‘translated’ post-treatment gambling symptom severity (as reflected in SMDs obtained from the guideline NMA) into (modelled) PGSI scores reflecting post-treatment symptoms, rather than the opposite (using real PGSI scores to measure post-treatment gambling symptom severity).

The base-case analysis assumed a normal distribution around post-treatment PGSI scores (around the post-treatment gambling symptom severity). However, it is likely that post-treatment symptoms are positively skewed, and for this reason sensitivity analysis tested gamma and log-normal distributions. Results were partially affected by the use of alternative types of distributions. It needs to noted that, at the level of post-treatment severity modelled (around a mean post-treatment PGSI score of 8-11), a normal distribution appeared to be the most conservative assumption, in the sense that a higher proportion of people in each cohort

were allocated at or above the PGSI cut-off score of 8 (that reflects problem gambling) using a normal distribution, compared with the other two (gamma or log-normal) distributions, despite the latter two allowing for positive skewness.

The change in the PGSI score over 3 months for no treatment (reference treatment) was estimated using results of a mixed methods regression model reported by a Canadian study that examined the trajectory of gambling symptom severity over a 18-month period, among a sample of non-treatment seeking/attending problem gamblers recruited from the community interested in quitting or reducing gambling (Kushnir 2018). The annual probabilities of remission and relapse to problem gambling after the end of treatment were taken from a longitudinal 2-year French study that aimed to assess changes in problem gambling behaviour, which recruited participants from an outpatient addiction treatment centre, gambling establishments and through the press (Bruneau 2016). Data on mortality associated with gambling-related harms were taken from a Swedish nationwide register study on people with gambling disorder who attended the Swedish inpatient and/or outpatient specialist health care system in 2005–2016. Application of mortality data derived from people with gambling disorder on people with problem gambling (which has a lower threshold) may have modestly overestimated the mortality of people who experience problem gambling in the model. However, this was unavoidable as no mortality data specific to people experiencing problem gambling were identified. This is acknowledged as a potential limitation of the analysis, as the data are not directly applicable to the UK population.

Utility data used in the economic model were derived from a systematic review of studies reporting utility data for harmful gambling-related health states. The review included three studies, all of which reported SF-6D utility data. One study (Moayeri 2020) reported utility data that were directly applicable to the model health states (problem gambling, at moderate risk of problem gambling, at low risk of problem gambling, at no risk of problem gambling) using the UK algorithm to obtain SF-6D utility values. Therefore, this study was selected to inform the guideline economic analysis.

Intervention costs were estimated based on relevant information provided in the studies included in the NMA supplemented by the committee's expert opinion, in order to reflect routine NHS practice.

Excess NHS/PSS costs and costs borne to the wider public sector, beyond NHS/PSS, associated with gambling-related harms, were obtained from 2 recent UK studies. The two cost sets, the 'OHID' (Office for Health Improvement and Disparities, 2023) and the 'NIESR' (Bhattacharjee 2023) were not combined but were used to inform separate analyses, as each report used different approaches, sources and methodologies to estimate costs and there might be some overlap in the estimated costs (which might lead to double-counting of costs if the two cost sets were combined in one analysis). The OHID cost set included costs associated with treatment of depression, alcohol dependence and illicit drug use (utilised in both the NHS/PSS and the public sector perspective), as well as costs associated with statutory homeless services, unemployment benefits, and costs associated with imprisonment associated with problem gambling (utilised in the public sector perspective). The NIESR cost set included NHS costs of mental health consultations and hospitalisation (utilised in both the NHS/PSS and the public sector perspective), and also crime costs (police call out and court), homelessness support, and universal credit (utilised in the public sector perspective). Both reports acknowledged that their estimated reported excess costs are associated with harmful gambling, but it was not possible to determine whether there was causal association between harmful gambling and the estimated costs. Both reports also acknowledged that their total cost estimates associated with gambling-related harms are likely to be underestimates, as not all relevant costs were possible to estimate, due to lack of appropriate data. The OHID report authors attributed their underestimation of costs to the fact that some cost categories were exclusively estimated for people engaging in problem gambling (and not for at-risk gambling). Also, most harms were costed only partially (such as financial, health, crime, education and work harms), while others were not costed at all (such

as relationships, cultural harms and the impacts on relations and families). The NIESR report authors emphasised that in the estimation of costs associated with problem gambling they did not include a number of metrics that were not found to be statistically significant given the currently publicly available public data, including impacts on the relationships of those experiencing problem gambling and wider impacts on families, friends affected others. As a result, the reported cost figures did not incorporate financial problems such as debt and higher costs of borrowing, more exposure to risks by lower insurance coverage, lower savings and lower pensions contributions, as well as the 'poverty premium' of having to spend more on necessities.

Costs relating to reduced performance at work or study, crime, cultural harms, healthcare costs associated with suicide attempts, anxiety and stress, non-suicidal self-harm, other mental and physical health conditions to the person experiencing problem gambling and/or their family, friends and close others were either not estimated or partly estimated in the two reports. Excess costs to the individual, their family and close others, such as financial harms and bankruptcy or debt, lower financial inclusion (inability to access affordable financial products and services), limited or no financial planning, as well as intangible costs such as physical, emotional or psychological distress, relationship breakdown or problems and wider impacts on the families of gamblers, were not estimated in either report, due to lack of relevant data. A range of these costs fall outside a NHS/PSS or a public sector perspective, so they would not be included in the estimation of costs in the guideline economic analysis, but should nevertheless be qualitatively considered when making recommendations. Moreover, as noted in the NIESR report, the estimated costs are an underestimate of the full fiscal costs associated with harmful gambling because they do not include costs associated with provision of support by the third sector to those experiencing problem gambling, which substitutes state assistance which is currently limited and not adequate to cover the needs of this population.

Costs associated with completed suicides, including NHS, coroner and police call out costs as well as NHS costs incurred by family and/or friends (relating to bereavement) were not considered by either the OHID or the NIESR report, but were possible to obtain from another NICE guideline on preventing suicide in community and custodial settings (NICE 2018) and include in the economic analysis, either in base-case or sensitivity analyses.

The time horizon of the analysis was 2 years, which was considered adequate to capture longer terms and costs associated with gambling-related harms following a course of treatment, without significant extrapolation beyond available evidence.

Overall conclusions from the guideline economic analysis

The guideline economic analysis suggests that group CBT is the most cost-effective treatment option for adults experiencing problem gambling, followed by motivational interviewing. Individual high intensity treatments such as individual CBT, individual behavioural therapy and counselling are also likely to be cost-effective compared with no treatment under a public sector perspective, especially considering that the public sector cost estimates utilised in the model are likely to be an underestimate of the true costs associated with gambling-related harms. These results were overall robust under different scenarios tested in sensitivity analysis.

References

Bhattacharjee A, Dolton P, Mosley M, Pabst A (2023) The Fiscal Costs and Benefits of Problem Gambling: Towards Better Estimates. London: National Institute of Economic and Social Research. Available from: https://www.niesr.ac.uk/projects/measuring-benefits-and-costs-gambling-focus-costs-gambling-related-harm [Accessed 16 May 2023]

Brazier J, Roberts J, Deverill M (2002) The estimation of a preference-based measure of health from the SF-36. Journal of Health Economics 21(2), 271-92

Brazier JE, Roberts J (2004) The estimation of a preference-based measure of health from the SF-12. Med Care 42:851-9.

Browne M, Russell AMT, Begg S, Rockloff MJ, Li E, Rawat V, Hing N (2022) Benchmarking gambling screens to health-state utility: the PGSI and the SGHS estimate similar levels of population gambling-harm. BMC Public Health 22(1): 839

Briggs A, Sculpher M, Claxton K (2006) Decision Modelling for Health Economic Evaluation. New York, NY: Oxford University Press

British Association for Behavioural & Cognitive Psychotherapies (2022) Criteria and guidelines for re-accreditation as a behavioural and/or cognitive psychotherapist. Available from: https://babcp.com/Accreditation/Reaccreditation/Reaccreditation-Guidelines

Brooks R (1996) EuroQol: the current state of play. Health Policy 37(1), 53-72

Bruneau M, Grall-Bronnec M, Venisse JL, Romo L, Valleur M, Magalon D (2016) Gambling transitions among adult gamblers: A multi-state model using a Markovian approach applied to the JEU cohort. Addictive Behaviors, 57, 13–20.

Caldwell DM, Ades AE, Higgins JP (2005) Simultaneous comparison of multiple treatments: combining direct and indirect evidence. BMJ 331(7521), 897-900

Comans T, Visser V, Scuffham P (2013) Cost effectiveness of a community-based crisis intervention program for people bereaved by suicide. Crisis, 34(6), 390-7.

Dolan P (1997) Modeling valuations for EuroQol health states. Medical Care 35(11), 1095-108.

Eniss K, Pollit V (2018) National Institute for Health and Care Excellence. Preventing Suicide in Community and Custodial Settings. Economic model report. York: York Health Economics Consortium.

Fenwick E, Claxton K, Sculpher M (2001) Representing uncertainty: the role of cost-effectiveness acceptability curves. Health Economics 10(8), 779-87

GambleAware (2022) Annual Statistics from the National Gambling Treatment Service. Great Britain. 2021-2022. Available from: https://www.begambleaware.org/sites/default/files/2022-11/202216_GA_Annual%20stats_report_English_v4.pdf [accessed 5 June 2023]

Jones KC, Weatherly H, Birch S, Castelli A, Chalkley M, Dargan A, Forder JE, Gao J, Hinde S, Markham S et al. (2023) Unit Costs of Health & Social Care 2022 Manual. Technical report. Canterbury: Personal Social Services Research Unit, University of Kent & Centre for Health Economics, University of York

Kaltenthaler E, Brazier J, De Nigris E, Tumur I, Ferriter M, Beverley C, Parry G, Rooney G, Sutcliffe P (2006). Computerised cognitive behaviour therapy for depression and anxiety update: a systematic review and economic evaluation. Health Technol Assess, 10(33).

Karlsson A, Håkansson A (2018) Gambling disorder, increased mortality, suicidality, and associated comorbidity: A longitudinal nationwide register study. Journal of Behavioral Addictions 7(4), 1091-1099. [Corrigendum available on 10 March 2023]

Kind P, Hardnab G, Macran S (1999) UK Population norms for EQ-5D. Discussion paper 172. York: Centre for Health Economics, The University of York.

Kohler D (2014) A monetary valuation of the quality of life loss associated with pathological gambling: An application using a health utility index. Journal of Gambling Issues 29: 1-23

Kushnir V, Godinho A, Hodgins DC, Hendershot CS, Cunningham JA (2018) Self-Directed Gambling Changes: Trajectory of Problem Gambling Severity in Absence of Treatment. Journal of Gambling Studies 34(4), 1407-1421.

Lu G and Ades AE (2004) Combination of direct and indirect evidence in mixed treatment comparisons. Statistics in Medicine 23(20), 3105-24

Lunn DJ, Thomas A, Best N et al. (2000) WinBUGS-A Bayesian modelling framework: Concepts, structure, and extensibility. Statistics and Computing 10, 325-337

McManus S, Meltzer H, Brugha T, Bebbington P, Jenkins R. (eds) (2009) Adult psychiatric morbidity in England, 2007. Results of a household survey. NHS The Health & Social Care Information Centre, Social Care Statistics. Available from: https://digital.nhs.uk/data-and-information/publications/statistical/adult-psychiatric-morbidity-survey/adult-psychiatric-morbidity-in-england-2007-results-of-a-household-survey [accessed 9 May 2023]

Moayeri F (2020) A reference set of Health State Utility Values for gambling problem behaviour, a survey of the Australian general population: implications for future healthcare evaluations. Expert review of pharmacoeconomics & outcomes research 20(1): 115-124

National Institute for Health and Care Excellence (2018) Preventing suicide in community and custodial settings (NG105) https://www.nice.org.uk/guidance/ng105

National Institute for Health and Care Excellence (2022a) NICE health technology evaluations: the manual (PMG 36). Available from www.nice.org.uk/process/pmg36 [accessed 9 May 2023]

National Institute for Health and Care Excellence (2022b) Depression in adults: treatment and management [NG222]. Evidence review B. Treatment of a new episode of depression. https://www.nice.org.uk/guidance/ng222/evidence/b-treatment-of-a-new-episode-of-depression-pdf-11131004415 [accessed 10 August 2023]

National Institute for Health and Care Excellence (2014, last updated 18 January 2022) Developing NICE guidelines: the manual (PMG 20). Available from: https://www.nice.org.uk/process/pmg20 [accessed 5 June 2023]

Netten A, Knight J, Dennett J et al. (1998) Development of a ready reckoner for staff costs in the NHS, Vols 1 & 2. Canterbury: PSSRU, University of Kent

NHS Digital (2022a) Hospital Episode Statistics for England. Hospital Admitted Patient Care Activity, 2021-22. https://digital.nhs.uk/data-and-information/publications/statistical/hospital-admitted-patient-care-activity [accesed 23 January 2023]

NHS Digital (2022b) Hospital Episode Statistics for England. Hospital Outpatient Activity, 2021-22. https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity [accessed 23 January 2023]

NHS England and Health Education England (2016). National College for Teaching and Leadership. Review of clinical and educational psychology training arrangements. NHS England and Health Education England.

Office for Health Improvement and Disparities (2023) The economic and social cost of harms associated with gambling in England. Evidence update 2023. Available from: https://www.gov.uk/government/publications/gambling-related-harms-evidence-review [Accessed 17 January 2023]

Office for National Statistics (2019) UK Wealth and Assets Survey Round 6 (WAS6) (Dec. 2019 revision). Wealth in Great Britain Round 6: 2016 to 2018. Avaiable from: https://www.ons.gov.uk/releases/wealthingreatbritainwave62016to2018 [accessed 9 May 2023]

Office for National Statistics (2021) National Life Tables, England, 1980-1982 to 2018-2020. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/datasets/nationallifetablesenglandreferencetables [Accessed on 13 January 2023]

Office for National Statistics (2022a) Consumer price inflation time series (MM23). Available from: https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/l55o/mm23 [Accessed on 17 January 2023]

Office for National Statistics (2022b) Suicides in England and Wales. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/suicidesintheunitedkingdomreferencetables [Accessed on 12 January 2023]

Public Health England (2021) Gambling-related harms evidence review. Quantitative analysis of gambling involvement and gambling-related harms among the general population in England. Available from: https://www.gov.uk/government/publications/gambling-related-harms-evidence-review [accessed 12 January 2023]

Roberts A, Sharman S, King M, Bayston A, Bowden-Jones H. Treatment-Seeking Problem Gamblers: Characteristics of Individuals Who Offend to Finance Gambling. Int J Ment Health Addiction 19, 824–836 (2021).

Ronzitti S, Soldini E, Lutri V, Smith N, Clerici M, Bowden-Jones H (2016). Types of gambling and levels of harm: A UK study to assess severity of presentation in a treatment-seeking population. Journal of Behavioral Addictions 5(3), 439-47.

Sharman S, Murphy R, Turner JJD, Roberts A (2019) Trends and patterns in UK treatment seeking gamblers: 2000-2015. Addictive Behaviors 89, 51-56.

Spiegelhalter D, Thomas A, Best N, Lunn DJ (2003). WinBUGS user manual: Version 1.4. Cambridge: MRC Biostatistics Unit.

Thorley C, Stirling A, Huyn E (2016) Cards on the table: cost to the government associated with people who are problem gamblers in Britain. London: Institute for Public Policy Research.

Victorian Responsible Gambling Foundation (2014) The Victorian Gambling Study: A longitudinal study of gambling and health in Victoria 2008–2012. Melbourne: Victorian Responsible Gambling Foundation.

Appendix J Excluded studies

Excluded studies for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Excluded effectiveness studies

Table 99: Excluded effectiveness studies and reasons for their exclusion

Study	Reason for exclusion
Actrn (2017) Comparison of two versions of psychological therapy for gambling disorder. https://trialsearch.who.int/Trial2.aspx?TrialID=ACTRN12617000646347	- Publication type Clinical trial record
Actrn (2010) 'XGAMBLE'- The effect of counselling on gambling behaviours in four New Zealand population groups. https://trialsearch.who.int/Trial2.aspx?TrialID=ACTRN12610000826044	- Publication type Clinical trial record
Actrn (2020) A randomised control trial comparing face-to-face with online problem gambling treatment. https://trialsearch.who.int/Trial2.aspx?TrialID=ACTRN12620000279921	- Publication type Clinical trial record
Amandine, L.; Marie-Laure, T.; Henri-Jean, A. (2017) Online psychotherapy among problem poker gamblers: 3 years of follow up. Journal of Behavioral Addictions 6(fusupplement1): 3	- Publication type Conference abstract only
Andersson, Gerhard, Rozental, Alexander, Shafran, Roz et al. (2018) Long-term effects of internet-supported cognitive behaviour therapy. Expert review of neurotherapeutics 18(1): 21-28	- Study design Narrative review, not a systematic review
Auer, Michael M and Griffiths, Mark D (2016) Personalized behavioral feedback for online gamblers: A real world empirical study. Frontiers in Psychology 7	- Outcome No protocol outcomes reported
Auer, Michael M and Griffiths, Mark D (2015) The use of personalized behavioral feedback for online gamblers: an empirical study. Frontiers in psychology 6: 1406	- Outcome No protocol outcomes reported
Augner, Christoph, Vlasak, Thomas, Aichhorn, Wolfgang et al. (2022) Psychological online interventions for problem gambling and gambling disorder – A meta-analytic approach. Journal of psychiatric research 151: 86-94	- Population Includes studies with population of <18 years old. Other included studies checked for possible inclusions.
Battersby, M. (2015) Cognitive versus exposure therapy for problem gambling: a randomised controlled trial. Australian and New Zealand journal of psychiatry 49: 76	- Publication type Abstract only
Bellringer ME; Palmer du Preez K; Vandal A (2022) Effectiveness of face-to-face gambling interventions: two years later.	- Outcome Data could not be extracted
Bergeron, P.-Y., Giroux, I., Chretien, M. et al. (2022) Exposure Therapy for Gambling Disorder: Systematic Review and Meta-analysis. Current Addiction Reports 9(3): 179-194	- Duplicate Individual papers have of this systematic review have been checked and included if they meet protocol criteria.
Bouchard, Amy E, Dickler, Maya, Renauld, Emmanuelle et al. (2021) Concurrent Transcranial Direct Current Stimulation and	- Outcome

