National Institute for Health and Care Excellence

Draft for consultation

Harmful gambling: identification, assessment and management

[A] Factors suggesting harmful gambling

NICE guideline number tbc

Evidence review underpinning recommendations 1.1.2 to 1.1.4 and 1.1.6 to 1.1.11 in the NICE guideline

October 2023

Draft for consultation

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ISBN:

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Factors suggesting harmful gambling

Review question

What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

Introduction

Only a small proportion of those experiencing harmful gambling are believed to access any type of support and treatment. This may be due to lack of awareness that they are experiencing gambling harms, lack of awareness about the help that is available, or reluctance to access support. However, it may also be because there is currently no advice or guidance to professionals working in non-gambling specialist services about how to identify those who may be experiencing gambling-related harms. There may be certain groups of people in whom harmful gambling is more likely to occur and who, if identified, could be asked pro-actively about gambling and therefore more easily be offered further assessment and support or treatment.

The aim of this review is to identify the factors of concern that suggest a person may be experiencing harmful gambling ('red flags'), and in whom questions about gambling may be advisable.

Summary of the protocol

See Table 1 for a summary of the Population, Index test, Reference standard and Outcome (PIRO) characteristics of this review.

Table 1: Summary of the protocol (PIRO table)

Population	**Inclusion:** Adults (aged 18 years and over) presenting in a non-gambling specialist setting (including in the Criminal Justice System, social care and the voluntary sector such as Citizens Advice).
Index test	The use of factors, individually or in combination, to indicate current participation in harmful gambling will be examined, for example: • Personal characteristics (for example family history of gambling or addictions, personality traits, risky behaviour, sensation seeking, impulsivity, compulsivity, inhibition dysregulation). • Co-morbidities (for example depression, Parkinson's disease, ADHD). • Ecological/ environmental (for example proliferation of gambling opportunities in a certain geographical area, culture). • Gambling characteristics (for example, presence of 'early big win', format of gambling) • Debt, experiencing homelessness, domestic violence, criminality, loss or lack of employment, observed social isolation. • Participating in gaming • Medication • Other factors identified in relevant studies. Demographic characteristics (such as age, gender, ethnicity, socio-economic status, educational level, and occupation) will also be considered but only in combination with another factor.
Reference standard	Participation in harmful gambling (as defined by any measure, including self-report)
Outcome	**Critical**

	• Positive predictive value
	• Risk of participating in harmful gambling
	  ○ Odds ratios
	  ○ Risk ratios
	  ○ Hazard ratios
	  ○ Incidence ratios
	Important
	• Negative predictive value
	• Sensitivity
	• Specificity

ADHD: Attention deficit hyperactivity disorder

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 the methods document (supplement 1).

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

Diagnostic evidence

Included studies

Thirty-three cross-sectional studies were included in this review (Abbott 2005, Adamson 2006, ANPAA 2011, Baldo 2006, Beaudette 2016, Bergamini 2018, Biddle 2005, Bodor 2018, Brunault 2019, Castren 2015, Cavicchioli 2020, Chaput 2007, Cowlishaw 2017, Dufour 2016, Goodyear-Smith 2006, Haydock 2015, Lejoyeux 2002, Lepage 2000, May-Chahal 2012, Nehlin 2013, Nielssen 2018, Pereiro 2013, Perrine 2008, Riley 2015, Riley 2017, Riley 2018, Rudd 2016, Schielein 2021, Turner 2009, Turner 2013, Widinghoff 2019, Wieczorek 2019, Zurhold 2014).

The included studies are summarised in Table 2.

Seven studies were conducted in Australia (Biddle 2005, Haydock 2015, Nielssen 2018, Riley 2015, Riley 2017, Riley 2018, Rudd 2016), 6 were conducted in Canada (Beaudette 2016, Chaput 2007, Dufour 2016, Lepage 2000, Turner 2009, Turner 2013), 4 were conducted in France (ANPAA 2011, Brunault 2019, Lajoyeoux 2002, Perrine 2008), 3 were conducted in New Zealand (Abbott 2005, Adamson 2006, Goodyear-Smith 2006), 3 in Italy (Baldo 2006, Bergamini 2016, Cavicchioli 2020), 2 in the UK (Cowlishaw 2017, May-Chahal 2012), 2 in Sweden (Nehlin 2013, Widinghoff 2019), 2 in Germany (Schielein 2021, Zurhold 2014), 1 in Poland (Wieczorek 2019), 1 in Croatia (Bodor 2018), 1 in Finland (Castren 2015), and 1 in Spain (Pereiro 2013).

Nine studies assessed gambling severity among populations in prison systems (Abbott 2015, Lepage 2000, May-Chahal 2012, Riley 2015, Riley 2017, Riley 2018, Turner 2009, Turner 2012, Zurhold 2014). Four of these studies used the South Oaks Gambling Screen (SOGS) as a reference standard (Abbott 2015, Lepage 2000, Turner 2009, Turner 2012), 3 of these studies used the Early Intervention Gambling Health Test (EIGHT) gambling screen as a reference standard (Riley 2015, Riley 2017, Riley 2018), 1 used the Problem Gambling Severity Index (PGSI) as a reference standard (May-Chahal 2012), and 1 the Diagnostic and Statistical Manual of Mental Disorders (4th edition) (DSM-IV) as a reference standard (Zurhold 2014).

Seven studies assessed gambling severity among populations living with co-morbidities such as mental health disorders (Baldo 2006, Beaudette 2016, Bergamini 2018, Haydock 2015, Lejoyeoux 2002, Perrine 2008, Widinghoss 2019). Two of these studies used the DSM-IV categorisation as a reference standard (Perrine 2008, Widinghoff 2019). One used SOGS as a reference standard (Baldo 2006), 1 used the Structured Clinical Interview for DSM Axis I disorders (SCID-I) as a reference standard (Beaudette 2016), 1 used the Canadian Problem Gambling Index (CPGI) as a reference standard (Bergamini 2018), 1 used the PGSI as a reference standard (Haydock 2015), and 1 used the Minnesota Impulsive Disorders Interview (MIDI) as a reference standard (Lajoyoux 2002).

Six studies assessed gambling severity of populations living with co-addictions such as alcohol and/or drug use (Adamson 2006, ANPAA 2011, Bodor 2018, Cavicchioli 2020, Goodyear-Smith 2006, Nehlin 2013). Two of these studies used SOGS as a reference standard (Adamson 2006, Bodor 2018), 2 used a multi-item screening tool as a reference standard (Goodyear-Smith 2006, Nehlin 2013), 1 used the Détection et Besoin d'Aide en regard du Jeu Excessif questionnaire (DEBA-jeu) as a reference standard (ANPAA 2011) and 1 did not report the reference standard used to measure harmful gambling (Cavicchioli 2020).

Eight studies assessed gambling severity among populations living with co-morbidities and/or co-addictions (Biddle 2005, Bruneault 2019, Chaput 2007, Cowlishaw 2017, Dufour 2016, Nielssen 2018, Pereiro 2013, Schielein 2021). Two of these studies used the PGSI as a reference standard (Cowlishaw 2017, Dufour 2016), 2 used data derived from their own records (Nielssen 2018, Pereiro 2013), 1 used DSM-IV criteria as a reference standard, 1 used the CPGI as a reference standard (Brunault 2019), 1 used SOGS as a reference standard (Biddle 2005), and 1 used the 20 questions Gamblers Anonymous questionnaire.

One study assessed gambling severity among a population taking opioid substitution medication using the Brief Biosocial Gambling Screen (BBGS) as a reference standard (Castren 2015), 1 study assessed gambling severity among a prison population with co-morbidities using client case files as a reference standard (Rudd 2016), 1 study assessed gambling severity among a prison population with co-addictions using the CPGI as a reference standard, and 1 study assessed gambling severity among a population experiencing homelessness using the PGSI as a reference standard.

Data on the following tests or 'factors' were identified through analysis of the included studies: personal characteristics (for example, family history of addiction), co-morbidities (for example, depression, post-traumatic stress disorder, anxiety), gambling behaviour (for example, experience of initial 'big' win), experiencing homelessness, criminality, medication, and co-addictions (for example, alcohol or other drugs).

No meta-analyses were conducted due to the high levels of heterogeneity observed between the studies in index tests, reference standards and settings in which people presented.

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	Index test(s)	Reference standard	Outcomes
Abbott 2005 Cross-sectional New Zealand Any industry funding	N=94 women in a prison setting. Age in years [Mean (SD)]: 30 (8) Sex (n): M=0, F=94 Reason for attendance/diagnosis: Not applicable.	• Criminality ○ Measured by imprisonment	Harmful gambling measured by: • Self-report ○ 6 months prior to imprisonment ○ Lifetime • ≥3 SOGS-R ○ 6 months prior to imprisonment ○ Lifetime • ≥5 SOGS-R ○ 6 months prior to imprisonment ○ Lifetime	• PPV
Adamson 2006 Cross-sectional New Zealand No industry funding	N=105 adults using community alcohol and drug services. Age in years [Mean (SD)]: 32.7 (10.6) Sex (n): M=71, F=34 Reason for attendance/diagnosis: Not reported.	• Alcohol and other drug co-addiction in last 6 months ○ Measured by CIDI and modified timeline follow-back procedure	Harmful gambling measured by: • ≥5 SOGS ○ Current	• PPV
ANPAA 2011 Cross-sectional France No industry funding	N=2790 adults using addiction treatment centres. Age in years [Mean (SD)]: 42.6 (11.8) Sex (n): M=2034, F=756 Reason for attendance/diagnosis (n): • Alcohol: 2159 • Tobacco: 134 • Illicit drug: 338 • Pathological gambling: 17 • Other: 142	• Alcohol and other drug co-addiction ○ Measured by addiction disorder data (type of drug or behaviour motivating attendance at treatment centre) and AUDIT	Harmful gambling measured by: • ≥2 DEBA-jeu ○ Time period not reported • ≥6 DEBA-jeu ○ Time period not reported	• PPV
Baldo 2006 Cross-	N=113 adults using health services for addiction treatment.	• Alcohol and other drug co-addiction ○ Measured by attendance to	Harmful gambling measured by: • ≥5 SOGS ○ Time period not	• PPV

Study	Population	Index test(s)	Reference standard	Outcomes
sectional Italy Unclear funding source	Age in years (Mean[SD]): 49.8 (SD not reported) Sex (n): M=89, F=24 Reason for attendance/diagnosis: Not reported.	drug or alcohol treatment programme	reported	
Beaudette 2016 Cross-sectional Canada No industry funding	N=1110 adults in a correctional (prison) service. Age in years: Not reported. Sex: Not reported. Reason for attendance/diagnosis: Not applicable.	• Criminality ○ Measured by imprisonment	Harmful gambling measured by: • SCID-I (threshold not reported) ○ Current ○ Lifetime	• PPV
Bergamini 2018 Cross-sectional Italy No industry funding	N=900 adults in a psychiatric unit. Age in years [Mean (SD)]: 48.7 (13.7) Sex (n): M=483, F=417 Reason for attendance/diagnosis (n): • Schizophrenia and related psychosis: 345 • Unipolar depression: 174 • Bipolar disorder: 103 • Cluster B personality: 183 • Anxiety disorder: 30 • Others: 65	• Psychiatric disorder co-morbidity ○ Measured by MINI	Harmful gambling measured by: • ≥1 CPGI ○ Time period not reported • ≥3 CPGI ○ Time period not reported • ≥8 CPGI ○ Time period not reported	• PPV
Biddle 2005 Cross-sectional Australia No	N=153 male veterans using PTSD treatment programs. Age in years [Mean (SD)]: 54.4 (4.9) Sex (n): M=153, F=0	• PTSD + male + veteran ○ Measured by attendance at group PTSD therapy sessions	Harmful gambling measured by: • ≥5 SOGS ○ Lifetime • ≥5 DSM-IV ○ Time period not reported	• PPV

Study	Population	Index test(s)	Reference standard	Outcomes
industry funding	Reason for attendance/diagnosis (n): • Depression: 107 • Anxiety: 69 • Alcohol use: 99			
Bodor 2018 Cross-sectional Croatia No industry funding	N=140 adults using alcohol addiction treatment services. Age in years [Mean (SD)]: 53.09 (11.09) Sex (n): M=116, F=24 Reason for attendance/diagnosis: Not reported.	• Alcohol co-addiction ○ Measured by ICD-10 criteria	Harmful gambling measured by: • ≥1 SOGS ○ Time period not reported • ≥5 SOGS ○ Time period not reported	• PPV
Brunault 2019 Cross-sectional France No industry funding	N=133 adults using drug and alcohol addiction treatment services. Age in years [Mean (SD)]: 43.9 (6.5) Sex (n): M=124, F=9 Reason for attendance/diagnosis (n): • Alcohol: 133 • Tobacco: 108 • Cannabis: 14 • Any other illicit drug: 6 • Gambling: 64	• Alcohol co-addiction ○ Measured by AUDIT	Harmful gambling measured by: • ≥3 CPGI ○ Time period not reported • ≥8 CPGI ○ Time period not reported	• PPV
Castren 2015 Cross-sectional Finland No industry funding	N=144 adults at an inpatient drug addiction treatment centre. Age in years [Mean (SD)]: • Male: 36.6 (7) • Female: 34.7 (9) Sex (n): M=89, F=55 Reason for attendance/diagnosis	• Opioid substitution treatment ○ Measured by treatment centre records	Harmful gambling measured by: • ≥1 BBGS ○ Previous 12 months	• PPV

Study	Population	Index test(s)	Reference standard	Outcomes
	(Treatment medication, n): • Methadone: 71 • Buprenorphine-naloxone: 73			
Cavicchioli 2020 Cross-sectional Italy Unclear funding source	N=319 adults using an alcohol dependence treatment unit (inpatient and outpatient). Age in years [Mean (SD)]: 46.26 (9.08) Sex (n): M=186, F=133 Reason for attendance/diagnosis (n): • Cannabis: 41 • Cocaine: 41 • Anxiolytic: 88 • Pathological gambling: 9 • Mood Disorders: 32 • Major depressive disorder: 11 • Bipolar I disorder: 3 • Bipolar II disorder: 5 • Adjustment disorder with depressed mood: 13 • Anxiety Disorders: 39 • Panic disorder: 8 • Generalized anxiety disorder: 10 • Social anxiety disorder: 4 • Adjustment disorder with anxiety: 17 • Eating Disorders: 6 • Anorexia nervosa: 29 • Bulimia nervosa: 29	• Alcohol co-addiction ○ Measurement tool not reported	Harmful gambling measured by: • Not reported ○ Time period not reported	• PPV

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Chaput 2007 Cross-sectional Canada Unclear funding source	N=31921 adults attending psychiatric emergency unit. Age in years: Not reported. Sex: Not reported. Reason for attendance/diagnosis: Not reported.	• Psychiatric co-morbidity ○ Measured by admission to psychiatric emergency services	Harmful gambling measured by: • ≥5 DSM-IV ○ Time period not reported	• PPV
Cowlishaw 2017 Cross-sectional UK No industry funding	N=1058 adults presenting to general practice. Age in years [Mean (SD)]: Not reported, age categories (%): • 18-24: 20.7 • 25-34: 15.1 • 35-44: 13.4 • 45-64: 27.8 • ≥65: 23 Sex (n): M=373, F=685 Reason for attendance/diagnosis: Not reported.	• Depression co-morbidity ○ Measured by Whooley • Anxiety co-morbidity ○ Measured by GAD-2 • Alcohol co-addiction ○ Measured by AUDIT-C • Drug co-addiction ○ Single item screening question	Harmful gambling measured by: • ≥1 PGSI ○ Time period not reported	• PPV • NPV • Sensitivity • Specificity
Dufour 2016 Cross-sectional Canada No industry funding	N=424 adults using community-based programs (including day programs for the homeless, various shelters, and needle exchange programs). Age in years [Mean (SD)]: 40.46 (10.7) Sex: Not reported. Reason for attendance/diagnosis: Not reported.	• Cocaine use in previous month ○ Measured by self-report • Cocaine use in previous month + ○ Family history of harmful gambling - Measured by self-report ○ Family history of alcohol or drug addiction - Measured by self-report ○ Diagnosis of panic disorder - Measured by CIDI diagnosis in past year ○ Diagnosis of phobic disorder	Harmful gambling measured by: • ≥3 PGSI ○ Previous 12 months	• PPV • NPV • Sensitivity • Specificity

		- Measured by CIDI diagnosis in past year ○ Diagnosis of generalised anxiety disorder - Measured by CIDI diagnosis in past year ○ Diagnosis of major depression - Measured by CIDI diagnosis in past year ○ Diagnosis of bipolar disorder - Measured by CIDI diagnosis in past year ○ Diagnosis of dysthymic disorder - Measured by CIDI diagnosis in past year ○ Diagnosis of schizophrenic disorder - Measured by CIDI diagnosis in past year ○ Presence of early 'big' win - Measured by self-report ○ Presence of early 'big' loss - Measured by self-report ○ Alcohol co-addiction - Measured by CAGE ○ Cocaine co-addiction - Measured by SDS		
Goodyear-Smith 2006 Cross-sectional New Zealand	N=2536 adults presenting at primary healthcare providers. Age in years: Not reported. Sex (n): M=837, F=1699	• Worried about depression ○ Measured by multi-item screening tool • Worried about anxiety ○ Measured by multi-item screening tool	Harmful gambling measured by: • Multi-item screening tool	• PPV • NPV • Sensitivity • Specificity

No industry funding	Reason for attendance/diagnosis: Not reported.	• Worried about anhedonia
		  ○ Measured by multi-item screening tool
		• Worried about drinking
		  ○ Measured by multi-item screening tool
		• Worried about other substance co-addiction
		  ○ Measured by multi-item screening tool
		• Worried about smoking
		  ○ Measured by multi-item screening tool
		• Worried about domestic violence
		  ○ Measured by multi-item screening tool
		• Worried about anger
		  ○ Measured by multi-item screening tool
		• Not participating in adequate exercise
		  ○ Measured by multi-item screening tool
		• Worried about weight
		  ○ Measured by multi-item screening tool		

Haydock 2015
 	
Cross-sectional
 	
Australia
 	
Unclear funding source
	N=435 adults presenting at public mental health services providing mental health support.
	
	Age in years [Mean (SD)]: 38.04 (11.88)
	
	Sex (n): M=272, F=163
	
	Reason for attendance/diagnosis: Not reported.
		• Psychosis co-morbidity
		  ○ Measured by DIP
			Harmful gambling measured by:
			• ≥1 PGSI
			  ○ Time period not reported
			• ≥3 PGSI
			  ○ Time period not reported
			• ≥8 PGSI
			  ○ Time period not reported
				• PPV

Lejoyeux 2002 Cross-sectional France Unclear funding source	N=107 adults presenting at the acute care university hospital receiving psychiatric patients. Age in years [Mean (SD)]: 41.3(SD not reported) Sex (n): M=24, F=83 Reason for attendance/diagnosis: Not reported.	• Depression co-morbidity ○ Measured by MINI	Harmful gambling measured by: • MIDI and DSM-IV (threshold not reported) ○ Time period not reported	• PPV
Lepage 2000 Cross-sectional Canada Any industry funding	N=87 adults presenting at community organisations which assist with food, materials, or lodging. Age in years [Mean (SD)]: 39 (SD not reported) Sex (n): M=54, F=33 Reason for attendance/diagnosis: Not reported.	• Community service use ○ Measured by attendance in previous 3 months	Harmful gambling measured by: • ≥3 SOGS ○ Lifetime • ≥5 SOGS ○ Lifetime	• PPV
May-Chahal 2012 Cross-sectional UK Unclear funding	N=423 adults in a prison setting. Age in years [Mean (SD)]: Not reported, age range: • Male: 29-60+ • Female: 21-49 Sex: Not reported.	• Criminality + male ○ Measured by imprisonment • Criminality + female ○ Measured by imprisonment	Harmful gambling measured by: • ≥1 PGSI ○ 12 months prior to imprisonment • ≥3 PGSI ○ 12 months prior to imprisonment • ≥8 PGSI ○ 12 months prior to imprisonment	• PPV

source	Reason for attendance/diagnosis: Not applicable.			
Nehlin 2013 Cross-sectional Sweden No industry funding	N=2161 adults in a psychiatric clinic. Age in years [Mean (SD)]: • Male: 35.2 (13.5) • Female: 35 (13.5) Sex (n): M=756, F=1405 Reason for attendance/diagnosis (n): • Primary diagnosis ○ Mood disorder: 1016 ○ Anxiety disorder: 756 ○ ADHD/autism spectrum disorder: 238 ○ Personality disorder: 130 ○ Anorexia/eating disorder: 22	• Psychosis co-morbidity ○ Measured by attendance at psychiatric outpatient clinic	Harmful gambling measured by: • ≥1 own questionnaire ○ Previous 12 months	• PPV
Nielssen 2018 Cross-sectional Australia No industry funding	N=2388 adults in mental health clinics located in 3 inner city homeless hostels. Age in years [Mean (SD)]: 42.3 (12.8) Sex (n): M=2230, F=158 Reason for attendance/diagnosis (n): • Current diagnosis of substance abuse disorder: 1578 • Diagnoses of psychotic illness: 1223	• Mental health comorbidity + experiencing homelessness ○ Measured by attendance at mental health clinics attached to homeless hostels	Harmful gambling measured by: • Not reported ○ Time period not reported	• PPV

Pereiro 2013 Cross-sectional Spain No industry funding	N=2300 adults using addictive disorder assistance units. Age in years [Mean (SD)]: 41.27 (10.13) Sex (n): M=1833, F=467 Reason for attendance/diagnosis: Not reported.	• Alcohol and other substance co-addiction ○ Measured by attendance at addiction assistance centres	Harmful gambling measured by: • Not reported ○ Time period not reported	• PPV
Perrine 2008 Cross-sectional France Unclear funding source	N=210 adults on psychiatric emergency wards. Age in years [Mean (SD)]: 40.2 (12) Sex (n): M=136, F=74 Reason for attendance/diagnosis (n): • Impulse control disorder: 73 ○ Compulsive buying: 41 ○ Pathological gambling: 13 ○ Intermittent explosive disorder: 11 ○ Trichotillomania: 2 ○ Kleptomania: 2 ○ Compulsive sexual behaviour: 2 ○ Pyromania: 2 Other: 137	• Psychiatric co-morbidity ○ Measured by MIDI	Harmful gambling measured by: • ≥5 SOGS ○ Current	• PPV
Riley 2015 Cross-sectional Australia No industry funding	N=105 males in a prison setting. Age in years: Not reported. Sex (n): M=105, F=0 Reason for attendance/diagnosis: Not applicable.	• Criminality + male ○ Measured by imprisonment	Harmful gambling measured by: • ≥2 EIGHT ○ Lifetime • ≥4 EIGHT ○ Lifetime • ≥6 EIGHT ○ Lifetime	• PPV

Riley 2017 Cross-sectional Australia No industry funding	N=74 females in a prison setting. Age in years [Mean (SD)]: 38.54 (9.86) Sex (n): M=0, F=74 Reason for attendance/diagnosis: Not applicable.	• Criminality + female ○ Measured by imprisonment	Harmful gambling measured by: • ≥2 EIGHT ○ Lifetime • ≥4 EIGHT ○ Lifetime • ≥6 EIGHT ○ Lifetime	• PPV
Riley 2018 Cross-sectional Australia No industry funding	N=296 males in a prison setting. Age in years [Mean (SD)]: 37.7 (11.08) Sex (n): M=296, F=0 Reason for attendance/diagnosis: Not applicable.	• Criminality + male ○ Measured by imprisonment	Harmful gambling measured by: • ≥2 EIGHT ○ Lifetime • ≥4 EIGHT ○ Lifetime • ≥6 EIGHT ○ Lifetime	• PPV
Rudd 2016 Cross-sectional Australia No industry funding	N=266 adults using drug and alcohol rehabilitation services. Age in years [Mean (SD)]: 34.68 (10.21) Sex (n): M=177, F=89 Reason for attendance/diagnosis: Not reported.	• Alcohol and other drug co-addiction ○ Measured by attendance at addiction treatment centres • Alcohol and other drug co-addiction + criminality ○ Measured as above plus ANZSOC categories	Harmful gambling measured by: • Self-report ○ Time period not reported	• PPV • OR (for participating in harmful gambling)
Schielein 2021 Cross-sectional Germany No industry funding	N=502 adults presenting at dermatological clinics and practices. Age in years: Not reported. Sex (n): M=284, F=218 Reason for attendance/diagnosis: Not reported.	• Psoriasis ○ Measured by psoriasis diagnosis	Harmful gambling measured by: • ≥7 GA 20 Questions ○ Time period not reported	• PPV
Turner 2009 Cross-sectional	N=256 males in a prison setting. Age in years [Mean (SD)]: 34.6 (10.8)	• Criminality + male ○ Measured by imprisonment	Harmful gambling measured by: • ≥1 PGSI ○ Time period not reported • ≥3 PGSI	• PPV

Canada Unclear funding source	Sex (n): M=256, F=0 Reason for attendance/diagnosis: Not applicable.		○ Time period not reported • ≥8 PGSI ○ Time period not reported • ≥5 DSM-IV ○ Time period not reported • ≥5 SOGS ○ Previous 12 months ○ Lifetime	
Turner 2013 Cross-sectional Canada Unclear funding source	N=422 adults in a prison setting. Age in years [Mean (SD)]: 38.7 (SD not reported) Sex (n): M=381, F=41 Reason for attendance/diagnosis: Not applicable.	• Criminality ○ Measured by imprisonment	Harmful gambling measured by: • ≥1 DSM-IV ○ 12 months prior to imprisonment ○ During imprisonment • ≥2 DSM-IV ○ 12 months prior to imprisonment ○ During imprisonment • ≥5 DSM-IV ○ 12 months prior to imprisonment ○ During imprisonment • ≥1 PGSI ○ 12 months prior to imprisonment ○ During imprisonment • ≥3 PGSI ○ 12 months prior to imprisonment ○ During imprisonment • ≥8 PGSI ○ 12 months prior to imprisonment ○ During imprisonment • ≥1 SOGS ○ 12 months prior to imprisonment ○ During imprisonment • ≥3 SOGS ○ 12 months prior to imprisonment ○ During imprisonment	• PPV

			• ≥5 SOGS ○ 12 months prior to imprisonment ○ During imprisonment	
Widinghoff 2019 Cross-sectional Sweden Any industry funding	N=264 males in a prison setting. Age in years [Mean (SD)]: 22.3 (SD not reported) Sex (n): M=0, F=264 Reason for attendance/diagnosis: Not reported.	• Criminality + male ○ Measured by imprisonment	Harmful gambling measured by: • ≥5 DSM-IV ○ Time period not reported	• PPV
Wieczorek 2019 Cross-sectional Poland No industry funding	N=690 adults in rehabilitation shelters and night shelters. Age in years [Mean (SD)]: Not reported, age categories (%): • 18-34: 15 • 35-54: 44 • 55+: 41 Sex (n): M=621, F=69 Reason for attendance/diagnosis: Not applicable.	• Experiencing homelessness ○ Measured by attendance at rehabilitation or night shelters	Harmful gambling measured by: • ≥1 PGSI ○ Time period not reported • ≥3 PGSI ○ Time period not reported • ≥8 PGSI ○ Time period not reported	• PPV
Zurhold 2014 Cross-sectional Germany No industry funding	N=1284 adults in a prison setting. Age in years [Mean (SD)]: 37 (SD not reported) Sex (n): M=1226, F=58 Reason for attendance/diagnosis: Not reported.	• Criminality ○ Measured by imprisonment	Harmful gambling measured by: • Lie/Bet questionnaire and arrest warrants ○ Previous 12 months • Prison intake records ○ Time period not reported	• PPV

ADHD: Attention deficit hyperactivity disorder; ANPAA: Association Nationale de Prévention en Alcoologie et Addictologie; AUDIT(-C): Alcohol Use Disorders Identification test (consumption); ANZSOC: Australian and New Zealand Society of Criminology; BBGS: Brief Biosocial Gambling Screen; CAGE: Cut Annoyed Guilty Eyes assessment; CIDI: World Mental Health Composite International Diagnostic Interview; CPGI: Canadian Problem Gambling Index; DEBA-jeu: Détection et Besoin d'Aide en regard du Jeu Excessif; DIP: Diagnostic Interview for Psychosis; DSM-IV(-TR): Diagnostic and Statistical Manual of Mental Disorders (4th edition) (text revision); EIGHT: Early Intervention Gambling Health Test; F: Female; GA: Gambler's Anonymous; GAD-2: General Anxiety Disorder 2-item test; ICD-10: International Classification of Diseases (10th Revision); M: Male; MIDI: Minnesota Impulsive Disorders Interview; MINI: Mini International Neuropsychiatric Interview; N/n: Number; NPV: Negative predictive value; OR: Odds ratio; PGSI: Problem Gambling Severity Index; PPV: Positive predictive value; PTSD:

Post-traumatic stress disorder; SCID-I: Structured Clinical Interview for DSM Axis I Disorders; SD: Standard deviation; SDS: Severity of Dependence Scale; SOGS(-R): South Oaks Gambling Screen (revised)

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

Summary of the evidence

Data were extracted from 32 studies to generate positive predictive values (PPVs) for a range of 'risk factors'. PPVs are summarized below in tables 3-13 according to pre-specified stratifications for study setting and funding. In setting the PPV for this review, the committee agreed that they wanted to identify all possible risk factors which should prompt concern about gambling behaviour and so lead to further investigation and questioning, rather than factors that would definitively predict a diagnosis of gambling. They therefore agreed a PPV of 2% as the value above which the risk factor should be considered an indication of harmful gambling behaviour and this would be taken into account in their decision making. All but 3 (Pereiro 2013, Schielein 2021 and Chaput 2007) of the results show a PPV above this threshold.

No industry funding

Table 3: Positive predictive values of risk factors for harmful gambling within addiction services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Alcohol and other drug co-addiction					
Adamson 2006	SOGS	≥5	Current	11.4 (6.7-18.9)	LOW
ANPAA 2011	DEBA-jeu	≥2	Not reported	18.5 (17.0-20.0)	LOW
ANPAA 2011	DEBA-jeu	≥6	Not reported	6.5 (5.6-7.5)	LOW
Pereiro 2013	Not reported	Not reported	Not reported	1.2 (0.8-1.8)	LOW
Rudd 2016	Self-report	Not applicable	Not reported	21.4 (16.9-26.7)	LOW
Risk factor(s): Alcohol co-addiction					
Bodor 2018	SOGS	≥1	Not reported	22.1 (16.1-29.7)	MODERATE
Bodor 2018	SOGS	≥5	Not reported	10.0 (6.1-16.1)	MODERATE
Brunault 2019	CPGI	≥3	Not reported	8.3 (4.7-14.2)	LOW
Brunault 2019	CPGI	≥8	Not reported	2.3 (0.8-6.4)	VERY LOW
Risk factor(s): Opioid substitution treatment					
Castren 2015	BBGS	≥1	Previous 12 months	12.5 (8.1-18.9)	MODERATE

BBGS: Brief Biosocial Gambling Screen; CI: Confidence interval; CPGI: Canadian Problem Gambling Index; DEBA-jeu; Détection et Besoin d'Aide en regard du Jeu Excessif; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen

Table 4: Positive predictive values of risk factors for harmful gambling within psychiatric services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Psychiatric disorder co-morbidity					
Bergamini 2018	CPGI	≥1	Not reported	9.4 (7.7-11.5)	LOW
Bergamini 2018	CPGI	≥3	Not reported	5.3 (4.0-7.0)	LOW
Bergamini 2018	CPGI	≥8	Not reported	3.3 (2.3-4.7)	LOW
Nehlin 2013	Own questionnaire	≥1	Previous 12 months	8.8 (7.7-10.1)	MODERATE
Risk factor(s): Mental health co-morbidity + experiencing homelessness					
Nielssen 2018	Not reported	Not reported	Not reported	12.1 (10.9-13.5)	LOW

CI: Confidence interval; CPGI: Canadian Problem Gambling Index; PPV: Positive predictive value

Table 5: Positive predictive values of risk factors for harmful gambling within primary care services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Depression co-morbidity					
Cowlishaw 2017	PGSI	≥1	Not reported	6.8 (5.0-9.2)	MODERATE
Risk factor(s): Worried about depression					
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	4.9 (3.8-6.4)	MODERATE
Risk factor(s): Anxiety co-morbidity					
Cowlishaw 2017	PGSI	≥1	Not reported	7.3 (4.7-11.0)	MODERATE
Risk factor(s): Worried about anxiety					
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	4.6 (3.5-6.1)	MODERATE
Risk factor(s): Worried about anhedonia					
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	5.2 (3.9-7.0)	MODERATE
Risk factor(s): Alcohol co-addiction					
Cowlishaw 2017	PGSI	≥1	Not reported	9.8 (6.9-13.6)	MODERATE
Risk factor(s): Worried about drinking					
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	7.0 (4.5-10.8)	MODERATE
Risk factor(s): Drug co-addiction					
Cowlishaw 2017	PGSI	≥1	Not reported	15.7 (10.6-22.6)	MODERATE
Risk factor(s): Worried about other drug use					
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	13.2 (7.1-23.3)	MODERATE
Risk factor(s): Worried about smoking					

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	7.4 (5.2-10.4)	MODERATE
Risk factor(s): Worried about domestic violence					
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	2.3 (0.8-6.6)	MODERATE
Risk factor(s): Worried about anger					
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	6.2 (4.2-9.1)	MODERATE
Risk factor(s): Not participating in adequate exercise					
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	2.8 (2.0-3.9)	MODERATE
Risk factor(s): Worried about weight					
Goodyear-Smith 2006	Multi-item screening tool	Positive response	Not reported	2.7 (2.0-3.6)	MODERATE

CI: Confidence interval; PGSI: Problem Gambling Severity Index; PPV: Positive predictive value

Table 6: Positive predictive values of risk factors for harmful gambling within secondary care services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): PTSD co-morbidity + male + veteran					
Biddle 2005	SOGS	≥5	Lifetime	21.1 (16.0-27.4)	MODERATE
Biddle 2005	DSM-IV	≥5	Not reported	12.4 (8.5-17.7)	MODERATE
Risk factor(s): Psoriasis co-morbidity					
Schielein 2021	GA 20 Questions	≥7	Not reported	1.2 (0.6-2.7)	LOW

CI: Confidence interval; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders (4th edition); GA: Gambler's Anonymous; PPV: Positive predictive value; PTSD: Post-traumatic stress disorder; SOGS: South Oaks Gambling Screen

Table 7: Positive predictive values of risk factors for harmful gambling within community services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Cocaine use in previous month					
Dufour 2016	PGSI	≥3	Previous 12 months	18.4 (15.0-22.4)	LOW
Risk factor(s): Experiencing homelessness					
Wieczorek 2019	PGSI	≥1	Not reported	30.1 (26.8-33.7)	MODERATE
Wieczorek 2019	PGSI	≥3	Not reported	21.7 (18.8-25.0)	MODERATE

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Wieczorek 2019	PGSI	≥8	Not reported	11.3 (9.2-13.9)	MODERATE
Risk factor(s): Cocaine use in previous month + family history of harmful gambling					
Dufour 2016	PGSI	≥3	Previous 12 months	35.1 (28.6-42.3)	LOW
Risk factor(s): Cocaine use in previous month + family history of alcohol or drug addiction					
Dufour 2016	PGSI	≥3	Previous 12 months	18.3 (14.5-22.8)	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of panic disorder]					
Dufour 2016	PGSI	≥3	Previous 12 months	20.5 (13.0-30.8)	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of phobic disorder]					
Dufour 2016	PGSI	≥3	Previous 12 months	24.3 (18.0-31.9)	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of generalised anxiety disorder]					
Dufour 2016	PGSI	≥3	Previous 12 months	23.5 (15.0-34.9)	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of major depression]					
Dufour 2016	PGSI	≥3	Previous 12 months	18.8 (11.7-28.7)	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of bipolar disorder]					
Dufour 2016	PGSI	≥3	Previous 12 months	17.1 (8.1-32.7)	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of dysthymic disorder]					
Dufour 2016	PGSI	≥3	Previous 12 months	14.3 (5.0-34.6)	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of schizophrenic disorder]					
Dufour 2016	PGSI	≥3	Previous 12 months	42.9 (15.8-75.0)	LOW
Risk factor(s): Cocaine use in previous month + presence of early 'big' win					
Dufour 2016	PGSI	≥3	Previous 12 months	25.0 (19.8-31.0)	LOW
Risk factor(s): Cocaine use in previous month + presence of early 'big' loss					
Dufour 2016	PGSI	≥3	Previous 12 months	28.6 (20.6-38.2)	LOW
Risk factor(s): Cocaine use in previous month + alcohol co-addiction [CAGE ≥2]					
Dufour 2016	PGSI	≥3	Previous 12 months	21.1 (16.8-26.2)	LOW
Risk factor(s): Cocaine use in previous month + cocaine co-addiction [SDS ≥4]					
Dufour 2016	PGSI	≥3	Previous 12 months	18.0 (14.4-22.3)	LOW

CAGE: Cut, Annoyed, Guilty, and Eye assessment; CI: Confidence interval; PGSI: Problem Gambling Severity Index; PPV: Positive predictive value; SDS: Severity of dependence scale

Table 8: Positive predictive values of risk factors for harmful gambling within prison system services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Criminality					
Beaudette 2016	SCID-1	Not applicable	Current	5.8 (4.5-7.3)	MODERATE
Beaudette 2016	SCID-1	Not applicable	Lifetime	9.9 (8.3-11.8)	MODERATE
Zurhold 2014	Lie-bet and arrest warrant	Lie/bet: ≥1 Arrest warrant: Not applicable	Previous 12 months	6.6 (5.1-8.5)	LOW
Zurhold 2014	Prison intake records	Not applicable	Not reported	7.3 (6.0-8.9)	LOW
Risk factor(s): Criminality + male					
Riley 2015, Riley 2018	EIGHT	≥2	Lifetime	75.8 (71.4-79.7)	LOW
Riley 2015, Riley 2018	EIGHT	≥4	Lifetime	57.6 (52.7-62.3)	LOW
Riley 2015, Riley 2018	EIGHT	≥6	Lifetime	41.6 (36.9-46.5)	LOW
Risk factor(s): Criminality + female					
Riley 2017	EIGHT	≥2	Lifetime	71.6 (60.5-80.6)	LOW
Riley 2017	EIGHT	≥4	Lifetime	63.5 (52.1-73.6)	LOW
Riley 2017	EIGHT	≥6	Lifetime	52.7 (41.5-63.7)	LOW

CI: Confidence interval; EIGHT: Early Intervention Gambling Health Test; PPV: Positive predictive value; SCID-I: Structured Clinical Interview for DSM Axis I Disorder

Any industry funding

Table 9: Positive predictive values of risk factors for harmful gambling within community services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Community service users in previous 3 months					
Lepage 2000	SOGS	≥3	Lifetime	29.9 (21.3-40.2)	MODERATE
Lepage 2000	SOGS	≥5	Lifetime	17.2 (10.7-26.5)	MODERATE

CI: Confidence interval; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen

Table 10: Positive predictive values of risk factors for harmful gambling within prison system services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Criminality + male					
Widinghoff	DSM-IV	≥5	Not reported	16.4 (12.4-	LOW

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
2019				21.4)	
Risk factor(s): Criminality + female					
Abbott 2005	Self-report	Not applicable	6 months prior to imprisonment	11.7 (6.7-19.8)	LOW
Abbott 2005	Self-report	Not applicable	Lifetime	21.3 (14.2-30.6)	LOW
Abbott 2005	SOGS-R	≥3	6 months prior to imprisonment	34.0 (25.3-44.1)	LOW
Abbott 2005	SOGS-R	≥3	Lifetime	44.7 (35.0-54.7)	LOW
Abbott 2005	SOGS-R	≥5	6 months prior to imprisonment	22.3 (15.1-31.8)	LOW
Abbott 2005	SOGS-R	≥5	Lifetime	33.0 (24.k93-43.0)	LOW

CI: Confidence interval; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders (4th edition); PPV: Positive predictive value; SOGS-R: Revised South Oaks Gambling Screen

Unclear funding source

Table 11: Positive predictive values of risk factors for harmful gambling within addiction services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Alcohol and drug co-addiction					
Baldo 2006	SOGS	≥5	Not reported	15.0 (9.6-22.8)	LOW
Risk factor(s): Alcohol co-addiction					
Cavicchioli 2020	Not reported	Not reported	Not reported	4.74 (2.5-8.8)	MODERATE

CI: Confidence interval; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen

Table 12: Positive predictive values of risk factors for harmful gambling within psychiatric services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Admittance to psychiatric emergency service					
Chaput 2007	DSM-IV	≥5	Not reported	0.7 (0.6-0.8)	LOW
Perrine 2008	SOGS	≥5	Current	6.2 (3.7-10.3)	LOW
Risk factor(s): Psychosis co-morbidity					
Haydock 2015	PGSI	≥1	Not reported	16.3 (13.1-20.1)	LOW
Haydock 2015	PGSI	≥3	Not reported	12.2 (9.4-15.6)	LOW
Haydock 2015	PGSI	≥8	Not reported	5.7 (3.9-8.3)	LOW

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Depression co-morbidity					
Lejoyeux 2002	MIDI and DSM-IV	Not reported	Not reported	2.8 (1.0-7.9)	LOW

CI: Confidence interval; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders (4th edition); MIDI: Minnesota Impulsive Disorders Interview; PGSI: Problem Gambling Severity Index; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen

Table 13: Positive predictive values of risk factors for harmful gambling within prison system services

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
Risk factor(s): Criminality					
Turner 2013	DSM-IV	≥1	12 months prior to imprisonment	27.5 (23.4-31.9)	LOW
Turner 2013	DSM-IV	≥1	During imprisonment	19.5 (16.0-23.6)	LOW
Turner 2013	DSM-IV	≥2	12 months prior to imprisonment	12.8 (9.9-16.3)	LOW
Turner 2013	DSM-IV	≥2	During imprisonment	7.8 (5.6-10.8)	LOW
Turner 2013	DSM-IV	≥5	12 months prior to imprisonment	7.8 (5.6-10.8)	LOW
Turner 2013	DSM-IV	≥5	During imprisonment	4.7 (3.1-7.2)	LOW
Turner 2013	PGSI	≥1	12 months prior to imprisonment	39.0 (34.5-43.8)	LOW
Turner 2013	PGSI	≥1	During imprisonment	22.1 (18.3-26.3)	LOW
Turner 2013	PGSI	≥3	12 months prior to imprisonment	21.0 (17.3-25.1)	LOW
Turner 2013	PGSI	≥3	During imprisonment	12.1 (9.3-15.6)	LOW
Turner 2013	PGSI	≥8	12 months prior to imprisonment	8.8 (6.5-11.9)	LOW
Turner 2013	PGSI	≥8	During imprisonment	4.4 (2.8-6.8)	LOW
Turner 2013	SOGS	≥1	12 months prior to imprisonment	36.3 (31.8-41.0)	LOW
Turner 2013	SOGS	≥1	During imprisonment	20.3 (16.7-24.4)	LOW
Turner 2013	SOGS	≥3	12 months prior to imprisonment	18.1 (14.7-22.1)	LOW
Turner 2013	SOGS	≥3	During imprisonment	6.9 (4.9-9.8)	LOW
Turner 2013	SOGS	≥5	12 months prior to imprisonment	13.4 (10.4-17.0)	LOW
Turner 2013	SOGS	≥5	During imprisonment	5.3 (3.5-7.8)	LOW
Risk factor(s): Criminality + male					

Study ID	Harmful gambling measure	Cut-off	Time frame	PPV (%) (95% CI)	GRADE rating
May-Chahal 2012	PGSI	≥1	12 months prior to imprisonment	42.3 (40.5-54.2)	LOW
May-Chahal 2012	PGSI	≥3	12 months prior to imprisonment	27.9 (22.1-34.4)	LOW
May-Chahal 2012	PGSI	≥8	12 months prior to imprisonment	10.4 (6.9-15.4)	LOW
Turner 2009	PGSI	≥1	Not reported	47.6 (41.6-53.8)	LOW
Turner 2009	PGSI	≥3	Not reported	25.2 (20.3-30.9)	LOW
Turner 2009	PGSI	≥8	Not reported	9.4 (6.4-13.7)	LOW
Turner 2009	DSM-IV	≥5	Not reported	6.3 (3.9-10.0)	LOW
Turner 2009	SOGS	≥5	Previous 12 months	13.0 (9.4-17.7)	LOW
Turner 2009	SOGS	≥5	Lifetime	15.0 (11.1-19.9)	LOW
Risk factor(s): Criminality + female					
May-Chahal 2012	PGSI	≥1	12 months prior to imprisonment	28.8 (23.3-35.1)	LOW
May-Chahal 2012	PGSI	≥3	12 months prior to imprisonment	18.0 (13.5-23.6)	LOW
May-Chahal 2012	PGSI	≥8	12 months prior to imprisonment	5.9 (3.5-9.8)	LOW

CI: Confidence interval; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders (4th edition); PGSI: Problem Gambling Severity Index; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen

From the 3 studies presenting sufficient data to calculate NPV (Cowlishaw 2017, Dufour 2016, Goodyear-Smith 2006, no industry funding), only 2 index tests showed values above the 98% threshold specified by the committee: people being worried about depression (low quality); and people who have used cocaine in previous month who also have diagnosis of schizophrenic disorder (very low quality).

Three studies reported sufficient data to calculate sensitivity of index tests (Cowlishaw 2017, Dufour 2016, Goodyear-Smith 2006, no industry funding). No risk factors were found to be very sensitive (≥90%) when identifying harmful gambling. The following risk factors, or combination of risk factors, were found to be moderately sensitive (60-90%) when identifying harmful gambling: depression co-morbidity (low quality); cocaine use in previous 3 months plus family history of gambling (very low quality); cocaine use in previous month plus family history of alcohol or drug addiction (very low quality); cocaine use in previous month plus diagnosis of phobic disorder (low quality); cocaine use in previous month plus presence of early 'big' win (low quality); cocaine use in previous month plus alcohol co-addiction (very low quality); cocaine use in previous month plus cocaine co-addiction (very low quality); and worried about depression (moderate quality). The following risk factors, or combination of risk factors, were found to be not sensitive (≤60%) when identifying harmful gambling: anxiety co-morbidity (low quality); alcohol co-addiction (low quality); drug co-addiction (low quality); cocaine use in previous month plus diagnosis of panic disorder (low quality); cocaine use in previous month plus diagnosis of generalised anxiety disorder (low quality); cocaine use in previous month plus diagnosis of major depression (low quality); cocaine use in previous month plus diagnosis of bipolar disorder (low quality); cocaine use in previous month plus diagnosis of dysthymic disorder low quality); cocaine use in previous month plus diagnosis of

schizophrenic disorder (very low quality); cocaine use in previous month plus presence of early 'big' loss (low quality); worried about drinking (moderate quality); worried about other drug use (moderate quality); worried about anxiety (low quality); worried about anhedonia (low quality); worried about smoking (moderate quality); worried about domestic violence (moderate quality); worried about anger (moderate quality); not participating in adequate exercise (low quality); and worried about weight (low quality).

Three studies reported sufficient data to calculate specificity of index tests (Cowlishaw 2017, Dufour 2016, Goodyear-Smith 2006, no industry funding). The following risk factors, or combination of risk factors, were found to be very specific (≥90%) when identifying harmful gambling; cocaine use in previous month plus diagnosis of bipolar disorder (low quality); cocaine use in previous month plus diagnosis of dysthymic disorder (low quality); worried about drinking (moderate quality); worried about other drug use (moderate quality), and worried about domestic violence (moderate quality). The following risk factors, or combination of risk factors, were found to be moderately specific (60-90%) when identifying harmful gambling: anxiety co-morbidity (moderate quality); alcohol co-addiction (moderate quality); dug co-addiction (moderate quality); cocaine use in previous 3 months plus family history of gambling (low quality); cocaine use in previous month plus diagnosis of panic disorder (very low quality); cocaine use in previous month plus diagnosis of phobic disorder (low quality); cocaine use in previous month plus diagnosis of generalised anxiety disorder (low quality); cocaine use in previous month plus diagnosis of major depression (very low quality); cocaine use in previous month plus diagnosis of schizophrenic disorder (low quality); cocaine use in previous month plus presence of early 'big' loss (very low quality); worried about anxiety (moderate quality); worried about anhedonia (moderate quality); worried about smoking (moderate quality); and worried about anger (moderate quality). The following risk factors, or combination of risk factors, were found to be not specific (≤60%) when identifying harmful gambling: depression co-morbidity (low quality); cocaine use in previous month plus family history of alcohol or drug addiction (low quality); cocaine use in previous month plus presence of early 'big' win (very low quality); cocaine use in previous month plus alcohol co-addiction (low quality); cocaine use in previous month plus cocaine co-addiction (low quality); worried about depression (moderate quality); not participating in adequate exercise (moderate quality); and worried about weight (moderate quality).

One study reported odds ratios of experiencing harmful gambling (measured using self-report) in people with alcohol and other drug co-morbidities plus criminality (Rudd 2016, unclear funding source). The odds of experiencing harmful gambling were not clinically importantly different in people with the risk factors of alcohol and other drug co-morbidities plus criminal offences against the person (very low quality) or alcohol and other drug co-morbidities plus criminal offence against organisations, government and community (very low quality). However, there was an increased odds of experiencing harmful gambling in people presenting with alcohol and other drug co-morbidities plus criminal offences against property (very low quality).

Evidence was identified for the following index tests: alcohol and other drug co-addictions (including people receiving opioid substitution treatment), mental and physical health co-morbidities, smoking, lifestyle factors (including exercise levels and body weight), domestic violence, homelessness or community service use, gambling behaviour, family history of harmful gambling or other addictions, veterans, and criminality. No evidence was identified for an ecological/environmental index test or participating in gaming index test.

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, but no economic studies were identified which were applicable to this review question. See the literature search strategy in appendix B and economic study selection flow chart in appendix G.

Excluded studies

No economic studies were reviewed at full text and excluded from this review.

Economic model

No economic modelling was undertaken for this review because the committee agreed that other topics were higher priorities for economic evaluation.

The committee's discussion and interpretation of the evidence

The outcomes that matter most

When choosing which outcomes to prioritise, the committee discussed the practical limitations of the review population being 'people presenting to non-gambling specialist settings'. The committee agreed that it would be unlikely that the number of people not presenting to the setting would be estimable, and for this reason, the usual diagnostic accuracy outcomes of sensitivity and specificity would not generally be calculable. Therefore, they agreed to use positive predictive values (PPVs) as a critical outcome. The PPV would provide information on the proportion of people presenting with a risk factor who are experiencing harmful gambling. The committee were aware that studies might not report enough information for PPVs to be calculated, but still provide valuable information on the associations between risk factors and participation in harmful gambling. Therefore, they decided to also include odds ratios, risk ratios, hazard ratios and incidence ratios as critical outcomes for studies where PPVs were not available.

The committee selected important outcomes of sensitivity, specificity and negative predictive values (NPVs) for studies that provided enough information to calculate these. Although sensitivity and specificity are not setting-specific, which limits the applicability to general settings, the committee agreed that these measures could still provide valuable information on the ability of risk factors to correctly identify people experiencing harmful gambling and the people not experiencing harmful gambling. The committee also agreed that NPVs (the proportion of people without a risk factor who are not experiencing harmful gambling) could provide further reassurance that people without certain risk factors may not need to be questioned about gambling-related harms.

The quality of the evidence

The quality of the evidence for quantitative outcomes was assessed with GRADE and was rated as very low to moderate.

Findings were downgraded in 2 areas. The main area evidence was downgraded was risk of bias, for example when the population included in the study was the same as the risk factor for gambling or where a large number of participants did not receive or complete the assessment for harmful gambling. Studies were also downgraded for imprecision when 95% confidence intervals crossed 1 decision-making threshold.

No evidence was identified for an ecological/environmental index test or participating in gaming index test.

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

Benefits and harms

Recommendations based on this review are for health and social care professionals, and for professionals within the criminal justice system. They may also be relevant for people working within voluntary, community and social enterprise sectors.

The committee considered evidence about the positive predictive value of a range of index tests or 'risk factors', which they had prespecified in the protocol. The positive predictive value indicated the proportion of people with the risk factor (such as a co-morbidity or certain gambling characteristic) who were also experiencing harmful gambling in the included studies. The committee were aware they would use their own expertise to assess the generalisability of the results beyond the study settings and they were also aware that the data would not prove causality (between the risk factor and gambling), and that relationships between risk factors and the experience of gambling-related harms could be bidirectional – for example depression could lead to someone experiencing harmful gambling, or harmful gambling could lead to depression.

To support their decision making, the committee agreed, a priori, a threshold of 2%, meaning that a risk factor with a PPV of 2% or more should be taken as an indication that the person may be experiencing harmful gambling. The committee were aware that 2% was a very low PPV to choose, but wanted to ensure that the risk factors identified were treated as 'red flags' which meant that further questioning or assessment was required, and not that a definitive diagnosis of harmful gambling should be made. They discussed the results, including the quality rating of the PPV estimate, and made recommendations for practitioners to ask people about gambling behaviour in certain circumstances and with certain risk factors, with the intention of improving case identification.

The committee discussed that the PPVs for a range of risk factors were much higher than the decision-making threshold of 2%. These included involvement in crime, mental health problems such as psychosis, depression and anxiety and co-occurring addictions such as alcohol and drugs. The quality of the PPVs for these factors was low to moderate and reinforced the committee's own knowledge of harmful gambling often being experienced by people with those risk factors. In terms of the engagement in crime risk factor, the PPV was generated from research conducted in a prison setting, but committee expertise led them to generalise to the criminal justice system, throughout which opportunities for case identification are routinely missed. They therefore agreed to include these risk factors in a recommendation for practitioners to ask about gambling behaviour. The committee also discussed the high PPV (moderate quality) for experiencing homelessness, but they agreed that the risk for harmful gambling was actually broader. They extended their recommendation to include people at risk of homelessness and with financial worries leading to an inability to meet basic needs, which they agreed were equal to homelessness in terms of being a cause for concern about gambling behaviour. One of the PPVs, being worried about domestic violence or abuse, was only a little above the decision-making threshold (at 2.3%, 95% CI 0.8-6.6) but the quality of the estimate was moderate and together with their own experiential knowledge in this area, it provided the committee with the confidence to include concerns about domestic abuse in this list of situations where people may be at an increased risk of experiencing gambling-related harms. They also agreed there would be greater benefit from recommending practitioners ask about gambling behaviour in the context of violence more generally as well as situations in which there are safeguarding concerns. Finally, the committee discussed that the combined risk factors of cocaine use plus family history of harmful gambling and cocaine use plus family history of alcohol or drug addiction generated high PPVs (35.1%, 95% CI 28.6-42.3 and 18.3%, 95% CI 14.5-22.8 respectively). Although

the quality of the PPVs was low, the findings resonated with the committee's experience. They agreed that when someone has a family history of harmful gambling or other addictions, this should ring alarm bells and that practitioners in those circumstances should therefore ask the person whether they gamble.

Next, the committee discussed several risk factors which they had listed in the protocol but for which no relevant data were located. For example in the committee's expert view, it has been well-documented that gambling is a side effect of certain medication for the treatment of Parkinson's disease, such as dopamine agonists. The committee were also aware that the product information for ariprazole (an antipsychotic drug which can be used for the treatment of schizophrenia) may lead to gambling. The committee were also in agreement that some conditions such as attention deficit hyperactivity disorder and other forms of neurodivergence or acquired brain injury may lead to a higher risk of harmful gambling and so it was useful to identify that these people should be considered in the high-risk groups for harmful gambling. The committee were also aware of wider evidence and documented accounts of people in certain occupations having an increased propensity to experience harmful gambling. They agreed about specific examples such as armed forces personnel, veterans, sports professionals and people working in the gambling or financial industries, but these were not intended to be exhaustive. Although the committee's experience and awareness of wider evidence led them to highlight these factors, the lack of underpinning data from this review resulted in them making a 'consider' recommendation. In turn this led them to discuss the additional time that would be needed in practice to ask the question about gambling behaviour, but they agreed any such cost would be proportionate to the expected benefits.

The committee also acknowledged that in practice, having a combination of risk factors is common among people experiencing harmful gambling. They agreed it would be important to make practitioners aware of the potentially additive effect when a person displays several of these characteristics or risk factors.

A small number of risk factors generated PPVs of less than 2% which were below the committee's decision-making threshold, so they were not in themselves used to inform recommendations. These were psoriasis (no industry funding), alcohol plus other drug co-addiction (no industry funding) and admittance to psychiatric emergency care (unclear funding source). In the case of psoriasis , this supported the committee's experience that it is not a cause for concern about gambling behaviour. In the case of admittance to psychiatric emergency care, the committee agreed that the priority in these instances would be treating the presenting mental health crisis. In the case of other co-addictions and mental illness, the committee agreed these results were at odds with their experience and they were also at odds with results from other studies (both within no industry funding sources and unclear funding sources stratifications), which had generated high PPVs for the same or very similar risk factors. The committee therefore agreed that the low PPVs seen for these risk factors were outweighed by the other evidence combined with their own expertise.

When the committee had agreed the list of situations or risk factors which indicated possible harmful gambling, they discussed how to use these to support practitioners, and agreed that their recommendations about simple questions to ask about gambling (see evidence review B) would apply to the 'at risk' groups as well.

The committee discussed that people may not be aware of how much their gambling behaviour is affecting their quality of life and that, as no initial brief screening tool had been identified (see evidence review B), people should be supported in assessing their gambling behaviour and the severity of potential gambling-related harms. The committee discussed that the recommended test should be easily self-administered without the need for trained practitioners, and it should be freely available. Therefore they agreed to highlight the questionnaire freely available via the NHS website (which is based on the Problem Gambling Severity Index) as a good resource for people worried about their gambling behaviour and included a link within the recommendations.

The committee were aware that, based on the evidence from this review and evidence review B, that they were recommending that people be asked about their gambling behaviour, and they agreed that they therefore needed to provide advice to professionals and practitioners about initial support if people answered 'yes' to the questions about gambling. Although not the focus of this evidence review, the committee used their knowledge and experience to develop advice. This included a range of options to suit different situations and severity of gambling-related harms, from providing brief motivational interviewing to encourage help-seeking, to visiting the NHS website for support and information, to seeing a healthcare provider or social worker or being referred to NHS-commissioned services for treatment, particularly if gambling-related harms appear to be serious. The committee suggested a cut-off PGSI score of 8 or more for referral to specialist gambling treatment services (or lower if the person had complex hams or comorbidities) based on the work conducted by the Office of Health Improvement and Disparities (OHID). As well as general advice about initial support options for people who had answered 'yes' the committee advised, based on their knowledge, that there were some immediate actions people could take to reduce their gambling-related harms and these included exclusion and blocking systems. They were also aware that as well as treatment of the gambling *per se*, people may have concerns about other issues such as finances, housing or employment and so could be sign-posted to seek help and advice on these issues separately.

The committee agreed these recommendations on initial support would have the benefit of providing people with an immediate feeling that their gambling-related harms were being taken seriously, indicating that there were a number of available treatment and support options and improving the likelihood of positive outcomes for the person and affected others.

Finally, the committee discussed that some people, when first identified as experiencing gambling-related harms, may be in great distress, with suicidal ideation or intent and these people would need immediate support and help, and may require specialist mental health services, so the committee made a recommendation to advise this and to signpost readers to the NICE guideline on self-harm. The committee agreed this recommendation would raise awareness that gambling-related harms can have serious consequences and so would help ensure these people received the necessary crisis help.

Cost effectiveness and resource use

No economic evidence was identified for this review. The recommendations to ask (or consider asking) people if they gamble or are worried about or experiencing harm due to their or another person's gambling in certain situations or locations are expected to have resource implications in terms of staff time. There may also be implications for training needs as staff will only ask these questions if they feel able to deal with the answers and provide any necessary support or advice. However, the committee agreed that identifying factors suggesting harmful gambling is likely to lead to earlier identification and management of people experiencing harm due to their, or another person's, gambling, which, in turn, can lead to improved outcomes and potential cost-savings, as it may prevent further harm due to gambling and reduce the need for more costly interventions further down the care pathway.

Other factors the committee took into account

The committee discussed that although this review looked at risk factors for harmful gambling there may be people who do not demonstrate any risk factors and may experience years of harm from gambling without any outward signs. They agreed that this group of people would be very difficult to identify unless they sought help themselves.

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

- Any industry funding: Abbott 2005, Lepage 2000, Widinghoff 2019

- No industry funding: Adamson 2006, ANPAA 2011, Beaudette 2016, Bergamini 2018, Biddle 2005, Bodor 2018, Brunault 2019, Castren 2015, Cowlishaw 2017, Dufour 2016, Goodyear-Smith 2006, Nehlin 2013, Nielssen 2018, Pereiro 2013, Riley 2015, Riley 2017, Riley 2018, Rudd 2016, Schielein 2021, Wieczorek 2019, Zurhold 2014
- Unclear funding source: Baldo 2006, Cavicchioli 2020, Chaput 2007, Haydock 2015, Lejoyeux 2002, May-Chahal 2012, Perrine 2008, Turner 2009, Turner 2013

The committee discussed that the results generated by studies with 'any industry funding' were coherent with the evidence from the other funding streams and so they considered all the evidence when making their recommendations.

Recommendations supported by this evidence review

This evidence review supports recommendations 1.1.2 to 1.1.4 and 1.1.6 to 1.1.11.

References – included studies

Diagnostic

Abbott 2005

Abbott, MW McKenna, BG (2005) Gambling and problem gambling among recently sentenced women in New Zealand prisons. Journal of Gambling Studies 21(4): 559 - 581

Adamson 2006

Adamson, Simon J, Todd, Fraser C, Sellman, J Douglas et al. (2006) Coexisting psychiatric disorders in a New Zealand outpatient alcohol and other drug clinical population. The Australian and New Zealand Journal of Psychiatry 40(2): 164-70

ANPAA 2011

ANPAA, Nalpas, Bertrand, Yguel, Jacques et al. (2011) Pathological gambling in treatment-seeking alcoholics: a national survey in France. Alcohol and Alcoholism (Oxford, Oxfordshire) 46(2): 156-60

Baldo 2006

Baldo, V, Cristofoletti, M, Majori, S et al. (2006) Relationship between pathological gambling, alcoholism and drug addiction. Annali di igiene : Medicina Preventiva E Di Comunita 18(2): 147-53

Beaudette 2016

Beaudette, J.N. and Stewart, L.A. (2016) National Prevalence of Mental Disorders among Incoming Canadian Male Offenders. Canadian Journal of Psychiatry 61(10): 624-632

Bergamini 2018

Bergamini, A., Turrina, C., Bettini, F. et al. (2018) At-risk gambling in patients with severe mental illness: Prevalence and associated features. Journal of Behavioral Addictions 7(2): 348-354

Biddle 2005

Biddle, Dirk, Hawthorne, Graeme, Forbes, David et al. (2005) Problem gambling in Australian PTSD treatment-seeking veterans. Journal of Traumatic Stress 18(6): 759-67

Bodor 2018

Bodor, Davor, Ricijas, Neven, Zoricic, Zoran et al. (2018) Prevalence of pathological gambling among alcohol addicts in outpatient treatment in the City of Zagreb: A cross-sectional study. Psychiatria Danubina 30(3): 348-355

Brunault 2019

Brunault, Paul, Lebigre, Kevin, Idbrik, Fatima et al. (2019) Posttraumatic Stress Disorder Is a Risk Factor for Multiple Addictions in Police Officers Hospitalized for Alcohol. European Addiction Research 25(4): 198-206

Castren 2015

Castren, Sari, Salonen, Anne H, Alho, Hannu et al. (2015) Past-year gambling behaviour among patients receiving opioid substitution treatment. Substance Abuse Treatment, Prevention, and Policy 10: 4

Cavicchioli 2020

Cavicchioli, Marco, Ramella, Pietro, Vassena, Giulia et al. (2020) Mindful self-regulation of attention is a key protective factor for emotional dysregulation and addictive behaviors among individuals with alcohol use disorder. Addictive Behaviors 105: 106317

Chaput 2007

Chaput, Yves, Lebel, Marie-Josee, Labonte, Edith et al. (2007) Pathological gambling and the psychiatric emergency service. Canadian journal of psychiatry. Revue Canadienne De Psychiatrie 52(8): 535-8

Cowlishaw 2017

Cowlishaw, Sean, Gale, Lone, Gregory, Alison et al. (2017) Gambling problems among patients in primary care: a cross-sectional study of general practices. The British journal of general practice : the journal of the Royal College of General Practitioners 67(657): e274-e279

Dufour 2016

Dufour, M., Nguyen, N., Bertrand, K. et al. (2016) Gambling problems among community cocaine users. Journal of Gambling Studies 32(3): 1039-1053

Goodyear-Smith 2006

Goodyear-Smith, Felicity, Arroll, Bruce, Kerse, Ngaire et al. (2006) Primary care patients reporting concerns about their gambling frequently have other co-occurring lifestyle and mental health issues. BMC Family Practice 7: 25

Haydock 2015

Haydock, Maria, Cowlishaw, Sean, Harvey, Carol et al. (2015) Prevalence and correlates of problem gambling in people with psychotic disorders. Comprehensive Psychiatry 58: 122-129

Lejoyeux 2002

Lejoyeux, Michel, Arbaretaz, Marie, McLoughlin, Mary et al. (2002) Impulse control disorders and depression. The Journal of Nervous and Mental Disease 190(5): 310-4

Lepage 2000

Lepage, C; Ladouceur, R; Jacques, C (2000) Prevalence of problem gambling among community service users. Community Mental Health Journal 36(6): 597-601

May-Chahal 2012

May-Chahal, Corinne, Wilson, Alison, Humphreys, Leslie et al. (2012) Promoting an Evidence-Informed Approach to Addressing Problem Gambling in UK Prison Populations. The Howard Journal of Criminal Justice 51(4): 372-386

Nehlin 2013

Nehlin, Christina, Gronbladh, Leif, Fredriksson, Anders et al. (2013) Alcohol and drug use, smoking, and gambling among psychiatric outpatients: a 1-year prevalence study. Substance Abuse 34(2): 162-8

Nielssen 2018

Nielssen, Olav B, Stone, William, Jones, Naidene M et al. (2018) Characteristics of people attending psychiatric clinics in inner Sydney homeless hostels. The Medical Journal of Australia 208(4): 169-173

Pereiro 2013

Pereiro, C., Pino, C., Florez, G. et al. (2013) Psychiatric Comorbidity in Patients from the Addictive Disorders Assistance Units of Galicia: The COPSIAD Study. PLoS ONE 8(6): e66451

Perrine 2008

Adam, Perrine; Richoux, Charlotte; Lejoyeux, Michel (2008) Screening for impulse control disorders among patients admitted to a French psychiatric emergency service. The Open Psychiatry Journal 2: 30-36

Riley 2015

Riley, B Oakes, J (2015) Problem gambling among a group of male prisoners: Lifetime prevalence and association with incarceration. Australian and New Zealand Journal of Criminology 48(1): 73 - 81

Riley 2017

Riley, BJ Larsen, A Battersby, M Harvey, P (2017) Problem gambling among female prisoners: lifetime prevalence, help-seeking behaviour and association with incarceration. International Gambling Studies 17(3): 401 - 411

Riley 2018

Riley, Ben J, Larsen, Amii, Battersby, Malcolm et al. (2018) Problem Gambling Among Australian Male Prisoners: Lifetime Prevalence, Help-Seeking, and Association With Incarceration and Aboriginality. International Journal of Offender Therapy and Comparative Criminology 62(11): 3447-3459

Rudd 2016

Rudd, Courtney and Thomas, Stuart D. M (2016) The prevalence, mental health and criminal characteristics of potential problem gamblers in a substance using treatment seeking population. International Journal of Mental Health and Addiction 14(5): 700-714

Schielein 2021

Schielein, Maximilian C, Tizek, Linda, Knobloch, Lisanne et al. (2021) Psoriasis and addiction: assessing mental health based on a cross-sectional study in Germany. European Journal of Dermatology: EJD 31(6): 722-729

Turner 2009

Turner, Nigel E, Preston, Denise L, Saunders, Crystal et al. (2009) The relationship of problem gambling to criminal behavior in a sample of Canadian male federal offenders. Journal of Gambling Studies 25(2): 153-69

Turner 2013

Turner, NE Preston, DL McAvoy, S Gillam, L (2013) Problem Gambling Inside and Out: The Assessment of Community and Institutional Problem Gambling in the Canadian Correctional System. Journal Of Gambling Studies 29(3): 435 - 451

Widinghoff 2019

Widinghoff, Carolina, Berge, Jonas, Wallinius, Märta et al. (2019) Gambling Disorder in Male Violent Offenders in the Prison System: Psychiatric and Substance-Related Comorbidity. Journal of Gambling Studies 35(2): 485-500

Wieczorek 2019

Wieczorek, L.; Stokwiszewski, J.; Klingemann, J.I. (2019) Screening of problem gambling among a homeless population in Warsaw. NAD Nordic Studies on Alcohol and Drugs 36(6): 542-555

Zurhold 2014

Zurhold, Heike; Verthein, Uwe; Kalke, Jens (2014) Prevalence of problem gambling among the prison population in Hamburg, Germany. Journal of Gambling Studies 30(2): 309-319

Appendices

Appendix A Review protocols

Review protocol for review question: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

Table 14: Review protocol

ID	Field	Content
0.	PROSPERO registration number	CRD42022371783
1.	Review title	Case identification for harmful gambling
2.	Review question	What factors, either alone or in combination, suggest that a person is participating in harmful gambling?
3.	Objective	• To establish what factors, either alone or in combination, would suggest that a person may be participating in harmful gambling. • To identify possible 'red flags' that indicate current participation in harmful gambling
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 • Epistemonikos • Health Management Information Consortium (HMIC) • International Health Technology Assessment (IHTA) • 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 • Gambling and Addictions Research Centre • Responsible Gambling Council • Victorian Responsible Gambling Foundation With the agreement of the guideline committee the searches will be re-run 6 weeks before final submission of the review and further studies retrieved for inclusion.