Study	Reason for exclusion
Resting-State Functional Magnetic Resonance Imaging in Patients with Gambling Disorder. Brain connectivity 11(10): 815-821	No protocol outcomes reported
Boughton, Roberta R; Jindani, Farah; Turner, Nigel E (2016) Group Treatment for Women Gamblers Using Web, Teleconference and Workbook: Effectiveness Pilot. International journal of mental health and addiction 14(6): 1074-1095	- Comparator No comparator
Boughton, Roberta, Jindani, Farah, Turner, Nigel E et al. (2017) Closing a treatment gap in Ontario: Pilot of a Tutorial Workbook for women gamblers. Journal of Gambling Issues 36: 199-231	- Comparator No comparator
Boumparis, N., Haugorcid, S., Abend, S. et al. (2022) Internet-based interventions for behavioral addictions: A systematic review. Journal of Behavioral Addictions 11(3): 620-642	- Duplicate Individual papers included in this review have been checked and included if they meet protocol criteria.
Canale, N., Vieno, A., Griffiths, M.D. et al. (2016) The efficacy of a web-based gambling intervention program for high school students: A preliminary randomized study. Computers in Human Behavior 55: 946-954	- Population Participants less than 18 years of age
Carlbring, Per, Jonsson, Jakob, Josephson, Henrik et al. (2010) Motivational interviewing versus cognitive behavioral group therapy in the treatment of problem and pathological gambling: a randomized controlled trial. Cognitive behaviour therapy 39(2): 92-103	- Outcome Data cannot be extracted (data not presented per arm)
Casey, Leanne M, Oei, Tian P S, Raylu, Namrata et al. (2017) Internet-Based Delivery of Cognitive Behaviour Therapy Compared to Monitoring, Feedback and Support for Problem Gambling: A Randomised Controlled Trial. Journal of gambling studies 33(3): 993-1010	- Outcome Data cannot be extracted (Ns not reported 'Available data at post ranged between n = 18–27 for I-CBT, n = 18–30 for I-MFS, and n = 38–44 for Waitlist')
Chebli, Jaymee-Lee; Blaszczynski, Alexander; Gainsbury, Sally M (2016) Internet-Based Interventions for Addictive Behaviours: A Systematic Review. Journal of gambling studies 32(4): 1279-1304	- Population Studies included in this review included populations with other addictive behaviours Other included studies checked for possible inclusions.
Choi, Y.S. (2010) Effectiveness of psychosocial rehabilitation program for the pathologic gamblers in Korea. International Journal of Neuropsychopharmacology 13(suppl1): 48	- Publication type Abstract only
Christensen, D. R., Dowling, N. A., Jackson, A. C. et al. (2013) A Proof of Concept for Using Brief Dialectical Behavior Therapy as a Treatment for Problem Gambling. Behaviour Change 30(2): 117-137	- Comparator No comparator
Clarke, Ciaran and Skokauskas, Norbertas (2009) CBT for adolescent pathological gambling – lessons from adult research. Irish journal of psychological medicine 26(3): 140-146	- Study design Not a systematic review.
Cowlishaw, S, Merkouris, S, Dowling, N et al. (2012) Psychological therapies for pathological and problem gambling. Cochrane Database of Systematic Reviews	- Duplicate Excluded based on duplicates. Individual studies within this review have been checked and included if they meet our protocol criteria
Danielsson, Anna-Karin; Eriksson, Anna-Karin; Allebeck, Peter (2014) Technology-based support via telephone or web: a systematic review of the effects on smoking, alcohol use and	- Population Studies included in the review included population

Study	Reason for exclusion
gambling. Addictive behaviors 39(12): 1846-68	with different substance abuse disorders
Di Nicola, Marco, De Crescenzo, Franco, D'Alo, Gian Loreto et al. (2020) Pharmacological and Psychosocial Treatment of Adults With Gambling Disorder: A Meta-Review. Journal of addiction medicine 14(4): e15-e23	- Duplicate Includes duplicates. Individual reviews and studies included in this review have been checked and included if they meet our protocol criteria.
Dickinson, Patrick, Gerling, Kathrin, Wilson, Liam et al. (2020) Virtual reality as a platform for research in gambling behaviour. Computers in Human Behavior 107: npag-npag	- Population Study excluded participants who currently engage in harmful gambling
DiClemente, Carlo C, Corno, Catherine M, Graydon, Meagan M et al. (2017) Motivational interviewing, enhancement, and brief interventions over the last decade: A review of reviews of efficacy and effectiveness. Psychology of addictive behaviors : journal of the Society of Psychologists in Addictive Behaviors 31(8): 862-887	- Outcome Outcomes reported qualitatively.
Donati, M.A., Iozzi, A., Fusi, G. et al. (2022) A cognitive group therapy for patients in case of Gambling Disorder: The utility of the dual-process model. Journal of Behavioral Addictions 11(supplement1): 259	- Publication type Abstract only
Dowling N, Merkouris S, Rodda S et al. (2018) Development and evaluation of an online gambling self-directed program: effective integration into existing services.	- Other protocol criteria Protocol summary only
Dowling, N.; Smith, D.; Thomas, T. (2004) Efficacy of a cognitive-behavioural approach in the treatment of female pathological gambling. Australian Journal of Psychology 56: 179-179	- Publication type Abstract only
Dowling, N; Jackson, AC; Thomas, SA (2008) Behavioral interventions in the treatment of pathological gambling: A review of activity scheduling and desensitization. International Journal of Behavioral Consultation & Therapy 4(2): 172-187	- Study design Not a systematic review
Dowling, Nicki; Smith, David; Thomas, Trang (2006) Treatment of female pathological gambling: the efficacy of a cognitive-behavioural approach. Journal of gambling studies 22(4): 355-72	- Outcome Data cannot be extracted (Ns not reported, data for all treated participants combined for intervention group [including those initially on waitlist], also only includes participants who selected abstinence as treatment goal)
Drks (2021) Further development of the Internet-based self-help program "Restart" for individuals with gambling problems: a randomized controlled trial. https://trialsearch.who.int/Trial2.aspx?TrialID=DRKS00024840	- Publication type Clinical trial record
Drks (2017) Evaluation of the effectiveness of "Check dein Spiel" (CDS), an Internet-based intervention for pathological gambling. https://trialsearch.who.int/Trial2.aspx?TrialID=DRKS00011569	- Publication type Clinical trial record
Echeburua, Enrique; Gomez, Montserrat; Freixa, Montserrat (2011) Cognitive-behavioural treatment of pathological gambling in individuals with chronic schizophrenia: a pilot study. Behaviour research and therapy 49(11): 808-14	- Study design Experimental study using a non-randomly assigned control group with no controls for confounding.
Drks (2018) Efficacy of a depression-focused internet intervention in	- Publication type

Study	Reason for exclusion
slot machine gamblers: A randomized controlled trial. https://trialsearch.who.int/Trial2.aspx?TrialID=DRKS00013888	Clinical trial record
Fiskaali, A., Stenbro, A.W., Marcussen, T. et al. (2022) Preventive Interventions and Harm Reduction in Online and Electronic Gambling: A Systematic Review. Journal of gambling studies	- Population Includes interventions other than psychological and/or psychosocial. Individual studies have been checked and included if they meet protocol criteria.
Ghosh, A.; Dhawan, L.; Basu, D. (2015) Treating Gambling disorder (GD): a biofeedback based exposure therapy. Indian Journal of Psychiatry 57(5): S139-S140	- Publication type Abstract only
Giroux, Isabelle, Faucher-Gravel, Andreanne, St-Hilaire, Alexandre et al. (2013) Gambling exposure in virtual reality and modification of urge to gamble. Cyberpsychology, behavior and social networking 16(3): 224-31	- Comparator No comparator
Gooding, Patricia and Tarrier, Nicholas (2009) A systematic review and meta-analysis of cognitive-behavioural interventions to reduce problem gambling: hedging our bets?. Behaviour research and therapy 47(7): 592-607	- Duplicate Includes duplicates. Individual studies included in this review have been checked and included if they meet our protocol criteria.
Goslar, Martina, Leibetseder, Max, Muench, Hannah M et al. (2017) Efficacy of face-to-face versus self-guided treatments for disordered gambling: A meta-analysis. Journal of behavioral addictions 6(2): 142-162	- Duplicate Excluded based on duplicates. Individual studies within this review have been checked and included if they meet our protocol criteria
Grande-Gosende, Aris, Lopez-Nunez, Carla, Garcia-Fernandez, Gloria et al. (2020) Systematic Review of Preventive Programs for Reducing Problem Gambling Behaviors Among Young Adults. Journal of gambling studies 36(1): 1-22	- Duplicate Includes duplicates. Individual studies included in this review have been checked and included if they meet our protocol criteria.
Grant, Jon E, Donahue, Christopher B, Odlaug, Brian L et al. (2011) A 6-month follow-up of imaginal desensitization plus motivational interviewing in the treatment of pathological gambling. Annals of clinical psychiatry : official journal of the American Academy of Clinical Psychiatrists 23(1): 3-10	- Outcome Follow-up data for Grant 2009 but only for intervention arm (so no comparator) as waitlist arm received intervention after endpoint
Harris, Nicholas and Mazmanian, Dwight (2016) Cognitive behavioural group therapy for problem gamblers who gamble over the internet: A controlled study. Journal of Gambling Issues 33: 170-188	- Study design Non-randomised and there is no control for confounding
Hodgins, David C, Toneatto, Tony, Makarchuk, Karyn et al. (2007) Minimal treatment approaches for concerned significant others of problem gamblers: a randomized controlled trial. Journal of gambling studies 23(2): 215-30	- Intervention Intervention and outcomes are aimed at concerned significant others and not people who participate in harmful gambling.
Humphreys, Gabrielle, Evans, Rebecca, Makin, Harriet et al. (2021) Identification of Behavior Change Techniques From Successful Web-Based Interventions Targeting Alcohol Consumption, Binge Eating, and Gambling: Systematic Review. Journal of medical Internet research 23(2): e22694	- Outcome Outcomes reported qualitatively.

Study	Reason for exclusion
Hutchison, P.; Cox, S.; Frings, D. (2018) Helping you helps me: Giving and receiving social support in recovery groups for problem gamblers. Group Dynamics 22(4): 187-199	- Comparator No comparator
Iriki, A. (2019) Our group therapy session has helped the people with gambling disorder. Journal of Behavioral Addictions 8(supplement1): 120-121	- Publication type Abstract only
Isrctn (2008) Is motivational interviewing and/or cognitive behavioural group therapy an effective treatment for pathological gambling?. https://trialsearch.who.int/Trial2.aspx?TrialID=ISRCTN92322614	- Publication type Clinical trial record
Isrctn (2019) A randomized controlled trial of an Internet-based psychological treatment for disordered gambling. https://trialsearch.who.int/Trial2.aspx?TrialID=ISRCTN38692394	- Publication type Clinical trial record
Jimenez-Murcia, S., Aymami, N., Gomez-Pena, M. et al. (2012) Does exposure and response prevention improve the results of group cognitive-behavioural therapy for male slot machine pathological gamblers?. The British journal of clinical psychology / the British Psychological Society 51(1): 54-71	- Study design Non-randomised and there is no control for confounding
Jimenez-Murcia, Susana, Tremblay, Joel, Stinchfield, Randy et al. (2017) The Involvement of a Concerned Significant Other in Gambling Disorder Treatment Outcome. Journal of gambling studies 33(3): 937-953	- Study design Non-randomised and there is no control for confounding
Jonsson, Jakob, Hodgins, David C, Munck, Ingrid et al. (2020) Reaching out to big losers leads to sustained reductions in gambling over 1 year: a randomized controlled trial of brief motivational contact. Addiction (Abingdon, England) 115(8): 1522-1531	- Outcome Data cannot be extracted (Unclear if reported data is ITT or completer analysis)
Josephson, Henrik, Carlbring, Per, Forsberg, Lars et al. (2016) People with gambling disorder and risky alcohol habits benefit more from motivational interviewing than from cognitive behavioral group therapy. PeerJ 4: e1899	- Study design Secondary analysis study with non-relevant data
Kotter, Roxana, Kraplin, Anja, Pittig, Andre et al. (2019) A Systematic Review of Land-Based Self-Exclusion Programs: Demographics, Gambling Behavior, Gambling Problems, Mental Symptoms, and Mental Health. Journal of gambling studies 35(2): 367-394	- Comparator Did not include comparators
Ladouceur, Robert; Sylvain, Caroline; Gosselin, Patrick (2007) Self-exclusion program: a longitudinal evaluation study. Journal of gambling studies 23(1): 85-94	- Intervention Not a psychological or psychosocial treatment.
Lee, B.K., Ofori Dei, S.M., Brown, M.M.R. et al. (2022) Congruence couple therapy for alcohol use and gambling disorders with comorbidities (part I): Outcomes from a randomized controlled trial. Family process	- Outcome Data not reported separately for those that have gambling disorder
Lee, B.K.; Ofori Dei, S.M.; Isik, E. (2022) Congruence couple therapy for alcohol use and gambling disorders with comorbidities (part II): Targeted areas and mechanisms of change. Family process: e12816	- Outcome Data cannot be extracted as no means (SD) reported.
Leibetseder, M., Laireiter, A.-R., Vierhauser, M. et al. (2011) Efficacy and effectiveness of psychological and psycho-pharmacological treatments in pathological gambling - A meta-analysis. Sucht 57(4): 275-285	- Other protocol criteria Non-English language article
Linardatou, C., Parios, A., Varvogli, L. et al. (2014) An 8-week stress management program in pathological gamblers: Apilot randomized controlled trial. Journal of Psychiatric Research 56(1): 137-143	- Intervention Intervention not targeted at gambling and no relevant gambling outcomes
Luquiens, A. (2018) Big data to track and treat? Proposing online	- Publication type

Study	Reason for exclusion
therapy to problem gamblers: A randomized clinical trial. European Psychiatry 48(supplement1): 19-s20	Conference abstract only
Luquiens, A., Lagadec, M., Tanguy, M. L. et al. (2015) Efficacy of online psychotherapies in poker gambling disorder: an online randomized clinical trial. Journal of behavioral addictions 4: 27-28	- Publication type Abstract only
Luquiens, A., Lagadec, M., Tanguy, M.-L. et al. (2015) Efficacy of online psychotherapies in poker gambling disorder: An online randomized clinical trial. Journal of Behavioral Addictions 4(supplement1): 27-28	- Publication type Abstract only
Luquiens, A., Lagadec, M., Tanguy, M. et al. (2015) Efficacy of online psychotherapies in poker gambling disorder: An online randomized clinical trial. European Psychiatry 30(suppl1): 1053	- Publication type Conference abstract only
Luquiens, Amandine, Tanguy, Marie-Laure, Lagadec, Marthylle et al. (2016) The Efficacy of Three Modalities of Internet-Based Psychotherapy for Non-Treatment-Seeking Online Problem Gamblers: A Randomized Controlled Trial. Journal of medical Internet research 18(2): e36	- Intervention Intervention is self-exclusion (from gambling); neither a psychological nor a psychological intervention
Makani, Ramkrishna, Pradhan, Basant, Shah, Umang et al. (2017) Role of Repetitive Transcranial Magnetic Stimulation (rTMS) in Treatment of Addiction and Related Disorders: A Systematic Review. Current drug abuse reviews 10(1): 31-43	- Population Studies included in this review included populations of different substance abuse disorders
Marchica, Loredana and Derevensky, Jeffrey L (2016) Examining personalized feedback interventions for gambling disorders: A systematic review. Journal of behavioral addictions 5(1): 1-10	- Duplicate Excluded as duplicate. Individual studies in this review have been checked and included if they meet our protocol criteria.
Martinotti, G. and Pettorruso, M. (2018) Brain stimulation and gambling disorder: New therapeutic perspectives. Journal of Behavioral Addictions 7(supplement1): 111	- Publication type Abstract only
Martinotti, Giovanni, Lupi, Matteo, Montemitro, Chiara et al. (2019) Transcranial Direct Current Stimulation Reduces Craving in Substance Use Disorders: A Double-blind, Placebo-Controlled Study. The journal of ECT 35(3): 207-211	- Population Results did not differentiate participants for their substance us disorder.
Matsuzaki, T., Matsushita, S., Nishimura, K. et al. (2019) Effectiveness of CBT-based outpatient treatment program for gambling disorder: multi-study site randomized control trial in Japan. Journal of behavioral addictions 8: 68	- Publication type Abstract only
Maynard, B.R., Wilson, A.N., Labuzienski, E. et al. (2018) Mindfulness-Based Approaches in the Treatment of Disordered Gambling: A Systematic Review and Meta-Analysis. Research on Social Work Practice 28(3): 348-362	- Duplicate Includes duplicates. Individual studies included in this review have been checked and included if they meet our protocol criteria
McCormick, Amanda V; Cohen, Irwin M; Davies, Garth (2018) Differential Effects of Formal and Informal Gambling on Symptoms of Problem Gambling During Voluntary Self-Exclusion. Journal of gambling studies 34(3): 1013-1031	- Comparator No comparator
McMahon, Naoimh, Thomson, Katie, Kaner, Eileen et al. (2019) Effects of prevention and harm reduction interventions on gambling behaviours and gambling related harm: An umbrella review. Addictive behaviors 90: 380-388	- Population Studies included children. Included studies checked for possible inclusions.
Melville, Cam L, Davis, Carolyn S, Matzenbacher, Dena L et al. (2004) Node-link-mapping-enhanced group treatment for	- Outcome Data cannot be extracted

Study	Reason for exclusion
pathological gambling. Addictive behaviors 29(1): 73-87	(no measure of variance reported)
Morefield, Kate, Walker, Claire, Smith, David et al. (2014) An inpatient treatment program for people with gambling problems: Synopsis and early outcomes. International Journal of Mental Health and Addiction 12(3): 367-379	- Comparator No comparator
Muller, K., Koch, A., Dickenhorst, U. et al. (2015) Effects of inpatient treatment of pathological gamblers: First results of a multicenter follow-up study. Journal of Behavioral Addictions 4(supplement1): 29	- Publication type Abstract only
Myrseth, Helga, Brunborg, Geir Scott, Eidem, Magnus et al. (2013) Description and pre-post evaluation of a telephone and internet based treatment programme for pathological gambling in Norway: A pilot study. International Gambling Studies 13(2): 205-220	- Comparator No comparator
Naish, Katherine R, Vedelago, Lana, MacKillop, James et al. (2018) Effects of neuromodulation on cognitive performance in individuals exhibiting addictive behaviors: A systematic review. Drug and alcohol dependence 192: 338-351	- Population Population included substance use disorders
Nct (2005) Cognitive Behavioral Therapy for Treatment of Pathological Gambling. https://clinicaltrials.gov/show/NCT00158314	- Publication type Clinical trial record
Nct (2006) A Randomized Control Trial Examining Two Treatments for Problem Gambling. https://clinicaltrials.gov/show/NCT00345527	- Publication type Clinical trial record
Nct (2016) Contingency Management as an Adjunct Treatment for Rural and Remote Disordered Gamblers. https://clinicaltrials.gov/show/NCT02953899	- Publication type Clinical trial record
Nct (2007) A Personalized Feedback Intervention for Problem Gamblers. https://clinicaltrials.gov/show/NCT00578357	- Publication type Clinical trial record
Nct (2008) Brief Therapies for Problem Gambling Substance Abusers. https://clinicaltrials.gov/show/NCT00685048	- Publication type Clinical trial record
Nct (2010) Deep Low-Frequency Repetitive Transcranial Magnetic Stimulation for Cessation of Pathological Gambling. https://clinicaltrials.gov/show/NCT01154712	- Publication type Clinical trial record
Nct (2017) SBIRT Intervention for Gambling Behaviors. https://clinicaltrials.gov/show/NCT03287583	- Publication type Clinical trial record
Nct (2018) Effects of Transcranial Direct Current Stimulation (tDCS) in Disordered Gambling. https://clinicaltrials.gov/show/NCT03464838	- Publication type Clinical trial record
Nct (2018) Mindfulness-Based Cognitive-Behavioral Therapy for Gambling Disorder. https://clinicaltrials.gov/show/NCT03497247	- Publication type Clinical trial record
Nilsson, Anders, Magnusson, Kristoffer, Carlbring, Per et al. (2018) The Development of an Internet-Based Treatment for Problem Gamblers and Concerned Significant Others: A Pilot Randomized Controlled Trial. Journal of gambling studies 34(2): 539-559	- Outcome Data cannot be extracted for inclusion in the NMA, and pairwise not performed as within-class comparison
Oakley-Browne, M A; Adams, P; Mobberley, P M (2000) Interventions for pathological gambling. The Cochrane database of systematic reviews: cd001521	- Publication date Studies included in this review were prior 2000
Oei, Tian P S; Raylu, Namrata; Casey, Leanne M (2010) Effectiveness of group and individual formats of a combined motivational interviewing and cognitive behavioral treatment program for problem gambling: a randomized controlled trial. Behavioural and cognitive psychotherapy 38(2): 233-8	- Outcome Data could not be extracted
Pallesen, Stale, Mitsem, Morten, Kvale, Gerd et al. (2005) Outcome	- Duplicate