		The full search strategies will be published in the final review.
5.	Condition or domain being studied	Indicators of participation in harmful gambling
6.	Population	**Inclusion:** Adults (aged 18 years and over) presenting in a non-gambling specialist setting (including in the Criminal Justice System, social care and the voluntary sector such as Citizens Advice) **Exclusion:** Children and young people <18 years old; people presenting with or being treated for harmful gambling, for example in a specialist gambling setting.
7.	Test	The use of factors, individually or in combination, to indicate current participation in harmful gambling will be examined, for example: • Personal characteristics (for example family history of gambling or addictions, personality traits, risky behaviour, sensation seeking, impulsivity, compulsivity, inhibition dysregulation). • Co-morbidities (for example depression, Parkinson's disease, ADHD). • Ecological/ environmental (for example proliferation of gambling opportunities in a certain geographical area, culture). • Gambling characteristics (for example, presence of 'early big win', format of gambling) • Debt, experiencing homelessness, domestic violence, criminality, loss or lack of employment, observed social isolation. • Participating in gaming • Medication • Other factors identified in relevant studies. Demographic characteristics (such age, gender, ethnicity, socio-economic status, educational level and occupation) will also be considered but only in combination with another factor.
8.	Reference standard	Participation in harmful gambling (as defined by any measure, including self-report).
9.	Types of study to be included	Include published full-text papers: • Systematic reviews of diagnostic test accuracy studies • Individual studies of diagnostic test accuracy • Randomised controlled trials with one arm that meets the protocol criteria will also be included • In addition, any study with random or consecutive selection of the target participants from which diagnostic

		data can be extracted. If insufficient of the above studies are located to support decision making then the following will also be considered for inclusion: • Cohort studies • Cross-sectional studies
10.	Other exclusion criteria	Inclusion: • Full text papers • Studies conducted in high income countries (as defined by the World Bank) in Europe as well as Australia, New Zealand and Canada. Exclusion: • Articles published before 2000 • Studies using qualitative methods only • Non-English language articles • Conference proceedings • Abstract only • Books, book chapters and theses.
11.	Context	Recommendations will apply in all settings where harmful gambling may be identified.

12.	Primary outcomes (critical outcomes)	• Positive predictive value (PPV)
		• Risk of participating in harmful gambling
		  ○ Odds ratios
		  ○ Risk ratios
		  ○ Hazard ratios
		  ○ Incidence ratios

13.	Secondary outcomes (important outcomes)	• Negative predictive value (NPV) • Sensitivity • Specificity
14.	Data extraction (selection and	All references identified by the searches and from other sources will be uploaded into EPPI-Reviewer 5 and

	coding)	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 sifting will be performed on at least 10% of records; 90% agreement is required. Disagreements will be resolved via discussion between the two reviewers, and consultation with senior staff if necessary. 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. A standardised form will be used to extract data from studies. The following data will be extracted: study details (reference, country where study was carried out, type and dates), participant characteristics, inclusion and exclusion criteria, details of the interventions if relevant, setting and follow-up, relevant outcome data and source of funding. One reviewer will extract relevant data into a standardised form, and this will be quality assessed by a senior reviewer.
15.	Risk of bias (quality) assessment	Quality assessment of individual studies will be performed according to Developing NICE guidelines: the manual, using the following checklists: • QUADAS-2 for diagnostic accuracy and association studies • ROBIS for systematic reviews The quality assessment will be performed by one reviewer and this will be quality assessed by a senior reviewer.
16.	Strategy for data synthesis	Depending on the availability of the evidence, the findings will be summarised narratively or quantitatively. Where appropriate, meta-analysis of diagnostic test accuracy will be performed using the metandi and midas applications in STATA/winbugs and meta-analysis of association data will be performed using the Mantel-Haenszel methods Cochrane Review Manager software. Positive predicative values, sensitivity, specificity, and negative predictive values with 95% CIs will be used as outcomes for diagnostic test accuracy. These diagnostic accuracy parameters will be obtained from the studies or calculated by the technical team using data from the studies and prevalence data from relevant UK

		settings. Odds, risks, hazard and incidence ratios with 95% CIs will be used as outcomes for association data and these parameters will be obtained from the studies or calculated by the technical team using data from the studies. The confidence in the findings across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group: http://www.gradeworkinggroup.org/. Decision making thresholds for DTA data: • A PPV threshold of 2% will be used for assessing imprecision.	
17.	Analysis of sub-groups	Due to the critical importance of the setting of the included studies the data will primarily be stratified by 'study setting' and then according to the funding source of included studies: • Any industry funding • No industry funding • Unclear funding source Evidence will be sub-grouped by the following only in the event that there is significant heterogeneity in outcomes: • Sex • Age • Ethnicity • Co-morbidities Where evidence is stratified or sub-grouped the committee will consider on a case-by-case basis if separate recommendations should be made for distinct groups. Separate recommendations may be made where there is evidence of a differential effect of interventions in distinct groups. If there is a lack of evidence in one group, the committee will consider, based on their experience, whether it is reasonable to extrapolate and assume the interventions will have similar effects in that group compared with others.	
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**
		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 review 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 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	https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=371783	
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; risk factors; individual; diagnosis; primary care; positive predictive value	
33.	Details of existing review of same topic by same authors	Not applicable.	
34.	Current review status	☒	Ongoing
		☐	Completed but not published

		☐	Completed and published
		☐	Completed, published and being updated
		☐	Discontinued
35.	Additional information	Not applicable.	
36.	Details of final publication	www.nice.org.uk	

ADHD: Attention deficit hyperactivity disorder; CI: Confidence interval; DTA: Diagnostic test accuracy; DV: Domestic violence; GRADE: Grading of Recommendations Assessment, Development and Evaluation; NHS: National Health Service; NICE: National Institute for Health and Care Excellence; PPV: Positive predictive value; PROSPERO: International prospective register of systematic reviews; RCT: Randomised controlled trial; ROBINS-I: Risk of bias In non-randomized studies of interventions; ROBIS: Risk of bias in systematic reviews; SD: Standard deviation; QUADAS-2: Revised tool for the quality assessment of diagnostic accuracy studies

Appendix B Literature search strategies

Literature search strategies for review question: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

Main searches

Database: Applied Social Science Index and Abstracts (ASSIA)

Date of last search: 08/09/2022

Search 1

#	Searches
S1	MAINSUBJECT.EXACT("Pathological gambling") OR MAINSUBJECT.EXACT("Pathological gamblers") OR MAINSUBJECT.EXACT("Gamblers") OR MAINSUBJECT.EXACT("Gambling")
S2	TI(Gamble* OR gambling* OR betting OR bets OR wager*)
S3	S1 or S2
S4	TI,AB(etiolog* OR aetiolog* OR "red flag" OR "red flags" OR "clinical presentation" OR "clinical presentations" OR "clinical feature" OR "clinical features" OR symptom* OR "trigger warning" or "trigger warnings")
S5	TI(detect* OR prognos* OR prevalence* OR comorbid* OR ludoman* or diagnos*)
S6	TI(behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid* or impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)
S7	TI(social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*)
S8	TI(identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib*)
S9	(s6 or s7) and s8
S10	s4 or s5 or s9
S11	s3 and s10
S12	(s3 and s10) AND yr(2000-2029)
S13	TI(longitudinal* or prospective* or retrospective* or cohort* or followup* or "follow up" or concurrent* or incidence* or population* or prevalence* or cross sectional* or meta analy* or metanaly* or metaanaly* or systematic* or trial* or random* or placebo* or sensitivity* or specificity* or diagnos* or ROC or AUC or screening* or surveillance* or detection* or review*)
S14	s12 and s13

Search 2

#	Searches
S1	MAINSUBJECT.EXACT("Pathological gambling") OR MAINSUBJECT.EXACT("Pathological gamblers") OR MAINSUBJECT.EXACT("Gamblers") OR MAINSUBJECT.EXACT("Gambling")
S2	TI,AB(Gamble* or gambling* or betting 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 "gaming machines" or "slot machines" or "fruit machines" or "poker machines" or "lottery machines" or "lotteries machines" or "gaming terminals" or "slot terminals" or "fruit terminals" or "poker terminals" or "lottery terminals" or "lotteries terminals" or pokies or pokey or puggy or fruities or "loot box" or "loot boxes" or lootbox* or roulette or blackjack or poker or baccarat or crap or craps or keno or casino* or bingo* or "scratch cards" or "scratch card" or scratchcard or "amusement arcade" or "amusement arcades" or cryptocurrency* or cryptocurrencies)
S3	S1 or S2
S4	TI,AB(predictive value* or PPV or NPV)
S5	TI,AB((odds* or risk* or hazard* or incidence*) near/2 ratio*)
S6	MAINSUBJECT.EXACT("Predictors") OR MAINSUBJECT.EXACT("Predictive validity")
S7	S4 or S5 or S6
S8	S3 and S7
S9	(S3 and S7) AND yr(2000-2029)

Database: Cochrane Central Register of Controlled Trials (CENTRAL)

Date of last search: 08/09/2022

#	Searches
	#1 MeSH descriptor: [Gambling] this term only #2 gambl*:ti,ab #3 betting:ti,ab #4 bets:ti,ab

#	Searches
	#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 casinos or bingo or bookmaker* or book maker or bookie* or lottery or lotteries or lotto or scratch card or scratch cards or scratchcard* or raffle or raffles or sweepstak* or amusement arcade or amusement arcades 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 loot boxes or lootbox*):ti,ab #11 {or #1-#10} #12 MeSH descriptor: [Predictive Value of Tests] this term only #13 (predictive value or predictive values or PPV or NPV):ti,ab #14 MeSH descriptor: [Odds Ratio] this term only #15 ((odds* or risk* or hazard* or incidence*) near/2 ratio*):ti,ab #16 {or #12-#15} #17 #11 and #16 #18 MeSH descriptor: [Behavioral Symptoms] this term only #19 MeSH descriptor: [Behavior, Addictive] this term only #20 MeSH descriptor: [Technology Addiction] explode all trees #21 MeSH descriptor: [Impulsive Behavior] this term only #22 MeSH descriptor: [Compulsive Behavior] this term only #23 MeSH descriptor: [Problem Behavior] this term only #24 MeSH descriptor: [Risk-Taking] this term only #25 MeSH descriptor: [Risk Factors] this term only #26 MeSH descriptor: [Personality] this term only #27 MeSH descriptor: [Character] this term only #28 MeSH descriptor: [Psychometrics] this term only #29 MeSH descriptor: [Comorbidity] this term only #30 MeSH descriptor: [Early Diagnosis] this term only #31 MeSH descriptor: [Prognosis] this term only #32 MeSH descriptor: [Emotional Regulation] this term only #33 ((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) near/3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)):ti,ab #34 ((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) near/3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)):ti,ab #35 (case* near/3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*)):ti,ab #36 ((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) near/3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)):ti,ab #37 ((gaming* or internet* or online* or sex* or porn* or computer* or media*) near/3 (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)):ti,ab #38 ((emotion* or inhibition*) near/3 (regulat* or dysregulat*)):ti,ab #39 ((presenting* or presentation* or hidden* or disguis* or predict* or causal*) near/3 factor*):ti,ab #40 (clinical* near/3 (presentation* or presenting* or feature*)):ti,ab #41 ((sign* or symptom*) near/3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*)):ti,ab #42 (etiolog* or aetiolog*):ti,ab #43 (warning* near/1 (symptom* or trigger* or sign*)):ti,ab #44 (red near/1 flag*):ti,ab #45 {or #18-#44} #46 #11 and #45 #47 #17 or #46 #48 conference:pt #49 #47 not #48 #50 (clinicaltrials or trialsearch):so #51 #49 not #50 #52 #49 not #50 in Trials #53 #49 not #50 with Publication Year from 2000 to 2022, in Trials

Database: Cochrane Database of Systematic Reviews (CDSR)

Date of last search: 08/09/2022

#	Searches
	#1 MeSH descriptor: [Gambling] this term only #2 gambl*:ti,ab

#	Searches
	#3 betting:ti,ab #4 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 casinos or bingo or bookmaker* or book maker or bookie* or lottery or lotteries or lotto or scratch card or scratch cards or scratchcard* or raffle or raffles or sweepstak* or amusement arcade or amusement arcades 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 loot boxes or lootbox*):ti,ab #11 {or #1-#10} #12 {or #1-#10} in Cochrane Reviews, Cochrane Protocols #13 {or #1-#10} with Cochrane Library publication date Between Jan 2000 and Sep 2022, in Cochrane Reviews, Cochrane Protocols

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

Date of last search: 08/09/2022

#	Searches
S1	(MH GAMBLING)
S2	(TI betting OR AB betting)
S3	(TI bets OR AB bets)
S4	(TI wager* OR AB wager*)
S5	TI((gaming or gambling or slot or fruit or poker or lottery or lotteries) N5 (machine* or terminal*))
S6	AB((gaming or gambling or slot or fruit or poker or lottery or lotteries) N5 (machine* or terminal*))
S7	((TI pokies OR AB pokies) OR (TI pokey OR AB pokey) OR (TI puggy OR AB puggy) OR (TI fruities OR AB fruities))
S8	TI((dice or card or cards or roulette or blackjack or poker or baccarat or crap or craps or keno or casino or casinos 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 sweepstak* or amusement arcade* or slot or slots) N5 (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))
S9	AB((dice or card or cards or roulette or blackjack or poker or baccarat or crap or craps or keno or casino or casinos 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 sweepstak* or amusement arcade* or slot or slots) N5 (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))
S10	TI((game or games or gaming or gamer or gamers) N5 (money or monetization or monetisation or monetary))
S11	AB((game or games or gaming or gamer or gamers) N5 (money or monetization or monetisation or monetary))
S12	((TI "loot box*" OR AB "loot box*") OR (TI lootbox* OR AB lootbox*))
S13	(TI gambl* OR AB gambl*)
S14	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13
S15	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13
S16	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13
S17	PT(anecdote or audiovisual or bibliography or biography or brief item or cartoon or commentary or computer program or editorial or games or glossary or historical material or interview or letter or listservs or masters thesis or obituary or pamphlet or pamphlet chapter or pictorial or poetry or proceedings or "questions and answers" or response or software or teaching materials or website)
S18	S16 not S17
S19	mh(animals+ or animals, laboratory or mh rodents+) or TI(rat or rats or mouse or mice)
S20	mh(human)
S21	s19 not s20
S22	s18 not s21
S23	(MH "Predictive Value of Tests")
S24	((TI "predictive value*" OR AB "predictive value*") OR (TI PPV OR AB PPV) OR (TI NPV OR AB NPV))
S25	(MH "Odds ratio")
S26	TI((odds* or risk* or hazard* or incidence*) N2 ratio*)
S27	AB((odds* or risk* or hazard* or incidence*) N2 ratio*)
S28	S23 OR S24 OR S25 OR S26 OR S27
S29	S22 AND S28
S30	TI((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) N3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*))
S31	AB((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) N3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*))

#	Searches
S32	TI((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) N3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*))
S33	AB((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) N3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*))
S34	TI(case* N3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*))
S35	AB(case* N3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*))
S36	TI((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) N3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*))
S37	AB((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) N3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*))
S38	TI((gaming* or internet* or online* or sex* or porn* or computer* or social media*) N3 (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*))
S39	AB((gaming* or internet* or online* or sex* or porn* or computer* or social media*) N3 (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*))
S40	TI((emotion* or inhibition*) N3 (regulat* or dysregulat*))
S41	AB((emotion* or inhibition*) N3 (regulat* or dysregulat*))
S42	TI((presenting* or presentation* or hidden* or disguis* or predict* or causal*) N3 factor*)
S43	AB((presenting* or presentation* or hidden* or disguis* or predict* or causal*) N3 factor*)
S44	TI(clinical* N3 (presentation* or presenting* or feature*))
S45	AB(clinical* N3 (presentation* or presenting* or feature*))
S46	TI((sign* or symptom*) N3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*))
S47	AB((sign* or symptom*) N3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*))
S48	((TI etiolog* OR AB etiolog*) OR (TI aetiolog* OR AB aetiolog*))
S49	TI(warning* N1 (symptom* or trigger* or sign*))
S50	AB(warning* N1 (symptom* or trigger* or sign*))
S51	TI(red N1 flag*)
S52	AB(red N1 flag*)
S53	(MH "Behavioral Symptoms")
S54	(MH "Behavior, Addictive")
S55	(MH "Impulsive Behavior")
S56	(MH "Compulsive Behavior+")
S57	(MH "Technology Addiction+")
S58	(MH "Risk Taking Behavior")
S59	(MH "Risk Factors")
S60	(MH "Personality")
S61	(MH "Character")
S62	(MH "Psychometrics")
S63	(MH "Comorbidity")
S64	(MH "Early Diagnosis")
S65	(MH "Prognosis")
S66	(MH "Emotional Regulation")
S67	S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66
S68	S22 AND S67
S69	(MH "Prospective Studies+")
S70	TI((follow up* or followup* or concurrent* or incidence* or population*) N3 (study* or studies* or analy* or observation* or design* or method* or research*))
S71	AB((follow up* or followup* or concurrent* or incidence* or population*) N3 (study* or studies* or analy* or observation* or design* or method* or research*))
S72	((TI longitudinal* OR AB longitudinal*) OR (TI prospective* OR AB prospective*) OR (TI retrospective* OR AB retrospective*) OR (TI cohort* OR AB cohort*) OR (TI cross sectional* OR AB cross sectional*)
S73	(MH "Cross Sectional Studies")
S74	TI((prevalence* or disease frequenc*) N3 (study* or studies* or analy* or observation* or design* or method* or

#	Searches
	research*))
S75	AB((prevalence* or disease frequenc*) N3 (study* or studies* or analy* or observation* or design* or method* or research*))
S76	S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75
S77	S68 AND S76
S78	(MH "Meta Analysis")
S79	(MH "Systematic Review")
S80	(TI (systematic* n3 review*)) or (AB (systematic* n3 review*)) or (TI (systematic* n3 bibliographic*)) or (AB (systematic* n3 bibliographic*)) or (TI (systematic* n3 literature)) or (AB (systematic* n3 literature)) or (TI (comprehensive* n3 literature)) or (AB (comprehensive* n3 literature)) or (TI (comprehensive* n3 bibliographic*)) or (AB (comprehensive* n3 bibliographic*)) or (TI (integrative n3 review)) or (AB (integrative n3 review)) or (JN "Cochrane Database of Systematic Reviews") or (TI (information n2 synthesis)) or (TI (data n2 synthesis)) or (AB (information n2 synthesis)) or (AB (data n2 synthesis)) or (TI (data n2 extract*)) or (AB (data n2 extract*)) or (TI (medline or pubmed or psyclit or cinahl or (psycinfo not "psycinfo database") or "web of science" or scopus or embase)) or (AB (medline or pubmed or psyclit or cinahl or (psycinfo not "psycinfo database") or "web of science" or scopus or embase)) or (MH "Systematic Review") or (MH "Meta Analysis") or (TI (meta-analy* or metaanaly*)) or (AB (meta-analy* or metaanaly*))
S81	S78 OR S79 OR S80
S82	S68 AND S81
S83	(MH "Randomized Controlled Trials")
S84	MH double-blind studies
S85	MH single-blind studies
S86	MH random assignment
S87	MH pretest-posttest design
S88	MH cluster sample
S89	TI (randomised OR randomized)
S90	AB (random*)
S91	TI (trial)
S92	MH (sample size) AND AB (assigned OR allocated OR control)
S93	MH (placebos)
S94	PT (randomized controlled trial)
S95	AB (control W5 group)
S96	MH (crossover design) OR MH (comparative studies)
S97	AB (cluster W3 RCT)
S98	S83 OR S84 OR S85 OR S86 OR S87 OR S88 OR S89 OR S90 OR S91 OR S92 OR S93 OR S94 OR S95 OR S96 OR S97
S99	S68 AND S98
S100	(MH "Sensitivity and Specificity")
S101	TI (sensitivity or specificity) OR AB (sensitivity or specificity)
S102	TI (("pre test" or pretest or "post test" or posttest) N1 probability) OR AB (("pre test" or pretest or "post test" or posttest) N1 probability)
S103	TI "likelihood ratio*" OR AB "likelihood ratio*"
S104	TI ("ROC curve*" or AUC) OR AB ("ROC curve*" or AUC)
S105	TI diagnos*
S106	AB (diagnos* N3 (performance* or accurac* or utilit* or value* or efficien* or effectiveness))
S107	AB "gold standard"
S108	MW "di"
S109	(MH "Health Screening+")
S110	(MH "Population Surveillance")
S111	TI((screening* or surveillance* or detection*) N3 (study* or studies* or analy* or observation* or design* or method* or research*))
S112	AB((screening* or surveillance* or detection*) N3 (study* or studies* or analy* or observation* or design* or method* or research*))
S113	S100 OR S101 OR S102 OR S103 OR S104 OR S105 OR S106 OR S107 OR S108 OR S109 OR S110 OR S111 OR S112
S114	S68 AND S113
S115	S29 OR S77 OR S82 OR S99 OR S114

Database: Embase

Date of last search: 08/09/2022

#	Searches
1	gambling/
2	PATHOLOGICAL GAMBLING/
3	gambl*.ti,ab.
4	betting.ti,ab.
5	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.

#	Searches
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 sweepstak* 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	limit 12 to english language
14	limit 13 to yr="2000 -Current"
15	(letter.pt. or letter/ or note.pt. or editorial.pt. or case report/ or case study/ or (letter or comment*).ti.) not (randomized controlled trial/ or random*.ti,ab.)
16	14 not 15
17	(animal/ not human/) or nonhuman/ or exp Animal Experiment/ or exp Experimental Animal/ or animal model/ or exp Rodent/ or (rat or rats or mouse or mice).ti.
18	16 not 17
19	(conference abstract* or conference review or conference paper or conference proceeding).db,pt,su.
20	18 not 19
21	predictive value/
22	(predictive value* or PPV or NPV).ti,ab.
23	odds ratio/
24	hazard ratio/
25	((odds* or risk* or hazard* or incidence*) adj2 ratio*).ti,ab.
26	or/21-25
27	20 and 26
28	behavior/
29	addiction/
30	behavioral addiction/
31	exp computer addiction/
32	sexual addiction/
33	exp risk behavior/
34	impulsiveness/
35	compulsion/
36	problem behavior/
37	risk factor/
38	personality/
39	character/
40	psychometry/
41	comorbidity/
42	early diagnosis/
43	prognosis/
44	clinical feature/
45	etiology/
46	emotional regulation/
47	((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
48	((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
49	(case* adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*)).ti,ab.
50	((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) adj3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)).ti,ab.
51	((gaming* or internet* or online* or sex* or porn* or computer* or social media*) adj3 (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)).ti,ab.
52	((emotion* or inhibition*) adj3 (regulat* or dysregulat*)).ti,ab.
53	((presenting* or presentation* or hidden* or disguis* or predict* or causal*) adj3 factor*).ti,ab.
54	(clinical* adj3 (presentation* or presenting* or feature*)).ti,ab.
55	((sign* or symptom*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*)).ti,ab.
56	(etiolog* or aetiolog*).ti,ab.
57	(warning* adj1 (symptom* or trigger* or sign*)).ti,ab.
58	(red adj1 flag*).ti,ab.

#	Searches
59	or/28-58
60	20 and 59
61	cohort analysis/
62	longitudinal study/
63	prospective study/
64	retrospective study/
65	follow up/
66	((follow up* or followup* or concurrent* or incidence* or population*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
67	(longitudinal* or prospective* or retrospective* or cohort*).ti,ab.
68	cross-sectional study/
69	((prevalence* or disease frequenc*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
70	cross sectional*.ti,ab.
71	or/61-70
72	60 and 71
73	systematic review/
74	meta-analysis/
75	(meta analy* or metanaly* or metaanaly*).ti,ab.
76	((systematic or evidence) adj2 (review* or overview*)).ti,ab.
77	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
78	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
79	(search* adj4 literature).ab.
80	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
81	((pool* or combined) adj2 (data or trials or studies or results)).ab.
82	cochrane.jw.
83	or/73-82
84	60 and 83
85	random*.ti,ab.
86	factorial*.ti,ab.
87	(crossover* or cross over*).ti,ab.
88	((doubl* or singl*) adj blind*).ti,ab.
89	(assign* or allocat* or volunteer* or placebo*).ti,ab.
90	crossover procedure/
91	single blind procedure/
92	randomized controlled trial/
93	double blind procedure/
94	or/85-93
95	60 and 94
96	"SENSITIVITY AND SPECIFICITY"/
97	receiver operating characteristic/
98	(sensitivity or specificity).ti,ab.
99	signal noise ratio/
100	((pre test or pretest or post test or posttest) adj probability).ti,ab.
101	likelihood ratio*.ti,ab.
102	STATISTICAL MODEL/
103	(ROC curve* or AUC).ti,ab.
104	diagnos*.ti.
105	(diagnos* adj2 (performance* or accurac* or utilit* or value* or efficien* or effectiveness)).ti,ab.
106	gold standard.ab.
107	*DIAGNOSTIC ACCURACY/ or DIAGNOSTIC TEST ACCURACY STUDY/
108	mass screening/
109	screening/ or screening test/
110	population surveillance/
111	((screening* or surveillance* or detection*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
112	or/96-111
113	60 and 112
114	27 or 72 or 84 or 95 or 113

Database: Emcare

Date of last search: 08/09/2022

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

#	Searches
5	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 sweepstak* 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	limit 12 to english language
14	limit 13 to yr="2000 -Current"
15	(letter.pt. or letter/ or note.pt. or editorial.pt. or case report/ or case study/ or (letter or comment*).ti.) not (randomized controlled trial/ or random*.ti,ab.)
16	14 not 15
17	(animal/ not human/) or nonhuman/ or exp Animal Experiment/ or exp Experimental Animal/ or animal model/ or exp Rodent/ or (rat or rats or mouse or mice).ti.
18	16 not 17
19	conference*.pt,su,so.
20	18 not 19
21	predictive value/
22	(predictive value* or PPV or NPV).ti,ab.
23	odds ratio/
24	hazard ratio/
25	((odds* or risk* or hazard* or incidence*) adj2 ratio*).ti,ab.
26	or/21-25
27	20 and 26
28	behavior/
29	addiction/
30	behavioral addiction/
31	exp computer addiction/
32	sexual addiction/
33	exp risk behavior/
34	impulsiveness/
35	compulsion/
36	problem behavior/
37	risk factor/
38	personality/
39	character/
40	psychometry/
41	comorbidity/
42	early diagnosis/
43	prognosis/
44	clinical feature/
45	etiology/
46	emotional regulation/
47	((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
48	((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
49	(case* adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*)).ti,ab.
50	((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) adj3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)).ti,ab.
51	((gaming* or internet* or online* or sex* or porn* or computer* or social media*) adj3 (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)).ti,ab.
52	((emotion* or inhibition*) adj3 (regulat* or dysregulat*)).ti,ab.
53	((presenting* or presentation* or hidden* or disguis* or predict* or causal*) adj3 factor*).ti,ab.
54	(clinical* adj3 (presentation* or presenting* or feature*)).ti,ab.
55	((sign* or symptom*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or

#	Searches
	detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*)).ti,ab.
56	(etiolog* or aetiolog*).ti,ab.
57	(warning* adj1 (symptom* or trigger* or sign*)).ti,ab.
58	(red adj1 flag*).ti,ab.
59	or/28-58
60	20 and 59
61	cohort analysis/
62	longitudinal study/
63	prospective study/
64	retrospective study/
65	follow up/
66	((follow up* or followup* or concurrent* or incidence* or population*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
67	(longitudinal* or prospective* or retrospective* or cohort*).ti,ab.
68	cross-sectional study/
69	((prevalence* or disease frequenc*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
70	cross sectional*.ti,ab.
71	or/61-70
72	60 and 71
73	systematic review/
74	meta-analysis/
75	(meta analy* or metanaly* or metaanaly*).ti,ab.
76	((systematic or evidence) adj2 (review* or overview*)).ti,ab.
77	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
78	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
79	(search* adj4 literature).ab.
80	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
81	((pool* or combined) adj2 (data or trials or studies or results)).ab.
82	cochrane.jw.
83	or/73-82
84	60 and 83
85	random*.ti,ab.
86	factorial*.ti,ab.
87	(crossover* or cross over*).ti,ab.
88	((doubl* or singl*) adj blind*).ti,ab.
89	(assign* or allocat* or volunteer* or placebo*).ti,ab.
90	crossover procedure/
91	single blind procedure/
92	randomized controlled trial/
93	double blind procedure/
94	or/85-93
95	60 and 94
96	"SENSITIVITY AND SPECIFICITY"/
97	receiver operating characteristic/
98	(sensitivity or specificity).ti,ab.
99	signal noise ratio/
100	((pre test or pretest or post test or posttest) adj probability).ti,ab.
101	likelihood ratio*.ti,ab.
102	STATISTICAL MODEL/
103	(ROC curve* or AUC).ti,ab.
104	diagnos*.ti.
105	(diagnos* adj2 (performance* or accurac* or utilit* or value* or efficien* or effectiveness)).ti,ab.
106	gold standard.ab.
107	*DIAGNOSTIC ACCURACY/ or DIAGNOSTIC TEST ACCURACY STUDY/
108	mass screening/
109	screening/ or screening test/
110	population surveillance/
111	((screening* or surveillance* or detection*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
112	or/96-111
113	60 and 112
114	27 or 72 or 84 or 95 or 113