Study	Reason for exclusion
of psychological treatments of pathological gambling: a review and meta-analysis. Addiction (Abingdon, England) 100(10): 1412-22	Includes duplicates. Individual studies included in this review have been checked and included if they meet our protocol criteria.
Park, J.J., King, D.L., Wilkinson-Meyers, L. et al. (2022) Content and Effectiveness of Web-Based Treatments for Online Behavioral Addictions: Systematic Review. JMIR Mental Health 9(9): e36662	- Population SR had 3 studies which included participants with harmful gambling. These studies have been checked and included if they meet protocol criteria.
Peter, Samuel C, Brett, Emma I, Suda, Matthew T et al. (2019) A Meta-analysis of Brief Personalized Feedback Interventions for Problematic Gambling. Journal of gambling studies 35(2): 447-464	- Duplicate Individual papers included in this paper are included in the review if they meet protocol criteria.
Petry, Nancy M; Ginley, Meredith K; Rash, Carla J (2017) A systematic review of treatments for problem gambling. Psychology of addictive behaviors : journal of the Society of Psychologists in Addictive Behaviors 31(8): 951-961	- Duplicate Includes duplicates. Individual studies have been checked and included if they meet our protocol criteria.
Pfund, Rory A, Peter, Samuel C, Whelan, James P et al. (2020) Is more better? A meta-analysis of dose and efficacy in face-to-face psychological treatments for problem and disordered gambling. Psychology of addictive behaviors : journal of the Society of Psychologists in Addictive Behaviors 34(5): 557-568	- Duplicate Systematic review. Individual papers included in this paper are included in the review if they meet protocol criteria.
Protasio, M.I.B., da Silva, J.P.L., Arias-Carrion, O. et al. (2015) Repetitive transcranial magnetic stimulation to treat substance use disorders and compulsive behavior. CNS and Neurological Disorders - Drug Targets 14(3): 331-340	- Study design Review is not systematic.
Quilty, Lena C, Wardell, Jeffrey D, Thiruchselvam, Thulasi et al. (2019) Brief interventions for problem gambling: A meta-analysis. PloS one 14(4): e0214502	- Duplicate Duplicate studies with Pfund - 2020 and Peter-2019
Ranta, Jussi, Bellringer, Maria, Garrett, Nick et al. (2019) Can a Brief Telephone Intervention for Problem Gambling Help to Reduce Co-existing Depression? A Three-Year Prospective Study in New Zealand. Journal of gambling studies 35(2): 617-633	- Comparator No comparator
Ribeiro, Eliana O; Afonso, Nuno H; Morgado, Pedro (2021) Non-pharmacological treatment of gambling disorder: a systematic review of randomized controlled trials. BMC psychiatry 21(1): 105	- Publication date Mixed publication date included in systematic review (3/22 pre-2000). Results not presented separately for target publication years. Included studies checked for possible inclusions.
Robillard, G., Bouchard, S., Boutin, C. et al. (2016) Effectiveness of a revised virtual reality program for pathological gambling. Journal of Cyber Therapy and Rehabilitation 9(1): 55	- Publication type Abstract only
Rodda, Simone N (2021) A Systematic Review of Internet Delivered Interventions for Gambling: Prevention, Harm Reduction and Early Intervention. Journal of gambling studies	- Duplicate Includes duplicates. Individual studies have been checked and included if they meet our protocol criteria.

Study	Reason for exclusion
Rogers, RD (2006) Review: psychological treatments improve pathological gambling in the short and long term. Evidence-based Mental Health 9(2): 44-44	- Other protocol criteria Abstract only
Sagoe, Dominic, Griffiths, Mark D, Erevik, Eilin Kristine et al. (2021) Internet-based treatment of gambling problems: A systematic review and meta-analysis of randomized controlled trials. Journal of behavioral addictions 10(3): 546-565	- Comparator Mixed comparators included in systematic review (wait-list control or no treatment [5/13 studies], sham (1/13 studies], referral to treatment [1/13 studies], assessment only [1/13 studies] , active treatment, not usual care [5/13 studies]). Results not presented separately for comparator of interest. Included studies checked for potential includes.
Sauvaget, Anne, Bulteau, Samuel, Guilleux, Alice et al. (2018) Both active and sham low-frequency rTMS single sessions over the right DLPFC decrease cue-induced cravings among pathological gamblers seeking treatment: A randomized, double-blind, sham-controlled crossover trial. Journal of behavioral addictions 7(1): 126-136	- Outcome No relevant outcome data reported. No data available for end of first phase (pre-crossover).
Savron, G.; De Luca, R.; Pitti, P. (2007) Group therapy with Pathological Gamblers: results after 6, 12 and 18 months of treatment. Rivista Di Psichiatria 42(3): 189-204	- Other protocol criteria Non-English language article
Saxton, Jenny, Rodda, Simone N, Booth, Natalia et al. (2021) The efficacy of Personalized Normative Feedback interventions across addictions: A systematic review and meta-analysis. PloS one 16(4): e0248262	- Population Studies included in this review included populations with other addictions.
Schuler, Andree, Ferentzy, Peter, Turner, Nigel E et al. (2016) Gamblers Anonymous as a Recovery Pathway: A Scoping Review. Journal of gambling studies 32(4): 1261-1278	- Other protocol criteria Review that uses mixed methodologies (scoping review).
Segawa, Tomoyuki, Baudry, Thomas, Bourla, Alexis et al. (2019) Virtual Reality (VR) in Assessment and Treatment of Addictive Disorders: A Systematic Review. Frontiers in neuroscience 13: 1409	- Population Studies included in this review included populations with other addictions.
Smith, D.P., Dunn, K.I., Harvey, P.W. et al. (2013) Assessing Randomised Clinical Trials of Cognitive and Exposure Therapies for Gambling Disorders: A Systematic Review. Behaviour Change 30(3): 139-158	- Publication date Studies included in the review were prior 2000
Smith, David P, Fairweather-Schmidt, A Kate, Harvey, Peter W et al. (2018) How does routinely delivered cognitive-behavioural therapy for gambling disorder compare to "gold standard" clinical trial?. Clinical psychology & psychotherapy 25(2): 302-310	- Study design Not a systematic review
Soyata, Ahmet Zihni, Aksu, Serkan, Woods, Adam J et al. (2019) Effect of transcranial direct current stimulation on decision making and cognitive flexibility in gambling disorder. European archives of psychiatry and clinical neuroscience 269(3): 275-284	- Outcome No relevant outcome data reported
Tavares, Hermano; Zilberman, Monica L; el-Guebaly, Nady (2003) Are there cognitive and behavioural approaches specific to the treatment of pathological gambling?. Canadian journal of psychiatry. Revue canadienne de psychiatrie 48(1): 22-7	- Study design Not a systematic review
Toneatto, T. and Ladouceur, R. (2003) Treatment of Pathological Gambling: A Critical Review of the Literature. Psychology of	- Study design

Study	Reason for exclusion
Addictive Behaviors 17(4): 284-292	Not a systematic review
Toneatto, Tony and Dragonetti, Rosa (2008) Effectiveness of community-based treatment for problem gambling: a quasi-experimental evaluation of cognitive-behavioral vs. twelve-step therapy. The American journal on addictions 17(4): 298-303	- Study design Non-randomised and there is no control for confounding
Toneatto, Tony, Pillai, Sabina, Courtice, Erin Leigh et al. (2014) Mindfulness-enhanced cognitive behavior therapy for problem gambling: A controlled pilot study. International Journal of Mental Health and Addiction 12(2): 197-205	- Study design Non-randomised and there is no control for confounding
Tse, S., Campbell, L., Rossen, F. et al. (2013) Face-to-Face and Telephone Counseling for Problem Gambling: A Pragmatic Multisite Randomized Study. Research on Social Work Practice 23(1): 57-65	- Population Included people aged <18 years of age.
Yakovenko, Igor and Hodgins, David C (2021) Effectiveness of a voluntary casino self-exclusion online self-management program. Internet interventions 23: 100354	- Outcome No raw data presented, only results of statistical analysis.
Yakovenko, Igor, Quigley, Leanne, Hemmelgarn, Brenda R et al. (2015) The efficacy of motivational interviewing for disordered gambling: systematic review and meta-analysis. Addictive behaviors 43: 72-82	- Duplicate Includes duplicates. Individual studies included in this review have been checked and included if they meet our protocol criteria.
Zack, Martin, Cho, Sang Soo, Parlee, Jennifer et al. (2016) Effects of High Frequency Repeated Transcranial Magnetic Stimulation and Continuous Theta Burst Stimulation on Gambling Reinforcement, Delay Discounting, and Stroop Interference in Men with Pathological Gambling. Brain stimulation 9(6): 867-875	- Comparator No comparator
Zucchella, Chiara, Mantovani, Elisa, Federico, Angela et al. (2020) Non-invasive Brain Stimulation for Gambling Disorder: A Systematic Review. Frontiers in neuroscience 14: 729	- Study design Mixed study design included in systematic review [cross-over studies [6/11 studies], observational studies [5/11 studies]). For cross-over studies, results not presented separately for initial experimental stage.

1

2 **Excluded economic and utility studies**

3 **Table 100: Excluded economic and utility studies and reasons for their exclusion**

Study	Code [Reason]
Economic studies	
ACTRN12620000279921 (2020) A randomised control trial comparing face-to-face with online problem gambling treatment. https://trialsearch.who.int/Trial2.aspx?TrialID=ACTRN12620000279921	- Economic study protocol
DRKS00015314 (2018) Efficacy and cost-effectiveness of an internet intervention for internet use disorder: a randomized controlled trial. https://trialsearch.who.int/Trial2.aspx?TrialID=DRKS00015314	- Economic study protocol
Utility studies	
Bonfils, Nicolas A, Aubin, Henri-Jean, Benyamina, Amine et al. (2019) Quality of life instruments used in problem gambling studies:	- Systematic review of HRQoL studies - primary

Study	Code [Reason]
A systematic review and a meta-analysis. Neuroscience and biobehavioral reviews 104: 58-72	studies checked for eligibility for utility review
Browne M, Greer N, Rawat V, Rockloff M (2017) A population-level metric for gambling-related harm. International Gambling Studies 17(2): 163-175	- No preference-based measure used directly or via mapping; health states described using vignettes. Disability weights reported
Browne, Matthew, Rawat, Vijay, Newall, Philip et al. (2020) A framework for indirect elicitation of the public health impact of gambling problems. BMC public health 20(1): 1717	- Methodological paper - no utility data reported
Kohler, D. (2011) Assessing the intangible costs of gambling addiction using a health utility index. Journal of Mental Health Policy and Economics 14(suppl1): 15-s16	- Utility study - abstract only. Full study reported in Kohler et al., 2014, which has been included in the review

1
2

Appendix K Research recommendations – full details

Research recommendations for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

K.1.1 Research recommendation

What is the long-term effectiveness and cost-effectiveness, including prevention of suicide and self-harm, of psychological treatments for gambling-related harms?

K.1.2 Why this is important

Evidence has shown that CBT is an effective intervention for treating harmful gambling. Research so far, however, has only examined the effectiveness of CBT and other psychological therapies on short term outcomes. People who have previously experienced harmful gambling and showed improvements in short term outcomes can later relapse which could lead to adverse events such as suicide, self-harm, or unplanned acute mental health hospital admission.

K.1.3 Rationale for research recommendation

Table 101: Research recommendation rationale

Importance to 'patients' or the population	Little is known about the long-term effectiveness of CBT or other psychological therapies for treating harmful gambling. Successful therapy should minimise the risk of relapse in the long-term to further reduce the risks of adverse advents.
Relevance to NICE guidance	Psychological therapies have been considered in this guideline but there is a lack of evidence on long-term outcomes.
Relevance to the NHS	If there is a psychological therapy which is shown to maintain long-term outcomes this will affect the commissioning and provision of NHS treatment for harmful gambling.
National priorities	High
Current evidence base	No long-term data
Equality considerations	Research should be designed to address that certain subgroups may be of higher risk of harm from gambling compared to others (for example young men, people living in lower socio-economic areas). Some subgroups may also have more difficulties accessing treatment services (for example people with neurodevelopmental disabilities and acquired cognitive impairments, people from LGBT+ communities, and people living in lower socio-economic areas).

CBT: Cognitive Behavioural Therapy

K.1.4 Modified PICO table

Table 102: Research recommendation modified PICO table

Population	Inclusion: People aged 18 years or above, currently participating in harmful gambling. Families, friends and others (all ages) close to people (aged 18years or above) who participate or have participated in harmful gambling. Exclusion: • Children and young people aged under 18 years. • Gambling behaviour only occurring during manic episodes of people with bipolar disorder
Intervention	Psychological interventions for harmful gambling
Comparator	Interventions compared with each other (psychological or psychosocial) or: A pharmacological treatment Treatment as usual Placebo or sham treatment No treatment
Outcome	**All outcomes should be long-term** **Critical:** • Gambling severity (assessed using validated scales such as the Problem Gambling Severity Index, dichotomous measures of abstinence and objective, quantifiable measures such as gambling frequency or time or money spent on gambling) at [insert follow up pending GC input] and repeat for each outcome. • Recovery capital (measured using validated tools such as the Life in Recovery Scale). • Psychological wellbeing (measured using scales such as the Warwick-Edinburgh Well Being Scale, the CORE-10 score and Psychclops). • Personal, social and life functioning (measured using person centred, validated scales such as the Work and Social Adjustment Scale) • Cost-effectiveness (including resource use measurements and QALY estimations using a validated preference-based measure such as the EQ-5D or SF-6D). • Self-harm, reports of suicidal ideation, attempted suicide, completed suicide **Important:** • Physical and mental health related quality of life (measured using scales such as EQ 5D and SF-12).
Study design	Randomised controlled trials

Timeframe	Long term – minimum 3 to 5 years
Additional information	None

CBT: Cognitive Behavioural Therapy; CORE-10: Clinical outcomes in routine evaluation 10; EQ-5D: EuroQol health related quality of life (5 domains); SF-12: 12-item short form survey

K.1.5 Research recommendation

What is the effectiveness and cost-effectiveness of psychological or psychosocial interventions for gambling-related harms with co-morbid conditions (for example depression, anxiety or other addictions)?

K.1.6 Why this is important

Evidence has shown that psychological and psychosocial interventions, particularly CBT can be effective treatments for harmful gambling. However, there is a lack of evidence for interventions targeting people who experience harmful gambling who also exhibit co-morbid conditions. People who live with co-morbid conditions such as depression are at higher risk of relapse, therefore interventions that aim to reduce gambling severity in people who experience harmful gambling and co-morbid conditions specifically could improve not only gambling symptom severity and symptoms of co-morbid conditions but also reduce the risk of relapse.

K.1.7 Rationale for research recommendation

Table 103: Research recommendation rationale

Importance to 'patients' or the population	Little is known about psychological and psychosocial interventions to treat people who experience harmful gambling and are living with co-morbid conditions. Interventions that are targeted to improve gambling severity as well as co-morbid conditions could reduce gambling severity and symptoms of co-morbid conditions, thus reducing the risks of relapse.
Relevance to NICE guidance	Psychological and psychosocial treatments have been considered in this guideline but evidence from studies including people who live with co-morbid conditions has been scarce.
Relevance to the NHS	The outcome of the recommended research will affect the commissioning and provision of NHS treatment for harmful gambling for people experiencing co-morbid conditions.
National priorities	High
Current evidence base	Minimal evidence for treatments of people experiencing harmful gambling and co-morbid conditions.
Equality considerations	Research should be designed to address that certain subgroups may be of higher risk of harm from gambling compared to others (for example young men, people living in lower socio-economic areas). Some subgroups may also have more difficulties accessing treatment services (for example people with neurodevelopmental disabilities and acquired cognitive impairments, people from LGBT+ communities, and people living in lower socio-economic areas).

CBT: Cognitive Behavioural Therapy

K.1.8 Modified PICO table

Table 104: Research recommendation modified PICO table

Population	Inclusion: People aged 18 years or above, currently participating in harmful gambling who live with co-morbid conditions such as depression or anxiety. Families, friends and others (all ages) close to people (aged 18 years or above) who participate or have participated in harmful gambling and who live with co-morbid conditions such as depression or anxiety. Exclusion: • Children and young people aged under 18 years. • Gambling behaviour only occurring during manic episodes of people with bipolar disorder
Intervention	1. Psychological interventions for the treatment of harmful gambling: 1.1 Other psychotherapeutic interventions for harmful gambling (including but not limited to the 12-step group-programme, counselling, harm reduction interventions and psychodrama and dramatherapy). 1.2 Trauma informed interventions for addiction (including but not limited to CBT based trauma interventions, eye movement desensitisation and Eriksonian hypnosis). 1.3 Neurological/ brain stimulation interventions (including but not limited to transcranial magnetic stimulation [TMS], deep brain stimulation and cognitive bias modification). 1.4 Residential treatment (including but not limited to short-term residential treatment, medium and long-term residential treatment and hybrid residential treatment, such as Retreat and Counselling model). 1.5 Self-help, digital interventions and helplines (including but not limited to self-help literature and workbooks, personalised feedback interventions and gamification psychotherapy). 2. Psychosocial interventions for the treatment of harmful gambling: 2.1 Life and social skills-based interventions (including but not limited to assertiveness training, life skills training and functional communication training). 2.2 Family, systemic and significant other interventions (including but not limited to family therapies with varying styles depending on the theoretical underpinning, transgenerational

	models and the structural family model). 2.3 Community and peer support interventions (including but not limited to peer support groups, intentional peer support and SMART recovery).
Comparator	Interventions compared with each other (psychological or psychosocial) or: • A pharmacological treatment • Treatment as usual • Placebo or sham treatment • No treatment
Outcome	Critical: • Gambling severity (assessed using validated scales such as the Problem Gambling Severity Index, dichotomous measures of abstinence and objective, quantifiable measures such as gambling frequency or time or money spent on gambling). • Recovery capital (measured using validated tools such as the Life in Recovery Scale). • Psychological wellbeing (measured using scales such as the Warwick-Edinburgh Well Being Scale, the CORE-10 score and Psychclops). • Personal, social and life functioning (measured using person centred, validated scales such as the Work and Social Adjustment Scale) • Cost-effectiveness (including resource use measurements and QALY estimations using a validated preference-based measure such as the EQ-5D or SF-6D). Important: • Physical and mental health related quality of life (measured using scales such as EQ 5D and SF-12).
Study design	Randomised controlled trials
Timeframe	Short and long-term
Additional information	None

CBT: Cognitive Behavioural Therapy; CORE-10: Clinical outcomes in routine evaluation 10; EQ-5D: EuroQol health related quality of life (5 domains); SF-12: 12-item short form survey

K.1.9 Research recommendation

What sequential or combination psychological or psychosocial interventions are most effective and cost-effective for the treatment of gambling-related harms?