Database: Epistemonikos

Date of last search: 08/09/2022

Search 1

#	Searches
	title:(Gamble* OR gambling*) AND (title:(predictive* OR ppv OR npv OR odds* OR risk* OR hazard* OR incidence* OR identify* OR identification* OR identifies* OR recognition* OR recognis* OR recogniz* OR detect* OR indication* OR indicator* OR profile* OR profiling* OR psychometric* OR pattern* OR characteristic* OR symptom* OR sign* OR observ* OR activit* OR trait* OR diagnos* OR refer* OR participat* OR triag* OR predict* OR determinant* OR moderator* OR mediator* OR relationship* OR likelihood* OR susceptib* OR prognos* OR compulsiv* OR impulsiv* OR etiolog* OR aetiolog* OR "red flag" OR "red flags" OR trigger* OR "clinical presentation" OR "clinical presentations" OR "clinical feature" OR "clinical features" OR hidden* OR disguis* OR prevalence* OR comorbid* OR ludoman* OR financial* OR debt* OR housing* OR criminal* OR employment* OR occupation* OR ecological* OR environment* OR demograph* OR population* OR violen* OR homeless* OR isolation* OR medication* OR screening*) OR abstract:(predictive* OR ppv OR npv OR odds* OR risk* OR hazard* OR incidence* OR identify* OR identification* OR identifies* OR recognition* OR recognis* OR recogniz* OR detect* OR indication* OR indicator* OR profile* OR profiling* OR psychometric* OR pattern* OR characteristic* OR symptom* OR sign* OR observ* OR activit* OR trait* OR diagnos* OR refer* OR participat* OR triag* OR predict* OR determinant* OR moderator* OR mediator* OR relationship* OR likelihood* OR susceptib* OR prognos* OR compulsiv* OR impulsiv* OR etiolog* OR aetiolog* OR "red flag" OR "red flags" OR trigger* OR "clinical presentation" OR "clinical presentations" OR "clinical feature" OR "clinical features" OR hidden* OR disguis* OR prevalence* OR comorbid* OR ludoman* OR financial* OR debt* OR housing* OR criminal* OR employment* OR occupation* OR ecological* OR environment* OR demograph* OR population* OR violen* OR homeless* OR isolation* OR medication* OR screening*))

Search 2

#	Searches
	(title:(betting 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 "gaming machines" OR "slot machines" OR "fruit machines" OR "poker machines" OR "lottery machines" OR "lotteries machines" OR "gaming terminals" OR "slot terminals" OR "fruit terminals" OR "poker terminals" OR "lottery terminals" OR "lotteries terminals" OR pokies OR pokey OR puggy OR fruities OR "loot box" OR "loot boxes" OR lootbox*) OR abstract:(betting 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 "gaming machines" OR "slot machines" OR "fruit machines" OR "poker machines" OR "lottery machines" OR "lotteries machines" OR "gaming terminals" OR "slot terminals" OR "fruit terminals" OR "poker terminals" OR "lottery terminals" OR "lotteries terminals" OR pokies OR pokey OR puggy OR fruities OR "loot box" OR "loot boxes" OR lootbox*)) AND (title:(predictive* OR ppv OR npv OR odds* OR risk* OR hazard* OR incidence* OR identify* OR identification* OR identifies* OR recognition* OR recognis* OR recogniz* OR detect* OR indication* OR indicator* OR profile* OR profiling* OR psychometric* OR pattern* OR characteristic* OR symptom* OR sign* OR observ* OR activit* OR trait* OR diagnos* OR refer* OR participat* OR triag* OR predict* OR determinant* OR moderator* OR mediator* OR relationship* OR likelihood* OR susceptib* OR prognos* OR compulsiv* OR impulsiv* OR etiolog* OR aetiolog* OR "red flag" OR "red flags" OR trigger* OR "clinical presentation" OR "clinical presentations" OR "clinical feature" OR "clinical features" OR hidden* OR disguis* OR prevalence* OR comorbid* OR ludoman* OR financial* OR debt* OR housing* OR criminal* OR employment* OR occupation* OR ecological* OR environment* OR demograph* OR population* OR violen* OR homeless* OR isolation* OR medication* OR screening*) OR abstract:(predictive* OR ppv OR npv OR odds* OR risk* OR hazard* OR incidence* OR identify* OR identification* OR identifies* OR recognition* OR recognis* OR recogniz* OR detect* OR indication* OR indicator* OR profile* OR profiling* OR psychometric* OR pattern* OR characteristic* OR symptom* OR sign* OR observ* OR activit* OR trait* OR diagnos* OR refer* OR participat* OR triag* OR predict* OR determinant* OR moderator* OR mediator* OR relationship* OR likelihood* OR susceptib* OR prognos* OR compulsiv* OR impulsiv* OR etiolog* OR aetiolog* OR "red flag" OR "red flags" OR trigger* OR "clinical presentation" OR "clinical presentations" OR "clinical feature" OR "clinical features" OR hidden* OR disguis* OR prevalence* OR comorbid* OR ludoman* OR financial* OR debt* OR housing* OR criminal* OR employment* OR occupation* OR ecological* OR environment* OR demograph* OR population* OR violen* OR homeless* OR isolation* OR medication* OR screening*))

Database: Health Information Management Consortium (HMIC)

Date of last search: 08/09/2022

#	Searches
1	gambl*.ti,ab.
2	gambl*.hw.
3	betting.ti,ab.
4	betting*.hw.
5	bets.ti,ab.
6	bets*.hw.
7	wager*.ti,ab.
8	wager*.hw.
9	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? or terminal?)).ti,ab.
10	((gaming* or gambling* or slot* or fruit* or poker* or lottery* or lotteries*) and (machine* or terminal*)).hw.
11	(pokies or pokey or puggy or fruities).ti,ab.
12	(pokies* or pokey* or puggy* or fruities*).hw.
13	((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 sweepstak* 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*

#	Searches
	or loss or losses or lose)).ti,ab.
14	((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 sweepstak* or amusement arcade* or slot*) and (money* or monetization* or monetisation* or monetary* or currency* or currencies* or cryptocurrency* or cryptocurrencies* or reward* or win* or loss* or lose*)).hw.
15	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
16	((game* or gaming* or gamer*) and (money* or monetization* or monetisation* or monetary*)).hw.
17	(loot box* or lootbox*).ti,ab.
18	(loot box* or lootbox*).hw.
19	or/1-18
20	limit 19 to yr="2000 -Current"
21	(predictive value* or PPV or NPV).ti,ab.
22	(predictive value* or PPV or NPV).hw.
23	((odds* or risk* or hazard* or incidence*) adj2 ratio*).ti,ab.
24	((odds* or risk* or hazard* or incidence*) and ratio*).hw.
25	or/21-24
26	20 and 25
27	((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
28	((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) and (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).hw.
29	((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
30	((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) and (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).hw.
31	(case* adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*)).ti,ab.
32	(case* and (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*)).hw.
33	((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) adj3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)).ti,ab.
34	((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) and (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)).hw.
35	((gaming* or internet* or online* or sex* or porn* or computer* or social media*) adj3 (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)).ti,ab.
36	((gaming* or internet* or online* or sex* or porn* or computer* or social media*) and (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)).hw.
37	((emotion* or inhibition*) adj3 (regulat* or dysregulat*)).ti,ab.
38	((emotion* or inhibition*) and (regulat* or dysregulat*)).hw.
39	((presenting* or presentation* or hidden* or disguis* or predict* or causal*) adj3 factor*).ti,ab.
40	((presenting* or presentation* or hidden* or disguis* or predict* or causal*) and factor*).hw.
41	(clinical* adj3 (presentation* or presenting* or feature*)).ti,ab.
42	(clinical* and (presentation* or presenting* or feature*)).hw.
43	((sign* or symptom*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*)).ti,ab.
44	((sign* or symptom*) and (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*)).hw.
45	(etiolog* or aetiolog*).ti,ab.
46	(etiolog* or aetiolog*).hw.
47	(warning* adj1 (symptom* or trigger* or sign*)).ti,ab.
48	(warning* and (symptom* or trigger* or sign*)).hw.

#	Searches
49	(red adj1 flag*).ti,ab.
50	(red* and flag*).hw.
51	or/27-50
52	20 and 51
53	26 or 52

Database: International Health Technology Assessment Database (INAHTA)

Date of last search: 08/09/2022

#	Searches
1	"Gambling"[mh]
2	(betting or bets)[abs]
3	(betting or bets)[title]
4	(dice or "card game" or "card games" or roulette or blackjack or poker or baccarat or crap or craps or keno or casino or casinos or bingo or bookmaker* or "book maker" or bookie* or lottery or lotteries or lotto or "scratch card" or "scratch cards" or scratchcard* or raffle or raffles or sweepstak* or "amusement arcade" or "amusement arcades" or "slot machine" or "slot machines" or cryptocurrenc*)[abs]
5	(dice or "card game" or "card games" or roulette or blackjack or poker or baccarat or crap or craps or keno or casino or casinos or bingo or bookmaker* or "book maker" or bookie* or lottery or lotteries or lotto or "scratch card" or "scratch cards" or scratchcard* or raffle or raffles or sweepstak* or "amusement arcade" or "amusement arcades" or "slot machine" or "slot machines" or cryptocurrenc*)[title]
6	(gambl*)[abs]
7	(gambl*)[title]
8	(gaming or gamer or gamers)[abs]
9	(gaming or gamer or gamers)[title]
10	(loot box* or lootbox*)[abs]
11	(loot box* or lootbox*)[title]
12	(pokies or pokey or puggy or fruities)[abs]
13	(pokies or pokey or puggy or fruities)[title]
14	(wager*)[abs]
15	(wager*)[title]
16	#15 OR #14 OR #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1
17	FROM 2000 TO 2022

Database: MEDLINE ALL

Date of last search: 08/09/2022

#	Searches
1	GAMBLING/
2	gambl*.ti,ab.
3	betting.ti,ab.
4	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 sweepstak* 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	limit 11 to english language
13	limit 12 to yr="2000 -Current"
14	(letter/ or editorial/ or news/ or exp historical article/ or anecdotes as topic/ or comment/ or case report/ or (letter or comment*).ti.) not (randomized controlled trial/ or random*.ti,ab.)
15	13 not 14
16	(animals/ not humans/) or exp Animals, Laboratory/ or exp Animal Experimentation/ or exp Models, Animal/ or exp Rodentia/ or (rat or rats or mouse or mice).ti.
17	15 not 16
18	Predictive Value of Tests/
19	(predictive value* or PPV or NPV).ti,ab.
20	Odds ratio/
21	((odds* or risk* or hazard* or incidence*) adj2 ratio*).ti,ab.
22	or/18-21
23	17 and 22
24	behavioral symptoms/
25	behavior, addictive/

#	Searches
26	exp Technology Addiction/
27	impulsive behavior/
28	compulsive behavior/
29	problem behavior/
30	risk taking/
31	risk factors/
32	personality/
33	character/
34	psychometrics/
35	comorbidity/
36	Early Diagnosis/
37	Prognosis/
38	emotional regulation/
39	((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
40	((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
41	(case* adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*)).ti,ab.
42	((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) adj3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)).ti,ab.
43	((gaming* or internet* or online* or sex* or porn* or computer* or social media*) adj3 (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)).ti,ab.
44	((emotion* or inhibition*) adj3 (regulat* or dysregulat*)).ti,ab.
45	((presenting* or presentation* or hidden* or disguis* or predict* or causal*) adj3 factor*).ti,ab.
46	(clinical* adj3 (presentation* or presenting* or feature*)).ti,ab.
47	((sign* or symptom*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*)).ti,ab.
48	(etiolog* or aetiolog*).ti,ab.
49	(warning* adj1 (symptom* or trigger* or sign*)).ti,ab.
50	(red adj1 flag*).ti,ab.
51	or/24-50
52	17 and 51
53	exp Cohort studies/
54	((follow up* or followup* or concurrent* or incidence* or population*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
55	(longitudinal* or prospective* or retrospective* or cohort*).ti,ab.
56	Cross-Sectional Studies/
57	((prevalence* or disease frequenc*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
58	cross sectional*.ti,ab.
59	or/53-58
60	52 and 59
61	Meta-Analysis/
62	Meta-Analysis as Topic/
63	(meta analy* or metanaly* or metaanaly*).ti,ab.
64	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
65	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
66	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
67	(search* adj4 literature).ab.
68	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
69	cochrane.jw.
70	or/61-69
71	52 and 70
72	randomized controlled trial.pt.
73	controlled clinical trial.pt.
74	pragmatic clinical trial.pt.
75	randomi#ed.ab.
76	placebo.ab.
77	randomly.ab.
78	Clinical Trials as topic/

#	Searches
79	trial.ti.
80	or/72-79
81	52 and 80
82	"SENSITIVITY AND SPECIFICITY"/ or ROC Curve/ or Signal-To-Noise Ratio/
83	(sensitivity or specificity).ti,ab.
84	((pre test or pretest or post test or posttest) adj probability).ti,ab.
85	likelihood ratio*.ti,ab.
86	LIKELIHOOD FUNCTIONS/
87	(ROC curve* or AUC).ti,ab.
88	diagnos*.ti.
89	(diagnos* adj2 (performance* or accurac* or utilit* or value* or efficien* or effectiveness)).ti,ab.
90	gold standard.ab.
91	di.fs.
92	Mass screening/
93	exp population surveillance/
94	((screening* or surveillance* or detection*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
95	or/82-94
96	52 and 95
97	23 or 60 or 71 or 81 or 96

Database: PsycInfo

Date of last search: 08/09/2022

#	Searches
1	GAMBLING/
2	GAMBLING DISORDER/
3	gambl*.ti,ab.
4	betting.ti,ab.
5	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 sweepstak* 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	limit 12 to english language
14	limit 13 to yr="2000 -Current"
15	((letter or editorial or comment reply).dt. or case report/ or (letter or comment*).ti.) not (exp randomized controlled trial/ or random*.ti,ab.)
16	14 not 15
17	animal.po. or (rat or rats or mouse or mice).ti.
18	16 not 17
19	dissertation*.pt.
20	18 not 19
21	"Predictability (Measurement)"/
22	(predictive value* or PPV or NPV).ti,ab.
23	((odds* or risk* or hazard* or incidence*) adj2 ratio*).ti,ab.
24	or/21-23
25	20 and 24
26	behavior/
27	addiction/
28	internet addiction/
29	sexual addiction/
30	risk taking/
31	impulsiveness/
32	compulsions/
33	behavior problems/
34	risk factors/
35	personality/ or persona/ or personality traits/
36	psychometrics/
37	comorbidity/
38	prognosis/
39	symptoms/
40	etiology/

#	Searches
41	emotional regulation/
42	((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
43	((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
44	(case* adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*)).ti,ab.
45	((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) adj3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)).ti,ab.
46	((gaming* or internet* or online* or sex* or porn* or computer* or social media*) adj3 (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)).ti,ab.
47	((emotion* or inhibition*) adj3 (regulat* or dysregulat*)).ti,ab.
48	((presenting* or presentation* or hidden* or disguis* or predict* or causal*) adj3 factor*).ti,ab.
49	(clinical* adj3 (presentation* or presenting* or feature*)).ti,ab.
50	((sign* or symptom*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*)).ti,ab.
51	(etiolog* or aetiolog*).ti,ab.
52	(warning* adj1 (symptom* or trigger* or sign*)).ti,ab.
53	(red adj1 flag*).ti,ab.
54	or/26-53
55	20 and 54
56	cohort analysis/
57	longitudinal studies/
58	prospective studies/
59	retrospective studies/
60	followup studies/
61	(longitudinal study or followup study or prospective study or retrospective study).md.
62	((follow up* or followup* or concurrent* or incidence* or population*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
63	(longitudinal* or prospective* or retrospective* or cohort*).ti,ab.
64	((prevalence* or disease frequenc*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
65	cross sectional*.ti,ab.
66	or/56-65
67	55 and 66
68	(meta analysis or "systematic review").md.
69	META ANALYSIS/
70	SYSTEMATIC REVIEW/
71	(meta analy* or metanaly* or metaanaly*).ti,ab.
72	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
73	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
74	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
75	(search* adj4 literature).ab.
76	cochrane.jw.
77	((pool* or combined) adj2 (data or trials or studies or results)).ab.
78	(medline or pubmed or cochrane or embase or psychlit or psyclit or cinahl or science citation index or bids or cancerlit).ab.
79	or/68-78
80	55 and 79
81	clinical trial.md.
82	Clinical trials/
83	Randomized controlled trials/
84	Randomized clinical trials/
85	assign*.ti,ab.
86	allocat*.ti,ab.
87	crossover*.ti,ab.
88	cross over*.ti,ab.
89	((doubl* or singl*) adj blind*).ti,ab.
90	factorial*.ti,ab.
91	placebo*.ti,ab.
92	random*.ti,ab.

#	Searches
93	volunteer*.ti,ab.
94	trial?.ti,ab.
95	or/81-94
96	55 and 95
97	TEST SENSITIVITY/
98	TEST SPECIFICITY/
99	MAXIMUM LIKELIHOOD/
100	(sensitivity or specificity).ti,ab.
101	((pre test or pretest or post test or posttest) adj probability).ti,ab.
102	likelihood ratio*.ti,ab.
103	(ROC curve* or AUC).ti,ab.
104	diagnos*.ti.
105	(diagnos* adj2 (performance* or accurac* or utilit* or value* or efficien* or effectiveness)).ti,ab.
106	gold standard.ab.
107	screening/ or screening tests/
108	((screening* or surveillance* or detection*) adj3 (study* or studies* or analy* or observation* or design* or method* or research*)).ti,ab.
109	or/97-108
110	55 and 109
111	25 or 67 or 80 or 96 or 110

Database: Social Care Online

Date of last search: 08/09/2022

Search 1

#	Searches
1	Subject heading: "gambling"
2	All fields: predictive* or ppv or npv or odds* or risk* or hazard* or incidence* or identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos* or compulsiv* or impulsiv* or etiolog* or aetiolog* or "red flag" or "red flags" or trigger* or "clinical presentation" or "clinical presentations" or "clinical feature" or "clinical features" or hidden* or disguis* or cohort* or longitudinal* or prospective* or retrospective* or "cross sectional*" or prevalence* or comorbid* or ludoman* or screening* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*
3	Publication Year: 2000-2022
4	1 AND 2 AND 3

Search 2

#	Searches
1	All fields: gamble* or gambling* or betting 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 "gaming machines" or "slot machines" or "fruit machines" or "poker machines" or "lottery machines" or "lotteries machines" or "gaming terminals" or "slot terminals" or "fruit terminals" or "poker terminals" or "lottery terminals" or "lotteries terminals" or pokies or pokey or puggy or fruities or "loot box" or "loot boxes" or lootbox*
2	All fields: predictive* or ppv or npv or odds* or risk* or hazard* or incidence* or identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos* or compulsiv* or impulsiv* or etiolog* or aetiolog* or "red flag" or "red flags" or trigger* or "clinical presentation" or "clinical presentations" or "clinical feature" or "clinical features" or hidden* or disguis* or cohort* or longitudinal* or prospective* or retrospective* or "cross sectional*" or prevalence* or comorbid* or ludoman* or screening* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*
3	Publication Year: 2000-2022
4	1 AND 2 AND 3

Database: Social Science Citation Index (SSCI)

Date of last search: 08/09/2022

#	Searches
	1: TI=(Gamble* or gambling* or betting 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 "gaming machines" or "slot machines" or "fruit machines" or "poker machines" or "lottery machines" or "lotteries machines" or "gaming terminals" or "slot terminals" or "fruit terminals" or "poker terminals" or "lottery terminals" or "lotteries terminals" or pokies or pokey or puggy or fruities or "loot box" or "loot boxes" or lootbox* or roulette or blackjack or poker or baccarat or crap or craps or keno or casino* or bingo* or

#	Searches
	"scratch cards" or "scratch card" or scratchcard or "amusement arcade" or "amusement arcades" or cryptocurrency* or cryptocurrencies) 2: TI=(predictive value* or PPV or NPV) Results: 16639 3: AB=(predictive value* or PPV or NPV) 4: TI=((odds* or risk* or hazard* or incidence*) near/2 ratio*) 5: #2 OR #3 OR #4 6: #5 AND #1 7: TI=(etiolog* OR aetiolog* OR "red flag" OR "red flags" OR "clinical presentation" OR "clinical presentations" OR "clinical feature" OR "clinical features" OR symptom* OR "trigger warning" or "trigger warnings") 8: AB=(etiolog* OR aetiolog* OR "red flag" OR "red flags" OR "clinical presentation" OR "clinical presentations" OR "clinical feature" OR "clinical features" OR "trigger warning" or "trigger warnings") Results: 394051 9: TI=(case* NEAR/3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or screen* or pattern* or characteristic* or symptom* or sign* or predict* or determinant* or hidden* or disguis* or trigger* or likelihood* or susceptib* or profile* or profiling* or psychometric* or pattern* or triag* or trait* or determinant* or moderator* or mediator* or referral* or detect* or prognos* or prevalence* or comorbid* or ludoman* or diagnos*)) 10: TI=(risk* NEAR/3 (identify* or identification* or identifies* or recognition* OR recognis* or recogniz* or detect* or predict* or screen* or diagnos* or prevalence* or behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or impulsiv* or compulsiv* or hidden* or disguis* or detect* or prognos* or prevalence* or comorbid* or ludoman* or diagnos*)) 11: TI=((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) near/3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)) 12: TI=((behaviour* or behavior* or emotion* or mental* or personalit* or psycho*) near/3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict* or screen* or diagnos* or prevalence* or impulsiv* or compulsiv* or hidden* or disguis* or detect* or prognos* or prevalence* or comorbid* or ludoman* or diagnos*)) 13: #7 OR #8 OR #9 OR #10 OR #11 OR #12 14: #13 AND #1 15: TI=(longitudinal* or prospective* or retrospective* or cohort* or followup* or "follow up" or concurrent* or incidence* or population* or prevalence* or cross sectional* or meta analy* or metanaly* or metaanaly* or systematic* or review* or trial* or random* or placebo* or sensitivity* or specificity* or diagnos* or ROC or AUC or screening* or surveillance* or detection* or pretest* or posttest*) 16: #14 AND #15 17: #16 OR #6 18: LA=(English) 19: #17 AND #18 20: PY=(2000-2022) 21: #20 AND #19 22: #20 AND #19 and Article or Review Article or Early Access (Document Types)

Database: Social Policy and Practice (SPP)

Date of last search: 08/09/2022

#	Searches
1	gambl*.ti,ab.
2	gambl*.hw.
3	betting.ti,ab.
4	betting*.hw.
5	bets.ti,ab.
6	bets*.hw.
7	wager*.ti,ab.
8	wager*.hw.
9	((gaming or gambling or slot or fruit or poker or lottery or lotteries) adj5 (machine? or terminal?)).ti,ab.
10	((gaming* or gambling* or slot* or fruit* or poker* or lottery* or lotteries*) and (machine* or terminal*)).hw.
11	(pokies or pokey or puggy or fruities).ti,ab.
12	(pokies* or pokey* or puggy* or fruities*).hw.
13	((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 sweepstak* 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.
14	((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 sweepstak* or amusement arcade* or slot*) and (money* or monetization* or monetisation* or monetary* or currency* or currencies* or cryptocurrency* or cryptocurrencies* or reward* or win* or loss* or lose*)).hw.
15	((game or games or gaming or gamer?) adj5 (money or monetization or monetisation or monetary)).ti,ab.
16	((game* or gaming* or gamer*) and (money* or monetization* or monetisation* or monetary*)).hw.
17	(loot box* or lootbox*).ti,ab.
18	(loot box* or lootbox*).hw.
19	or/1-18

#	Searches
20	limit 19 to yr="2000 -Current"
21	(predictive value* or PPV or NPV).ti,ab.
22	(predictive value* or PPV or NPV).hw.
23	((odds* or risk* or hazard* or incidence*) adj2 ratio*).ti,ab.
24	((odds* or risk* or hazard* or incidence*) and ratio*).hw.
25	or/21-24
26	20 and 25
27	((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
28	((behaviour* or behavior* or emotion* or mental* or personalit* or psycho* or ludoman* or comorbid*) and (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).hw.
29	((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).ti,ab.
30	((impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsiv* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*) and (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or psychometric* or pattern* or characteristic* or symptom* or sign* or observ* or activit* or trait* or diagnos* or refer* or participat* or triag* or predict* or determinant* or moderator* or mediator* or relationship* or likelihood* or susceptib* or prognos*)).hw.
31	(case* adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*)).ti,ab.
32	(case* and (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or predict*)).hw.
33	((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) adj3 (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)).ti,ab.
34	((social* or financial* or debt* or housing* or criminal* or employment* or occupation* or ecological* or environment* or demograph* or population* or violen* or homeless* or isolation* or medication*) and (indication* or indicator* or profile* or profiling* or pattern* or characteristic* or predict* or determinant* or moderator* or mediator*)).hw.
35	((gaming* or internet* or online* or sex* or porn* or computer* or social media*) adj3 (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)).ti,ab.
36	((gaming* or internet* or online* or sex* or porn* or computer* or social media*) and (impulsiv* or harmful* or risk* or disorder* or problem* or pathologic* or compulsive* or compulsion* or addict* or excess* or repetitive* or dependenc* or overdependen* or dysfunction*)).hw.
37	((emotion* or inhibition*) adj3 (regulat* or dysregulat*)).ti,ab.
38	((emotion* or inhibition*) and (regulat* or dysregulat*)).hw.
39	((presenting* or presentation* or hidden* or disguis* or predict* or causal*) adj3 factor*).ti,ab.
40	((presenting* or presentation* or hidden* or disguis* or predict* or causal*) and factor*).hw.
41	(clinical* adj3 (presentation* or presenting* or feature*)).ti,ab.
42	(clinical* and (presentation* or presenting* or feature*)).hw.
43	((sign* or symptom*) adj3 (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*)).ti,ab.
44	((sign* or symptom*) and (identify* or identification* or identifies* or recognition* or recognis* or recogniz* or detect* or indication* or indicator* or profile* or profiling* or pattern* or characteristic* or refer* or diagnos*)).hw.
45	(etiolog* or aetiolog*).ti,ab.
46	(etiolog* or aetiolog*).hw.
47	(warning* adj1 (symptom* or trigger* or sign*)).ti,ab.
48	(warning* and (symptom* or trigger* or sign*)).hw.
49	(red adj1 flag*).ti,ab.
50	(red* and flag*).hw.
51	or/27-50
52	20 and 51
53	26 or 52

Additional searches: citation searching

Date of last search: 26/08/2022

Papers citing Allami were checked in Web of Science (comprising Science Citation Index Expanded (1990-present); Social Sciences Citation Index (1990-present); Arts & Humanities Citation Index (1990-present); Emerging Sources Citation Index (2017-present)):

Allami Y et al. (2021) A meta-analysis of problem gambling risk factors in the general adult population. Addiction,116(11): 2968-2977.

Additional searches: reference checking

Date of last search: 01/09/2022

Papers in the reference lists to Allami and Public Health England were checked in Web of Science (comprising Science Citation Index Expanded (1990-present); Social Sciences Citation Index (1990-present); Arts & Humanities Citation Index (1990-present); Emerging Sources Citation Index (2017-present)):

Allami Y et al. (2021) A meta-analysis of problem gambling risk factors in the general adult population. Addiction,116(11): 2968-2977.

Public Health England (2021) Risk factors for gambling and harmful gambling: an umbrella review. A review of systematic reviews and meta-analyses

Additional searches: websites

All websites listed in the protocol were searched and browsed.

Date of last search: 09/09/2022

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 financ* OR fee OR fees OR expenditure* OR saving* OR "value for money" OR "monetary value" OR "resourc* allocat*" OR "allocat* resourc*" 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 "nottingham health profile*" or "sickness impact profile*" or "health status indicator*" or "health utilit*" or "utilit* valu*" or "utilit* measur*" or "willingness to pay" or "standard gamble*" or "time trade off" or "time tradeoff" or "duke health profile" or "functional status questionnaire" or "dartmouth 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 sweepstak* or "amusement arcade*" or slot or slots) near/5 (money or monetization or monetisation or

#	Searches
	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	(financ* or fee or fees or expenditure* or saving*):ti,ab
#27	(value near/2 (money or monetary)):ti,ab
#28	resourc* allocat*: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
#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	"nottingham health profile*":ti,ab
#53	"sickness impact profile":ti,ab
#54	MeSH descriptor: [Health Status Indicators] explode all trees
#55	(health near/3 (utilit* or status)):ti,ab
#56	(utilit* near/3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or weight)):ti,ab
#57	(preference* near/3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or instrument or instruments)):ti,ab
#58	disutilit*: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

#	Searches
#68	"dartmouth 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 financ* OR fee OR fees OR expenditure* OR saving* OR "value for money" OR "monetary value" OR "resourc* allocat*" OR "allocat* resourc*" 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 "nottingham health profile*" or "sickness impact profile*" or "health status indicator*" or "health utilit*" or "utilit* valu*" or "utilit* measur*" or "willingness to pay" or "standard gamble*" or "time trade off" or "time tradeoff" or "duke health profile" or "functional status questionnaire" or "dartmouth 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.
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 sweepstak* 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 english 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/

#	Searches
38	budget*.ti,ab.
39	cost*.ti,ab.
40	(economic* or pharmaco?economic*).ti,ab.
41	(price* or pricing*).ti,ab.
42	(financ* or fee or fees or expenditure* or saving*).ti,ab.
43	(value adj2 (money or monetary)).ti,ab.
44	resourc* allocat*.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	nottingham health profile*.ti,ab,kw.
70	SICKNESS IMPACT PROFILE/
71	sickness impact profile.ti,ab,kw.
72	HEALTH STATUS INDICATOR/
73	(health adj3 (utilit* or status)).ti,ab,kw.
74	(utilit* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or weight)).ti,ab,kw.
75	(preference* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or instrument or instruments)).ti,ab,kw.
76	disutilit*.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	dartmouth 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.

#	Searches
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 sweepstak* 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 english 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	(financ* or fee or fees or expenditure* or saving*).ti,ab.
43	(value adj2 (money or monetary)).ti,ab.
44	resourc* allocat*.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.

#	Searches
68	NOTTINGHAM HEALTH PROFILE/
69	nottingham health profile*.ti,ab,kw.
70	SICKNESS IMPACT PROFILE/
71	sickness impact profile.ti,ab,kw.
72	HEALTH STATUS INDICATOR/
73	(health adj3 (utilit* or status)).ti,ab,kw.
74	(utilit* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or weight)).ti,ab,kw.
75	(preference* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or instrument or instruments)).ti,ab,kw.
76	disutilit*.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	dartmouth 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 Management Information Consortium (HMIC)

Date of last search: 04/04/2023

#	Searches
1	GAMBLING/
2	GAMBLERS/
3	GAMBLING MACHINES/
4	AMUSEMENT ARCADES/
5	CASINOS/
6	BOOKMAKERS/
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 sweepstak* 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	(financ* or fee or fees or expenditure* or saving*).ti,ab.
29	(value adj2 (money or monetary)).ti,ab.
30	resourc* allocat*.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/

#	Searches
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	nottingham health profile*.ti,ab.
56	sickness impact profile.ti,ab.
57	(health adj3 (utilit* or status)).ti,ab.
58	(utilit* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or weight)).ti,ab.
59	(preference* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or instrument or instruments)).ti,ab.
60	disutilit*.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.
69	functional status questionnaire.ti,ab.
70	dartmouth 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 and Medline-in-Process

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 sweepstak* 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

#	Searches
11	limit 10 to english 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	(financ* or fee or fees or expenditure* or saving*).ti,ab.
47	(value adj2 (money or monetary)).ti,ab.
48	resourc* allocat*.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	nottingham health profile*.ti,ab,kf.
74	sickness impact profile.ti,ab,kf.
75	exp HEALTH STATUS INDICATORS/

#	Searches
76	(health adj3 (utilit* or status)).ti,ab,kf.
77	(utilit* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or weight)).ti,ab,kf.
78	(preference* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or instrument or instruments)).ti,ab,kf.
79	disutilit*.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	dartmouth 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 sweepstak* 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
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 sweepstak* 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 english 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

#	Searches
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	(financ* or fee or fees or expenditure* or saving*).ti,ab.
34	(value adj2 (money or monetary)).ti,ab.
35	resourc* allocat*.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.
57	(quality of wellbeing or quality of well being or index of wellbeing or index of well being or qwb).ti,ab.
58	nottingham health profile*.ti,ab.
59	sickness impact profile.ti,ab.
60	(health adj3 (utilit* or status)).ti,ab.
61	(utilit* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or weight)).ti,ab.
62	(preference* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or instrument or instruments)).ti,ab.
63	disutilit*.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	dartmouth 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

#	Searches
	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

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 sweepstak* 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	(financ* or fee or fees or expenditure* or saving*).ti,ab.
16	(value adj2 (money or monetary)).ti,ab.
17	resourc* allocat*.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.
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	nottingham health profile*.ti,ab.
39	sickness impact profile.ti,ab.
40	(health adj3 (utilit* or status)).ti,ab.
41	(utilit* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or weight)).ti,ab.
42	(preference* adj3 (valu* or measur* or health or life or estimat* or elicit* or disease or score* or instrument or instruments)).ti,ab.
43	disutilit*.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.