K.1.10 Why this is important

Psychological and psychosocial interventions have been used as treatment options for harmful gambling. Research so far has only examined the effectiveness of single interventions and not the combination of treatments or the sequential offer of two or more different interventions. Some people may not show improvements in gambling severity if only

being offered a single intervention and may see greater benefits if more than one type of psychological or psychosocial intervention either combined or sequential is offered.

K.3.11 Rationale for research recommendation

Table 105: Research recommendation rationale

Importance to 'patients' or the population	Little is known about the effectiveness of psychological or psychosocial interventions to treat harmful gambling if they are offered combined or sequentially. Some people who experience harmful gambling may see a greater benefit if more than one single intervention is offered.
Relevance to NICE guidance	Psychological and psychosocial treatments have been considered in this guideline but there is a lack of data on the effectiveness of combined or sequential interventions.
Relevance to the NHS	The outcome of the recommended research would affect the commissioning and provision of NHS treatment for harmful gambling, particularly in terms of the offer or combined or sequenced interventions.
National priorities	High
Current evidence base	No evidence for combined or sequential treatments.
Equality considerations	Research should be designed to address that certain subgroups may be of higher risk of harm from gambling compared to others (for example young men, people living in lower socio-economic areas). Some subgroups may also have more difficulties accessing treatment services (for example people with neurodevelopmental disabilities and acquired cognitive impairments, people from LGBT+ communities, and people living in lower socio-economic areas).

NHS: National Health Service

K.3.12 Modified PICO table

Table 106: Research recommendation modified PICO table

Population	Inclusion: People aged ≥ 18years old, currently participating in harmful gambling. Families, friends and others (all ages) close to people (aged ≥ 18years) who participate or have participated in harmful gambling. Exclusion: • Children and young people <18 years old. • Gambling behaviour only occurring during manic episodes of people with bipolar disorder
Intervention	Two or more of the following interventions offered either combined or sequentially.

	1. Psychological interventions for the treatment of harmful gambling: 1.1 Cognitive & behavioural interventions and related techniques (including but not limited to cognitive behavioural therapy [CBT], cognitive restructuring technique and aversion therapies). 1.2 Other psychotherapeutic interventions for harmful gambling (including but not limited to the 12-step group-programme, counselling, harm reduction interventions and psychodrama and dramatherapy). 1.3 Trauma informed interventions for addiction (including but not limited to CBT based trauma interventions, eye movement desensitisation and Eriksonian hypnosis). 1.4 Neurological/ brain stimulation interventions (including but not limited to transcranial magnetic stimulation [TMS], deep brain stimulation and cognitive bias modification). 1.5 Residential treatment (including but not limited to short-term residential treatment, medium and long-term residential treatment and hybrid residential treatment, such as Retreat and Counselling model). 1.6 Self-help, digital interventions and helplines (including but not limited to self-help literature and workbooks, personalised feedback interventions and gamification psychotherapy). 2. Psychosocial interventions for the treatment of harmful gambling: 2.1 Life and social skills-based interventions (including but not limited to assertiveness training, life skills training and functional communication training). 2.2 Family, systemic and significant other interventions (including but not limited to family therapies with varying styles depending on the theoretical underpinning, transgenerational models and the structural family model). 2.3 Community and peer support interventions (including but not limited to peer support groups, intentional peer support and SMART recovery).
Comparator	Interventions compared with each other or: A single psychological treatment A single psychosocial treatment Treatment as usual Placebo or sham treatment No treatment
Outcome	**Critical:** • Gambling severity (assessed using validated scales such as the Problem Gambling Severity Index, dichotomous measures of abstinence and objective, quantifiable measures such as gambling

	frequency or time or money spent on gambling). • Recovery capital (measured using validated tools such as the Life in Recovery Scale). • Psychological wellbeing (measured using scales such as the Warwick-Edinburgh Well Being Scale, the CORE-10 score and Psychclops). • Personal, social and life functioning (measured using person centred, validated scales such as the Work and Social Adjustment Scale). • Cost-effectiveness (including resource use measurements and QALY estimations using a validated preference-based measure such as the EQ-5D or SF-6D). **Important:** • Physical and mental health related quality of life (measured using scales such as EQ 5D and SF-12).
Study design	Randomised controlled trials
Timeframe	Short and long term
Additional information	None

CBT: Cognitive Behavioural Therapy; CORE-10: Clinical outcomes in routine evaluation 10; EQ-5D: EuroQol health related quality of life (5 domains); SF-12: 12-item short form survey

K.3.13 Research recommendation

What is the effectiveness and cost-effectiveness of psychological or psychosocial interventions to reduce gambling symptoms and increase recovery capital?

K.3.14 Why this is important

Psychological and psychosocial interventions have been used as treatment options for harmful gambling. However, to work in the long-term these treatments not only need to reduce gambling symptoms but to also increase resilience and lead to long-term recovery and avoidance of relapse.

K.3.15 Rationale for research recommendation

Table 107: Research recommendation rationale

Importance to 'patients' or the population	Little is known about the effectiveness of psychological or psychosocial interventions to increase recovery capital.
Relevance to NICE guidance	Psychological and psychosocial treatments have been considered in this guideline but there is a lack of data on their effectiveness to increase recovery capital.
Relevance to the NHS	The outcome of the recommended research would affect the commissioning and provision of NHS treatment for harmful gambling, particularly in terms of the offer or combined or sequenced interventions.
National priorities	High

Current evidence base	No evidence for effects on recovery capital
Equality considerations	Research should be designed to address that certain subgroups may be of higher risk of harm from gambling compared to others (for example young men, people living in lower socio-economic areas). Some subgroups may also have more difficulties accessing treatment services (for example people with neurodevelopmental disabilities and acquired cognitive impairments, people from LGBT+ communities, and people living in lower socio-economic areas).

1 *NHS: National Health Service*

K.1.16 Modified PICO table

3 **Table 108: Research recommendation modified PICO table**

Population	Inclusion: People aged ≥ 18years old, currently participating in harmful gambling. Families, friends and others (all ages) close to people (aged ≥ 18years) who participate or have participated in harmful gambling. Exclusion: • Children and young people <18 years old. • Gambling behaviour only occurring during manic episodes of people with bipolar disorder
Intervention	1. Psychological interventions for the treatment of harmful gambling: 1.1 Cognitive & behavioural interventions and related techniques (including but not limited to cognitive behavioural therapy [CBT], cognitive restructuring technique and aversion therapies.) 1.2 Other psychotherapeutic interventions for harmful gambling (including but not limited to the 12-step group-programme, counselling, harm reduction interventions and psychodrama and dramatherapy). 1.3 Trauma informed interventions for addiction (including but not limited to CBT based trauma interventions, eye movement desensitisation and Eriksonian hypnosis). 1.4 Neurological/ brain stimulation interventions (including but not limited to transcranial magnetic stimulation [TMS], deep brain stimulation and cognitive bias modification). 1.5 Residential treatment (including but not limited to short-term residential treatment, medium and long-term residential treatment and hybrid residential treatment, such as Retreat and Counselling model). 1.6 Self-help, digital interventions and helplines (including but not limited to self-help literature and workbooks, personalised feedback interventions and gamification psychotherapy).

	2. Psychosocial interventions for the treatment of harmful gambling: 2.1 Life and social skills-based interventions (including but not limited to assertiveness training, life skills training and functional communication training). 2.2 Family, systemic and significant other interventions (including but not limited to family therapies with varying styles depending on the theoretical underpinning, transgenerational models and the structural family model). 2.3 Community and peer support interventions (including but not limited to peer support groups, intentional peer support and SMART recovery).
Comparator	Interventions compared with each other or: Treatment as usual Placebo or sham treatment No treatment
Outcome	**Critical:** • Gambling severity (assessed using validated scales such as the Problem Gambling Severity Index, dichotomous measures of abstinence and objective, quantifiable measures such as gambling frequency or time or money spent on gambling). • Recovery capital (measured using validated tools such as the Life in Recovery Scale). • Psychological wellbeing (measured using scales such as the Warwick-Edinburgh Well Being Scale, the CORE-10 score and Psychclops). • Personal, social and life functioning (measured using person centred, validated scales such as the Work and Social Adjustment Scale) • Cost-effectiveness (including resource use measurements and QALY estimations using a validated preference-based measure such as the EQ-5D or SF-6D). **Important:** • Physical and mental health related quality of life (measured using scales such as EQ 5D and SF-12).
Study design	Randomised controlled trials
Timeframe	Short and long term
Additional information	None

CBT: Cognitive Behavioural Therapy; CORE-10: Clinical outcomes in routine evaluation 10; EQ-5D: EuroQol health related quality of life (5 domains); SF-12: 12-item short form survey

Appendix L Network meta-analysis report from the NICE Guidelines Technical Support Unit (TSU)

Network meta-analysis report from the NICE Guidelines TSU for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Beatrice C Downing, Nicky J Welton. Guidelines Technical Support Unit, University of Bristol

Introduction

The aim of this analysis is to compare the efficacy of different psychological and psychosocial interventions for harmful gambling (RQ4.1b). Analyses are conducted for 2 outcomes: symptom severity, and frequency of gambling. Potential bias due to industry funding, method for handling attrition, and small sample size are investigated in sensitivity and bias-adjusted analyses.

Methods

Interventions

Interventions were classified into classes as shown in Table 109. Some studies compared an active intervention plus treatment as usual (TAU) with TAU alone. Because TAU is given on both arms of these studies, the TAU can be considered to “cancel out”, so that the results of the study would be similar to a study comparing the active intervention with No Treatment.

We fitted models that either allowed the intervention effects in the same class to be different or the same. The “random class” model assumes that intervention effects in the same class differ but come from a distribution of interventions effects with an overall class mean effect and between intervention variance within class. The “fixed class” model estimates a single effect for the class, assuming that all intervention effects are the same within the class.

We use No Treatment as the reference that all relative intervention and class effects are reported against.

Table 109. Categorisations of interventions into intervention classes with numbers of patients randomised to each intervention / class for the full dataset for symptom severity and the frequency outcomes

Class	N Severity	N Frequency	Intervention	N Severity	N Frequency
No treatment	681	592	No treatment	681	592
TAU	153	111	TAU	8	-
			Information + referral	110	111
			Referral to Gamblers anonymous (GA) group	35	-
Attention placebo	179	39	Brief semi-structured interview	-	39
			Attention-control (non-gambling) feedback	114	-
			Sham computerised attentional bias modification	65	-
Waitlist	461	401	Waitlist	461	401
CBT individual (face-to-face)	592	331	Brief CBT individual (face-to-face)	317	183
			Brief motivational interviewing + brief CBT individual (face-to-face)	143	103
			CBT individual (face-to-face)	104	45
			Brief Mindfulness-based cognitive therapy (MBCT) individual	28	-
CBT group (face-to-face)	121	30	CBT group	121	30
Behavioural therapies individual (face-to-face)	136	98	Behavioural therapy individual (face-to-face)	73	98
			Exposure therapy individual (face-to-face)	43	-
			Dialectical behavior therapy (DBT), modified for anger and addiction	20	-
Counselling individual (face-to-face)	76	76	Client-centred therapy (CCT)	76	76
Motivational interviewing	303	290	Brief motivational interviewing	231	195
			Motivational interviewing	72	95
Self-help (with no or minimal support)	1616	1526	Personalised feedback intervention	446	349
			Psychoeducational materials	182	182
			Psychoeducational workbook	-	213

			CBT workbook	191	199
			Computerised personalised feedback intervention	243	243
			Computerised CBT	222	145
			Chatbot-delivered CBT	96	96
			Computerised CBT for depression	71	-
			Computerised attentional bias modification	66	-
			Behaviour change SMS + accessing internet mental health service	99	99
Guided self-help	644	608	Brief motivational interviewing + CBT workbook	110	223
			CBT workbook with support	189	224
			CBT workbook with email support	14	-
			Psychoeducational materials with email support	56	56
			Computerised CBT with support	153	51
			Computerised behavioural couples therapy with support	68	-
			Computerised counselling with support	54	54
Couple interventions (face-to-face)	8	-	Congruence couple therapy	8	-
Twelve step group programme	11	-	Twelve-step facilitated group therapy	11	-
Couple interventions (face-to-face)	8	-	Congruence couple therapy	8	-

Outcomes

Symptom Severity

Studies report intervention effects on symptom severity either as summaries from a continuous severity scale or as the average number of diagnostic criteria met. Of the 39 studies that report either a severity scale, number of diagnostic criteria, or both, 9 studies only reported number of diagnostic criteria. To be able to include all studies we pooled all data on symptom severity and number of diagnostic criteria. In all studies reporting the number of diagnostic criteria, either a 9-point or 10-point diagnostic criteria were used, which was considered to be sufficiently large for this outcome to be considered and modelled as a continuous scale.

Because studies report on different severity symptom scales, and because we were pooling severity scales with number of diagnostic criteria outcomes, we pooled results as standardised mean differences in change from baseline. Study outcomes were standardised using the study-specific standard deviation at baseline averaged across study arms. There was one study (Luquiens 2016) where baseline standard deviation was not reported, and for this study we used an average of the baseline standard deviations from the 4 other studies that reported on the same severity scale (Problem Gambling Severity Index (PGSI)). Another study (So 2020) had baseline standard deviation for only 1 of the 2 outcomes reported, and in this case we excluded the outcome without baseline standard deviation, because a more reliable outcome was available from that study. Finally, Oei 2018 only reports baseline data for one study arm. We assumed that the same baseline values applied for the other study arm.

Some studies report results for 2 different severity scores or for a severity score and number of diagnostic criteria. Rather than arbitrarily select an outcome to include in the model, we included both outcomes for studies that reported two outcomes. This was achieved using a within trial synthesis to obtained a pooled study-specific effect across outcomes (Daly 2021), which is then pooled with the other study estimates. This approach enables both outcomes to be combined from studies reporting 2 outcomes, but avoids double counting of effects from the same study.

Most studies reported results at baseline and follow-up, rather than change from baseline. We prefer to pool change from baseline because this adjusts for any baseline imbalance between study arms which can arise if there are issues with randomisation or simply due to chance when sample sizes are small. Mean change from baseline was computed from the means at baseline and follow-up, and we assumed a correlation of 0.5 to estimate the standard deviation in the change from baseline.

One study (Ede 2020) reported a standard deviation that was very small compared with the mean outcome, and very different to all the other studies. We were unable to fit the models because this study gave such unusual results. We considered it more plausible that what was reported as a standard deviation was in fact a standard error, which was in line with the other study data and enabled us to fit the models. We therefore made the assumption that Ede 2020 reported standard errors, rather than standard deviations.

There was a high level of attrition in the included studies. Some studies adjusted for this and reported results from an Intention-To-Treat (ITT) analysis, whereas some studies reported results just for those who had follow-up data available (a Complete Case (CC) analysis). In our base-case model we imputed ITT results for studies reporting CC data, by assuming that all those lost to follow-up would have a follow-up value equal to the mean at baseline (that is, Baseline Observation Carried Forward (BOCF)). This makes an assumption that those lost to follow-up are unlikely to see an improvement in symptom severity. We ran separate sensitivity analyses including studies reporting ITT only and studies reporting CC only.

Frequency

Most studies reporting frequency of gambling reported either the mean number of days or the mean number of sessions over a time-period. Two studies (Marceaux 2011, McIntosh 2016) were excluded because they did not provide information on the time period over which the frequency was measured. Two studies reported a dichotomous gambling abstinence outcome only. Abstinence data could be combined with gambling frequency data under the assumption that gambling frequency can be described by a Poisson distribution, and log-rate ratios are pooled. However, when we attempted to fit this model, we found that it gave a poor fit to the data and there were issues in getting the models to run. This was regardless of whether the abstinence data were included or not.

We therefore had to take an alternative approach and treat the frequency data as continuous data to estimate standardised mean differences in frequency, excluding the abstinence data. Standardisation was necessary because the scale of the frequency measures varied greatly across studies, reflecting the different follow-up times, units (days or sessions), and populations (baseline frequency).

The same methods were used as described for the symptom severity outcome above. In total there were 23 studies reporting a continuous measure of frequency, however one study (Luquiens 2016) was excluded because there was no baseline standard deviation to use for standardisation. Toneatto 2009/2016 did not have baseline data for one study arm, and so we assumed the same baseline values as for arm 1 of that study.

Sensitivity analyses

The main (base-case) analyses for both symptom severity and gambling frequency were conducted for the full dataset which included studies reporting ITT results and imputed ITT results from studies reporting CC using the BOCF method for imputation.

We ran sensitivity analyses using the following subsets of the full dataset:

- Studies reporting ITT only
- Studies reporting CC only (without imputation)
- Studies classified as not receiving industry funding

We also ran two bias-adjusted models, (i) adjusting for small study effects by including a covariate effect for 1/N for active vs control comparisons, where N is the sample size, and (ii) adjusting for industry funding by including a covariate effect if a study reported receiving industry funding or if industry funding was unclear.

Network Meta-Analysis Models

We fitted network meta-analysis (NMA) models to estimate intervention / class effects as standardised mean differences (adapting code from Dias 2011). We fitted models with either a fixed effect (FE) or random (RE) effect at the study level, and either a fixed or random class models at the intervention level. This allowed us to estimate a between-study standard deviation (SD), and a between-intervention within class SD, to assess heterogeneity at the study and intervention levels. Further technical detail of the models is given in section 'Details of the NMA models' at the end of this appendix. Model choice was based on goodness of fit measures (posterior mean deviance and Deviance Information Criteria [DIC], preferring lower values), and inspection of the estimated between studies standard deviation. The model selected for the full dataset was used for all the sensitivity analyses.

NMA assumes that the included studies are similar in terms of factors that might interact with the intervention effects (effect modifiers). So, the relative effect of intervention B vs intervention A would be expected to be similar in all of the studies (if they had included A and B interventions). We can assess this assumption by measuring statistical heterogeneity, and also by checking if the direct and indirect estimates are in agreement (consistent) when there

are loops of evidence in the network. To determine if there is evidence of inconsistency, the selected consistency model (fixed or random effects) was compared to an "inconsistency", or unrelated mean effects (UME), model (Dias 2013). The latter is equivalent to having separate, unrelated, meta-analyses for every pairwise contrast, with a common variance parameter assumed in the case of random effects models.

Results

Full data and results of all analyses described here are provided in supplement 4: NMA data and results.

Symptom severity

Full dataset (base-case)

Figure 16 shows the network plot for the full dataset at the class level, where width of the lines is proportional to the number of studies making each comparison. Model fit statistics (Table 110) support the choice of RE on study effects, and a FE structure within intervention classes. There is no evidence of global inconsistency as seen by comparing model fit for the Inconsistency and NMA models (Table 110), however in the dev-dev plot results from data-point 20 (Ladouceur 2001) were identified as potentially inconsistent with the other evidence (Figure 17). Data for this study were checked and no data errors were identified. Ladouceur 2001 compared CBT individual (face-to-face) with Waitlist, and the estimate for this comparison was -1.58 95%CrI (-2.21, -0.97) in the NMA compared with -3.57 95%CrI (-4.42, -2.71) in the inconsistency model. This suggests that the direct evidence from Ladouceur 2001 finds a stronger benefit of CBT individual (face-to-face) compared with Waitlist than that seen from the indirect evidence. The results for the CBT individual (face-to-face) class in Table 111 should therefore be interpreted with caution.

The results for the full dataset are presented in Table 111. These show evidence that Group CBT (face-to-face) and Individual CBT (face-to-face) are effective compared with No Treatment, and that Waiting List is less effective than No Treatment. Note that the effect seen for Individual CBT (face-to-face) may be less strong than estimated due to the impact of the potentially inconsistent study Ladouceur 2001. For all other intervention classes, there was no evidence of a directional change in symptom severity as a result of the intervention.

Figure 16. Network diagram for symptom severity outcome, class-level

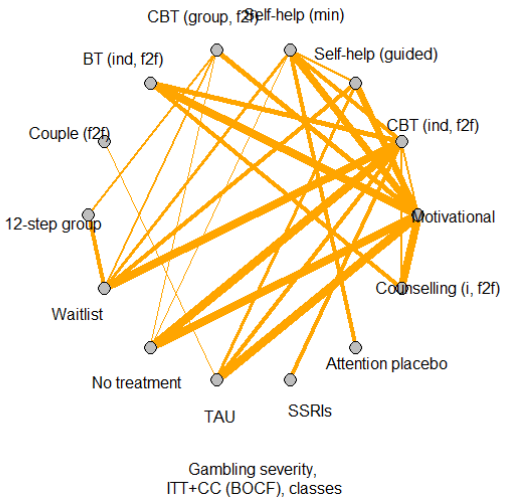
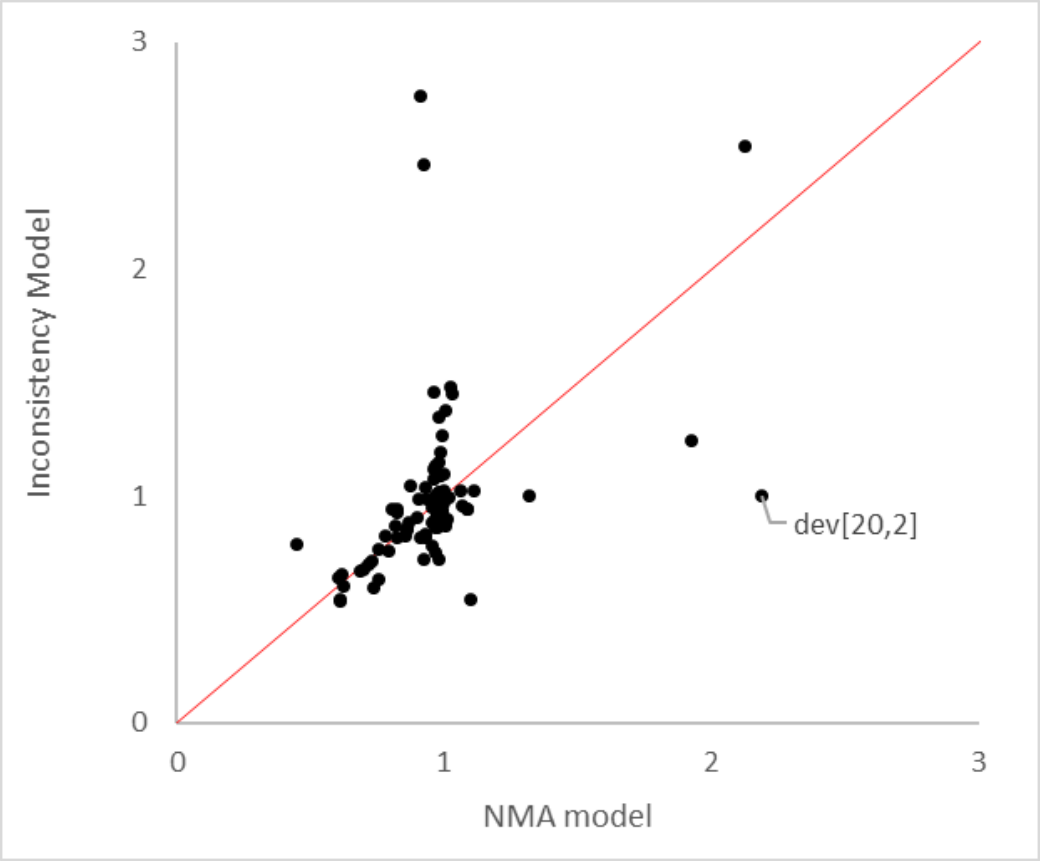


Table 110. Model fit statistics for the base case analysis for the outcome symptom severity, using the full dataset.

Model	Total residual deviance	pD	DIC	Between-study SD (95% CrI)	Between-intervention SD (95% CrI)	Regression coefficient (95%CrI)
RE study, FE class	107.7	94.5	256.2	0.64 (0.49, 0.84)	-	-
FE study, FE class	388.7	58.0	500.7	-	-	-
RE study, RE class	107.7	94.8	256.5	0.63 (0.47, 0.83)	0.17 (0.01, 0.48)	-
Inconsistency Model [RE study, FE class]	116.3	87.7	258.0	0.29 (0.16, 0.45)	-	-
Meta-Regression, sample size	107.6	94.9	256.5	0.65 (0.50, 0.85)	-	8.25 (-21.86, 39.53)
Meta-regression, industry funding	107.6	94.6	256.2	0.65 (0.50, 0.85)		-0.23 (-1.16, 0.69)

Models differed in their specification of effects structure on study effects and treatment class effects. 45 studies with 108 study arms.

Figure 17. Dev-dev plot showing the posterior mean deviance for each data-point for the inconsistency model plotted against the NMA model (random study, fixed class effect model).



Data-point 20 (Ladouceur 2001) is identified as potentially inconsistent.

Table 111. Effect estimates for each intervention class relative to no treatment for full dataset and scenario analyses of symptom severity

Class	Scenario	Effect estimate (95% CrI)
Attention placebo	Full dataset	0.12 (-0.92, 1.18)
	CC only	0.55 (-0.69, 1.79)
	ITT only	**-0.58 (-1.15, -0.01)**
	No industry funding	*Class not present*
Behavioural therapies, individual (face-to-face)	Full dataset	-0.57 (-1.49, 0.35)
	CC only	-0.31 (-1.47, 0.86)
	ITT only	**-1.20 (-2.06, -0.34)**
	No industry funding	*Class not present*
CBT group (face-to-face)	Full dataset	**-1.08 (-1.82, -0.35)**
	CC only	**-1.01 (-1.84, -0.22)**
	ITT only	*Class not present*
	No industry funding	-0.60 (-1.65, 0.40)
CBT individual (face-to-face)	Full dataset	-0.54 (-1.11, 0.04)
	CC only	-0.51 (-1.30, 0.28)
	ITT only	**-0.59 (-0.90, -0.28)**
	No industry funding	-0.40 (-1.09, 0.29)
Counselling individual (face-to-face)	Full dataset	-0.42 (-1.64, 0.80)
	CC only	-0.28 (-1.65, 1.09)
	ITT only	*Class not present*
	No industry funding	*Class not present*
Couple interventions (face-to-face)	Full dataset	-0.48 (-2.37, 1.42)
	CC only	-0.52 (-2.69, 1.66)
	ITT only	*Class not present*
	No industry funding	*Class not present*
Guided self-help	Full dataset	-0.10 (-0.75, 0.54)
	CC only	0.17 (-0.66, 1.02)
	ITT only	*Class not present*
	No industry funding	-0.21 (-1.03, 0.61)
Motivational interviewing	Full dataset	-0.29 (-0.90, 0.32)
	CC only	-0.17 (-0.88, 0.53)
	ITT only	*Class not present*
	No industry funding	-0.14 (-0.81, 0.54)
Self-help (with no or minimal support)	Full dataset	0.07 (-0.38, 0.52)
	CC only	0.26 (-0.37, 0.89)
	ITT only	**-0.28 (-0.49, -0.08)**
	No industry funding	-0.01 (-0.57, 0.55)
SSRIs	Full dataset	-0.44 (-2.05, 1.16)
	CC only	-0.41 (-2.18, 1.33)
	ITT only	*Class not present*
	No industry funding	-0.31 (-1.94, 1.34)
Treatment as usual (TAU)	Full dataset	0.16 (-0.81, 1.13)
	CC only	0.11 (-1.25, 1.48)
	ITT only	**0.74 (0.14, 1.33)**

	No industry funding	0.19 (-0.83, 1.22)
Twelve step group programme	Full dataset	-0.38 (-2.02, 1.23)
	CC only	-0.31 (-2.05, 1.41)
	ITT only	*Class not present*
	No industry funding	*Class not present*
Waitlist	Full dataset	**1.05 (0.46, 1.65)**
	CC only	**1.21 (0.48, 1.96)**
	ITT only	*Class not present*
	No industry funding	**1.09 (0.27, 1.95)**

Intervention effects are shown as standardised mean differences in severity score relative to no treatment. Where the 95% credible interval (CrI) does not include zero, the estimate of no difference in severity score, the effect estimate is shown in bold. Negative estimates indicate intervention classes where the severity score was reduced relative to no treatment. Not all classes were present for all scenarios.

Symptom severity, subgroup of studies reporting intention-to-treat results (ITT) only

Of the 15 studies reporting ITT results, 4 reported on intervention classes that were disconnected from the main network (Figure 18). Therefore 11 studies were included in the ITT subgroup analysis. The model fit well to the data, and there was less heterogeneity in the ITT dataset than in the full dataset (Table 112). Effect estimates for intervention classes were more precise than estimates from the full dataset, likely because of the smaller estimated between-study SD. All the active classes in the network (attention placebo, behavioural therapies, individual CBT and self-help with minimal support) show a benefit compared to No Treatment, but TAU is less effective than No Treatment.

Figure 18. Network diagram for symptom severity outcome, class-level, ITT studies only. Disconnected networks indicated by different colours

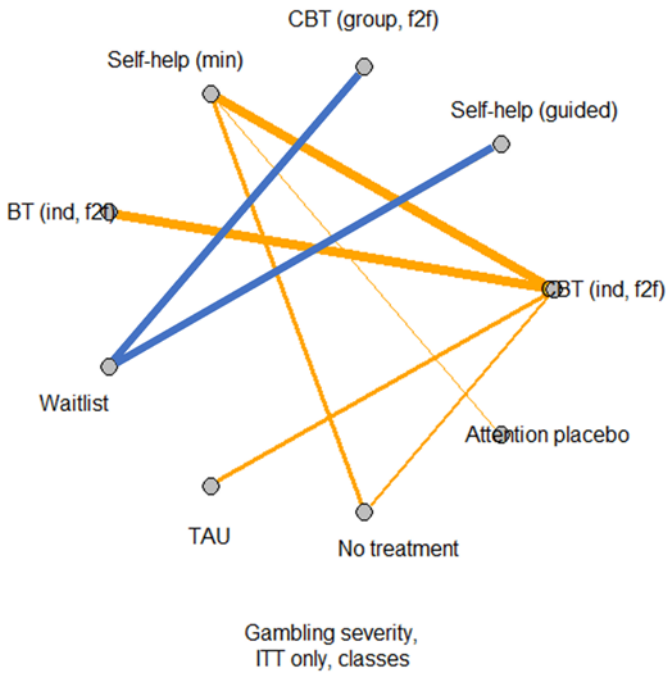


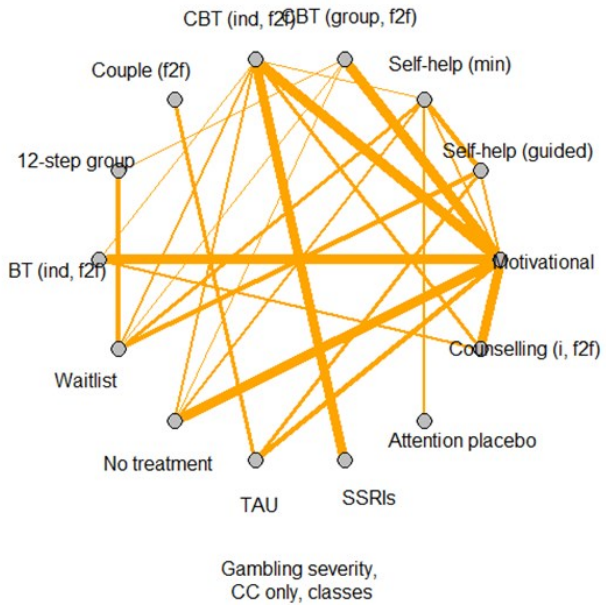
Table 112. Model fit statistics for the chosen model structure (random effects for study estimates, fixed effects for treatment class) for the full dataset and scenario analyses for the outcome symptom severity.

Scenario	Studies (arms)	Total residual deviance	Between-study SD (95% CrI)
Full dataset	45 (108)	107.7	0.64 (0.49, 0.84)
CC only	29 (71)	68.8	0.68 (0.48, 0.96)
ITT only	14 (32)	35.4	0.11 (<0.01, 0.35)
No industry funding	22 (54)	52.5	0.63 (0.41, 0.95)

Symptom severity, subgroup of studies reporting completers (CC) results only

Over half – 26 out of 45 studies reporting symptom severity – reported CC results, and all intervention classes were represented in the dataset (Figure 19). The model fit well, but resulted in heterogeneity that was as high as for the full dataset (Table 112). As for the full dataset there was evidence that Group CBT (face-to-face) and Individual CBT (face-to-face) are effective compared with No Treatment, and that Waiting List is less effective that No Treatment (Table 111). The results for the full dataset are largely driven by the CC studies.

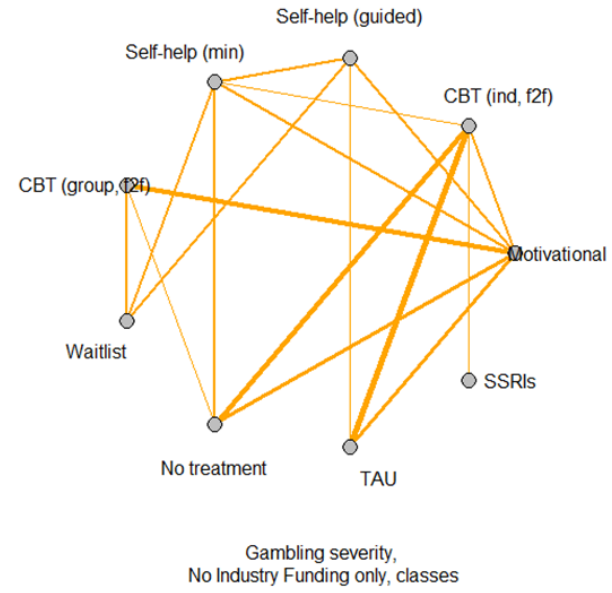
Figure 19. Network diagram for symptom severity outcome, class-level, CC studies only



Symptom severity, studies with no industry funding

Figure 20 shows the network of comparisons for the 18 studies that reported not having industry funding. Nine intervention classes were represented in the data subset. The model fit well, but resulted in heterogeneity that was as high as for the full dataset (Table 112). Waiting List is less effective that No Treatment (Table 111), and there is no evidence that any of the classes are more effective than No Treatment, but note the small amount of evidence available for this sensitivity analysis.

Figure 20. Network diagram for symptom severity outcome, class-level, studies reporting no industry funding



Adjusting for small study effects and effects due to industry funding

There was no evidence of improved model fit when adjusting for small study effects as the regression coefficient was very large and contained zero (Table 110). There was also no evidence of improved model fit when adjusting for industry funding, with a regression co-efficient in the direction of improved symptom severity but with a 95% credible interval easily spanning zero (Table 110).

Frequency

Full dataset (base-case)

Figure 21 shows the network plot for the full dataset at the class level. Model fit statistics (Table 113) show that all models fit well to the data. There is a small benefit in DIC for the model with fixed study effects and fixed class effect. However, we chose the model with random study effects and fixed class effects for consistency with the model used for symptom severity, and to allow for the possibility of heterogeneity in the sensitivity analyses. Note however, that the between study standard deviation is low (0.053, 95%CrI 0.002, 0.144), so results are very similar to the model with fixed study effects. There was no evidence of global inconsistency as seen by comparing model fit for the Inconsistency and NMA models (Table 113), however in the dev-dev plot results from data-point 13 (Ladouceur 2001) were identified as potentially inconsistent with the other evidence (Figure 22). Data for this study were checked and no data errors were identified. Ladouceur 2001 compared CBT individual (face-to-face) with Waitlist, and the estimate for this comparison was 0.04 95%CrI (-0.46, 0.52) from the NMA compared with -0.81 95%CrI (-1.25, -0.36) from the inconsistency model. This suggests that the direct evidence from Ladouceur 2001 found a benefit of CBT individual (face-to-face) compared with Waitlist, which was not seen from the indirect evidence. The results for the CBT individual (face-to-face) class in Table 114 should therefore be interpreted with caution.

The results for the full dataset are presented in Table 114. These show evidence that most of the active interventions are effective compared with No Treatment, although the 95% credible intervals just contain 0 for Counselling individual (face-to-face) and Self-help (with

no or minimal support). There is evidence that TAU is more effective than No Treatment, but no evidence of a difference between Waitlist and No Treatment.