#	Searches
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	dartmouth coop functional health assessment*.ti,ab.
54	or/21-53
55	10 and 20
56	10 and 54
57	55 or 56

Database: Social Sciences Citation Index

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 financ* OR fee OR fees OR expenditure* OR saving* OR "value for money" OR "monetary value" OR "resourc* allocat*" OR "allocat* resourc*" 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 "nottingham health profile*" or "sickness impact profile*" or "health status indicator*" or "health utilit*" or "utilit* valu*" or "utilit* measur*" or "willingness to pay" or "standard gamble*" or "time trade off" or "time tradeoff" or "duke health profile" or "functional status questionnaire" or "dartmouth coop functional health assessment*") (Title) Timespan: 2000-01-01 to 2022-03-24

Other sources

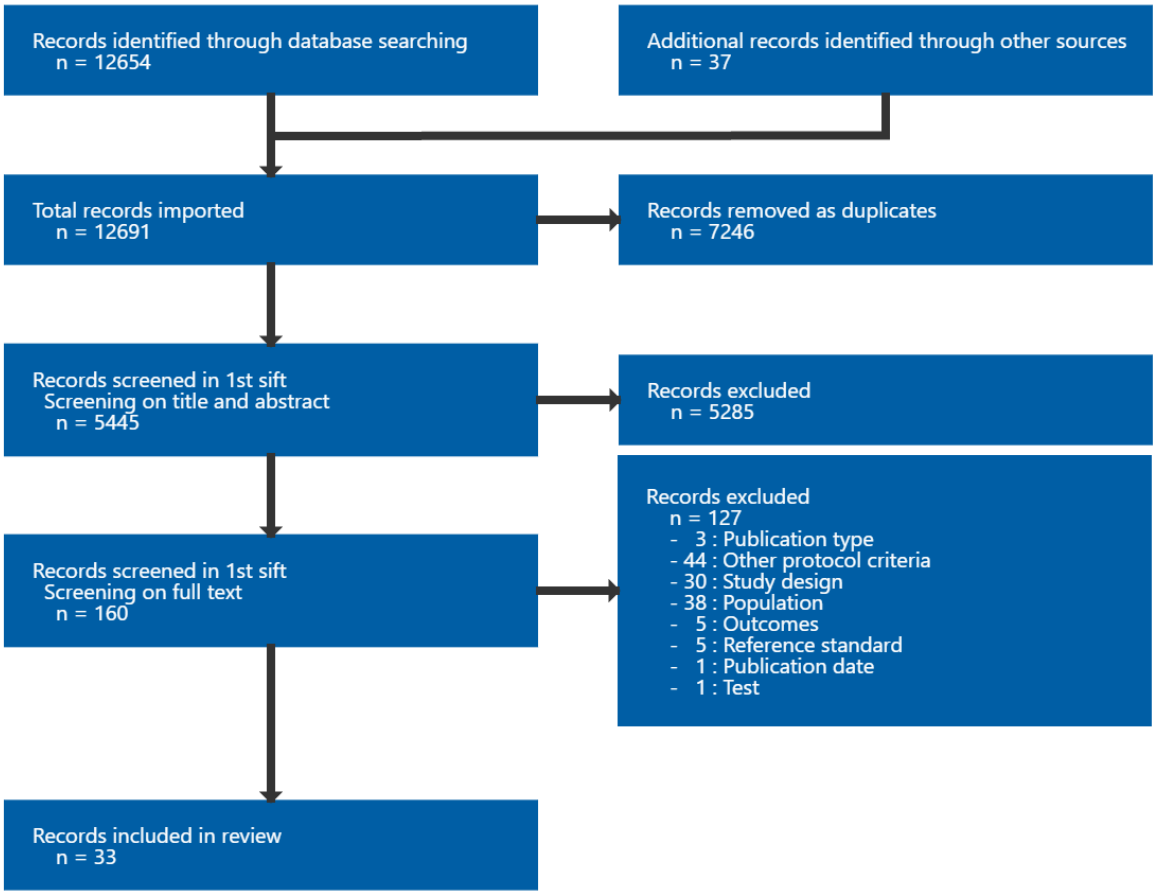
All websites listed in the protocol were searched and browsed.

Date of last search: 11/04/2023

Appendix C Diagnostic evidence study selection

Study selection for: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

Figure 1: Study selection flow chart



Appendix D Evidence tables

Evidence tables for review question: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

Table 15: Evidence tables

Abbott, 2005

Bibliographic Reference	Abbott, MW McKenna, BG (2005) Gambling and problem gambling among recently sentenced women in New Zealand prisons; Journal of Gambling Studies 21 (4): 559 - 581

Study details

Country/ies where study was carried out	New Zealand
Study dates	March – November 1999
Inclusion criteria	Participants had to: • Be female • Be prisoners serving the first 12 months of their sentence
Exclusion criteria	Not reported
Patient characteristics	N=94 women in a prison setting Age in years [Mean (SD)]: 30 (8) Sex (n): M=0, F=94 Ethnicity (%): • Maori: 67 • European: 30 • Other: 3

<table>
<tr><td></td><td>• Co-morbidities: Not reported.</td></tr>
<tr><td>Index test(s)</td><td>Criminality (measured using imprisonment)</td></tr>
<tr><td>Reference standard(s)</td><td>Revised SOGS</td></tr>
<tr><td>Duration of follow-up</td><td>• 6 months prior to imprisonment
• Lifetime</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr>
<tr><td colspan="4">≥3 SOGS-R probable pathological gambling only – 6 months prior to imprisonment</td></tr>
<tr><td>Criminality (n)</td><td>21</td><td>73</td><td>22.3 (15.1-31.8)</td></tr>
<tr><td colspan="4">≥5 SOGS-R probable pathological gambling only – lifetime</td></tr>
<tr><td>Criminality (n)</td><td>31</td><td>63</td><td>33.0 (24.3-43.0)</td></tr>
<tr><td colspan="4">≥3 SOGS-R probable pathological gambling + problem gambling – 6 months prior to imprisonment</td></tr>
<tr><td>Criminality (n)</td><td>32</td><td>62</td><td>34.0 (25.3-44.1)</td></tr>
<tr><td colspan="4">≥5 SOGS-R probable pathological gambling + problem gambling – lifetime</td></tr>
<tr><td>Criminality (n)</td><td>42</td><td>52</td><td>44.7 (35.0-54.7)</td></tr>
<tr><td colspan="4">Self-report problem gambling – 6 months prior to imprisonment</td></tr>
<tr><td>Criminality (n)</td><td>11</td><td>83</td><td>11.7 (6.7-19.8)</td></tr>
<tr><td colspan="4">Self-report problem gambling – lifetime</td></tr>
<tr><td>Criminality (n)</td><td>20</td><td>74</td><td>21.3 (14.2-30.6)</td></tr>
</table>
</td></tr>
<tr><td>Sources of funding</td><td>Any industry funding (Undistributed profits of the Lotteries Commission (via Minister of Internal Affairs) and Problem Gambling Committee)</td></tr>
</table>

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in prison services
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Unclear (Unclear interval between index test [criminality] and reference standard)

Adamson, 2006

Bibliographic Reference: Adamson, Simon J; Todd, Fraser C; Sellman, J Douglas; Huriwai, Terry; Porter, Joel; Coexisting psychiatric disorders in a New Zealand outpatient alcohol and other drug clinical population.; The Australian and New Zealand journal of psychiatry; 2006; vol. 40 (no. 2); 164-70

Study details

Country/ies where study was carried out	New Zealand
Study dates	Not reported
Inclusion criteria	Not reported

Exclusion criteria	• Aged less than 17 years • Deemed too psychiatrically unwell or cognitively impaired to understand and tolerate the interview procedure • Serving a term of imprisonment at the time of assessment • Living more than 50km away from the clinic
Patient characteristics	N=105 adults using community alcohol and drug services Age in years [Mean (SD)]: 32.7 (10.6) Sex (n): M=71, F=34 Ethnicity (%): • New Zealand/Pakeha: 75 • Maori: 20 • Other: 10 Co-morbidities (n): • Major depressive episode, single episode: 11 • Major depressive episode, recurrent: 25 • Bipolar I disorder: 12 • Dysthymic disorder: 9 • Substance induced mood disorder: 8 • Obsessive compulsive disorder: 21 • Post-traumatic stress disorder: 33 • Panic disorder without agoraphobia: 4 • Panic disorder with agoraphobia: 14 • Agoraphobia without history of panic disorder: 8 • Social phobia: 33 • Generalised anxiety disorder: 1 • Specific phobia: 23 • Any mood disorder: 56 • Any anxiety disorder: 68 • Any mood/anxiety/eating disorder: 78

	• Antisocial personality disorder: 28
Index test(s)	• DSM-IV Axis I diagnoses (measured using the Composite International Diagnostic Interview (CIDI-Auto). Sections utilised for this study were phobic disorders, depressive disorders, bipolar disorder, eating disorders, alcohol use disorders, substance related disorders, obsessive compulsive disorder, and posttraumatic stress disorder) ○ Past 6 months alcohol and other drug use (measured using modified timeline follow-back procedure)
Reference standard(s)	SOGS
Duration of follow-up	Not reported
Outcomes	

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
SOGS probable pathological gambling (>5) – current			
Past 6-months alcohol and other drug use (n)	12	93	11.4 (6.7-18.9)

Sources of funding	No industry funding (Alcohol Advisory Council)

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in alcohol and other drug addiction services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (No information on whether reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)

Section	Question	Answer
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Unclear (Unclear whether an appropriate interval between index test and reference standard)

ANPAA, 2011

Bibliographic Reference	ANPAA; Nalpas, Bertrand; Yguel, Jacques; Fleury, Benoit; Martin, Sandrine; Jarraud, Delphine; Craplet, Michel; Pathological gambling in treatment-seeking alcoholics: a national survey in France.; Alcohol and alcoholism (Oxford, Oxfordshire); 2011; vol. 46 (no. 2); 156-60

Study details

Country/ies where study was carried out	France
Study dates	March 2009
Inclusion criteria	Participants had to: • Be currently attending a treatment centre belonging to Association Nationale de Prévention en Alcoologie et Addictologie (ANPAA)
Exclusion criteria	• Not completing all survey sections
Patient characteristics	N=2790 adults using addiction treatment centres Age in years [Mean (SD)]: 42.6 (11.8) Sex (n): M=2034, F=756 Ethnicity: Not reported. Co-morbidities (reported as reason for attendance) (n): • Alcohol: 2159 • Tobacco: 134

	• Illicit drug: 338 • Pathological gambling: 17 • Other: 142
Index test(s)	Alcohol and other drug co-addiction: • Alcohol disorder (measured using alcohol use disorders identification test [AUDIT]) • Addiction disorder data (measured using type of drug or behaviour motivating attendance at treatment centre)
Reference standard(s)	DEBA-jeu: contains 6 questions derived from DSM-IV-TR diagnostic criteria for harmful gambling and SOGS. Each answer is scored from 0-4 with scores of 1 or less denoting an absence of gambling (green light), score of 2-5 denoting moderate problem (yellow light), and score 6-24 denoting serious problem (red light).
Duration of follow-up	Not reported
Outcomes	

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
DEBA-jeu pathological gambling red light only (≥6) – time period not reported			
Alcohol and other drug co-addiction (n)	168	2420	6.5 (5.6-7.5)
DEBA-jeu pathological gambling yellow + red lights (≥2) – time period not reported			
Alcohol and other drug co-addiction (n)	478	2110	18.5 (17.0-20.0)

Sources of funding	No industry funding (Associations Addictions France)

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in alcohol and other drug addiction services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low

Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Unclear (Not all participants received reference standard [151/2773 did not] and were subsequently not included in analysis)

Baldo, 2006

Bibliographic Reference	Baldo, V; Cristofoletti, M; Majori, S; Cibin, M; Peron, C; Dal Zotto, A; Zampieri, N; Saia, M; Trivello, R; Relationship between pathological gambling, alcoholism and drug addiction.; Annali di igiene : medicina preventiva e di comunita; 2006; vol. 18 (no. 2); 147-53

Study details

Country/ies where study was carried out	Italy
Study dates	September – December 2001
Inclusion criteria	Participants had to: • Attend drug or alcohol addiction treatment program • Remain in treatment for at least 1 month
Exclusion criteria	Not reported
Patient characteristics	N=113 adults using health services for addiction treatment Age in years [Mean (SD)]: 49.8 (SD not reported) Sex (n): M=89, F=24 Ethnicity: Not reported.

	Co-morbidities: Not reported.
Index test(s)	Alcohol and other drug co-addiction (measured using attendance to drug or alcohol treatment programme)
Reference standard(s)	SOGS
Duration of follow-up	Not reported
Outcomes	<table><tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr><tr><td colspan="4">SOGS pathological gambling (≥5) – time period not reported</td></tr><tr><td>Alcohol and drug co-addiction (n)</td><td>17</td><td>96</td><td>15.0 (9.6-22.8)</td></tr></table>
Sources of funding	Unclear funding source (Funding not reported).

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in alcohol and other drug addiction services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Unclear (Lack of information provided on how people were referred to drug or alcohol addiction treatment programme)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard:	Is there concern that the target condition as defined by the reference standard does not match the review	Low

Section	Question	Answer
applicability	question?	
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Beaudette, 2016

Bibliographic Reference	Beaudette, J.N.; Stewart, L.A.; National Prevalence of Mental Disorders among Incoming Canadian Male Offenders; Canadian Journal of Psychiatry; 2016; vol. 61 (no. 10); 624-632

Study details

Country/ies where study was carried out	Canada
Study dates	March 2012 – September 2014
Inclusion criteria	Participants had to: • Be male • Be admitted to the Correctional Service of Canada
Exclusion criteria	Offenders that were: • Immediately placed in segregation • Receiving treatment in hospital • Assessed as a security risk • A high-profile offender
Patient characteristics	N=1110 adults in a correctional (prison) service Age in years: Not reported. Sex: Not reported. Ethnicity: Not reported. Co-morbidities (n):

	• Alcohol and substance abuse: 551 • Antisocial personality disorder: 490 • Anxiety disorder: 327 • Meeting diagnostic criteria for at least 1 mental health disorder in their lifetime: 899 • Meeting diagnostic criteria for current disorder: 810
Index test(s)	Criminality (measured using imprisonment)
Reference standard(s)	Structured Clinical Interview for DSM Axis I Disorder (SCID-I): Semi-structured interview designed to determine DSM-IV Axis I disorders assessing mood, psychotic, substance use, anxiety, eating, and pathological gambling as an optional module.
Duration of follow-up	Patients assessed during 6-month period.
Outcomes	

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
SCID-1* pathological gambling - current			
Criminality (n)	65	1065	5.8 (4.5-7.3)
SCID-I* pathological gambling - lifetime			
Criminality (n)	110	1000	9.9 (8.3-11.8)
* Structured Clinical Interview for DSM Axis 1 Diagnosis. Pathological gambling included as an optional module			

Sources of funding	No industry funding (No funding received).

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in prison systems)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low

Section	Question	Answer
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Bergamini, 2018

Bibliographic Reference	Bergamini, A.; Turrina, C.; Bettini, F.; Toccagni, A.; Valsecchi, P.; Sacchetti, E.; Vita, A.; At-risk gambling in patients with severe mental illness: Prevalence and associated features; Journal of Behavioral Addictions; 2018; vol. 7 (no. 2); 348-354

Study details

Country/ies where study was carried out	Italy
Study dates	Not reported
Inclusion criteria	Participants had to: • Be aged 18-70 • Have an IQ >70 • Be able to understand spoken Italian
Exclusion criteria	Not reported
Patient characteristics	N=900 adults in a psychiatric unit Age in years [Mean (SD)]: 48.7 (13.7) Sex (n): M=483, F=417

<table>
<tr><td></td><td>Ethnicity (n): Not reported, race (n):
• Caucasians: 868
• Others: 32

Co-morbidities (reported as diagnoses) (n):
• Schizophrenia and related psychosis: 344
• Unipolar depression: 179
• Bipolar disorder: 103
• Cluster B personality: 183
• Anxiety disorder: 59
• Others: 32</td></tr>
<tr><td>Index test(s)</td><td>Major Axis I psychiatric disorders (measured using the Mini International Neuropsychiatric Interview (MINI) in DSM-IV and ICD-10)</td></tr>
<tr><td>Reference standard(s)</td><td>CPGI</td></tr>
<tr><td>Duration of follow-up</td><td>Not reported</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr>
<tr><td colspan="4">CPGI low + moderate + problem gambling (≥1) – time period not reported</td></tr>
<tr><td>Primary diagnosis of major psychiatric disorder (MINI) (n)</td><td>85</td><td>815</td><td>9.4 (7.7-11.5)</td></tr>
<tr><td colspan="4">CPGI moderate + problem gambling (≥3) – time period not reported</td></tr>
<tr><td>Primary diagnosis of major psychiatric disorder (MINI) (n)</td><td>48</td><td>852</td><td>5.3 (4.0-7.0)</td></tr>
<tr><td colspan="4">CPGI problem gambling (≥8) – time period not reported</td></tr>
<tr><td>Primary diagnosis of major psychiatric disorder (MINI) (n)</td><td>30</td><td>870</td><td>3.3 (2.3-4.7)</td></tr>
</table>
</td></tr>
<tr><td>Sources of funding</td><td>No industry funding (No funding received).</td></tr>
</table>

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in psychiatric services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Unclear (Unclear whether index test was interpreted without knowledge of reference standard)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Biddle, 2005

Bibliographic Reference	Biddle, Dirk; Hawthorne, Graeme; Forbes, David; Coman, Greg; Problem gambling in Australian PTSD treatment-seeking veterans.; Journal of traumatic stress; 2005; vol. 18 (no. 6); 759-67

Study details

Country/ies where study was carried out	Australia
Study dates	Not reported
Inclusion criteria	Participants had to: • Be an Australian veteran

<table>
<tr><td></td><td>• Be attending group PTSD therapy treatment</td></tr>
<tr><td>Exclusion criteria</td><td>Not reported</td></tr>
<tr><td>Patient characteristics</td><td>N=153 male veterans using PTSD treatment programs

Age in years [Mean (SD)]: 54.4 (4.9)

Sex (n): M=153, F=0

Ethnicity: Not reported.

Co-morbidities (n):
• PTSD: 153
• Depression: 107
• Anxiety: 69
• Alcohol use: 99</td></tr>
<tr><td>Index test(s)</td><td>• Post-traumatic stress disorder (measured using the Post-traumatic Stress Disorder Checklist)
• Veteran (measured using attendance at treatment programme)</td></tr>
<tr><td>Reference standard(s)</td><td>SOGS
DSM-IV</td></tr>
<tr><td>Duration of follow-up</td><td>Not reported</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr>
<tr><td colspan="4">SOGS pathological gambling (≥5) – lifetime</td></tr>
<tr><td>Veteran + PTSD (n)</td><td>41</td><td>153</td><td>21.1 (16.0-27.4)</td></tr>
<tr><td colspan="4">DSM-IV pathological gambling (≥5) – time period not reported</td></tr>
<tr><td>Veteran + PTSD (n)</td><td>24</td><td>170</td><td>12.4 (8.5-17.7)</td></tr>
</table>
</td></tr>
<tr><td>Sources of funding</td><td>No industry funding (grants from Department of Veterans’ Affairs)</td></tr>
</table>

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in PTSD treatment services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Bodor, 2018

Bibliographic Reference	Bodor, Davor; Ricijas, Neven; Zoricic, Zoran; Dodig Hundric, Dora; Filipcic, Igor; Prevalence of pathological gambling among alcohol addicts in outpatient treatment in the City of Zagreb: A cross-sectional study.; Psychiatria Danubina; 2018; vol. 30 (no. 3); 348-355

Study details

Country/ies where study was carried out	Croatia
Study dates	Not reported

<table>
<tr><td>Inclusion criteria</td><td>Participants had to:
• Be an active member of clubs for treatment of alcohol addiction in Zagreb
• Have a diagnosis of alcohol dependence based on ICD-10 criteria</td></tr>
<tr><td>Exclusion criteria</td><td>Not reported</td></tr>
<tr><td>Patient characteristics</td><td>N=140 adults using alcohol addiction treatment services

Age in years [Mean (SD)]: 53.09 (11.09)

Sex (n): M=116, F=24

Ethnicity: Not reported.

Co-morbidities: Not reported.</td></tr>
<tr><td>Index test(s)</td><td>Alcohol co-addiction (alcohol dependence syndrome measured using the ICD-10 criteria)</td></tr>
<tr><td>Reference standard(s)</td><td>Gambling frequency and type of gambling assessed using a checklist of gambling activities
SOGS</td></tr>
<tr><td>Duration of follow-up</td><td>Not reported</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr>
<tr><td colspan="4">SOGS problem + pathological gambling (≥1) – time period not reported</td></tr>
<tr><td>Alcohol co-addiction (ICD-10) (n)</td><td>31</td><td>109</td><td>22.1 (16.1-29.7)</td></tr>
<tr><td colspan="4">SOGS pathological gambling (≥5) – time period not reported</td></tr>
<tr><td>Alcohol co-addiction (ICD-10) (n)</td><td>14</td><td>126</td><td>10.0 (6.1-16.1)</td></tr>
</table>
</td></tr>
<tr><td>Sources of funding</td><td>No industry funding (Funding not reported but article includes a statement of no conflicts of interest)</td></tr>
</table>

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Unclear selection of clubs where participants were recruited, study did not avoid inappropriate exclusions as conducted in alcohol addiction services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Brunault, 2019

Bibliographic Reference: Brunault, Paul; Lebigre, Kevin; Idbrik, Fatima; Mauge, Damien; Adam, Philippe; El Ayoubi, Hussein; Hingray, Coraline; Barrault, Servane; Grall-Bronnec, Marie; Ballon, Nicolas; El-Hage, Wissam; Posttraumatic Stress Disorder Is a Risk Factor for Multiple Addictions in Police Officers Hospitalized for Alcohol.; European addiction research; 2019; vol. 25 (no. 4); 198-206

Study details

Country/ies where study was carried out	France
Study dates	January 2016 – October 2017
Inclusion criteria	Participants had to:

<table>
<tr><td></td><td>• Be aged ≥ 18 years
• Be able to give informed and signed consent</td></tr>
<tr><td>Exclusion criteria</td><td>Not reported</td></tr>
<tr><td>Patient characteristics</td><td>N=133 adults using drug and alcohol addiction treatment services

Age in years [Mean (SD)]: 43.9 (6.5)

Sex (n): M=124, F=9

Ethnicity: Not reported.

Co-morbidities: Not reported, substance/behaviour use in past 12 months) (n):
• Alcohol: 133
• Tobacco: 108
• Cannabis: 14
• Any other illicit drug: 6
• Gambling: 64</td></tr>
<tr><td>Index test(s)</td><td>Alcohol use disorder (measured using the 10-item AUDIT)</td></tr>
<tr><td>Reference standard(s)</td><td>CPGI</td></tr>
<tr><td>Duration of follow-up</td><td>Not reported</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><th></th><th>Harmful gambling present (n)</th><th>Harmful gambling not present (n)</th><th>PPV (%) (95% CI)</th></tr>
<tr><td colspan="4">CPGI at-risk for gambling (≥3) – time period not reported</td></tr>
<tr><td>Alcohol use disorder (AUDIT ≥8) (n)</td><td>11</td><td>122</td><td>8.3 (4.7-14.2)</td></tr>
<tr><td colspan="4">CPGI at-risk for gambling (≥8) – time period not reported</td></tr>
<tr><td>Alcohol use disorder (AUDIT ≥8) (n)</td><td>3</td><td>130</td><td>2.3 (0.8-6.4)</td></tr>
</table>
</td></tr>
</table>

Sources of funding	No industry funding (No funding received).

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in alcohol addiction services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Unclear (Unclear whether index test was interpreted without knowledge of reference standard)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Castren, 2015

Bibliographic Reference	Castren, Sari; Salonen, Anne H; Alho, Hannu; Lahti, Tuuli; Simojoki, Kaarlo; Past-year gambling behaviour among patients receiving opioid substitution treatment.; Substance abuse treatment, prevention, and policy; 2015; vol. 10; 4

Study details

Country/ies where	Finland

<table>
<tr><td>study was carried out</td><td></td></tr>
<tr><td>Study dates</td><td>March – April 2014</td></tr>
<tr><td>Inclusion criteria</td><td>Participants had to:
• Be receiving opioid substitution treatments</td></tr>
<tr><td>Exclusion criteria</td><td>Not reported</td></tr>
<tr><td>Patient characteristics</td><td>N=144 adults at an inpatient drug addiction treatment centre

Age in years [Mean (SD)]:
• Male: 36.6 (7)
• Female: 34.7 (9)

Sex (n): M=89, F=55

Ethnicity: Not reported.

Co-morbidities: Not reported.</td></tr>
<tr><td>Index test(s)</td><td>Opioid substitution treatment (measured using prescription of treatment medication)</td></tr>
<tr><td>Reference standard(s)</td><td>Past year gambling problem assessed via the Brief Biosocial Gambling Screen (BBGS)</td></tr>
<tr><td>Duration of follow-up</td><td>Not reported</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><th></th><th>Harmful gambling present (n)</th><th>Harmful gambling not present (n)</th><th>PPV (%) (95% CI)</th></tr>
<tr><td colspan="4">Brief Biosocial Gambling Screen* (score ≥1) – previous 12 months</td></tr>
<tr><td>Opioid substitution treatment (methodone or buprenorphine-naloxone) (n)</td><td>18</td><td>126</td><td>12.5 (8.1-18.9)</td></tr>
</table>
*3 questions, score 0-3. Lower = better.
</td></tr>
<tr><td>Sources of funding</td><td>No industry funding (Funding not reported but article includes a statement of no conflicts of interest)</td></tr>
</table>

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in other drug addiction services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Cavicchioli, 2020

Bibliographic Reference	Cavicchioli, Marco; Ramella, Pietro; Vassena, Giulia; Simone, Giulia; Prudenziati, Francesca; Sirtori, Federica; Movalli, Mariagrazia; Maffei, Cesare; Mindful self-regulation of attention is a key protective factor for emotional dysregulation and addictive behaviors among individuals with alcohol use disorder.; Addictive behaviors; 2020; vol. 105; 106317

Study details

Country/ies where study was carried out	Italy
Study dates	January 2012 – June 2019

Inclusion criteria	Participants had to: • Be admitted to the Alcohol Dependence Treatment Unit
Exclusion criteria	• People with psychotic disorders • People with severe cognitive impairment
Patient characteristics	N=319 adults using an alcohol dependence treatment unit (inpatient and outpatient) Age in years [Mean (SD)]: 46.26 (9.08) Sex (n): M=186, F=133 Ethnicity: Not reported. Co-morbidities (reported as co-occurrent substance use disorders) (n): • Cannabis: 41 • Cocaine: 41 • Anxiolytic: 88 • Pathological gambling: 9 • Mood Disorders: 32 • Major depressive disorder: 11 • Bipolar I disorder: 3 • Bipolar II disorder: 5 • Adjustment disorder with depressed mood: 13 • Anxiety Disorders: 39 • Panic disorder: 8 • Generalized anxiety disorder: 10 • Social anxiety disorder: 4 • Adjustment disorder with anxiety: 17 • Eating Disorders: 6 • Anorexia nervosa: 3 • Bulimia nervosa: 3
Index test(s)	Alcohol use disorder (measurement tool not reported)

Reference standard(s)	SPQ
Duration of follow-up	Not reported
Outcomes	<table><tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr><tr><td colspan="4">Pathological gambling/gambling disorder (measurement tool and cut off not reported) – time period not reported</td></tr><tr><td>Alcohol use disorder (measurement tool not reported) (n)</td><td>9</td><td>181</td><td>4.74 (2.5-8.8)</td></tr></table>
Sources of funding	Unclear funding source (Funding not reported).