Figure 21. Network diagram for frequency outcome, class-level

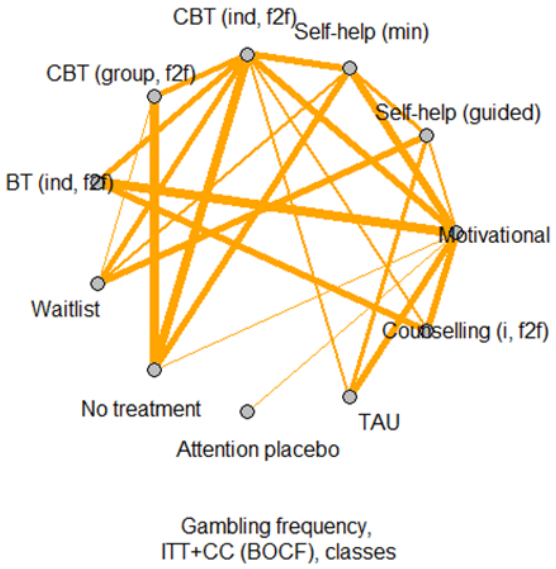
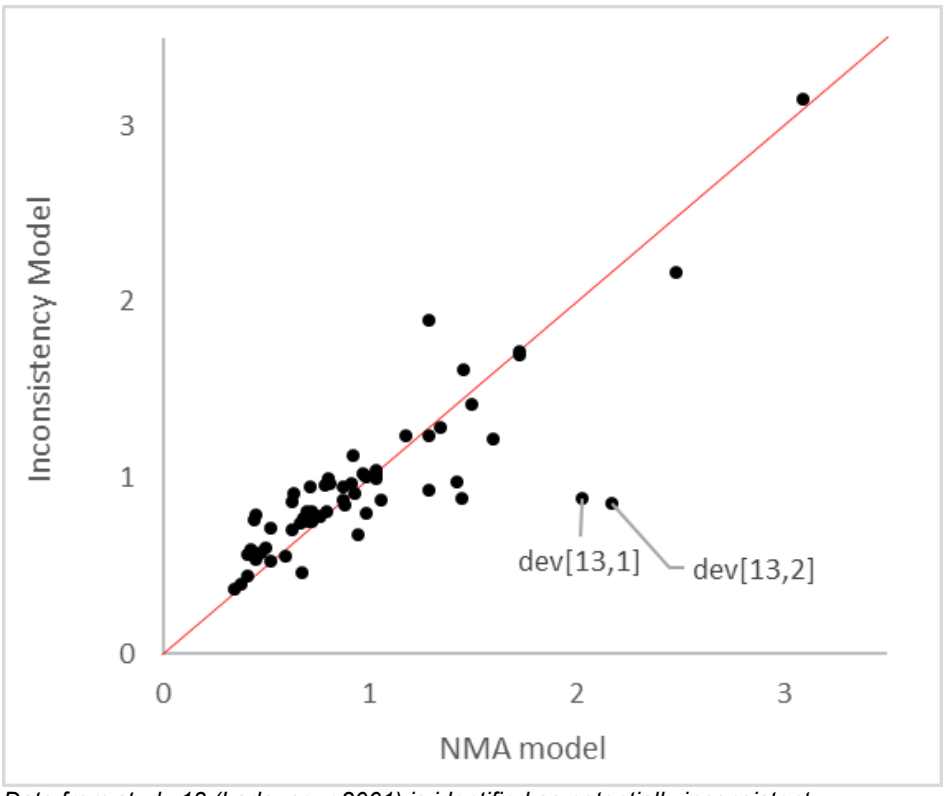


Table 113. Model fit statistics for the base case analysis for the outcome gambling frequency, using the full dataset.

Model	Total residual deviance	pD	DIC	Between-study SD (95% CrI)	Between-intervention SD (95% CrI)	Regression coefficient (95%CrI)
RE study, FE class	59.9	36.2	196.1	0.053 (0.002, 0.144)	-	-
FE study, FE class	62.2	32.0	194.6	-	-	-
RE study, RE class	59.3	37.9	197.6	0.056 (0.002, 0.148)	0.043 (0.002, 0.135)	-
Inconsistency Model [RE study, FE class]	59.1	40.8	200.4	0.056 (<0.001, 0.154)	-	-
Meta-Regression, sample size	60.2	37.1	197.7	0.058 (0.003, 0.150)	-	2.83 (-10.59, 15.77)
Meta-Regression, industry funding	60.0	37.1	197.6	0.057 (0.003, 0.151)	-	-0.06 (-0.281, 0.158)

Models differed in their specification of effects structure on study effects and treatment class effects. 22 studies with 62 study arms.

Figure 22. Dev-dev plot showing the posterior mean deviance for each data-point for the inconsistency model plotted against the NMA model (random study, fixed class effect model).



Data from study 13 (Ladouceur 2001) is identified as potentially inconsistent.

Table 114. Effect estimates for each intervention class relative to no treatment for full dataset and scenario analyses of gambling frequency

Class	Scenario	Effect estimate (95% CrI)
Attention placebo	Full dataset	-0.37 (-0.86, 0.08)
	CC only	-0.38 (-0.90, 0.13)
	ITT only	*Class not present*
	No industry funding	*Class not present*
Behavioural therapies, individual (face-to-face)	Full dataset	**-0.41 (-0.68, -0.13)**
	CC only	**-0.47 (-0.86, -0.07)**
	ITT only	-0.22 (-0.89, 0.46)
	No industry funding	*Class not present*
CBT group (face-to-face)	Full dataset	-0.34 (-0.77, 0.10)
	CC only	-0.37 (-0.83, 0.10)
	ITT only	*Class not present*
	No industry funding	*Class not present*
CBT individual (face-to-face)	Full dataset	**-0.36 (-0.55, -0.18)**
	CC only	**-0.48 (-0.81, -0.15)**
	ITT only	**-0.32 (-0.59, -0.05)**
	No industry funding	-0.21 (-0.47, 0.07)
Counselling individual (face-to-face)	Full dataset	-0.24 (-0.57, 0.08)
	CC only	-0.29 (-0.71, 0.16)
	ITT only	*Class not present*

	No industry funding	*Class not present*
Guided self-help	Full dataset	**-0.31 (-0.47, -0.13)**
	CC only	**-0.31 (-0.58, -0.04)**
	ITT only	**-0.59 (-1.07, -0.12)**
	No industry funding	**-0.36 (-0.62, -0.10)**
Motivational interviewing	Full dataset	**-0.30 (-0.49, -0.09)**
	CC only	**-0.31 (-0.61, -0.01)**
	ITT only	-0.04 (-0.61, 0.52)
	No industry funding	**-0.36 (-0.66, -0.05)**
Self-help (with no or minimal support)	Full dataset	**-0.15 (-0.25, -0.04)**
	CC only	-0.14 (-0.34, 0.06)
	ITT only	**-0.21 (-0.38, -0.04)**
	No industry funding	-0.14 (-0.30, 0.01)
Treatment as usual (TAU)	Full dataset	**-0.42 (-0.69, -0.14)**
	CC only	**-0.41 (-0.78, -0.04)**
	ITT only	*Class not present*
	No industry funding	**-0.47 (-0.84, -0.11)**
Waitlist	Full dataset	0.01 (-0.15, 0.19)
	CC only	0.05 (-0.25, 0.37)
	ITT only	-0.12 (-0.41, 0.16)
	No industry funding	-0.03 (-0.32, 0.27)

Intervention effects are shown as standardised mean differences in gambling frequency relative to no treatment. Where the 95% credible interval (CrI) does not include zero, the effect estimate is shown in bold. Negative estimates indicate intervention classes where the frequency was reduced relative to no treatment. Not all classes were present for all scenarios.

Frequency, subgroup of studies reporting intention-to-treat results (ITT) only

Only 9 of the 22 studies reporting gambling frequency reported ITT results. The ITT data subset included 9 intervention classes (Figure 23). The model fit well to the data, though there was slightly more heterogeneity in the ITT dataset than in the full dataset (Table 115). Effect estimates for intervention classes were less precise than estimates from the full dataset, however findings are generally in line with those seen in the full dataset. The exceptions are Behavioural therapies individual (face-to-face) and Motivational Interviewing, where there is no evidence of effect from the ITT studies.

Figure 23. Network diagram for frequency outcome, class-level, ITT studies only

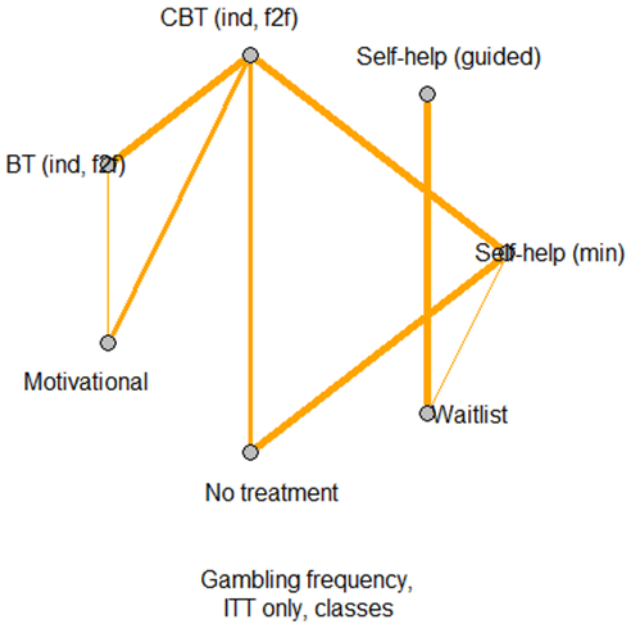


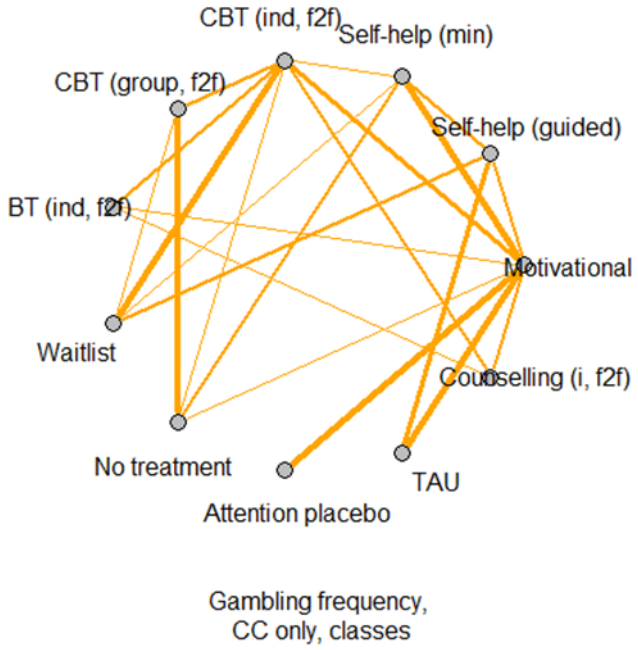
Table 115. Model fit statistics for the chosen model structure (random effects for study estimates, fixed effects for treatment class) for the full dataset and scenario analyses for the outcome gambling frequency.

Scenario	Studies (arms)	Total residual deviance	Between-study SD (95% CrI)
Full dataset	22 (62)	59.9	0.053 (0.002, 0.144)
CC only	13 (36)	31.4	0.070 (0.002, 0.211)
ITT only	9 (26)	26.2	0.096 (0.005, 0.255)
No industry funding	10 (29)	28.0	0.080 (0.003, 0.223)

Frequency, subgroup of studies reporting completers (CC) results only

Over half –13 out of 22 studies reporting symptom severity – reported CC results, and all intervention classes were represented in the dataset (Figure 24). The model fit well, but resulted in slightly higher heterogeneity than for the full dataset (Table 115). The results for the CC studies are in line with the results for the full dataset, with evidence that individual behavioural therapies (face-to-face), individual CBT (face-to-face), guided self-help, motivational interviewing and treatment as usual are effective compared with No Treatment (Table 114).

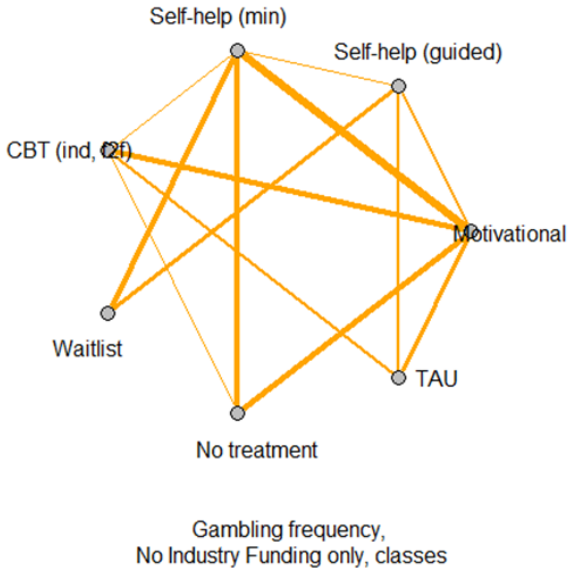
Figure 24. Network diagram for frequency outcome, class-level, CC studies only



Frequency, studies with no industry funding

Figure 25 shows the network of comparisons for the 10 studies that reported not having industry funding. This subset included seven intervention classes. The model fit well, but resulted in heterogeneity that was slightly higher than for the full dataset (Table 115). The results are in line with those found for the full dataset, but with less precision and wider credible intervals (Table 114).

Figure 25. Network diagram for frequency outcome, class-level, studies reporting no industry funding.



Adjusting for small study effects and effects due to industry funding

There was no evidence of improved model fit when adjusting for small study effects and the regression coefficient was very large and contained zero (Table 113). There was also no

evidence of improved model fit when adjusting for industry funding and the regression coefficient was close to zero with a 95% credible that spanned zero (Table 113).

Details of the NMA models

Symptom severity

We adapted the NMA code for continuous outcomes from the NICE Decision Support Unit Technical Support Document TSD2 (Dias et al. 201***1***) to model standardised mean difference, and to allow for some studies reporting two different measures of symptom severity.

Let $y_{i,k,m}$ be the mean outcome in study i, arm k, for outcome m, with corresponding standard error $se_{i,k,m}$, and with pooled baseline standard deviation sd_i^{pooled}. A Normal likelihood was assumed on the observed scale with mean $\varphi_{i,k}$, which is equal to the mean SMD $\theta_{i,k,m}$ multiplied by the pooled standard deviation sd_i^{pooled}:

$$\begin{aligned} y_{i,k,m} &\sim N\left(\varphi_{i,k}, se_{i,k,m}^2\right) \\ \varphi_{i,k,m} &= \theta_{i,k,m} * sd_i^{pooled} \end{aligned} \quad (1)$$

The NMA model is for the relative effect on mean SMD $\theta_{i,k,m}$. For studies reporting 2 outcome scales, it is assumed that each outcome proved as estimate of a common effect for that study and intervention, $\delta_{i,k}$:

$$\theta_{i,k,m} = \mu_{i,m} + \delta_{i,k} \quad (2)$$

where the baseline SMD depends on outcome measure, $\mu_{i,m}$.

The fixed and random effects models are then:

$$\begin{aligned} \delta_{i,k} &\sim N\left(d_{t_{i,k}} - d_{t_{i,1}}, \tau^2\right) \quad \text{Random Effects} \\ \delta_{i,k} &= d_{t_{i,k}} - d_{t_{i,1}} \qquad \text{Fixed Effects} \end{aligned} \quad (3)$$

where τ^2 is the between study standard deviation, $t_{i,k}$ indicates the intervention on arm k of study i, and intervention effects d_k are **standardised mean differences.**

The fixed class model assumes that each intervention has the same effect within a class:

$$d_k = D_{class(k)} \quad (4)$$

where $class(k)$ indicates the class for intervention k.

The random class effect model assumes that intervention effects come from a distribution of effects with mean $D_{class(k)}$ and between intervention standard deviation sd_{class}:

$$d_k \sim Normal(D_{class(k)}, sd_{class}^2) \quad (5)$$

Network meta-regression models are fitted to estimate potential bias associated with industry funding and for sample size. The NMA model adjusted for sample size is:

$$\delta_{i,k} \sim Normal(d_{t_{i,k}} - d_{t_{i,1}} + (\beta_{t_{i,k}} - \beta_{t_{i,1}}) / n_{i,k}, \tau^2) \quad (6)$$

where β_k is assumed constant ($\beta_k = B$) for active interventions, and zero ($\beta_k = 0$) for control interventions.

The NMA model adjusted for studies with (or unclear) industry funding ($x_i = 1$) is:

$$\delta_{i,k} \sim Normal(d_{t_{i,k}} - d_{t_{i,1}} + (\beta_{t_{i,k}} - \beta_{t_{i,1}}) * x_{i,k}, \tau^2) \quad (7)$$

where β_k is assumed constant ($\beta_k = B$) for active interventions, and zero ($\beta_k = 0$)for control interventions.

Very flat Normal priors are used for all parameters except variance parameters, where Uniform(0,5) priors are used on the standard deviation scale.

Frequency

The NMA model for frequency is as for symptom severity, however there is only a single outcome measure for each study, so the outcome subscript m is not required, and equations (1) and (2) become:

$$y_{i,k} \sim N\left(\varphi_{i,k}, se_{i,k}^2\right)$$
$$\varphi_{i,k} = \theta_{i,k} * sd_i^{pooled}$$

$$\theta_{i,k} = \mu_i + \delta_{i,k}$$

The fixed and random effects models are then as for equation (3). The fixed and random class models are defined as for the symptom severity outcome given by equations (4) and (5), and priors used are the same. The network meta-regression model are also as for the symptom severity outcome given by equations (6) and (7).

WinBUGS code

We provide the WinBUGS code for the following models:

1. Symptom Severity, Random Study Effect, Random Class Effect Model (Table 116)
2. Symptom Severity, Random Study Effect, Fixed Class Effect Model (Table 117)
3. Symptom Severity, Random Study Effect, Fixed Class Effect Model, Meta-Regression for Sample Size (Table 118)
4. Symptom Severity, Random Study Effect, Fixed Class Effect Model, Meta-Regression for Industry Funding (Table 119)
5. Symptom Severity, Unrelated Mean Effects (Inconsistency) Model (

```
# Normal likelihood, identity link
# Random study effects, random intervention within class effects

model{                          # *** PROGRAM STARTS
#Likelihood
for(i in 1:ndata){                    #   LOOP THROUGH STUDIES
   w[i,1] <- 0      # adjustment for multi-arm trials is zero for control arm
   delta[i,1] <- 0            # treatment effect is zero for control arm
                     mu[i] ~ dnorm(0,.0001)         # vague priors for all baselines
   for (k in 1:na[i]) {            #  LOOP THROUGH ARMS
      prec[i,k] <- N[i,k]/pow(sdCFB[i,k],2)     # set precisions
```

```
                                        y[i,k]<- meanCFB[i,k]
      y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
# model for linear predictor
                                        theta[i,k]<-phi[i,k]*sd.pooled[i]
      phi[i,k] <- mu[i] + eta[i,k]
#Set relative effect for outcome 2 equal to outcome 1 for same study
#Pools outcomes from same study
                                        eta[i,k]<- delta[i-out[i]+1,k]
#Deviance contribution
      dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k]
    }
#  summed residual deviance contribution for this trial/outcome
   resdev[i] <- sum(dev[i,1:na[i]])
 }
totresdev <- sum(resdev[])          #Total Residual Deviance

#RE Model
for(i in 1:ndata){                  # LOOP THROUGH STUDIES WITH ARM DATA
   for (k in 2:na[i]) {            # LOOP THROUGH ARMS
# trial-specific RE distributions
      delta[i,k] ~ dnorm(md[i,k],taud[i,k])
# mean of RE distributions, with multi-arm trial correction
      md[i,k] <-  d[t[i,k]] - d[t[i,1]] + (beta[t[i,k]] - beta[t[i,1]])*step(Industry[i]-1) + sw[i,k]
# precision of RE distributions (with multi-arm trial correction)
      taud[i,k] <- tau *2*(k-1)/k
# adjustment, multi-arm RCTs
      w[i,k] <- (delta[i,k] - (d[t[i,k]] - d[t[i,1]])- (beta[t[i,k]] - beta[t[i,1]])*step(Industry[i]-1))
# cumulative adjustment for multi-arm trials
      sw[i,k] <- sum(w[i,1:k-1])/(k-1)
    }
}

#Fixed treatment effects within class
d[1]<-0      # treatment effect is zero for reference treatment / class
D[1]<-0
#Single treatment classes
for (k in 2:nt){
          d[k]<- D[classd[k]]
}

#Priors
for (k in 2:nc){  D[k] ~ dnorm(0,.0001) }
tau<-1/pow(sd,2)
sd~dunif(0,5)

for (k in 1:4){ beta[k]<-0}#No bias for control conditions
for (k in 5:nt){ beta[k]<- B}
B~dnorm(0,.0001)

# SMDs for all possible pair-wise comparisons - Treatments
for (c in 1:(nt-1)) {
          for (k in (c+1):nt) {
```

```
      smd[c,k] <- d[k] - d[c]
  }
}

# SMDs for all possible pair-wise comparisons - Classes
for (c in 1:(nc-1)) {
          for (k in (c+1):nc) {
      smdC[c,k] <- D[k] - D[c]
  }
}

# rank classes
for (k in 1:nc){
  rkC[k] <- rank(D[],k)           # assumes lower values are “good”
           #rk[k] <- nc+1-rank(D[],k)           # assumes higher values are “good”
  bestC[k] <- equals(rkC[k],1)      #calculate probability that treat k is best
  # calculate probability that class k is h-th best
  for (h in 1:nc){ probC[h,k] <- equals(rkC[k],h) }
 }

#Stop unused variables causing error message
dum[1]<-Industry[1]
dum[2]<-ITT[1]
dum[3]<-CC[1]
dum[4]<-out.type[1]
dum[5]<-class[1,1]
dum[6]<-s[1]
}                              # *** PROGRAM ENDS
```

1 6. Table 120)
2 7. Frequency, Random Study Effect, Fixed Class Effect Model (Table 121).

3 All WinBUGS files are available in supplement 5: NMA codes

4 **Table 116. WinBUGS code for Symptom Severity, Random Study Effect, Random**
5 **Class Effect Model**

```
# Normal likelihood, identity link
# Random study effects, random intervention within class effects

model{                          # *** PROGRAM STARTS
#Likelihood
for(i in 1:ndata){                    #   LOOP THROUGH STUDIES
   w[i,1] <- 0      # adjustment for multi-arm trials is zero for control arm
   delta[i,1] <- 0            # treatment effect is zero for control arm
                    mu[i] ~ dnorm(0,.0001)         # vague priors for all baselines
   for (k in 1:na[i]) {            #  LOOP THROUGH ARMS
      prec[i,k] <- N[i,k]/pow(sdCFB[i,k],2)     # set precisions
                                        y[i,k]<- meanCFB[i,k]
      y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
# model for linear predictor
                                        theta[i,k]<-phi[i,k]*sd.pooled[i]
      phi[i,k] <- mu[i] + eta[i,k]
#Set relative effect for outcome 2 equal to outcome 1 for same study
```

```
#Pools outcomes from same study
                                        eta[i,k]<- delta[i-out[i]+1,k]
#Deviance contribution
       dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k]
     }
#  summed residual deviance contribution for this trial/outcome
   resdev[i] <- sum(dev[i,1:na[i]])
  }
totresdev <- sum(resdev[])           #Total Residual Deviance

#RE Model
for(i in 1:ndata){                  # LOOP THROUGH STUDIES WITH ARM DATA
   for (k in 2:na[i]) {            # LOOP THROUGH ARMS
# trial-specific RE distributions
       delta[i,k] ~ dnorm(md[i,k],taud[i,k])
# mean of RE distributions, with multi-arm trial correction
       md[i,k] <-  d[t[i,k]] - d[t[i,1]] + sw[i,k]
# precision of RE distributions (with multi-arm trial correction)
       taud[i,k] <- tau *2*(k-1)/k
# adjustment, multi-arm RCTs
       w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]])
# cumulative adjustment for multi-arm trials
       sw[i,k] <- sum(w[i,1:k-1])/(k-1)
     }
}

#Random treatment effects within class
d[1]<-0       # treatment effect is zero for reference treatment / class
D[1]<-0
#Single treatment classes
for (j in 1:n1){
           d[j1[j]]<- D[classd[j1[j]]]
}
#Classes with 2 or more treatments
for (j in 1:nn){
           d[jn[j]]~dnorm(D[classd[jn[j]]],tauD)
}

#Priors
for (k in 2:nc){  D[k] ~ dnorm(0,.0001) }
tau<-1/pow(sd,2)
tauD<-1/pow(sdD,2)
sd~dunif(0,5)
sdD~dunif(0,5)

# SMDs for all possible pair-wise comparisons - Treatments
for (c in 1:(nt-1)) {
           for (k in (c+1):nt) {
      smd[c,k] <- d[k] - d[c]
  }
}
```

```
# SMDs for all possible pair-wise comparisons - Classes
for (c in 1:(nc-1)) {
          for (k in (c+1):nc) {
      smdC[c,k] <- D[k] - D[c]
  }
}

#Stop unused variables causing error message
dum[1]<-Industry[1]
dum[2]<-ITT[1]
dum[3]<-CC[1]
dum[4]<-out.type[1]
dum[5]<-class[1,1]
dum[6]<-s[1]
}                              # *** PROGRAM ENDS
```

Table 117. WinBUGS code for Symptom Severity, Random Study Effect, Fixed Class Effect Model

```
# Normal likelihood, identity link
# Random study effects, random intervention within class effects

model{                          # *** PROGRAM STARTS
#Likelihood
for(i in 1:ndata){                    #   LOOP THROUGH STUDIES
   w[i,1] <- 0      # adjustment for multi-arm trials is zero for control arm
   delta[i,1] <- 0            # treatment effect is zero for control arm
                     mu[i] ~ dnorm(0,.0001)         # vague priors for all baselines
   for (k in 1:na[i]) {            #  LOOP THROUGH ARMS
      prec[i,k] <- N[i,k]/pow(sdCFB[i,k],2)     # set precisions
                                        y[i,k]<- meanCFB[i,k]
      y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
# model for linear predictor
                                        theta[i,k]<-phi[i,k]*sd.pooled[i]
      phi[i,k] <- mu[i] + eta[i,k]
#Set relative effect for outcome 2 equal to outcome 1 for same study
#Pools outcomes from same study
                                        eta[i,k]<- delta[i-out[i]+1,k]
#Deviance contribution
      dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k]
    }
#  summed residual deviance contribution for this trial/outcome
   resdev[i] <- sum(dev[i,1:na[i]])
  }
totresdev <- sum(resdev[])          #Total Residual Deviance

#RE Model
for(i in 1:ndata){                  # LOOP THROUGH STUDIES WITH ARM DATA
   for (k in 2:na[i]) {            # LOOP THROUGH ARMS
# trial-specific RE distributions
      delta[i,k] ~ dnorm(md[i,k],taud[i,k])
# mean of RE distributions, with multi-arm trial correction
      md[i,k] <-  d[t[i,k]] - d[t[i,1]] + sw[i,k]
```

```
# precision of RE distributions (with multi-arm trial correction)
        taud[i,k] <- tau *2*(k-1)/k
# adjustment, multi-arm RCTs
        w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]])
# cumulative adjustment for multi-arm trials
        sw[i,k] <- sum(w[i,1:k-1])/(k-1)
      }
}

#Fixed treatment effects within class
d[1]<-0       # treatment effect is zero for reference treatment / class
D[1]<-0
#Single treatment classes
for (k in 2:nt){
            d[k]<- D[classd[k]]
}

#Priors
for (k in 2:nc){  D[k] ~ dnorm(0,.0001) }
tau<-1/pow(sd,2)
sd~dunif(0,5)

# SMDs for all possible pair-wise comparisons - Treatments
for (c in 1:(nt-1)) {
            for (k in (c+1):nt) {
       smd[c,k] <- d[k] - d[c]
  }
}

# SMDs for all possible pair-wise comparisons - Classes
for (c in 1:(nc-1)) {
           for (k in (c+1):nc) {
       smdC[c,k] <- D[k] - D[c]
  }
}

# rank classes
for (k in 1:nc){
  rkC[k] <- rank(D[],k)            # assumes lower values are “good”
            #rk[k] <- nc+1-rank(D[],k)            # assumes higher values are “good”
  bestC[k] <- equals(rkC[k],1)      #calculate probability that treat k is best
  # calculate probability that class k is h-th best
  for (h in 1:nc){ probC[h,k] <- equals(rkC[k],h) }
 }

#Stop unused variables causing error message
dum[1]<-Industry[1]
dum[2]<-ITT[1]
dum[3]<-CC[1]
dum[4]<-out.type[1]
dum[5]<-class[1,1]
dum[6]<-s[1]
```

```
}                              # *** PROGRAM ENDS
```

Table 118. WinBUGS code for Symptom Severity, Random Study Effect, Fixed Class Effect Model, Meta-Regression for Sample Size

```
# Normal likelihood, identity link
# Random study effects, random intervention within class effects

model{                          # *** PROGRAM STARTS
#Likelihood
for(i in 1:ndata){                  #   LOOP THROUGH STUDIES
   w[i,1] <- 0      # adjustment for multi-arm trials is zero for control arm
   delta[i,1] <- 0            # treatment effect is zero for control arm
                    mu[i] ~ dnorm(0,.0001)         # vague priors for all baselines
   for (k in 1:na[i]) {            #  LOOP THROUGH ARMS
      prec[i,k] <- N[i,k]/pow(sdCFB[i,k],2)     # set precisions
                                        y[i,k]<- meanCFB[i,k]
      y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
# model for linear predictor
                                        theta[i,k]<-phi[i,k]*sd.pooled[i]
      phi[i,k] <- mu[i] + eta[i,k]
#Set relative effect for outcome 2 equal to outcome 1 for same study
#Pools outcomes from same study
                                        eta[i,k]<- delta[i-out[i]+1,k]
#Deviance contribution
      dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k]
    }
#  summed residual deviance contribution for this trial/outcome
   resdev[i] <- sum(dev[i,1:na[i]])
 }
totresdev <- sum(resdev[])          #Total Residual Deviance

#RE Model
for(i in 1:ndata){                  # LOOP THROUGH STUDIES WITH ARM DATA
   for (k in 2:na[i]) {            # LOOP THROUGH ARMS
# trial-specific RE distributions
      delta[i,k] ~ dnorm(md[i,k],taud[i,k])
# mean of RE distributions, with multi-arm trial correction
      md[i,k] <-  d[t[i,k]] - d[t[i,1]] + (beta[t[i,k]] - beta[t[i,1]])/N[i,k] + sw[i,k]
# precision of RE distributions (with multi-arm trial correction)
      taud[i,k] <- tau *2*(k-1)/k
# adjustment, multi-arm RCTs
      w[i,k] <- (delta[i,k] - (d[t[i,k]] - d[t[i,1]])- (beta[t[i,k]] - beta[t[i,1]])/N[i,k])
# cumulative adjustment for multi-arm trials
      sw[i,k] <- sum(w[i,1:k-1])/(k-1)
    }
}

#Fixed treatment effects within class
d[1]<-0      # treatment effect is zero for reference treatment / class
D[1]<-0
#Single treatment classes
for (k in 2:nt){
```

```
            d[k]<- D[classd[k]]
}

#Priors
for (k in 2:nc){  D[k] ~ dnorm(0,.0001) }
tau<-1/pow(sd,2)
sd~dunif(0,5)

for (k in 1:4){ beta[k]<-0}#No bias for control conditions
for (k in 5:nt){ beta[k]<- B}
B~dnorm(0,.0001)

# SMDs for all possible pair-wise comparisons - Treatments
for (c in 1:(nt-1)) {
            for (k in (c+1):nt) {
      smd[c,k] <- d[k] - d[c]
  }
}

# SMDs for all possible pair-wise comparisons - Classes
for (c in 1:(nc-1)) {
           for (k in (c+1):nc) {
      smdC[c,k] <- D[k] - D[c]
  }
}

# rank classes
for (k in 1:nc){
  rkC[k] <- rank(D[],k)           # assumes lower values are “good”
            #rk[k] <- nc+1-rank(D[],k)           # assumes higher values are “good”
  bestC[k] <- equals(rkC[k],1)      #calculate probability that treat k is best
  # calculate probability that class k is h-th best
  for (h in 1:nc){ probC[h,k] <- equals(rkC[k],h) }
 }

#Stop unused variables causing error message
dum[1]<-Industry[1]
dum[2]<-ITT[1]
dum[3]<-CC[1]
dum[4]<-out.type[1]
dum[5]<-class[1,1]
dum[6]<-s[1]
}                               # *** PROGRAM ENDS
```

Table 119. WinBUGS code for Symptom Severity, Random Study Effect, Fixed Class Effect Model, Meta-Regression for Industry Funding

```
# Normal likelihood, identity link
# Random study effects, random intervention within class effects

model{                          # *** PROGRAM STARTS
#Likelihood
for(i in 1:ndata){                  #   LOOP THROUGH STUDIES
```

```
   w[i,1] <- 0      # adjustment for multi-arm trials is zero for control arm
   delta[i,1] <- 0            # treatment effect is zero for control arm
                    mu[i] ~ dnorm(0,.0001)         # vague priors for all baselines
   for (k in 1:na[i]) {            #  LOOP THROUGH ARMS
      prec[i,k] <- N[i,k]/pow(sdCFB[i,k],2)     # set precisions
                                        y[i,k]<- meanCFB[i,k]
      y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
# model for linear predictor
                                        theta[i,k]<-phi[i,k]*sd.pooled[i]
      phi[i,k] <- mu[i] + eta[i,k]
#Set relative effect for outcome 2 equal to outcome 1 for same study
#Pools outcomes from same study
                                        eta[i,k]<- delta[i-out[i]+1,k]
#Deviance contribution
      dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k]
    }
#  summed residual deviance contribution for this trial/outcome
   resdev[i] <- sum(dev[i,1:na[i]])
 }
totresdev <- sum(resdev[])           #Total Residual Deviance

#RE Model
for(i in 1:ndata){                  # LOOP THROUGH STUDIES WITH ARM DATA
   for (k in 2:na[i]) {            # LOOP THROUGH ARMS
# trial-specific RE distributions
      delta[i,k] ~ dnorm(md[i,k],taud[i,k])
# mean of RE distributions, with multi-arm trial correction
      md[i,k] <-  d[t[i,k]] - d[t[i,1]] + (beta[t[i,k]] - beta[t[i,1]])*step(Industry[i]-1) + sw[i,k]
# precision of RE distributions (with multi-arm trial correction)
      taud[i,k] <- tau *2*(k-1)/k
# adjustment, multi-arm RCTs
      w[i,k] <- (delta[i,k] - (d[t[i,k]] - d[t[i,1]])- (beta[t[i,k]] - beta[t[i,1]])*step(Industry[i]-1))
# cumulative adjustment for multi-arm trials
      sw[i,k] <- sum(w[i,1:k-1])/(k-1)
    }
}

#Fixed treatment effects within class
d[1]<-0       # treatment effect is zero for reference treatment / class
D[1]<-0
#Single treatment classes
for (k in 2:nt){
          d[k]<- D[classd[k]]
}

#Priors
for (k in 2:nc){  D[k] ~ dnorm(0,.0001) }
tau<-1/pow(sd,2)
sd~dunif(0,5)

for (k in 1:4){ beta[k]<-0}#No bias for control conditions
for (k in 5:nt){ beta[k]<- B}
```

```
B~dnorm(0,.0001)

# SMDs for all possible pair-wise comparisons - Treatments
for (c in 1:(nt-1)) {
            for (k in (c+1):nt) {
      smd[c,k] <- d[k] - d[c]
  }
}

# SMDs for all possible pair-wise comparisons - Classes
for (c in 1:(nc-1)) {
           for (k in (c+1):nc) {
      smdC[c,k] <- D[k] - D[c]
  }
}

# rank classes
for (k in 1:nc){
  rkC[k] <- rank(D[],k)           # assumes lower values are “good”
            #rk[k] <- nc+1-rank(D[],k)           # assumes higher values are “good”
  bestC[k] <- equals(rkC[k],1)      #calculate probability that treat k is best
  # calculate probability that class k is h-th best
  for (h in 1:nc){ probC[h,k] <- equals(rkC[k],h) }
 }

#Stop unused variables causing error message
dum[1]<-Industry[1]
dum[2]<-ITT[1]
dum[3]<-CC[1]
dum[4]<-out.type[1]
dum[5]<-class[1,1]
dum[6]<-s[1]
}                               # *** PROGRAM ENDS
```

Table 120. WinBUGS code for Symptom Severity, Unrelated Mean Effects (Inconsistency) Model

```
# Normal likelihood, identity link
# Random study effects, random intervention within class effects

model{                          # *** PROGRAM STARTS
#Likelihood
for(i in 1:ndata){                    #   LOOP THROUGH STUDIES
   w[i,1] <- 0      # adjustment for multi-arm trials is zero for control arm
   delta[i,1] <- 0            # treatment effect is zero for control arm
                     mu[i] ~ dnorm(0,.0001)          # vague priors for all baselines
   for (k in 1:na[i]) {            #  LOOP THROUGH ARMS
      prec[i,k] <- N[i,k]/pow(sdCFB[i,k],2)     # set precisions
                                        y[i,k]<- meanCFB[i,k]
      y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
# model for linear predictor
                                        theta[i,k]<-phi[i,k]*sd.pooled[i]
      phi[i,k] <- mu[i] + eta[i,k]
```

```
#Set relative effect for outcome 2 equal to outcome 1 for same study
#Pools outcomes from same study
                                        eta[i,k]<- delta[i-out[i]+1,k]
#Deviance contribution
       dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k]
     }
#  summed residual deviance contribution for this trial/outcome
   resdev[i] <- sum(dev[i,1:na[i]])
  }
totresdev <- sum(resdev[])          #Total Residual Deviance

#RE Model
for(i in 1:ndata){                  # LOOP THROUGH STUDIES WITH ARM DATA
   for (k in 2:na[i]) {            # LOOP THROUGH ARMS
# trial-specific RE distributions
       delta[i,k] ~ dnorm(md[i,k],taud[i,k])
# mean of RE distributions, with multi-arm trial correction
       md[i,k] <-  D[classd[t[i,1]],classd[t[i,k]]] + sw[i,k]
# precision of RE distributions (with multi-arm trial correction)
       taud[i,k] <- tau *2*(k-1)/k
# adjustment, multi-arm RCTs
       w[i,k] <- (delta[i,k] - D[classd[t[i,1]],classd[t[i,k]]] )
# cumulative adjustment for multi-arm trials
       sw[i,k] <- sum(w[i,1:k-1])/(k-1)
     }
}

#Fixed treatment effects within class
#Priors
for (c in 1:nc-1){
           D[c,c]<-0
           for (k in (c+1):nc){
           D[c,k]~dnorm(0,.0001)
           D[k,c]<- -D[c,k]
           }
}
D[nc,nc]<-0
tau<-1/pow(sd,2)
sd~dunif(0,5)

#Stop unused variables causing error message
dum[1]<-Industry[1]
dum[2]<-ITT[1]
dum[3]<-CC[1]
dum[4]<-out.type[1]
dum[5]<-class[1,1]
dum[6]<-s[1]
}                              # *** PROGRAM ENDS
```