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in alcohol addiction services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing:	Could the patient flow have introduced bias?	Low

Section	Question	Answer
risk of bias		

Chaput, 2007

Bibliographic Reference: Chaput, Yves; Lebel, Marie-Josee; Labonte, Edith; Beaulieu, Lucie; Paradis, Michel; Pathological gambling and the psychiatric emergency service.; Canadian journal of psychiatry. Revue canadienne de psychiatrie; 2007; vol. 52 (no. 8); 535-8

Study details

Country/ies where study was carried out	Canada
Study dates	July 1996 – September 2002
Inclusion criteria	Participants had to be: • Adult patients from Psychiatric Emergency Services
Exclusion criteria	Not reported
Patient characteristics	N=31921 Age in years: Not reported. Sex: Not reported. Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Admittance to psychiatric emergency service (measured using admittance to psychiatric emergency service)
Duration of follow-up	Not reported
Outcomes	

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
DSM-IV pathological gambling only (≥5) – time period not reported			
Admittance to	210	31711	0.7 (0.6-0.8)

	psychiatric emergency service (n)			
Sources of funding	Unclear funding source (Valorisation Recherche Québec grant no. 2200–089)			

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in psychiatric services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Unclear (Unclear whether index test was interpreted without knowledge of reference standard)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Unclear (Up to 3 problem gambling diagnoses were permitted per visit to the Psychiatric Emergency Service and the proportions of people having multiple tests was not reported)

Cowlishaw, 2017

Bibliographic Reference	Cowlishaw, Sean; Gale, Lone; Gregory, Alison; McCambridge, Jim; Kessler, David; Gambling problems among patients in primary care: a cross-sectional study of general practices.; The British journal of general practice: the journal of the Royal

College of General Practitioners; 2017; vol. 67 (no. 657); e274-e279

Study details

Country/ies where study was carried out	England
Study dates	Not reported
Inclusion criteria	Participants had to: • Be aged ≥18 years
Exclusion criteria	• People that were unable to understand English • People who required immediate medical attention • People unable to give consent
Patient characteristics	N=1058 adults presenting to general practice Age in years [Mean (SD)]: Not reported, age categories (%): • 18-24: 20.7 • 25-34: 15.1 • 35-44: 13.4 • 45-64: 27.8 • ≥65: 23 Sex (n): M=373, F=685 Ethnicity (n): • White: 928 • Other: 130 Co-morbidities: Not reported.
Index test(s)	• Depression (measured using the 2-item Whooley scale) • Anxiety (measured using the GAD-2 scale) • Alcohol co-addiction (measured using the AUDIT-C) • Unhealthy drug use (measured using a Single Item Screening question, no further details reported)

Reference standard(s)

Gambling frequency assessed using items from the British Gambling Prevalence Surveys: Asking about purchases of lottery or instant win/scratch tickets, play on bingo, casino table games, slot machines, and other electronic gambling machines, games of skill against other individuals, or betting money on sporting events
PGSI

Duration of follow-up

Not reported

Outcomes

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%)	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)	NPV (%) (95% CI)
PGSI harmful gambling (≥1) – time period not reported						
Depression + (Whooley ≥1) (n)	38	523	6.8 (5.0-9.2)	71.7 (58.4-82.0)	48.0 (44.9-51.1)	97.0 (95.1-98.2)
Depression – (Whooley 0) (n)	15	482				
PGSI harmful gambling (≥1) – time period not reported						
Anxiety + (GAD-2 ≥3) (n)	19	243	7.3 (4.7-11.0)	37.3 (25.3-51.0)	75.9 (73.1-78.4)	96.0 (94.4-97.1)
Anxiety – (GAD-2 <3) (n)	32	764				
PGSI harmful gambling (≥1) – time period not reported						
Alcohol co-addiction + (AUDIT-C ≥5) (n)	30	277	9.8 (6.9-13.6)	55.6 (42.4-68.0)	72.4 (69.6-75.1)	96.8 (95.3-97.8)
Alcohol co-addiction – (AUDIT-C <5) (n)	24	727				
PGSI harmful gambling (≥1) – time period not reported						
Drug use + (Single-item screening questions Yes) (n)	22	118	15.7 (10.6-22.6)	42.3 (29.9-55.8)	88.3 (86.1-90.1)	96.7 (95.4-97.7)

	Drug use – (Single-item screening questions No) (n)	30	888				
Sources of funding	No industry funding (National Institute for Health Research, School for Primary Care Research)						

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	Low
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Unclear (Unclear whether index test was interpreted without knowledge of reference standard)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (No information on whether reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Dufour, 2016

Bibliographic Reference	Dufour, M.; Nguyen, N.; Bertrand, K.; Perreault, M.; Jutras-Aswad, D.; Morvannou, A.; Bruneau, J.; Berbiche, D.; Roy, E.; Gambling problems among community cocaine users; Journal of Gambling Studies; 2016; vol. 32 (no. 3); 1039-1053

Study details

Country/ies where study was carried out	Canada
Study dates	June 2011 – May 2014
Inclusion criteria	Participants had to: • Have reported using cocaine (either by smoking crack or by injection) in last month • Be ≥14 years • Speak English or French • Provide informed consent • Be able to complete interviewer administered questionnaire • Have plans to stay in Montreal area for the following year
Exclusion criteria	Not reported
Patient characteristics	N=424 adults using community-based programs (including day programs for the homeless, various shelters, and needle exchange programs) Age in years [Mean (SD)]: 40.46 (10.7) Sex: Not reported. Ethnicity: Not reported. Co-morbidities (reported as substance misuse) (n): • Smoking crack: 391 • Injecting Cocaine: 253
Index test(s)	• Alcohol use disorder (measured using CAGE questionnaire) • Cocaine dependence (measured using the Severity of dependence scale) • Past year diagnosis of one or multiple primary mental disorders (measured using the World Mental Health Composite International Diagnostic Interview (CIDI) version 2.1) • Anxiety disorder co-morbidity (measured using the Composite International Diagnostic Interview screen)
Reference standard(s)	PGSI

Duration of follow-up Not reported

Outcomes

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
PGSI at-risk gambling (≥3) – previous 12 months			
Cocaine use in previous month (smoking or injection) (n)	78	346	18.4 (15.0-22.4)

Risk factor	% non-problem group (n=346)	FP	% at-risk group (n=78)	TP	OR (95% CI)
Panic disorder (diagnosis in last 12 months)	17.9	62	20.5	16	1.18 (0.64-2.19)
Phobic disorder (diagnosis in last 12 months)	31.5	109	44.9	35	1.77 (1.07-2.92)*
Generalised anxiety disorder (diagnosis in last 12 months)	15.0	52	20.5	16	1.46 (0.78-2.72)
Major depression (diagnosis in last 12 months)	18.8	65	19.5	15	1.05 (0.56-1.95)
Bipolar disorder (diagnosis in last 12 months)	8.4	29	7.8	6	0.92 (0.37-2.31)
Dysthymic disorder (diagnosis in last 12 months)	4.9	18	3.8	3	0.77 (0.22-2.71)
Schizophrenic disorder (diagnosis in last 12 months)	1.2	4	3.8	3	3.42 (0.75-15.6)

Alcohol problem (CAGE ≥2) (diagnosis in last 12 months)	61.6	224	76.9	60	2.08 (1.18-3.68)**
Cocaine dependence (SDS ≥4) (diagnosis in last 12 months)	82.3	300	84.4	66	1.17 (0.59-2.29)
Have won a large sum when first started gambling	46.9	171	73.1	57	3.71 (2.01 - 6.84)***
Have lost a large sum when first started gambling	19.1	70	36.0	28	11.47 (6.08 - 21.70)***
Gambling problems in family	35.7	130	83.1	65	1.01 (0.60 - 1.80)
Alcohol or drug problems in family	74.7	272	77.9	61	1.67 (0.83 - 3.35)

* p < .05, ** p < .01, *** p < 0.001

Risk factor	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)	NPV (%) (95% CI)
PGSI at-risk gambling (≥3) – previous 12 months						
Panic disorder (diagnosis in last 12 months)	16	62	20.5 (13.0-30.8)	20.5 (13.0-30.8)	82.1 (77.7-85.8)	82.1 (77.7-85.8)
No diagnosis	62	284				
Phobic disorder (diagnosis in last 12 months)	35	109	24.3 (18.0-31.9)	44.9 (34.3-55.9)	68.5 (63.4-73.2)	84.6 (80.0-88.4)
No diagnosis	43	237				
Generalised anxiety disorder (diagnosis in last 12 months)	16	52	23.5 (15.0-34.9)	20.5 (13.0-30.8)	85.0 (80.8-88.4)	82.6 (78.3-86.2)
No diagnosis	62	294				

Major depression (diagnosis in last 12 months)	15	65	18.8 (11.7-28.7)	19.2 (12.0-29.3)	81.2 (76.8-85.0)	81.7 (77.3-85.4)
No diagnosis	63	281				
Bipolar disorder (diagnosis in last 12 months)	6	29	17.1 (8.1-32.7)	7.7 (3.6-15.8)	91.6 (88.2-94.1)	81.5 (77.3-85.0)
No diagnosis	72	317				
Dysthymic disorder (diagnosis in last 12 months)	3	18	14.3 (5.0-34.6)	3.8 (1.3-10.7)	94.8 (91.9-96.7)	81.4 (77.3-84.9)
No diagnosis	75	328				
Schizophrenic disorder (diagnosis in last 12 months)	3	4	42.9 (15.8-75.0)	37.5 (13.7-69.4)	98.8 (97.1-99.5)	98.6 (96.7-99.4)
No diagnosis	75	342				
Alcohol problem (CAGE ≥2) (diagnosis in last 12 months)	60	224	21.1 (16.8-26.2)	76.9 (66.4-84.9)	35.3 (30.4-40.4)	87.1 (80.6-91.7)
No diagnosis	18	122				
Cocaine dependence (SDS ≥4) (diagnosis in last 12 months)	66	300	18.0 (14.4-22.3)	84.6 (75.0-91.0)	13.3 (10.1-17.3)	79.3 (67.2-87.7)
No diagnosis	12	46				
Have won a large sum when first started gambling	57	171	25.0 (19.8-31.0)	73.1 (62.3-81.7)	50.6 (45.3-55.8)	89.3 (84.2-92.9)
Not present	21	175				
Have lost a large sum when first started gambling	28	70	28.6 (20.6-38.2)	35.9 (26.1-47.0)	79.8 (75.2-83.7)	84.7 (80.3-88.2)
Not present	50	276				
Gambling problems in family	65	130	35.1 (28.6-42.3)	83.3 (73.5-90.0)	64.3 (59.0-69.2)	94.3 (90.5-96.7)
Not present	13	216				
Alcohol or drug problems in family	61	272	18.3 (14.5-22.8)	78.2 (67.8-85.9)	21.4 (17.4-26.0)	81.3 (72.1-88.0)
Not present	17	74				

Sources of funding	No industry funding (Canadian Institutes of Health Research)

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	Unclear (Lack of information provided on recruitment process for participants)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Unclear (Unclear whether index test was interpreted without knowledge of reference standard)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (No information on whether reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	High (Unclear interval between index test and reference standard; not all participants received reference standard [181/605 did not] and were subsequently not included in analysis)

Goodyear-Smith, 2006

Bibliographic Reference	Goodyear-Smith, Felicity; Arroll, Bruce; Kerse, Ngaire; Sullivan, Sean; Coupe, Nicole; Tse, Samson; Shepherd, Robin; Rossen, Fiona; Perese, Lana; Primary care patients reporting concerns about their gambling frequently have other co-occurring lifestyle and mental health issues.; BMC family practice; 2006; vol. 7; 25

Study details

Country/ies where	New Zealand

study was carried out	
Study dates	Not reported
Inclusion criteria	Participants had to: • Be aged ≥16 years
Exclusion criteria	• People unable to understand English • People with mental impairments preventing participation
Patient characteristics	N=2536 adults presenting at primary healthcare providers • Patients worried about their gambling (n): 79 Age in years: Not reported. Sex (n): M=837, F=1699 • Sex (n) out of the 79 patients worried about their gambling: M=36, F=43 Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Smoking, alcohol, substance abuse, gambling, depression, anxiety, stress, violence, eating disorders, physical activity (measured using a multi-item screening tool)
Reference standard(s)	Gambling assessed via the multi-item screening tool.
Duration of follow-up	Not reported
Outcomes	<table><tr><th>Risk factor</th><th>Total positive response to screening question n(%)</th><th>Worried about gambling n(%)</th><th>OR (95% CI)</th><th>p</th></tr><tr><td>Do you ever feel the need to cut down on your smoking?*</td><td>406 (16)</td><td>30 (38)</td><td>3.9 (2.12 – 5.44)</td><td><0.0001</td></tr><tr><td>Do you ever</td><td>258 (10)</td><td>18 (23)</td><td>2.74 (1.64</td><td><0.0001</td></tr></table>

feel the need to cut down on your drinking?			– 4.55)	
Do you ever feel the need to cut down on your other drug use?	68 (3)	9 (11)	5.23 (2.51 – 10.9	<0.0001
During the past month have you often been bothered by feeling down, depressed or hopeless?	1081 (43)	53 (67)	2.84 (1.7 – 4.75)	<0.0001
During the past month have you often been bothered by having little interest or pleasure in doing things?	805 (32)	42 (53)	2.5 (1.67 – 3.81)	<0.0001
Have you been worrying a lot about everyday problems?	997 (39)	46 (58)	2.21 (1.38 – 3.55)	<0.001
Is there anyone in your life whom you are afraid of, who hurts you in any	130 (5)	3 (4)	0.73 (0.24 – 2.24)	0.57

Risk factor	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)	NPV (%) (95% CI)
way or prevents you doing what you want?						
Is controlling your anger sometimes a problem for you?	387 (15)	24 (30)	2.52 (1.44 – 4.43)	<0.001		
As a rule, do you do at least 30 minutes of moderate or vigorous exercise (such as walking or a sport) on 5 or more days of the week?	1379 (54)	47 (59)	1.24 (0.78 – 1.99)	0.36		
Are you happy with your current weight?	1072 (42)	40 (51)	1.4 (0.88 – 2.25)	0.15		

Total responses N=2536, total worried about gambling n=79
Odds ratio for logistic regression taking into account clustering

Multi-item screening tool, time period not reported						
Worried about smoking	30	376	7.4 (5.2-10.4)	38.0 (28.1-49.0)	84.7 (83.2-86.1)	97.7 (97.0-98.3)
Not worried about smoking	49	2081				
Worried about drinking	18	240	7.0 (4.5-10.8)	22.8 (14.9-33.2)	90.2 (89.0-98.1)	97.3 (96.6-97.9)
Not worried about drinking	61	2217				
Worried about other drug use	9	59	13.2 (7.1-23.3)	11.4 (6.1-20.3)	97.6 (96.9-98.1)	97.2 (96.4-97.7)
Not worried about other drug use	70	2398				
Worried about depression	53	1028	4.9 (3.8-6.4)	68.8 (57.8-78.1)	58.2 (56.2-60.1)	98.4 (97.6-98.9)
Not worried about depression	24	1431				
Worried about anhedonia	42	763	5.2 (3.9-7.0)	53.2 (42.3-63.8)	68.9 (67.1-70.7)	97.9 (97.0-98.5)
Not worried about anhedonia	37	1694				
Worried about anxiety	46	951	4.6 (3.5-6.1)	58.2 (47.2-68.5)	61.3 (59.4-63.2)	97.9 (97.0-98.5)
Not worried about anxiety	33	1506				
Worried about domestic violence	3	127	2.3 (0.8-6.6)	3.8 (1.3-10.6)	94.8 (93.9-95.6)	96.8 (96.1-97.5)
Not worried about domestic violence	76	2330				
Worried about anger	24	363	6.2 (4.2-9.1)	30.4 (21.3-41.2)	85.2 (83.8-86.6)	97.4 (96.7-98.0)

	Not worried about anger	55	2094				
	Not participating in adequate exercise	32	1125	2.8 (2.0-3.9)	40.5 (30.4-51.5)	54.2 (52.2-56.2)	96.6 (95.5-97.4)
	Participating in adequate exercise	47	1332				
	Worried about weight	39	1425	2.7 (2.0-3.6)	49.4 (38.6-60.2)	42.0 (40.1-44.0)	96.3 (95.0-97.2)
	Not worried about weight	40	1032				
Sources of funding	No industry funding (Charitable Trust of the Auckland Faculty of the Royal New Zealand College of General Practitioners, Ministry of Health Mental Health Directorate, and Institute of Rural Health, Hamilton)						

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	Low
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Unclear (Unclear whether index test was interpreted without knowledge of reference standard)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (No information on whether reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low

Section	Question	Answer
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Haydock, 2015

Bibliographic Reference	Haydock, Maria; Cowlishaw, Sean; Harvey, Carol; Castle, David; Prevalence and correlates of problem gambling in people with psychotic disorders.; Comprehensive Psychiatry; 2015; vol. 58; 122-129

Study details

Country/ies where study was carried out	Australia
Study dates	March – December 2010
Inclusion criteria	Participants had to: • Screen positive for psychosis • Be 18-64 years • Attend public mental health services or non-government organisations in year prior March 2010
Exclusion criteria	• People with insufficient English • People with insufficient cognitive capacity
Patient characteristics	N=435 adults presenting at public mental health services providing mental health support Age in years [Mean (SD)]: 38.04 (11.88) Sex (n): M=272, F=163 Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Psychosis (measured using the Diagnostic Interview for Psychosis, semi-structured clinical interview with diagnosis of psychoses according to a range of operationalised criteria including DSM-IV)

Reference standard(s)	PGSI
Duration of follow-up	Not reported
Outcomes	<table><tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr><tr><td colspan="4">PGSI low + moderate + problem gambling (≥1) – time period not reported</td></tr><tr><td>People with psychosis (n)</td><td>71</td><td>364</td><td>16.3 (13.1-20.1)</td></tr><tr><td colspan="4">PGSI moderate + problem gambling (≥3) – time period not reported</td></tr><tr><td>People with psychosis (n)</td><td>53</td><td>382</td><td>12.2 (9.4-15.6)</td></tr><tr><td colspan="4">PGSI problem gambling (≥8) – time period not reported</td></tr><tr><td>People with psychosis (n)</td><td>25</td><td>410</td><td>5.7 (3.9-8.3)</td></tr></table>
Sources of funding	Unclear funding source (Funding not reported).

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in psychiatric services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Unclear (Unclear whether index test was interpreted without knowledge of reference standard)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (For psychosis: Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias (For other index tests: No information on whether reference standard was interpreted with

Section	Question	Answer
		knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Unclear (Nnot all participants received reference standard [54/496 did not] and were subsequently not included in analysis)

Lejoyeux, 2002

Bibliographic Reference	Lejoyeux, Michel; Arbaretaz, Marie; McLoughlin, Mary; Ades, Jean; Impulse control disorders and depression.; The Journal of nervous and mental disease; 2002; vol. 190 (no. 5); 310-4

Study details

Country/ies where study was carried out	France
Study dates	Not reported
Inclusion criteria	Participants had to: • Be admitted to study centre for depression
Exclusion criteria	Not reported
Patient characteristics	N=107 adults presenting at the acute care university hospital receiving psychiatric patients Age in years [Mean (SD)]: 41.3 (SD not reported) Sex (n): M=24, F=83 Ethnicity: Not reported. Co-morbidities: Not reported.

Index test(s)	Major depression without psychotic symptoms (measured using the Mini International Neuropsychiatric Interview, according to DSM-IV criteria)
Reference standard(s)	Impulse control disorders (ICD) assessed based on the DSM-IV criteria and modified version of the Minnesota Impulse Disorder Interview (MIDI) (36-item semi-structured interview)
Duration of follow-up	Not reported
Outcomes	

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
MIDI and DSM-IV pathological gambling (score not reported) – time period not reported			
Major depression without psychotic symptoms (DSM-IV) (n)	3	104	2.8 (1.0-7.9)

Sources of funding	Unclear funding source (Funding not reported).

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	Unclear (Study did not avoid inappropriate exclusions as conducted in psychiatric services [although patients not presenting based on depression status])
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard:	Is there concern that the target condition as defined by the reference standard does not match the review	Low

Section	Question	Answer
applicability	question?	
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Lepage, 2000

Bibliographic Reference: Lepage, C; Ladouceur, R; Jacques, C; Prevalence of problem gambling among community service users; Community Mental Health Journal; 2000; vol. 36 (no. 6); 597-601

Study details

Country/ies where study was carried out	Canada
Study dates	Not reported
Inclusion criteria	Participants had to: • Be reliant on community organisation at least once in past 3 months
Exclusion criteria	Not reported
Patient characteristics	N=87 adults presenting at community organisations which assist with food, materials or lodging Age in years [Mean (SD)]: 39 (SD not reported) Sex (n): M=54, F=33 Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Community service use (measured using attendance at community organisations assisting with food, materials and lodging)
Reference standard(s)	SOGS
Duration of follow-up	Not reported

Outcomes		Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95%v CI)
	SOGS potential problem gamblers (≥3) – lifetime			
	Community service users in previous 3 months (n)	26	61	29.9 (21.3-40.2)
	SOGS probable problem gamblers (≥5) – lifetime			
	Community service users in previous 3 months (n)	15	72	17.2 (10.7-26.5)
Sources of funding	Any industry funding (Loto Quebec grant)			

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in services dispensing community assistance)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing:	Could the patient flow have introduced bias?	Low

Section	Question	Answer
risk of bias		

May-Chahal, 2012

Bibliographic Reference	May-Chahal, Corinne; Wilson, Alison; Humphreys, Leslie; Anderson, Jill; Promoting an Evidence-Informed Approach to Addressing Problem Gambling in UK Prison Populations; The Howard Journal of Criminal Justice; 2012; vol. 51 (no. 4); 372-386

Study details

Country/ies where study was carried out	UK
Study dates	Not reported
Inclusion criteria	Participants had to: • Be imprisoned in study prisons
Exclusion criteria	Not reported
Patient characteristics	N=423 adults in a prison setting Age in years [Mean (SD)]: Not reported, age range: • Male: 29-60+ • Female: 21-49 Sex: Not reported. Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Criminality (measured using imprisonment)
Reference standard(s)	PGSI Attitude to Gambling Scale (ATGS)

Duration of follow-up	Not reported
Outcomes	

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
PGSI low + moderate + problem gambling (≥1) (12 months before imprisonment)			
Criminality + male (n)	95	106	42.3 (40.5-54.2)
Criminality + female (n)	64	158	28.8 (23.3-35.1)
PGSI moderate + problem gambling (≥3) (12 months before imprisonment)			
Criminality + male (n)	56	145	27.9 (22.1-34.4)
Criminality + female (n)	40	182	18.0 (13.5-23.6)
PGSI problem gambling (≥8) (12 months before imprisonment)			
Criminality + male (n)	21	180	10.4 (6.9-15.4)
Criminality + female (n)	13	209	5.86 (5.9 (3.5-9.8)

Sources of funding	Unclear funding source (Funding not reported).

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in prisons)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference	Is there concern that the target condition as defined	Low

Section	Question	Answer
standard: applicability	by the reference standard does not match the review question?	
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Unclear (Unclear interval between index test [criminality] and reference standard)

Nehlin, 2013

Bibliographic Reference	Nehlin, Christina; Gronbladh, Leif; Fredriksson, Anders; Jansson, Lennart; Alcohol and drug use, smoking, and gambling among psychiatric outpatients: a 1-year prevalence study.; Substance abuse; 2013; vol. 34 (no. 2); 162-8

Study details

Country/ies where study was carried out	Sweden
Study dates	Autumn 2009
Inclusion criteria	Participants had to: • Be aged 18 years or over • Attending study outpatient clinic
Exclusion criteria	Not reported
Patient characteristics	N=2161 adults in a psychiatric clinic Age in years [Mean (SD)]: • Male: 35.2 (13.5) • Female: 35 (13.5) Sex (n): M=756, F=1405 Ethnicity: Not reported. Co-morbidities (reported as impulse control disorder primary diagnosis) (n): • Mood disorder: 1015

	• Anxiety disorder: 756 • ADHD/autism spectrum disorder: 238 • Personality disorder: 130 • Anorexia/eating disorder: 22
Index test(s)	Psychiatric co-morbidities (measured using attendance at psychiatric outpatient service)
Reference standard(s)	Gambling assessed via gambling frequency questionnaire
Duration of follow-up	3 months
Outcomes	<table><tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr><tr><td colspan="4">Problematic gambling* (≥1) – previous 12 months</td></tr><tr><td>Psychiatric outpatients (n)</td><td>190</td><td>1971</td><td>8.8 (7.7-10.1)</td></tr></table> *Own questionnaire, scale 0-6. Lower = better.
Sources of funding	No industry funding (Municipal Research Fund of Uppsala County, Nasvell Fund for Psychiatric Research, and Gadelius' Memorial Fund)

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in psychiatric service setting)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study

Section	Question	Answer
bias		used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Nielssen, 2018

Bibliographic Reference	Nielssen, Olav B; Stone, William; Jones, Naidene M; Challis, Sarah; Nielssen, Amelia; Elliott, Gordon; Burns, Nicholas; Rogoz, Astrid; Cooper, Lucy E; Large, Matthew M; Characteristics of people attending psychiatric clinics in inner Sydney homeless hostels.; The Medical journal of Australia; 2018; vol. 208 (no. 4); 169-173

Study details

Country/ies where study was carried out	Australia
Study dates	July 2008 – December 2016
Inclusion criteria	Participants had to: • Presenting at mental health clinics (located in 3 large homeless hostels in Sydney)
Exclusion criteria	Not reported
Patient characteristics	N=2388 adults in mental health clinics located in 3 inner city homeless hostels Age in years [Mean (SD)]: 42.3 (12.8) Sex (n): M=2230, F=158 Ethnicity: Not reported. Co-morbidities (reported as mental health co-morbidities) (n):

<table>
<tr><td></td><td>• Psychotic illness: 1220
• Intellectual disability: 119
• Acquired brain injury: 343
• Current substance use disorder: 1578
• Problem gambling: 289</td></tr>
<tr><td>Index test(s)</td><td>• Homelessness (measured using records of ongoing assessment and ongoing care, no further details reported)
• Mental health co-morbidities (measured using records of ongoing assessment and ongoing care, no further details reported)</td></tr>
<tr><td>Reference standard(s)</td><td>Socio-demographic and clinical information extracted from records of ongoing assessment and ongoing care</td></tr>
<tr><td>Duration of follow-up</td><td>Not reported</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr>
<tr><td colspan="4">Problem gambling (measurement tool not reported) – time period not reported</td></tr>
<tr><td>Homeless + attending mental health services (n)</td><td>289</td><td>2099</td><td>12.1 (10.9-13.5)</td></tr>
</table>
</td></tr>
<tr><td>Sources of funding</td><td>No industry funding (Funding not reported but article includes a statement of no conflicts of interest)</td></tr>
</table>

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in mental health services for people experiencing homelessness)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference	Could the reference standard, its conduct, or its	Unclear

Section	Question	Answer
standard: risk of bias	interpretation have introduced bias?	(Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Unclear (8.5 year study period; unclear whether index test and reference standard processes changed during this period)

Pereiro, 2013

Bibliographic Reference	Pereiro, C.; Pino, C.; Florez, G.; Arrojo, M.; Becona, E.; Psychiatric Comorbidity in Patients from the Addictive Disorders Assistance Units of Galicia: The COPSIAD Study; PLoS ONE; 2013; vol. 8 (no. 6); e66451

Study details

Country/ies where study was carried out	Spain
Study dates	March 2010
Inclusion criteria	Participants had to: • Aged 18-65 years • Be admitted to study addictive disorder assistance units in Northwestern Spain • Be treated for at least 3 months in the drug dependence or alcoholism unit • Able to provide informed consent
Exclusion criteria	Not reported
Patient characteristics	N=2300 adults using addictive disorder assistance units Age in years [Mean (SD)]: 41.27 (10.13) Sex (n): M=1833, F=467

	Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Alcohol and other substance use disorder (measured using DSM-IV criteria)
Reference standard(s)	Ad-hoc data collection on sociodemographic variables, substance used, and diagnosis of mental and use of substance disorder (According to DSM-IV)
Duration of follow-up	Not reported
Outcomes	<table><tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr><tr><td colspan="4">Problem gambling (measurement tool not reported) – time period not reported</td></tr><tr><td>Alcohol and other substance use disorder (n)</td><td>28</td><td>2272</td><td>1.2 (0.8-1.8)</td></tr></table>
Sources of funding	No industry funding (No funding received).

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in addiction treatment services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)

Section	Question	Answer
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	High (Not all participants received reference standard and/or index test [260/2560 did not] and were subsequently not included in analysis)

Perrine, 2008

Bibliographic Reference: Adam, Perrine; Richoux, Charlotte; Lejoyeux, Michel; Screening for impulse control disorders among patients admitted to a French psychiatric emergency service.; The Open Psychiatry Journal; 2008; vol. 2; 30-36

Study details

Country/ies where study was carried out	France
Study dates	January – June 2008
Inclusion criteria	Participants had to: • Be currently admitted to the study emergency ward • Have the ability to read and understand the consent form
Exclusion criteria	Not reported
Patient characteristics	N=210 adults on psychiatric emergency wards Age in years [Mean (SD)]: 40.2 (12) Sex (n): M=136, F=74 Ethnicity: Not reported. Co-morbidities (n): • Impulse control disorder: 54*

	○ Compulsive buying: 41 ○ Pathological gambling: 13 ○ Intermittent explosive disorder: 11 ○ Trichotillomania: 2 ○ Kleptomania: 2 ○ Compulsive sexual behaviour: 2 ○ Pyromania: 2 *Numbers add up to more than 54 due to some people having multiple impulse control disorders.
Index test(s)	Psychiatric co-morbidity (measured using admittance to psychiatric emergency ward)
Reference standard(s)	SOGS
Duration of follow-up	Not reported
Outcomes	<table><tr><th></th><th>Harmful gambling present (n)</th><th>Harmful gambling not present (n)</th><th>PPV (%) (95% CI)</th></tr><tr><td colspan="4">≥5 SOGS, current</td></tr><tr><td>Admittance to psychiatric emergency ward (anxiety, depression, psychotic state, suicide attempt, withdrawal and other) (n)</td><td>13</td><td>197</td><td>6.2 (3.7-10.3)</td></tr></table>
Sources of funding	Unclear funding source (Funding not reported).

Critical appraisal – NGA Critical appraisal – QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in psychiatric services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of	Could the conduct or interpretation of the index test	Unclear

Section	Question	Answer
bias	have introduced bias?	(Unclear whether index test was interpreted without knowledge of reference standard)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Riley, 2015

Bibliographic Reference	Riley, B Oakes, J; Problem gambling among a group of male prisoners: Lifetime prevalence and association with incarceration; AUSTRALIAN AND NEW ZEALAND JOURNAL OF CRIMINOLOGY; 2015; vol. 48 (no. 1); 73 – 81

Study details

Country/ies where study was carried out	Australia
Study dates	Not reported
Inclusion criteria	Participants had to: • Be imprisoned in study prison (low-security male correctional facility in South Australia)
Exclusion criteria	Not reported
Patient characteristics	N=105 males in a prison setting Age in years: Not reported.

	Sex (n): M=105, F=0 Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Criminality (measured using imprisonment)
Reference standard(s)	EIGHT gambling screen (brief lifetime pathological gambling screening tool)
Duration of follow-up	Not reported
Outcomes	<table><tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr><tr><td colspan="4">EIGHT at-risk* + problem + pathological gambling (≥2) – lifetime</td></tr><tr><td>Criminality + male (n)</td><td>88</td><td>17</td><td>83.8 (75.6-89.6)</td></tr><tr><td colspan="4">EIGHT problem + pathological gambling (≥4) – lifetime</td></tr><tr><td>Criminality + male (n)</td><td>54</td><td>51</td><td>51.4 (42.0-60.8)</td></tr><tr><td colspan="4">EIGHT pathological gambling (≥6) – lifetime</td></tr><tr><td>Criminality + male (n)</td><td>43</td><td>62</td><td>41.0 (32.0-50.5)</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td colspan="4">*defined in tool as ‘suggested for health promotional purposes or brief interventions’</td></tr></table>
Sources of funding	No industry funding (Department for Families and Communities and the Office of Problem Gambling (via Statewide Gambling Therapy Service)

Critical appraisal – NGA Critical appraisal – QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in prisons)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests:	Are there concerns that the index test, its conduct, or	Low

Section	Question	Answer
applicability	interpretation differ from the review question?	
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	High (Unclear interval between index test [criminality] and reference standard; not all participants received reference standard [45/150 did not] and were subsequently not included in analysis)

Riley, 2017

Bibliographic Reference	Riley, BJ Larsen, A Battersby, M Harvey, P; Problem gambling among female prisoners: lifetime prevalence, help-seeking behaviour and association with incarceration; INTERNATIONAL GAMBLING STUDIES; 2017; vol. 17 (no. 3); 401 – 411

Study details

Country/ies where study was carried out	Australia
Study dates	Not reported
Inclusion criteria	Participants had to: • Be imprisoned in study prisons (2 women's prison in South Australia)
Exclusion criteria	Not reported
Patient characteristics	N=74 females in a prison setting Age in years [Mean (SD)]: 38.54 (9.86) Sex (n): M=0, F=74

<table>
<tr><td></td><td>Ethnicity (n):
• Aboriginal and/or Torres Strait Islander: 12
• Other: 62

Co-morbidities: Not reported.</td></tr>
<tr><td>Index test(s)</td><td>Criminality (measured using imprisonment)</td></tr>
<tr><td>Reference standard(s)</td><td>EIGHT gambling screen (brief lifetime pathological gambling screening tool)</td></tr>
<tr><td>Duration of follow-up</td><td>Not reported</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr>
<tr><td colspan="4">EIGHT at-risk* + problem + pathological gambling (≥2) – lifetime</td></tr>
<tr><td>Criminality + female (n)</td><td>53</td><td>21</td><td>71.6 (60.5-80.6)</td></tr>
<tr><td colspan="4">EIGHT problem + pathological gambling (≥4) – lifetime</td></tr>
<tr><td>Criminality + female (n)</td><td>47</td><td>27</td><td>63.5 (52.1-73.6)</td></tr>
<tr><td colspan="4">EIGHT pathological gambling (≥6) – lifetime</td></tr>
<tr><td>Criminality + female (n)</td><td>39</td><td>35</td><td>52.7 (41.5-63.7)</td></tr>
</table>
*defined in tool as ‘suggested for health promotional purposes or brief interventions’
</td></tr>
<tr><td>Sources of funding</td><td>No industry funding (grant from Department for Correctional Services, South Australia)</td></tr>
</table>

Critical appraisal – NGA Critical appraisal – QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in prisons)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low

Section	Question	Answer
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	High (Unclear interval between index test [criminality] and reference standard; Not all participants received reference standard [53/127 did not] and were subsequently not included in analysis)

Riley, 2018

Bibliographic Reference: Riley, Ben J; Larsen, Amii; Battersby, Malcolm; Harvey, Peter; Problem Gambling Among Australian Male Prisoners: Lifetime Prevalence, Help-Seeking, and Association With Incarceration and Aboriginality; International Journal of Offender Therapy and Comparative Criminology; 2018; vol. 62 (no. 11); 3447-3459

Study details

Country/ies where study was carried out	Australia
Study dates	Not reported
Inclusion criteria	Participants had to: • Be imprisoned in study prisons (3 correctional facilities in South Australia)
Exclusion criteria	Not reported
Patient characteristics	N=296 males in a prison setting Age in years [Mean (SD)]: 37.7 (11.08)

<table>
<tr><td></td><td>Sex (n): M=296, F=0

Ethnicity (n):
• Aboriginal and/or Torres Strait Islander: 56
• Other: 240

Co-morbidities: Not reported.</td></tr>
<tr><td>Index test(s)</td><td>Criminality (measured using imprisonment)</td></tr>
<tr><td>Reference standard(s)</td><td>EIGHT gambling screen (brief lifetime pathological gambling screening tool)</td></tr>
<tr><td>Duration of follow-up</td><td>Not reported</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr>
<tr><td colspan="4">EIGHT at-risk* + problem + pathological gambling (≥2) – lifetime</td></tr>
<tr><td>Criminality + male (n)</td><td>216</td><td>80</td><td>73.0 (67.6-77.7)</td></tr>
<tr><td colspan="4">EIGHT problem + pathological gambling (≥4) – lifetime</td></tr>
<tr><td>Criminality + male (n)</td><td>177</td><td>119</td><td>59.8 (54.1-65.2)</td></tr>
<tr><td colspan="4">EIGHT pathological gambling (≥6) – lifetime</td></tr>
<tr><td>Criminality + male (n)</td><td>124</td><td>172</td><td>41.9 (36.4-47.6)</td></tr>
</table>
*defined in tool as ‘suggested for health promotional purposes or brief interventions’</td></tr>
<tr><td>Sources of funding</td><td>No industry funding (grant from Department for Correctional Services, South Australia)</td></tr>
</table>

Critical appraisal – NGA Critical appraisal – QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in prisons)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low

Section	Question	Answer
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	High (Unclear interval between index test [criminality] and reference standard; not all participants received reference standard [154/450 did not] and were subsequently not included in analysis)

Rudd, 2016

Bibliographic Reference: Rudd, Courtney; Thomas, Stuart D. M; The prevalence, mental health and criminal characteristics of potential problem gamblers in a substance using treatment seeking population.; International Journal of Mental Health and Addiction; 2016; vol. 14 (no. 5); 700-714

Study details

Country/ies where study was carried out	Australia
Study dates	2013
Inclusion criteria	Participants had to: • Attend face-to-face admission assessment at study treatment centre (Drug and Alcohol Rehabilitation Service in New South Wales Australia)

Exclusion criteria

- People with a criminal history of extremely violent charges
- People who were incarcerated at time of referral

Patient characteristics

N=266 adults using drug and alcohol rehabilitation services

Age in years [Mean (SD)]: 34.68 (10.21)

Sex (n): M=177, F=89

Ethnicity: Not reported.