Table 121. WinBUGS code for Frequency, Random Study Effect, Fixed Class Effect Model

```
# Normal likelihood, identity link
```

```
# Random study effects, random intervention within class effects

model{                          # *** PROGRAM STARTS
#Likelihood
for(i in 1:ns){                 #   LOOP THROUGH STUDIES
   w[i,1] <- 0      # adjustment for multi-arm trials is zero for control arm
   delta[i,1] <- 0            # treatment effect is zero for control arm
                    mu[i] ~ dnorm(0,.0001)         # vague priors for all baselines
   for (k in 1:na[i]) {            #  LOOP THROUGH ARMS
      prec[i,k] <- N[i,k]/pow(sdCFB[i,k],2)     # set precisions
                                      y[i,k]<- meanCFB[i,k]
      y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
# model for linear predictor
                                      theta[i,k]<-phi[i,k]*sd.pooled[i]
      phi[i,k] <- mu[i] + delta[i,k]
#Deviance contribution
      dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k]
    }
#  summed residual deviance contribution for this trial/outcome
   resdev[i] <- sum(dev[i,1:na[i]])
 }
totresdev <- sum(resdev[])          #Total Residual Deviance

#RE Model
for(i in 1:ns){                 # LOOP THROUGH STUDIES WITH ARM DATA
   for (k in 2:na[i]) {            # LOOP THROUGH ARMS
# trial-specific RE distributions
      delta[i,k] ~ dnorm(md[i,k],taud[i,k])
# mean of RE distributions, with multi-arm trial correction
      md[i,k] <-  d[t[i,k]] - d[t[i,1]] + sw[i,k]
# precision of RE distributions (with multi-arm trial correction)
      taud[i,k] <- tau *2*(k-1)/k
# adjustment, multi-arm RCTs
      w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]])
# cumulative adjustment for multi-arm trials
      sw[i,k] <- sum(w[i,1:k-1])/(k-1)
    }
}

#Fixed treatment effects within class
d[1]<-0      # treatment effect is zero for reference treatment / class
D[1]<-0
#Single treatment classes
for (k in 2:nt){
          d[k]<- D[classd[k]]
}

#Priors
for (k in 2:nc){  D[k] ~ dnorm(0,.0001) }
tau<-1/pow(sd,2)
sd~dunif(0,5)
```

```
# SMDs for all possible pair-wise comparisons - Treatments
for (c in 1:(nt-1)) {
           for (k in (c+1):nt) {
      smd[c,k] <- d[k] - d[c]
  }
}

# SMDs for all possible pair-wise comparisons - Classes
for (c in 1:(nc-1)) {
          for (k in (c+1):nc) {
      smdC[c,k] <- D[k] - D[c]
  }
}

# rank classes
for (k in 1:nc){
  rkC[k] <- rank(D[],k)           # assumes lower values are “good”
           #rk[k] <- nc+1-rank(D[],k)          # assumes higher values are “good”
  bestC[k] <- equals(rkC[k],1)      #calculate probability that treat k is best
  # calculate probability that class k is h-th best
  for (h in 1:nc){ probC[h,k] <- equals(rkC[k],h) }
 }

#Stop unused variables causing error message
dum[1]<-Industry[1]
dum[2]<-ITT[1]
dum[3]<-units[1]
dum[4]<-out.type[1]
dum[5]<-class[1,1]
dum[6]<-s[1]
dum[7]<-E[1]
}                              # *** PROGRAM ENDS
```

References

Daly C, Welton NJ, Dias S, Anwer S, Ades AE (2021). Meta-analysis of continuous outcomes. NICE Guidelines Technical Support Unit Guideline Methodology Document 2. January 2021. http://www.bristol.ac.uk/population-health-sciences/centres/cresyda/mpes/nice/guideline-methodology-documents-gmds/

Dias S, Welton N, Sutton A, Ades A (2011). NICE DSU Technical Support Document 2: A Generalised Linear Modelling Framework for Pairwise and Network Meta-Analysis of Randomised Controlled Trials, 2011, last updated September 2016, available from https://www.sheffield.ac.uk/nice-dsu/tsds

Dias S, Welton NJ, Sutton AJ, Caldwell DM, Lu G, Ades AE (2013). Evidence Synthesis for Decision Making 4: Inconsistency in Networks of Evidence Based on Randomized Controlled Trials. Medical Decision Making, 33:641-656

Appendix M Threshold analysis report from the NICE Guidelines Technical Support Unit (TSU)

Threshold analysis report from the NICE Guidelines TSU for review question: What is the effectiveness of psychological and psychosocial interventions for people who participate in harmful gambling (including those with comorbid conditions such as depression, anxiety and other substance-use disorders)?

Nicky J Welton. Guidelines Technical Support Unit, University of Bristol

Introduction

Threshold analysis (Phillippo 2018 & 2019) can be used to assess the robustness of recommendations made to potential limitations in the evidence, when the recommendations are based on a Network Meta-Analysis (NMA). Such limitations arise because the observed estimates differ from the true effects of interest, for example due to study biases, sampling variation, or issues of relevance. Threshold analysis quantifies precisely how much the evidence could change before the recommendation changes, and what the revised recommendation would be. Requirements for use of the method are that there is a clear decision rule that is used to base the recommendations on the NMA results, for example: choose the intervention class with the largest estimated reduction in symptom severity score.

In this report, we begin by summarising the draft preliminary recommendations made by the committee and linking these to the NMA results to identify decision rules that could be used in the threshold method. For those draft preliminary recommendations where a decision rule could be identified, we then perform the threshold analysis and present the results. We end with a brief summary of our findings.

Linking recommendations to NMA results

The TSU attended the Harmful Gambling Guideline Committee meeting on 13th April 2023, where they observed the discussion of the clinical evidence and drafting of preliminary recommendations. The relevant preliminary recommendation is:

1.5.14 Offer group cognitive behavioural therapy (CBT) to reduce gambling severity and frequency. Start treatment as soon as possible after diagnosis.

The draft recommendation was primarily based on a discussion of the NMA results for the symptom severity outcome. Figure 26 gives a network diagram showing the comparisons between intervention classes made by the included studies reporting symptom severity. Estimated standardised mean differences (SMDs) for each intervention class compared with no treatment are given in Figure 27.

Offer individual or group CBT

This recommendation was based on the NMA results that show that Group CBT was the most effective class and the only class with a 95% credible interval that does not include 0 compared with No Treatment (Figure 27). Group CBT may not be suitable or available for some patients, and so individual CBT was included in the recommendation, noting that it is also effective with an upper 95% credible limit close to 0. A threshold analysis can be conducted to assess the robustness of group CBT being the most effective intervention class.

Figure 26. Network diagram for symptom severity – full dataset 39 RCTs, 95 treatment arms, 14 treatment classes and 40 interventions, 4,996 participants

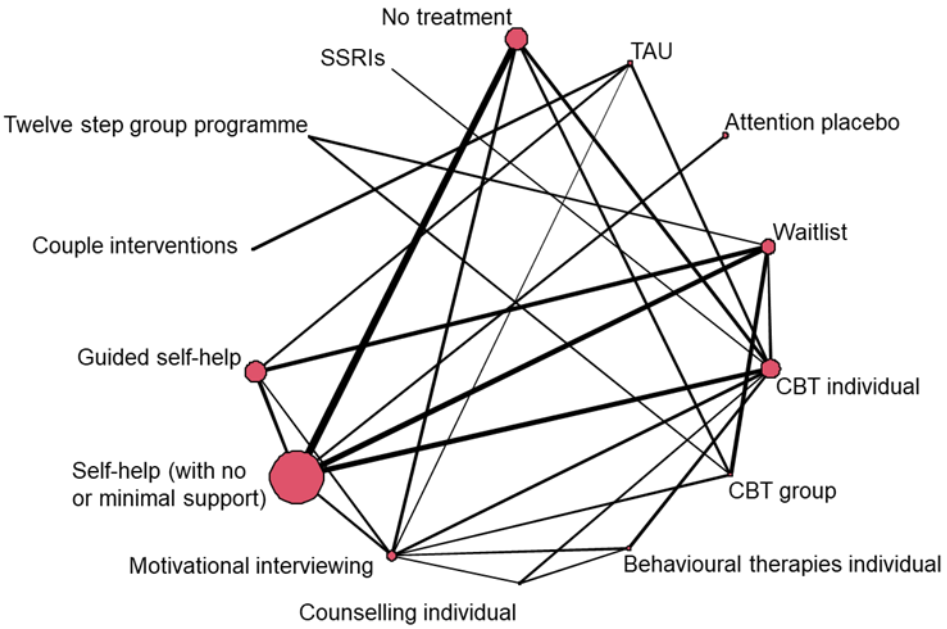
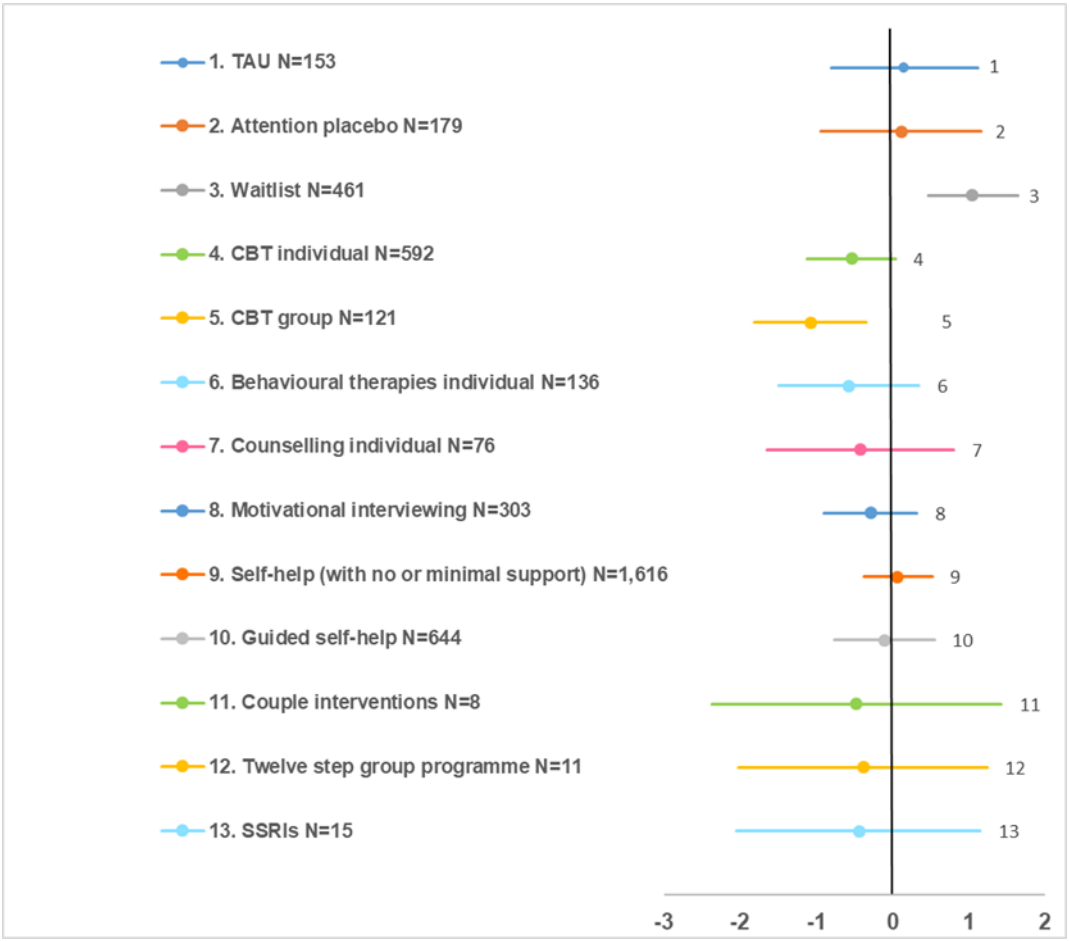


Figure 27. NMA results for symptom severity – full dataset. Standardised Mean Difference in change from baseline vs no treatment, where negative values indicate a more effective treatment.



Threshold analysis

In threshold analysis we exclude intervention classes which were based on small numbers considered insufficient for recommendations: couple interventions (N=8), twelve step group programme (N=11), and SSRIs (N=15). Intervention classes are coded with No Treatment as intervention class 1, TAU is class 2, etc. Note that this means that all intervention class numbers are 1 higher than those displayed in Figure 27.

Figure 28 shows, for each comparison between two intervention classes ("contrasts"), the range of values for which the evidence for that contrast could change without changing the recommendations (shaded blue areas). The NMA estimates and 95% credible intervals are displayed in black. The decision to recommend group CBT as the most effective intervention class is robust to changes in the estimates for all contrasts, with the possible exception of the comparison between Behavioural Therapies Individual and CBT Individual (Figure 28). For this contrast the evidence would have to change to give an estimated SMD close to the lower credible limit in favour of Behavioural Therapies Individual for the most effective intervention class to change from Group CBT to Behavioural Therapies Individual (Figure 28). There were 3 studies comparing Behavioural Therapies Individual and CBT Individual (Korman 2008, Smith 2015, and Thomas 2017). All 3 studies received funding from industry, and had similar risk of bias profiles (including some high risk of bias ratings). Smith 2015 reports complete case data, whereas the other 2 studies report ITT data. The study-specific estimates of SMD from the NMA for Behavioural Therapies Individual relative to CBT Individual were:

- Korman 2008: 0.47 (-0.197, 1.144)
- Smith 2015: -0.15 (-0.550, 0.233)
- Thomas 2017: 0.05 (-0.249, 0.351)

These study-specific estimates are quite heterogeneous, but all are consistent with no effect, and all 95% credible intervals are within the invariant range (-0.73, 11.34). It is unlikely that the true estimate would be outside of all of the study-specific credible intervals.

Conclusions

The results of the threshold analysis suggest that the recommendation made based on the NMA results is robust to potential changes in the evidence. If there were a large change in the estimate for Behavioural Therapies Individual vs CBT Individual, then the most effective intervention class would change to Behavioural Therapies Individual, however this would only occur is the estimate were substantially lower than lower limits of the 95% credible intervals from the 3 existing studies making this comparison.

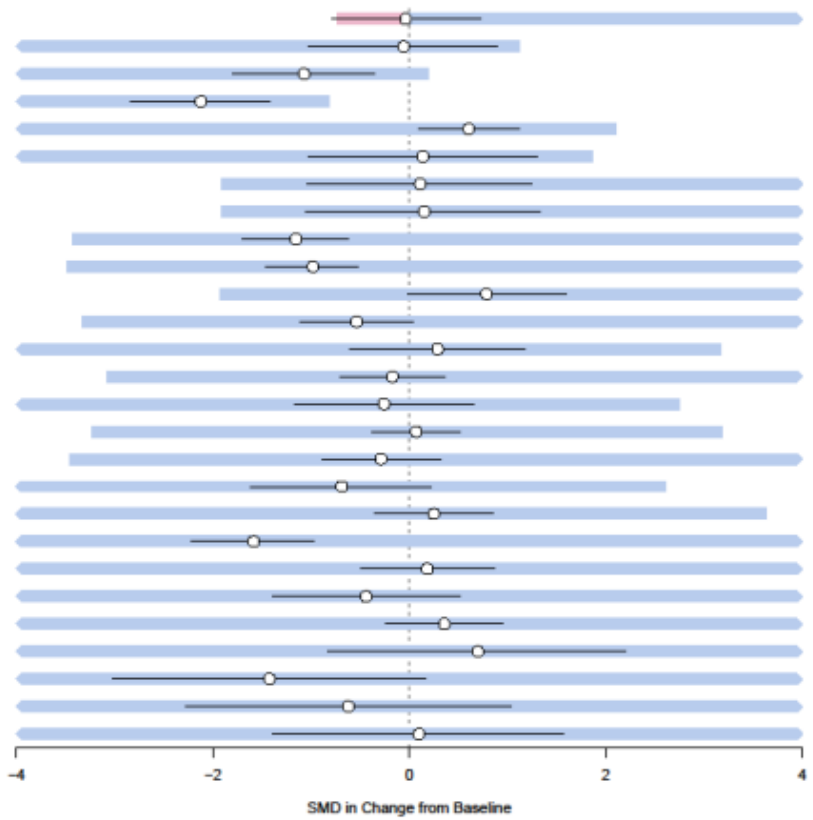
References

Phillippo DM, Dias S, Ades AE, Didelez V, Welton NJ. Sensitivity of treatment recommendations to bias in network meta-analysis. JRSSA. 2018. 181:843-867. https://doi.org/10.1111/rssa.12341

Phillippo DM, Dias S, Welton NJ, Caldwell DM, Taske N, Ades AE. Confidence in recommendations based on Network Meta-Analysis: threshold analysis as an alternative to GRADE NMA in guideline development. Annals of Internal Medicine 2019. 170: 538-546. DOI: 10.7326/M18-3542

Figure 28. Threshold analysis for Group CBT being the most effective class for SMD in change from baseline in symptom severity.

Contrast	Mean	95% Credible Interval		Invariant Interval	
7 vs. 5	−0.04	(−0.79, 0.73)	7	(−0.73, 11.34)	5
10 vs. 3	−0.06	(−1.02, 0.90)	8	(−44.32, 1.12)	3
6 vs. 1	−1.07	(−1.81, −0.35)	–	(NT, 0.20)	7
6 vs. 4	−2.12	(−2.84, −1.43)	–	(NT, −0.82)	7
10 vs. 5	0.60	(0.09, 1.12)	3	(−7.17, 2.10)	5
9 vs. 8	0.14	(−1.03, 1.30)	9	(−28.09, 1.86)	8
8 vs. 5	0.11	(−1.04, 1.25)	8	(−1.92, 34.02)	5
8 vs. 7	0.15	(−1.05, 1.33)	8	(−1.91, 4.55)	7
11 vs. 4	−1.16	(−1.70, −0.62)	11	(−3.43, 15.08)	4
10 vs. 4	−0.98	(−1.46, −0.52)	7	(−3.49, 7.23)	4
9 vs. 6	0.78	(−0.02, 1.60)	7	(−1.92, NT)	–
5 vs. 1	−0.54	(−1.11, 0.04)	5	(−3.34, 11.68)	1
9 vs. 7	0.29	(−0.60, 1.17)	9	(−20.28, 3.17)	7
11 vs. 10	−0.17	(−0.71, 0.36)	11	(−3.07, 8.59)	10
11 vs. 2	−0.26	(−1.17, 0.66)	11	(−12.34, 2.75)	2
10 vs. 1	0.07	(−0.38, 0.52)	10	(−3.23, 3.18)	1
9 vs. 1	−0.29	(−0.89, 0.32)	9	(−3.45, 8.49)	1
5 vs. 2	−0.69	(−1.61, 0.22)	5	(−8.11, 2.61)	2
9 vs. 5	0.25	(−0.36, 0.85)	9	(−4.60, 3.63)	5
5 vs. 4	−1.59	(−2.22, −0.97)	5	(−5.54, 34.17)	4
11 vs. 9	0.18	(−0.50, 0.87)	11	(−6.52, 5.59)	9
9 vs. 2	−0.44	(−1.40, 0.51)	9	(−16.82, 5.59)	2
10 vs. 9	0.36	(−0.24, 0.96)	10	(−23.50, 8.18)	9
13 vs. 6	0.70	(−0.83, 2.21)	7	(−13.21, NT)	–
13 vs. 4	−1.43	(−3.02, 0.17)	–	(NT, 14.37)	7
12 vs. 2	−0.62	(−2.27, 1.03)	8	(−61.74, 1112.38)	4
14 vs. 5	0.10	(−1.39, 1.57)	8	(−91.39, 199.33)	2



The NMA estimates and 95% credible intervals are shown by the black lines. The blue shaded areas show the invariant interval where the most effective intervention class does not change, and the intervention that would become the most effective class is indicated by the figures either side of the invariant interval. The pink area indicates where the most effective class changes within the credible limits of the NMA estimates. Intervention codes are 1 higher than those given in Figure 27.