Co-morbidities: Not reported.

Index test(s)

- Alcohol and other substance use disorder (measured using data extracted from client case files, no further details reported)
- Criminal history (measured using the Australian standard (ANZSOC))

Reference standard(s)

Gambling history extracted through client case files

Duration of follow-up

Not reported

Outcomes

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
Potential problem gambling* – time period not reported			
Alcohol and other substance use disorder (n)	57	209	21.4 (16.9-26.7)

*Self-report of being a current gambler or answering yes to ('do you gamble to chase your losses?'/do you gamble more than you can afford?')

ANZSOC category	Problem gamblers (M (SD)]	Non-problem gamblers (M (SD)]	p	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)
Offences Against the Person	0.89 (0.74)	0.73 (0.79)		1.29 (0.90-1.86)	1.19 (0.81-1.74)
Offences Against Property	0.70 (0.92)	0.35 (0.63)	<0.001	1.79 (1.24-2.59)	1.61 (1.10-2.37)
Offences Against	0.63 (0.69)	0.42 (0.63)	0.03	1.58 (1.04-2.40)	1.37 (0.89-2.13)

	Organisations, Government and Community					
	* Statistically adjusted for age and gender					
Sources of funding	No industry funding (Funding not reported but article includes a statement of no conflicts of interest)					

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in addiction treatment services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Unclear (Unclear whether index test was interpreted without knowledge of reference standard)
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Schielein, 2021

Bibliographic Schielein, Maximilian C; Tizek, Linda; Knobloch, Lisanne; Maasen, Dirk; Biedermann, Tilo; Zink, Alexander; Psoriasis and

Reference addiction: assessing mental health based on a cross-sectional study in Germany.; European journal of dermatology : EJD; 2021; vol. 31 (no. 6); 722-729

Study details

Country/ies where study was carried out	Germany
Study dates	September 2018 – November 2019
Inclusion criteria	Participants had to: • Be aged ≥18 years • Be diagnosed with psoriasis • Able to provide informed consent • Able to comprehend German questionnaire
Exclusion criteria	Not reported
Patient characteristics	N=502 adults presenting at dermatological clinics and practices Age in years: Not reported. Sex (n): M=284, F=218 Ethnicity: Not reported. Co-morbidities [Mean (SD)]: • Psoriasis Area and Severity Index: 7.3 (7.6) • Dermatology Life Quality Index: 7.5 (7.1) Co-morbidities (n): • Depression: 148 • Anxiety: 245
Index test(s)	Psoriasis co-morbidity (measured using attendance at dermatological clinics and practices)
Reference standard(s)	Gambler Anonymous 20 questions

Duration of follow-up	Not reported
Outcomes	

	Harmful gambling present	Harmful gambling not present	PPV (%) (95% CI)
Gamblers Anonymous 20 Questions compulsive gambling (≥7) – time period not reported			
Psoriasis (n)	6	481*	1.2 (0.6-2.7)

Sources of funding	No industry funding (Novartis Pharma GmbH)

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in dermatology clinics)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Turner, 2009

Bibliographic Turner, Nigel E; Preston, Denise L; Saunders, Crystal; McAvoy, Steven; Jain, Umesh; The relationship of problem gambling to

Reference criminal behavior in a sample of Canadian male federal offenders.; Journal of gambling studies; 2009; vol. 25 (no. 2); 153-69

Study details

Country/ies where study was carried out	Canada
Study dates	Not reported
Inclusion criteria	Participants had to: • Be imprisoned in study prison • Be a federal offender
Exclusion criteria	• People who had difficulties with language • Completed assessments with excessive missing values
Patient characteristics	N=256 males in a prison setting Age in years [Mean (SD)]: 34.6 (10.8) Sex (n): M=256, F=0 Ethnicity (n): • Caucasian: 174 • Black: 21 • East Asian: 3 • First Nation: 18 • Latin American: 10 • Mixed origin: 6 • Other: 24 Co-morbidities: Not reported.
Index test(s)	Criminality (measured using imprisonment)
Reference standard(s)	SOGS PGSI

	Consequences of harmful gambling assessed via 12-item harmful gambling consequences scale (HCG) Gambling history assessed via gambling history questionnaire
Outcomes	

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
PGSI low + moderate + problem gambling (≥1) – time period not reported			
Criminality + male (n)	121	133	47.6 (41.6-53.8)
PGSI moderate + problem gambling (≥3) – time period not reported			
Criminality + male (n)	64	190	25.2 (20.3-30.9)
PGSI problem gambling (≥8) – time period not reported			
Criminality + male (n)	24	230	9.4 (6.4-13.7)
DSM-IV-TR pathological gambling (≥5) – time period not reported			
Criminality + male (n)	16	238	6.3 (3.9-10.0)
SOGS probable pathological gambling (≥5) – previous 12 months			
Criminality + male (n)	33	221	13.0 (9.4-17.7)
SOGS probable pathological gambling (≥5) – lifetime			
Criminality + male (n)	38	216	15.0 (11.1-19.9)

Sources of funding	Unclear funding source (Ontario Problem Gambling Research Centre)

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in addiction treatment services)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference	Could the reference standard, its conduct, or its	Low

Section	Question	Answer
standard: risk of bias	interpretation have introduced bias?	(Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	High More than 2 years between index test [criminality] and reference standard; not all participants received reference standard [figures not reported] and were subsequently not included in analysis)

Turner, 2013

Bibliographic Reference	Turner, NE Preston, DL McAvoy, S Gillam, L; Problem Gambling Inside and Out: The Assessment of Community and Institutional Problem Gambling in the Canadian Correctional System; JOURNAL OF GAMBLING STUDIES; 2013; vol. 29 (no. 3); 435 - 451

Study details

Country/ies where study was carried out	Canada
Study dates	Not reported
Inclusion criteria	Not reported
Exclusion criteria	Not reported
Patient characteristics	N=422 adults in a prison setting Age in years [Mean (SD)]: 38.7 (SD not reported) Sex (n): M=381, F=41 Ethnicity (n):

	• Caucasian: 264 • Non-Caucasian (%): 158 Co-morbidities: Not reported.
Index test(s)	Criminality (measured using imprisonment)
Reference standard(s)	Gambling behaviour measured using a gambling behaviour questionnaire (assessing frequency and amount wagered) Gambling severity measured using SOGS, DSM-IV-TR, and CPGI/PGSI
Duration of follow-up	Not reported

Outcomes

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
DSM-IV low + moderate + pathological gambling (≥1) – previous 12 months to imprisonment			
Criminality (n)	116	306	27.5 (23.4-31.9)
DSM-IV moderate + pathological gambling (≥2) – previous 12 months to imprisonment			
Criminality (n)	54	368	12.8 (9.9-16.3)
DSM-IV pathological gambling (≥5) – previous 12 months to imprisonment			
Criminality (n)	33	389	7.8 (5.6-10.8)
PGSI low + moderate + problem gambling (≥1) – previous 12 months to imprisonment			
Criminality (n)	164	256	39.0 (34.5-43.8)
PGSI moderate + problem gambling (≥3) – previous 12 months to imprisonment			
Criminality (n)	88	332	21.0 (17.3-25.1)
PGSI problem gambling (≥8) – previous 12 months to imprisonment			
Criminality (n)	37	383	8.8 (6.5-11.9)
SOGS low + moderate + problem gambling (≥1) – previous 12 months to imprisonment			
Criminality (n)	152	267	36.3 (31.8-41.0)
SOGS moderate + problem gambling (≥3) – previous 12 months to imprisonment			
Criminality (n)	76	343	18.1 (14.7-22.1)
SOGS problem gambling (≥5) – previous 12 months to imprisonment			
Criminality (n)	56	363	13.4 (10.4-17.0)
DSM-IV low + moderate + pathological gambling (≥1) – during imprisonment			
Criminality (n)	82	338	19.5 (16.0-23.6)
DSM-IV moderate + pathological gambling (≥2) – during imprisonment			
Criminality (n)	33	389	7.8 (5.6-10.8)
DSM-IV pathological gambling (≥5) – during imprisonment			
Criminality (n)	20	402	4.7 (3.1-7.2)

	PGSI low + moderate + problem gambling (≥1) – during imprisonment			
	Criminality (n)	91	321	22.1 (18.3-26.3)
	PGSI moderate + problem gambling (≥3) – during imprisonment			
	Criminality (n)	50	362	12.1 (9.3-15.6)
	PGSI problem gambling (≥8) – during imprisonment			
	Criminality (n)	18	394	4.4 (2.8-6.8)
	SOGS low + moderate + problem gambling (≥1) – during imprisonment			
	Criminality (n)	85	334	20.3 (16.7-24.4)
	SOGS moderate + problem gambling (≥3) – during imprisonment			
	Criminality (n)	29	390	6.9 (4.9-9.8)
	SOGS problem gambling (≥5) – during imprisonment			
	Criminality (n)	22	397	5.3 (3.5-7.8)
Sources of funding	Unclear funding source (Ontario Problem Gambling Research Centre)			

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in prisons)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing:	Could the patient flow have introduced bias?	High

Section	Question	Answer
risk of bias		(Unclear interval between index test [criminality] and reference standard; not all participants received reference standard [38.5% did not] and were subsequently not included in analysis)

Widinghoff, 2019

Bibliographic Reference: Widinghoff, Carolina; Berge, Jonas; Wallinius, Märta; Billstedt, Eva; Hofvander, Björn; Håkansson, Anders; Gambling Disorder in Male Violent Offenders in the Prison System: Psychiatric and Substance-Related Comorbidity.; Journal of Gambling Studies; 2019; vol. 35 (no. 2); 485-500

Study details

Country/ies where study was carried out	Sweden
Study dates	March 2010 – July 2012
Inclusion criteria	Participants had to: • Be males • Be imprisoned in Western Region of the Swedish Prison and Probation Service • Be serving a sentence for violent crimes
Exclusion criteria	• People with insufficient language skills • Spending <4 weeks in current prison
Patient characteristics	N=264 males in a prison setting Age in years [Mean (SD)]: 22.3 (SD not reported) Sex (n): M=0, F=264 Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Criminality (measured using imprisonment)

Reference standard(s)	Structured DSM-IV checklist
Duration of follow-up	Not reported
Outcomes	<table><tr><td></td><td>Harmful gambling present (n)</td><td>Harmful gambling not present (n)</td><td>PPV (%) (95% CI)</td></tr><tr><td colspan="4">DSM IV pathological gambling – time period not reported</td></tr><tr><td>Criminality + male (n)</td><td>43</td><td>219</td><td>16.4 (12.4-21.4)</td></tr></table>
Sources of funding	Any industry funding (Svenska Spel)

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in prisons)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	High (Unclear interval between index test [criminality] and reference standard; not all participants received reference standard [115/379 did not] and were subsequently not included in analysis)

Wieczorek, 2019

Bibliographic Reference	Wieczorek, L.; Stokwiszewski, J.; Klingemann, J.I.; Screening of problem gambling among a homeless population in Warsaw; NAD Nordic Studies on Alcohol and Drugs; 2019; vol. 36 (no. 6); 542-555

Study details

Country/ies where study was carried out	Russia
Study dates	November 2015 and January 2016
Inclusion criteria	Participants had to: • Be aged ≥18 years • Have a lack of stable residence • Be current residents of Warsaw rehabilitation shelters or night shelters • Be able to provide informed consent
Exclusion criteria	• People noticeably under the influence of psychoactive substances
Patient characteristics	N=690 adults in rehabilitation shelters and night shelters Age in years [Mean (SD)]: Not reported, age categories (%): • 18-34: 15 • 35-54: 44 • 55+: 41 Sex (n): 621/69 Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Homelessness (measured using attendance at rehabilitation and night shelters)
Reference standard(s)	PGSI
Duration of follow-up	Not reported

Outcomes		Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
	PGSI low + moderate + problem gambling (≥1)			
	Homelessness (n)	208	482	30.1 (26.8-33.7)
	PGSI moderate + problem gambling (≥3)			
	Homelessness (n)	150	540	21.7 (18.8-25.0)
	PGSI problem gambling (≥8)			
	Homelessness (n)	78	612	11.3 (9.2-13.9)
Sources of funding	No industry funding (Fund of Solving of Gambling Problems being in disposal of the Ministry of Health)			

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in community services for people experiencing homelessness)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias tools)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	Low

Zurhold, 2014

Bibliographic Reference: Zurhold, Heike; Verthein, Uwe; Kalke, Jens; Prevalence of problem gambling among the prison population in Hamburg, Germany.; Journal of Gambling Studies; 2014; vol. 30 (no. 2); 309-319

Study details

Country/ies where study was carried out	Germany
Study dates	December 2009
Inclusion criteria	Participants had to: • Be imprisoned in study prisons (Hamburg penal institution)
Exclusion criteria	• People serving a prison sentence for not paying a fine
Patient characteristics	N=1284 adults in a prison setting Age in years [Mean (SD)]: 37 (SD not reported) Sex (n): M=1226, F=58 Ethnicity: Not reported. Co-morbidities: Not reported.
Index test(s)	Criminality (measured using imprisonment)
Reference standard(s)	Lie/Bet questionnaire DSM-IV questionnaire
Duration of follow-up	NA

Outcomes

	Harmful gambling present (n)	Harmful gambling not present (n)	PPV (%) (95% CI)
Lie/Bet problem gambling (≥1) and/or arrest warrant note – previous 12 months			
Criminality* (pre-trial detainees) (n)	54	763	6.6 (5.1-8.5)
Problem gambling (prison intake records showing type of gambling, treatment for			

	gambling, prison sentence resulting from gambling)			
	Criminality** (sentenced prisoners) (n)	90	1146	7.3 (6.0-8.9)
Sources of funding	No industry funding (Interstate Treaty on Gambling of the Federal State Hamburg)			

Critical appraisal - NGA Critical appraisal - QUADAS-2

Section	Question	Answer
Patient selection: risk of bias	Could the selection of patients have introduced bias?	High (Study did not avoid inappropriate exclusions as conducted in prisons)
Patient selection: applicability	Are there concerns that included patients do not match the review question?	Low
Index tests: risk of bias	Could the conduct or interpretation of the index test have introduced bias?	Low
Index tests: applicability	Are there concerns that the index test, its conduct, or interpretation differ from the review question?	Low
Reference standard: risk of bias	Could the reference standard, its conduct, or its interpretation have introduced bias?	Unclear (Reference standard was interpreted with knowledge of index test; however, study used standardised measurement tools to measure harmful gambling which does reduce the potential for bias)
Reference standard: applicability	Is there concern that the target condition as defined by the reference standard does not match the review question?	Low
Flow and timing: risk of bias	Could the patient flow have introduced bias?	High (For pre-trial detainees: Not all participants received reference standard [234/1051 did not] and were subsequently not included in analysis) (For imprisoned participants: Unclear interval between index test [criminality] and reference standard; not all participants received reference standard [82/1318] did not] and were subsequently not included in analysis)

Appendix E Forest plots

Forest plots for review question: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

No meta-analysis was conducted for this review question and so there are no forest plots.

Appendix F GRADE tables

GRADE tables for review question: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

No industry funding

Table 16: GRADE table for risk factors for harmful gambling within addiction services from studies receiving no industry funding

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Alcohol and other drug co-addiction								
1 (Adamson 2006)	Population: 105 adults using community alcohol and drug services	≥5 SOGS, current	PPV: 11.4 (6.7-18.9)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
1 (ANPAA 2011)	Population: 2790 adults using addiction treatment centres	≥2 DEBA-jeu, time period not reported	PPV: 18.5 (17.0-20.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥6 DEBA-jeu, time period not reported	PPV: 6.5 (5.6-7.5)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
1 (Pereiro 2013)	Population: 2300 adults using the addictive disorder assistance units	Not reported, time period not reported	PPV: 1.2 (0.8-1.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
1 (Rudd	Population:	Self-report,	PPV: 21.4 (16.9-26.7)	Very serious[1]	No serious	No serious	No serious	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
2016)	266 adults using drug and alcohol rehabilitation services	time period not reported			inconsistency	indirectness	imprecision	
Risk factor(s): Alcohol co-addiction								
1 (Bodor 2018)	Population: adults using alcohol addiction treatment services	≥1 SOGS, time period not reported	PPV: 22.1 (16.1-29.7)	Serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
		≥5 SOGS, time period not reported	PPV: 10.0 (6.1-16.1)	Serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
1 (Brunault 2019)	Population: 133 adults using drug and alcohol addiction treatment services	≥3 CPGI, time period not reported	PPV: 8.3 (4.7-14.2)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥8 CPGI, time period not reported	PPV: 2.3 (0.8-6.4)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[3]	VERY LOW
Risk factor(s): Opioid substitution treatment								
1 (Castren 2015)	Population: 144 adults at an inpatient drug addiction treatment centre	≥1 BBSG, previous 12 months	PPV: 12.5 (8.1-18.9)	Serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE

BBGS: Brief Biosocial Gambling Screen; CI: Confidence interval; CPGI: Canadian Problem Gambling Index; DEBA-jeu; Détection et Besoin d'Aide en regard du Jeu Excessif; PPV: Positive predictive value; South Oaks Gambling Screen
1 Very serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
2 Serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
3 95% CI crosses 1 decision making threshold (for PPV: 0.4 and 2.0)

Table 17: GRADE table for association data relating to risk factors for harmful gambling within addiction services from studies receiving no industry funding

No of studies	Study details	Reference standard	Effect size (95% CI)*	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Alcohol and other drug co-addiction + criminality [ANZSOC category = Offences against the Person]								
1 (Rudd 2016)	Population: 266 adults using drug and alcohol rehabilitation services	Self-report, time period not reported	OR*: 1.29 (0.90-1.86)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
			aOR**: 1.19 (0.81-1.74)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
Risk factor(s): Alcohol and other drug co-addiction + criminality [ANZSOC category = Offences against Property]								
1 (Rudd 2016)	Population: 266 adults using drug and alcohol rehabilitation services	Self-report, time period not reported	OR*: 1.79 (1.24-2.59)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
			aOR**: 1.61 (1.10-2.37)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
Risk factor(s): Alcohol and other drug co-addiction + criminality [ANZSOC category = Offences Against Organisations, Government and Community]								
1 (Rudd 2016)	Population: 266 adults using drug and alcohol rehabilitation services	Self-report, time period not reported	OR*: 1.58 (1.04-2.40)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
			aOR**: 1.37 (0.89-2.13)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW

ANZSOC: Australian and New Zealand Society of Criminology; CI: Confidence interval; (a)OR: (adjusted) Odd ratio
**Final outcome figure extracted from paper. Raw data not provided.*
*** Statistically adjusted for age and gender*
1 Very serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
2 95% CI crosses 1 MID

Table 18: GRADE table for risk factors for harmful gambling within psychiatric services from studies receiving no industry funding

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Psychiatric disorder co-morbidity								
1	Population:	≥1 CPGI,	PPV: 9.4 (7.7-11.5)	Very serious[1]	No serious	No serious	No serious	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
(Bergamini 2018)	900 adults in a psychiatric unit	time period not reported			inconsistency	indirectness	imprecision	
		≥3 CPGI, time period not reported	PPV: 5.3 (4.0-7.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥8 CPGI, time period not reported	PPV: 3.3 (2.3-4.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
1 (Nehlin 2013)	Population: 2161 adults in a psychiatric clinic	≥1 own questionnaire, previous 12 months	PPV: 8.8 (7.7-10.1)	Serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Mental health co-morbidity + experiencing homelessness								
1 (Nielsse n 2018)	Population: 2388 adults in mental health clinics located in homeless hostels	Not reported, time period not reported	PPV: 12.1 (10.9-13.5)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW

CI: Confidence interval; CPGI: Canadian Problem Gambling Index; PPV: Positive predictive value
1 Very serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
2 Serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2

Table 19: GRADE table for risk factors for harmful gambling within primary care services from studies receiving no industry funding

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Depression co-morbidity								
1 (Cowlishaw 2017)	Population: 1058 adults presenting to general	≥1 PGSI, time period not reported	PPV: 6.8 (5.0-9.2)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 97.0 (95.1-98.2)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
	practice		Sensitivity: 71.7 (58.4-82.0)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Specificity: 48.0 (44.9-51.1)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
Risk factor(s): Worried about depression								
1 (Goodyear-Smith 2006)	Population: 2536 adults presenting at primary healthcare providers	Multi-item screening tool, time period not reported	PPV: 4.9 (3.8-6.4)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 98.4 (97.6-98.9)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Sensitivity: 68.8 (57.8-78.1)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Specificity: 58.2 (56.2-60.1)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Anxiety co-morbidity								
1 (Cowlishaw 2017)	Population: 1058 adults presenting to general practice	≥1 PGSI, time period not reported	PPV: 7.3 (4.7-11.0)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 96.0 (94.4-97.1)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Sensitivity: 37.3 (25.3-51.0)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Specificity: 75.9 (73.1-78.4)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Worried about anxiety								
1 (Goodyear-Smith 2006)	Population: 2536 adults presenting at primary healthcare providers	Multi-item screening tool, time period not reported	PPV: 4.6 (3.5-6.1)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 97.9 (97.0-98.5)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Sensitivity: 58.2 (47.2-68.5)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Specificity: 61.3 (59.4-63.2)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Worried about anhedonia								

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
1 (Goodyear-Smith 2006)	Population: 2536 adults presenting at primary healthcare providers	Multi-item screening tool, time period not reported	PPV: 5.2 (3.9-7.0)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 97.9 (97.0-98.5)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Sensitivity: 53.2 (42.3-63.8)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Specificity: 68.9 (67.1-70.7)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Alcohol co-addiction								
1 (Cowlishaw 2017)	Population: 1058 adults presenting to general practice	≥1 PGSI, time period not reported	PPV: 9.8 (6.9-13.6)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 96.8 (95.3-97.8)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Sensitivity: 55.6 (42.4-68.0)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Specificity: 72.4 (69.6-75.1)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Worried about drinking								
1 (Goodyear-Smith 2006)	Population: 2536 adults presenting at primary healthcare providers	Multi-item screening tool, time period not reported	PPV: 7.0 (4.5-10.8)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 97.3 (96.6-97.9)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Sensitivity: 22.8 (14.9-33.2)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Specificity: 90.2 (89.0-98.1)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Drug co-addiction								
1 (Cowlishaw 2017)	Population: 1058 adults presenting to general practice	≥1 PGSI, time period not reported	PPV: 15.7 (10.6-22.6)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 96.7 (95.4-97.7)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Sensitivity: 42.3 (29.9-	Serious[1]	No serious	No serious	Serious[2]	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
			55.8)		inconsistency	indirectness		
			Specificity: 88.3 (86.1-90.1)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Worried about other drug use								
1 (Goodyear-Smith 2006)	Population: 2536 adults presenting at primary healthcare providers	Multi-item screening tool, time period not reported	PPV: 13.2 (7.1-23.3)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 97.2 (96.4-97.7)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Sensitivity: 11.4 (6.1-20.3)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Specificity: 97.6 (96.9-98.1)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Worried about smoking								
1 (Goodyear-Smith 2006)	Population: 2536 adults presenting at primary healthcare providers	Multi-item screening tool, time period not reported	PPV: 7.4 (5.2-10.4)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 97.7 (97.0-98.3)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Sensitivity: 38.0 (28.1-49.0)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Specificity: 84.7 (83.2-86.1)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Worried about domestic violence								
1 (Goodyear-Smith 2006)	Population: 2536 adults presenting at primary healthcare providers	Multi-item screening tool, time period not reported	PPV: 2.3 (0.8-6.6)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 96.8 (96.1-97.5)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Sensitivity: 3.8 (1.3-10.6)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Specificity: 94.8 (93.9-95.6)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Worried about anger								
1	Population:	Multi-item	PPV: 6.2 (4.2-9.1)	Serious[1]	No serious	No serious	No serious	MODERATE

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
(Goodyear-Smith 2006)	2536 adults presenting at primary healthcare providers	screening tool, time period not reported			inconsistency	indirectness	imprecision	
			NPV: 97.4 (96.7-98.0)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Sensitivity: 30.4 (21.3-41.2)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Specificity: 85.2 (83.8-86.6)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Not participating in adequate exercise*								
1 (Goodyear-Smith 2006)	Population: 2536 adults presenting at primary healthcare providers	Multi-item screening tool, time period not reported	PPV: 2.8 (2.0-3.9)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 96.6 (95.5-97.4)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Sensitivity: 40.5 (30.4-51.5)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Specificity: 54.2 (52.2-56.2)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Worried about weight								
1 (Goodyear-Smith 2006)	Population: 2536 adults presenting at primary healthcare providers	Multi-item screening tool, time period not reported	PPV: 2.7 (2.0-3.6)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			NPV: 96.3 (95.0-97.2)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
			Sensitivity: 49.4 (38.6-60.2)	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	LOW
			Specificity: 42.0 (40.1-44.0)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE

CI: Confidence interval; NPV: Negative predictive value; PGSI: Problem Gambling Severity Index; PPV: Positive predictive value
**Adequate exercise defined as at least 30 minutes of moderate or vigorous exercise (such as walking or a sport) on 5 or more days of the week*
1 Serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
2 95% CI crosses 1 decision making threshold (for NPV: 98.0 and 99.6; for sensitivity: 50.0 and 80.0; for specificity: 50.0 and 80.0)

Table 20: GRADE table for risk factors for harmful gambling within secondary care services from studies receiving no industry funding

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): PTSD co-morbidity + male + veteran								
1 (Biddle 2005)	Population: 153 males using PTSD treatment programs	≥5 SOGS, lifetime	PPV: 21.1 (16.0-27.4)	Serious[1]	No inconsistency	No indirectness	No serious imprecision	MODERATE
		≥5 DSM-IV, time period not reported	PPV: 12.4 (8.5-17.7)	Serious[1]	No inconsistency	No indirectness	No imprecision	MODERATE
Risk factor(s): Psoriasis co-morbidity								
1 (Schielein 2021)	Population: 502 adults presenting dermatological clinics and practices	≥7 GA 20 Questions, time period not reported	PPV: 1.2 (0.6-2.7)	Serious[1]	No inconsistency	No indirectness	Serious[2]	LOW

CI: Confidence interval; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders (4th edition); GA: Gambler's Anonymous; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen
1 Serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
2 95% CI crosses 1 decision making threshold (for PPV: 0.4 and 2.0)

Table 21: GRADE table for risk factors for harmful gambling within community services from studies receiving no industry funding

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Cocaine use in previous month								
1 (Dufour 2016)	Population: 424 adults using community-based programs (including day programs for the homeless, various shelters, and needle	≥3 PGSI, previous 12 months	PPV: 18.4 (15.0-22.4)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
	exchange programs)							
Risk factor(s): Experiencing homelessness								
1 (Wieczorek 2019)	Population: 690 adults in rehabilitation shelters and night shelters	≥1 PGSI, time period not reported	PPV: 30.1 (26.8-33.7)	Serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
		≥3 PGSI, time period not reported	PPV: 21.7 (18.8-25.0)	Serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
		≥8 PGSI, time period not reported	PPV: 11.3 (9.2-13.9)	Serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
Risk factor(s): Cocaine use in previous month + family history of harmful gambling								
1 (Dufour 2016)	Population: 424 adults using community-based programs (including day programs for the homeless, various shelters, and needle exchange programs)	≥3 PGSI, previous 12 months	PPV: 35.1 (28.6-42.3)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 94.3 (90.5-96.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 83.3 (73.5-90.0)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
			Specificity: 64.3 (59.0-69.2)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Cocaine use in previous month + family history of alcohol or drug addiction								
1 (Dufour 2016)	Population: 424 adults using community-	≥3 PGSI, previous 12 months	PPV: 18.3 (14.5-22.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 81.3 (72.1-88.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
	based programs (as above)		Sensitivity: 78.2 (67.8-85.9)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
			Specificity: 21.4 (17.4-26.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of panic disorder]								
1 (Dufour 2016)	Population: 424 adults using community-based programs (as above)	≥3 PGSI, previous 12 months	PPV: 20.5 (13.0-30.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 82.1 (77.7-85.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 20.5 (13.0-30.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Specificity: 82.1 (77.7-85.8)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of phobic disorder]								
1 (Dufour 2016)	Population: 424 adults using community-based programs (as above)	≥3 PGSI, previous 12 months	PPV: 24.3 (18.0-31.9)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 84.6 (80.0-88.4)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 44.9 (34.3-55.9)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Specificity: 68.5 (63.4-73.2)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of generalised anxiety disorder]								
1 (Dufour 2016)	Population: 424 adults using community-based programs (as above)	≥3 PGSI, previous 12 months	PPV: 23.5 (15.0-34.9)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 82.6 (78.3-86.2)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 20.5 (13.0-30.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Specificity: 85.0 (80.8-88.4)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of major depression]								

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
1 (Dufour 2016)	Population: 424 adults using community-based programs (as above)	≥3 PGSI, previous 12 months	PPV: 18.8 (11.7-28.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 81.7 (77.3-85.4)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 19.2 (12.0-29.3)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Specificity: 81.2 (76.8-85.0)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of bipolar disorder]								
1 (Dufour 2016)	Population: 424 adults using community-based programs (as above)	≥3 PGSI, previous 12 months	PPV: 17.1 (8.1-32.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 81.5 (77.3-85.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 7.7 (3.6-15.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Specificity: 91.6 (88.2-94.1)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of dysthymic disorder]								
1 (Dufour 2016)	Population: 424 adults using community-based programs (as above)	≥3 PGSI, previous 12 months	PPV: 14.3 (5.0-34.6)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 81.4 (77.3-84.9)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 3.8 (1.3-10.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Specificity: 94.8 (91.9-96.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Cocaine use in previous month + psychiatric co-morbidity [diagnosis of schizophrenic disorder]								
1 (Dufour 2016)	Population: 424 adults using community-based	≥3 PGSI, previous 12 months	PPV: 42.9 (15.8-75.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 98.6 (96.7-99.4)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
			Sensitivity: 37.5 (13.7-	Very serious[1]	No serious	No serious	Serious[2]	VERY LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
	programs (as above)		69.4)		inconsistency	indirectness		
			Specificity: 98.8 (97.1-99.5)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Cocaine use in previous month + presence of early 'big' win								
1 (Dufour 2016)	Population: 424 adults using community-based programs (as above)	≥3 PGSI, previous 12 months	PPV: 25.0 (19.8-31.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 89.3 (84.2-92.9)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 73.1 (62.3-81.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Specificity: 50.6 (45.3-55.8)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
Risk factor(s): Cocaine use in previous month + presence of early 'big' loss								
1 (Dufour 2016)	Population: 424 adults using community-based programs (as above)	≥3 PGSI, previous 12 months	PPV: 28.6 (20.6-38.2)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 84.7 (80.3-88.2)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 35.9 (26.1-47.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Specificity: 79.8 (75.2-83.7)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
Risk factor(s): Cocaine use in previous month + alcohol co-addiction [CAGE ≥2]								
1 (Dufour 2016)	Population: 424 adults using community-based programs (as above)	≥3 PGSI, previous 12 months	PPV: 21.1 (16.8-26.2)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			NPV: 87.1 (80.6-91.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 76.9 (66.4-84.9)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
			Specificity: 35.3 (30.4-40.4)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Cocaine use in previous month + cocaine co-addiction [SDS ≥4]								
1	Population:	≥3 PGSI,	PPV: 18.0 (14.4-22.3)	Very serious[1]	No serious	No serious	No serious	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
(Dufour 2016)	424 adults using community-based programs (as above)	previous 12 months			inconsistency	indirectness	imprecision	
			NPV: 79.3 (67.2-87.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
			Sensitivity: 84.6 (75.0-91.0)	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	VERY LOW
			Specificity: 13.3 (10.1-17.3)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW

CAGE: Cut, Annoyed, Guilty, and Eye test; CI: Confidence interval; PGSI: Problem Gambling Severity Index; PPV: Positive predictive value; SDS: Severity of Dependence Scale
1 Very serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
2 95% CI crosses 1 decision making threshold (for NPV: 98.0 and 99.6; for sensitivity: 50.0 and 80.0; for specificity: 50.0 and 80.0)

Table 22: GRADE table for risk factors for harmful gambling within prison system services from studies receiving no industry funding

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Criminality								
1 (Beaudette 2016)	Population: 1110 adults in correctional service	SCID-1, current	PPV: 5.8 (4.5-7.3)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
		SCID-1, lifetime	PPV: 9.9 (8.3-11.8)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
1 (Zurhold 2014)	Population: 1284 adults in a prison setting	Lie-bet and arrest warrant, previous 12 months	PPV: 6.6 (5.1-8.5)	Very serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		Prison intake records, time period not reported	PPV: 7.3 (6.0-8.9)	Very serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Criminality + male								
2 (Riley 2015, Riley	Population: 401 males in a prison	≥2 EIGHT, lifetime	PPV: 75.8 (71.4-79.7)	Very serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥4 EIGHT,	PPV: 57.6 (52.7-62.3)	Very serious[2]	No serious	No serious	No serious	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
2018)	setting	lifetime			inconsistency	indirectness	imprecision	
		≥6 EIGHT, lifetime	PPV: 41.6 (36.9-46.5)	Very serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Criminality + female								
1 (Riley 2017)	Population: 74 females in a prison setting	≥2 EIGHT, lifetime	PPV: 71.6 (60.5-80.6)	Very serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥4 EIGHT, lifetime	PPV: 63.5 (52.1-73.6)	Very serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥6 EIGHT, lifetime	PPV: 52.7 (41.5-63.7)	Very serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW

CI: Confidence interval; EIGHT: Early Intervention Gambling Health Test; PPV: Positive predictive value; SCID-I: Structured Clinical Interview for DSM Axis I Disorder
1 Serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
2 Very serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2

Any industry funding

Table 23: GRADE table for risk factors for harmful gambling within community services from studies receiving any industry funding

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Community service users in previous 3 months								
1 (Lepage 2000)	Population: 87 adults presenting at community organisations which assist with food, materials or lodging	≥3 SOGS, lifetime	PPV: 29.9 (21.3-40.2)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE
		≥5 SOGS, lifetime	PPV: 17.2 (10.7-26.5)	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE

CI: Confidence interval; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen
1 Serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2

Table 24: GRADE table for risk factors for harmful gambling within prison system services from studies receiving any industry funding

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Criminality + male								
1 (Windinghoff 2019)	Population: 264 males in a prison setting	≥5 DSM-IV, time period not reported	PPV: 16.4 (12.4-21.4)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Criminality + female								
1 (Abbott 2005)	Population: 94 women in a prison setting	Self-report, 6 months prior to imprisonment	PPV: 11.7 (6.7-19.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		Self-report, lifetime	PPV: 21.3 (14.2-30.6)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥3 SOGS-R, 6 months prior to imprisonment	PPV: 34.0 (25.3-44.1)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥3 SOGS-R, lifetime	PPV: 44.7 (35.0-54.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥5 SOGS-R, 6 months prior to imprisonment	PPV: 22.3 (15.1-31.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥5 SOGS-R, lifetime	PPV: 33.0 (24.3-43.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW

CI: Confidence interval; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders (4th edition); PPV: Positive predictive value; SOGS-R: Revised South Oaks Gambling Screen

1 Serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2

Unclear funding source

Table 25: GRADE table for risk factors for harmful gambling within addiction services from studies receiving funding from an unclear funding source

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Alcohol and other drug co-addiction								
1 (Baldo 2006)	Population: 113 adults using health services for addiction treatment	≥5 SOGS, time period not reported	PPV: 15.0 (9.6-22.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Alcohol co-addiction								
1 (Cavicchioli 2020)	Population: 319 adults using an alcohol dependence treatment unit	Not reported, time period not reported	PPV: 4.74 (2.5-8.8)	Serious[2]	No serious inconsistency	No serious indirectness	No serious imprecision	MODERATE

CI: Confidence interval; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen
1 Very serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
2 Serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2

Table 26: GRADE table for risk factors for harmful gambling within psychiatric services from studies receiving funding from an unclear funding source

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Admittance to psychiatric emergency service								
1 (Chaput 2007)	Population: 21921 adults attending psychiatric emergency unit	≥5 DSM-IV, time period not reported	PPV: 0.7 (0.6-0.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
1 (Perrine	Population: 210 adults on	≥5 SOGS,	PPV: 6.2 (3.7-10.3)	Very serious[1]	No serious	No serious	No serious	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
2008)	psychiatric emergency wards	current			inconsistency	indirectness	imprecision	
Risk factor(s): Psychosis co-morbidity								
1 (Haydock 2015)	Population: 435 adults presenting at public mental health services providing mental health support	≥1 PGSI, time period not reported	PPV: 16.3 (13.1-20.1)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥1 PGSI, time period not reported	PPV: 12.2 (9.4-15.6)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥1 PGSI, time period not reported	PPV: 5.7 (3.9-8.3)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Depression co-morbidity								
1 (Lejoyeux 2002)	Population: 107 adults presenting at the acute care university hospital receiving psychiatric patients	MIDI and DSM-IV (cut-off not reported), time period not reported	PPV: 2.8 (1.0-7.9)	Serious[2]	No serious inconsistency	No serious indirectness	Serious[3]	LOW

CI: Confidence interval; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders (4th edition); MIDI: Minnesota Impulsive Disorders Interview; PGSI: Problem Gambling Severity Index; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen
1 Very serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
2 Serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2
3 95% CI crosses 1 decision making threshold (for PPV: 0.4 and 2.0)

Table 27: GRADE table for risk factors for harmful gambling within prison system services from studies receiving funding from an unclear funding source

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
Risk factor(s): Criminality								
1 (Turner 2013)	Population: 422 adults in a prison setting	≥1 DSM-IV, 12 months prior to imprisonment	PPV: 27.5 (23.4-31.9)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥1 DSM-IV, during imprisonment	PPV: 19.5 (16.0-23.6)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥2 DSM-IV, 12 months prior to imprisonment	PPV: 12.8 (9.9-16.3)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥2 DSM-IV, during imprisonment	PPV: 7.8 (5.6-10.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥5 DSM-IV, 12 months prior to imprisonment	PPV: 7.8 (5.6-10.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥5 DSM-IV, during imprisonment	PPV: 4.7 (3.1-7.2)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥1 PGSI, 12 months prior to imprisonment	PPV: 39.0 (34.5-43.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
		≥1 PGSI, during imprisonment	PPV: 22.1 (18.3-26.3)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥3 PGSI, 12 months prior to imprisonment	PPV: 21.0 (17.3-25.1)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥3 PGSI, during imprisonment	PPV: 12.1 (9.3-15.6)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥8 PGSI, 12 months prior to imprisonment	PPV: 8.8 (6.5-11.9)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥8 PGSI, during imprisonment	PPV: 4.4 (2.8-6.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥1 SOGS, 12 months prior to imprisonment	PPV: 36.3 (31.8-41.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥1 SOGS, during imprisonment	PPV: 20.3 (16.7-24.4)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥3 SOGS, 12 months prior to imprisonme	PPV: 18.1 (14.7-22.1)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
		nt						
		≥3 SOGS, during imprisonment	PPV: 6.9 (4.9-9.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥5 SOGS, 12 months prior to imprisonment	PPV: 13.4 (10.4-17.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥5 SOGS, during imprisonment	PPV: 5.3 (3.5-7.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Criminality + male								
1 (May-Chahal 2012)	Population: 201 males in a prison setting	≥1 PGSI, 12 months prior to imprisonment	PPV: 42.3 (40.5-54.2)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥3 PGSI, 12 months prior to imprisonment	PPV: 27.9 (22.1-34.4)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥8 PGSI, 12 months prior to imprisonment	PPV: 10.4 (6.9-15.4)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
1 (Turner 2009)	Population: 256 males in a prison setting	≥1 PGSI, time period not reported	PPV: 47.6 (41.6-53.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥3 PGSI,	PPV: 25.2 (20.3-30.9)	Very serious[1]	No serious	No serious	No serious	LOW

No of studies	Study details	Reference standard	Effect size (95% CI)	Risk of bias	Inconsistency	Indirectness	Imprecision	Quality of evidence
		time period not reported			inconsistency	indirectness	imprecision	
		≥8 PGSI, time period not reported	PPV: 9.4 (6.4-13.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥5 DSM-IV, time period not reported	PPV: 6.3 (3.9-10.0)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥5 SOGS, previous 12 months	PPV: 13.0 (9.4-17.7)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥5 SOGS, lifetime	PPV: 15.0 (11.1-19.9)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
Risk factor(s): Criminality + female								
1 (May-Chahal 2012)	Population: 222 females in a prison setting	≥1 PGSI, 12 months prior to imprisonment	PPV: 28.8 (23.3-35.1)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥3 PGSI, 12 months prior to imprisonment	PPV: 18.0 (13.5-23.6)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW
		≥8 PGSI, 12 months prior to imprisonment	PPV: 5.9 (3.5-9.8)	Very serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	LOW

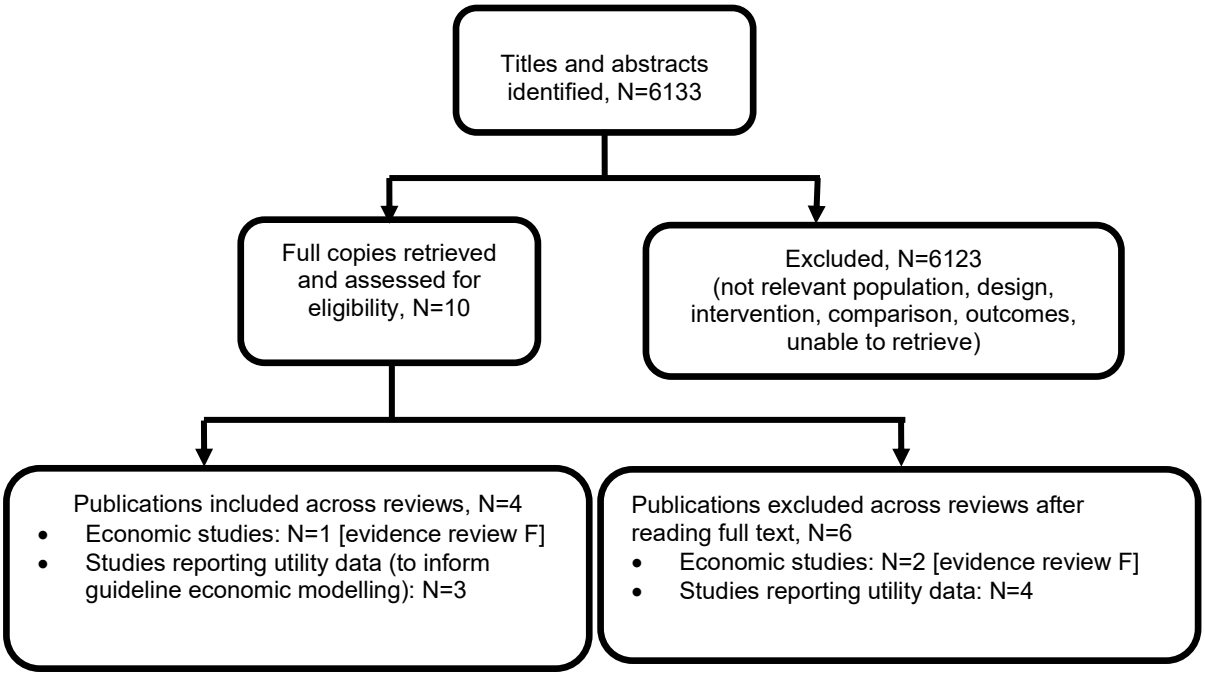
CI: Confidence interval; DSM-IV(-TR): Diagnostic and Statistical Manual of Mental Disorders (4th edition) (text revision); PGSI: Problem Gambling Severity Index; PPV: Positive predictive value; SOGS: South Oaks Gambling Screen
1 Very serious risk of bias in the evidence contributing to the outcomes as per QUADAS-2

Appendix G Economic evidence study selection

Study selection for: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

A global health economics search was undertaken for all areas covered in the guideline. **Figure 2** shows the flow diagram of the selection process for economic evaluations of interventions and strategies associated with the care of people who participate in harmful gambling, their families, friends and others close to them, and studies reporting gambling-related health state utility data.

Figure 2: Study selection flow chart



Appendix H Economic evidence tables

Economic evidence tables for review question: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

No economic evidence was identified which was applicable to this review question.

Appendix I Economic model

Economic model for review question: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

No economic analysis was conducted for this review question.

Appendix J Excluded studies

Excluded studies for review question: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

Excluded diagnostic studies

Table 28: Excluded studies and reasons for their exclusion

Study	Reason for exclusion
Alvarez-Moya, Eva M, Jimenez-Murcia, Susana, Granero, Roser et al. (2007) Comparison of personality risk factors in bulimia nervosa and pathological gambling. Comprehensive psychiatry 48(5): 452-7	- Population Non-randomised and non-consecutive selection of participants.
Bagby, RM, Vachon, DD, Bulmash, E et al. (2008) Personality disorders and pathological gambling: a review and re-examination of prevalence rates. Journal of Personality Disorders 22(2): 191-207	- Population Participants did not present to a non-gambling specialist setting.
Banks, J, Waters, J, Andersson, C et al. (2020) Prevalence of Gambling Disorder Among Prisoners: A Systematic Review. International journal of offender therapy and comparative criminology 64(12): 306624x19862430	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and 5 were identified.
Barkley, Russell A. (2019) Research Findings. ADHD Report 27(3): 8-12	- Publication type Research article abstracts
Blank, Lindsay, Baxter, Susan, Woods, Helen Buckley et al. (2021) Should screening for risk of gambling-related harm be undertaken in health, care and support settings? A systematic review of the international evidence. Addiction science & clinical practice 16(1): 35	- Study design Mixed study designs. Systematic review includes studies with both included (for example, cross-sectional and diagnostic test accuracy) and excluded (for example, qualitative and mixed-methods) study designs, with results not presented separately for target study designs. Included studies were checked for relevance to protocol – and none were identified.
Blaszczynski, A and Nower, L (2010) Instrumental tool or drug: relationship between attitudes to money and problem gambling. Addiction Research & Theory 18(6): 681-691	- Population Participants did not present to a non-gambling specialist setting.
Brakoulias, Vlasios, Starcevic, Vladan, Albert, Umberto et al. (2020) The rates of co-occurring behavioural addictions in treatment-seeking individuals with obsessive-compulsive disorder: a preliminary report. International Journal of Psychiatry in Clinical Practice 24(2): 173-175	- Other protocol criteria Study includes data from both included and excluded study countries, with results not presented separately for target countries.
Chowdhury, Nahian S, Livesey, Evan J, Blaszczynski, Alex et al. (2017) Pathological Gambling and Motor Impulsivity: A Systematic Review with Meta-Analysis. Journal of gambling studies 33(4): 1213-1239	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to

Study	Reason for exclusion
	protocol – and none were identified.
Cipriani, G., Cammisuli, D.M., Danti, S. et al. (2016) Disordered gambling and dementia. European Geriatric Medicine 7(5): 474-478	- Study design Non-systematic literature review
Del Pino-Gutierrez, Amparo, Jimenez-Murcia, Susana, Fernandez-Aranda, Fernando et al. (2017) The relevance of personality traits in impulsivity-related disorders: From substance use disorders and gambling disorder to bulimia nervosa. Journal of behavioral addictions 6(3): 396-405	- Population Mixed population. Systematic review includes studies with both included (presenting to a non-gambling specialist setting) and excluded (presenting to a gambling treatment setting) participants, with results not presented separately for target population. Included studies were checked for relevance to protocol – and none were identified.
Deutscher, Karl, Gutwinski, Stefan, Bermpohl, Felix et al. (2022) The Prevalence of Problem Gambling and Gambling Disorder Among Homeless People: A Systematic Review And Meta-Analysis. Journal of gambling studies	- Population Mixed population. Systematic review includes studies with both included (presenting to a non-gambling specialist setting) and excluded (presenting to a gambling treatment setting) participants, with results not presented separately for target population. Included studies were checked for relevance to protocol – and none were identified.
Devoe, Daniel J, Anderson, Alida, Bahji, Anees et al. (2021) The Prevalence of Impulse Control Disorders and Behavioral Addictions in Eating Disorders: A Systematic Review and Meta-Analysis. Frontiers in psychiatry 12: 724034	- Reference standard Mixed reference standard. Systematic review includes studies with both included (harmful gambling) and excluded (other impulse control disorders and behavioural addictions) reference standards, with results not presented separately for target reference standard. Included studies were checked for relevance to protocol – and none were identified.
Di Nicola, Marco, Tedeschi, Daniela, De Risio, Luisa et al. (2015) Co-occurrence of alcohol use disorder and behavioral addictions: relevance of impulsivity and craving. Drug and alcohol dependence 148: 118-25	- Study design Non-randomised and non-consecutive selection of participants.
Dighton, G., Wood, K., Armour, C. et al. Gambling problems among United Kingdom armed forces veterans: Associations with gambling motivation and posttraumatic stress disorder. INTERNATIONAL GAMBLING STUDIES	- Population Participants did not present to a non-gambling specialist setting.
Dodd, M Leann, Klos, Kevin J, Bower, James H et al. (2005) Pathological gambling caused by drugs used to treat Parkinson disease. Archives of neurology 62(9): 1377-81	- Study design Case series
Dowling, Nicki, Suomi, Aino, Jackson, Alun et al. (2016) Problem Gambling and Intimate Partner Violence: A Systematic Review and Meta-Analysis. Trauma, violence & abuse 17(1): 43-61	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Dudfield, Francine W H; Malouff, John M; Meynadier, Jai (2022) The Association between the Five-factor Model of Personality and Problem Gambling: a Meta-analysis. Journal of	- Population Mixed population. Systematic review includes studies with both included (presenting to a non-

Study	Reason for exclusion
gambling studies	gambling specialist setting) and excluded (presenting to a gambling treatment setting) participants, with results not presented separately for target population. Included studies were checked for relevance to protocol – and none were identified.
Durdle, Heather; Gorey, Kevin M; Stewart, Sherry H (2008) A meta-analysis examining the relations among pathological gambling, obsessive-compulsive disorder, and obsessive-compulsive traits. Psychological reports 103(2): 485-98	- Publication date Mixed publication dates. Systematic review includes studies from both included (2000 onwards) and excluded (pre-2000) time periods, with results not presented separately for target time period. Included studies were checked for relevance to protocol – and none were identified.
Eisenberg, Seth (2001) Psychiatric comorbidity in the addictions treatment setting: Assessment, diagnosis, and treatment. Psychiatric Rehabilitation Skills 5(1): 108-130	- Other protocol criteria Study country not in protocol: US
Elley, Carolyn Raina, Dawes, Diana, Dawes, Martin et al. (2014) Screening for lifestyle and mental health risk factors in the waiting room: feasibility study of the Case-finding Health Assessment Tool. Canadian family physician Medecin de famille canadien 60(11): e527-34	- Outcomes Not able to compare harmful gambling respondents against identified risk factors.
Erevik, Eilin K, Landro, Helene, Mattson, Ase L et al. (2022) Problem gaming and suicidality: A systematic literature review. Addictive behaviors reports 15: 100419	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Erickson, L., Molina, C.A., Ladd, G.T. et al. (2005) Problem and pathological gambling are associated with poorer mental and physical health in older adults. International Journal of Geriatric Psychiatry 20(8): 754-759	- Other protocol criteria Study country not in protocol: US
Estevez, Ana, Jauregui, Paula, Lopez-Gonzalez, Hibai et al. (2021) Exploring the Predictive Value of Gambling Motives, Cognitive Distortions, and Materialism on Problem Gambling Severity in Adolescents and Young Adults. Journal of gambling studies 37(2): 643-661	- Population Participants did not present to a non-gambling specialist setting.
Fabio, Frisone; Angela, Alibrandi; Salvatore, Settineri (2020) Problem gambling during Covid-19. Mediterranean Journal of Clinical Psychology 8(3)	- Population Participants did not present to a non-gambling specialist setting.
Forbush, Kelsie T, Shaw, Martha, Graeber, Margarita A et al. (2008) Neuropsychological characteristics and personality traits in pathological gambling. CNS spectrums 13(4): 306-15	- Population Participants did not present to a non-gambling specialist setting.
Fortgang, Rebecca G; Hoff, Rani A; Potenza, Marc N (2020) Schizophrenia symptom severity and motivations for gambling in individuals with schizophrenia or schizoaffective disorder. Psychiatry research 291: 113281	- Other protocol criteria Study country not in protocol: US
Fuentes, D., Tavares, H., Artes, R. et al. (2006) Self-reported and neuropsychological measures	- Other protocol criteria

Study	Reason for exclusion
of impulsivity in pathological gambling. Journal of the International Neuropsychological Society 12(6): 907-912	Study country not in protocol: Brazil
Garea, Shaun Stephen, Drummond, Aaron, Sauer, James D. et al. (2021) Meta-analysis of the relationship between problem gambling, excessive gaming and loot box spending. International Gambling Studies	- Population Mixed population. Systematic review includes studies with both included (presenting to a non-gambling specialist setting) and excluded (presenting to a gambling treatment setting) participants, with results not presented separately for target population. Included studies were checked for relevance to protocol – and none were identified.
Gibson, E., Griffiths, M.D., Calado, F. et al. (2022) The relationship between videogame micro-transactions and problem gaming and gambling: A systematic review. Computers in Human Behavior 131: 107219	- Population Mixed population. Systematic review includes studies with both included (18 years old and over) and excluded (under 18 years old) participants, with results not presented separately for target population. Included studies were checked for relevance to protocol – and none were identified.
Gill, Kathryn J, Heath, Laura M, Derevensky, Jeffrey et al. (2016) The Social and Psychological Impacts of Gambling in the Cree Communities of Northern Quebec. Journal of gambling studies 32(2): 441-57	- Population Participants did not present to a non-gambling specialist setting.
Goodyear-Smith, Felicity; Arroll, Bruce; Coupe, Nicole (2009) Asking for help is helpful: validation of a brief lifestyle and mood assessment tool in primary health care. Annals of family medicine 7(3): 239-44	- Outcomes Not able to compare harmful gambling respondents against identified risk factors.
Goodyear-Smith, Felicity, Arroll, Bruce, Sullivan, Sean et al. (2004) Lifestyle screening: development of an acceptable multi-item general practice tool. The New Zealand medical journal 117(1205): u1146	- Outcomes Not able to calculate primary or secondary outcomes from presented data.
Goodyear-Smith, Felicity, Coupe, Nicole M, Arroll, Bruce et al. (2008) Case finding of lifestyle and mental health disorders in primary care: validation of the 'CHAT' tool. The British journal of general practice : the journal of the Royal College of General Practitioners 58(546): 26-31	- Outcomes Not able to compare harmful gambling respondents against identified risk factors.
Goodyear-Smith, Felicity; Warren, James; Elley, C Raina (2013) The eCHAT program to facilitate healthy changes in New Zealand primary care. Journal of the American Board of Family Medicine : JABFM 26(2): 177-82	- Publication type Narrative description of intervention.
Goudriaan, Anna E, Oosterlaan, Jaap, de Beurs, Edwin et al. (2006) Neurocognitive functions in pathological gambling: a comparison with alcohol dependence, Tourette syndrome and normal controls. Addiction (Abingdon, England) 101(4): 534-47	- Population Participants did not present to a non-gambling specialist setting.
Grall-Bronnec, Marie, Laforgue, Edouard-Jules, Challet-Bouju, Gaelle et al. (2019) Prevalence of coaddictions and rate of successful treatment among a French sample of opioid-dependent	- Population Unclear. No information given on recruitment methods (for example, if participants presented to non-gambling specialist setting or if

Study	Reason for exclusion
patients with long-term opioid substitution therapy: The OPAL study. Frontiers in Psychiatry 10	consecutive samples were used).
Grall-Bronnec, Marie, Sauvaget, Anne, Perrouin, Fanny et al. (2016) Pathological Gambling Associated With Aripiprazole or Dopamine Replacement Therapy: Do Patients Share the Same Features? A Review. Journal of clinical psychopharmacology 36(1): 63-70	- Study design Only included participants diagnosed with harmful gambling. Note: Paper also includes a systematic review. Included studies were checked for relevance to protocol – and none were identified.
Grant, Jon E, Levine, Laura, Kim, Daniel et al. (2005) Impulse control disorders in adult psychiatric inpatients. The American journal of psychiatry 162(11): 2184-8	- Other protocol criteria Study country not in protocol: US
GRIFFITHS, Mark; PARKE, Jonathan; WOOD, Richard (2002) Excessive gambling and substance abuse: is there a relationship?. Journal of Substance Use 7(4): 187-190	- Study design Narrative review
Guillot, C.R., Fanning, J.R., Liang, T. et al. (2013) COMT associations with disordered gambling and drinking measures. Journal of Gambling Studies 31(2): 513-524	- Other protocol criteria Study country not in protocol: US
Guillou Landreat, Morgane, Cholet, Jennyfer, Grall Bronnec, Marie et al. (2019) Determinants of Gambling Disorders in Elderly People-A Systematic Review. Frontiers in psychiatry 10: 837	- Study design Mixed study designs. Systematic review includes studies from both included (for example, cross-sectional) and excluded (for example, qualitative and case reports) study designs, with results not presented separately for target study designs. Included studies were checked for relevance to protocol – and 2 were identified.
Gungor, Buket Belkiz, Askin, Rustem, Taymur, Ibrahim et al. (2014) Research. Obsessive Compulsive Disorder and Impulse Control Disorder Comorbidity and Evaluation of Impulsivity and Compulsivity in Alcohol Dependent Patients. Dusunen Adam: Journal of Psychiatry & Neurological Sciences 27(3): 233-241	- Other protocol criteria Study country not in protocol: Turkey
Gyollai, A., Griffiths, M.D., Barta, C. et al. (2014) The genetics of problem and pathological gambling: A systematic review. Current Pharmaceutical Design 20(25): 3993-3999	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Hing, N., Russell, A. M. T., Black, A. et al. (2022) Gambling prevalence and gambling problems amongst land-based-only, online-only and mixed-mode gamblers in Australia: A national study. COMPUTERS IN HUMAN BEHAVIOR 132	- Population Participants did not present to a non-gambling specialist setting.
Hodgins, David C and Stevens, Rhys M G (2021) The impact of COVID-19 on gambling and gambling disorder: emerging data. Current opinion in psychiatry 34(4): 332-343	- Population Mixed population. Systematic review includes studies with both included (presenting to a non-gambling specialist setting) and excluded (presenting to a gambling treatment setting)

Study	Reason for exclusion
	participants, with results not presented separately for target population. Included studies were checked for relevance to protocol – and none were identified.
Huddy, V., Kitchenham, N., Roberts, A. et al. (2017) Self-report and behavioural measures of impulsivity as predictors of impulsive behaviour and psychopathology in male prisoners. Personality and Individual Differences 113: 173-177	- Outcomes Not able to calculate primary or secondary outcomes from presented data.
Huggett, Spencer B., Winiger, Evan A., Corley, Robin P. et al. (2019) Alcohol use, psychiatric disorders and gambling behaviors: A multi-sample study testing causal relationships via the co-twin control design. Addictive Behaviors 93: 173-179	- Other protocol criteria Study country not in protocol: US
Hwang, JY, Shin, YC, Lim, SW et al. (2012) Multidimensional comparison of personality characteristics of the Big Five model, impulsiveness, and affect in pathological gambling and obsessive-compulsive disorder. Journal of Gambling Studies 28(3): 351-362	- Other protocol criteria Study country not in protocol: South Korea
Jimenez-Murcia, Susana, Granero, Roser, Moragas, Laura et al. (2015) Differences and similarities between bulimia nervosa, compulsive buying and gambling disorder. European eating disorders review : the journal of the Eating Disorders Association 23(2): 111-8	- Study design Unclear. No information given on recruitment of participants (for example, if study used a random or consecutive selection).
Jones, Lisa, Metcalf, Alice, Gordon-Smith, Katherine et al. (2015) Gambling problems in bipolar disorder in the UK: Prevalence anddistribution. The British Journal of Psychiatry 207(4): 328-333	- Population Participants did not present to a non-gambling specialist setting.
Karaca, Servet, Saleh, Ayman, Canan, Fatih et al. (2017) Comorbidity between behavioral addictions and Attention Deficit/Hyperactivity Disorder: A systematic review. International Journal of Mental Health and Addiction 15(3): 701-724	- Reference standard Mixed reference standard. Systematic review includes studies with both included (harmful gambling) and excluded (behavioural addictions) reference standards, with results not presented separately for target reference standard. Included studies were checked for relevance to protocol – and none were identified.
Kildahl, Nanna, Hansen, Simon, Brevers, Damien et al. (2020) Individual differences in learning during decision-making may predict specific harms associated with gambling. Addictive Behaviors 110: npag-npag	- Population Participants did not present to a non-gambling specialist setting.
Konkoly Thege, B., Horwood, L., Slater, L. et al. (2017) Relationship between interpersonal trauma exposure and addictive behaviors: A systematic review. BMC Psychiatry 17(1): 164	- Reference standard Mixed reference standard. Systematic review includes studies with both included (harmful gambling) and excluded (other addictive behaviours) reference standards, with results not presented separately for target reference standard. Included studies were checked for relevance to protocol – and none were identified.
Korpa, Terpsichori N. and Papadopoulou, Pinelopi V. (2013) Clinical signs and symptoms of addictive behaviors. International Journal of	- Study design Narrative review

Study	Reason for exclusion
Child & Adolescent Health 6(4): 369-376	
Kovacs, Ildiko, Richman, Mara J, Janka, Zoltan et al. (2017) Decision making measured by the Iowa Gambling Task in alcohol use disorder and gambling disorder: a systematic review and meta-analysis. Drug and alcohol dependence 181: 152-161	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and 1 was identified.
Lai, DWL (2006) Gambling and the older Chinese in Canada. JOURNAL OF GAMBLING STUDIES 22(1): 121 - 141	- Population Participants did not present to a non-gambling specialist setting.
Langan, Kristen, Wall, Megan, Potts, Wendy et al. (2019) Prevalence and potential predictors of gambling disorder among people living with HIV. AIDS care 31(4): 421-426	- Other protocol criteria Study country not in protocol: US
Leavens, Eleanor; Marotta, Jeffery; Weinstock, Jeremiah (2014) Disordered gambling in residential substance use treatment centers: an unmet need. Journal of addictive diseases 33(2): 163-73	- Other protocol criteria Study country not in protocol: US
Lee, Rico S C; Hoppenbrouwers, Sylco; Franken, Ingmar (2019) A Systematic Meta-Review of Impulsivity and Compulsivity in Addictive Behaviors. Neuropsychology review 29(1): 14-26	- Study design Systematic review of systematic reviews. Included studies were checked for relevance to protocol – and none were identified.
Lelonek-Kuleta, Bernadeta and Bartczuk, Rafal Piotr (2021) Online Gambling Activity, Pay-to-Win Payments, Motivation to Gamble and Coping Strategies as Predictors of Gambling Disorder Among e-sports Bettors. Journal of gambling studies 37(4): 1079-1098	- Population Participants did not present to a non-gambling specialist setting.
Leppink, E., Derbyshire, K., Chamberlain, S.R. et al. (2014) A preliminary comparison of cannabis use in subsyndromal gamblers: Select neurocognitive and behavioral differences based on use. Journal of Addiction Medicine 8(6): 443-449	- Study design Non-randomised and non-consecutive selection of participants
Leppink, E.W. and Grant, J.E. (2015) Traumatic event exposure and gambling: Associations with clinical, neurocognitive, and personality variables. Annals of Clinical Psychiatry 27(1): 16-24	- Other protocol criteria Study country not in protocol: US
Lloyd, Caleb D, Chadwick, Nick, Serin, Ralph C et al. (2014) Associations between gambling, substance misuse and recidivism among Canadian offenders: A multifaceted exploration of poor impulse control traits and behaviours. International Gambling Studies 14(2): 279-300	- Study design Unclear. Lack of information reported on recruitment of participants (if participants were randomly or consecutively selected)
Loo, Jasmine M Y; Shi, Yongdong; Pu, Xiaohong (2016) Gambling, Drinking and Quality of Life: Evidence from Macao and Australia. Journal of gambling studies 32(2): 391-407	- Population Participants did not present to a non-gambling specialist setting.
Loxton, N.J., Nguyen, D., Casey, L. et al. (2008) Reward drive, rash impulsivity and punishment sensitivity in problem gamblers. Personality and Individual Differences 45(2): 167-173	- Population Participants did not present to a non-gambling specialist setting.

Study	Reason for exclusion
Luo, Hai and Ferguson, Megan (2017) Gambling among culturally diverse older adults: A systematic review of qualitative and quantitative data. International Gambling Studies 17(2)	- Study design Mixed study designs. Systematic review includes studies from both included (for example, cross-sectional) and excluded (for example, qualitative and mixed-methods) study designs, with results not presented separately for target study designs. Included studies were checked for relevance to protocol – and none were identified.
MacKillop, James, Anderson, Emily J, Castelda, Bryan A et al. (2006) Divergent validity of measures of cognitive distortions, impulsivity, and time perspective in pathological gambling. Journal of gambling studies 22(3): 339-54	- Population Participants did not present to a non-gambling specialist setting.
Matheson, F.I., Devotta, K., Wendaferew, A. et al. (2014) Prevalence of Gambling Problems Among the Clients of a Toronto Homeless Shelter. Journal of Gambling Studies 30(2): 537-546	- Study design Non-randomised and non-consecutive selection of participants.
Matheson, Flora I, Dastoori, Parisa, Hahmann, Tara et al. (2022) Prevalence of Problem Gambling Among Women Using Shelter and Drop-in Services. International journal of mental health and addiction 20(4): 2436-2447	- Study design Non-randomised and non-consecutive selection of participants.
McPherson, Susan, Clayton, Sarah, Wood, Heather et al. (2013) The role of childhood experiences in the development of sexual compulsivity. Sexual Addiction & Compulsivity 20(4): 259-278	- Population Participants did not present to a non-gambling specialist setting.
Merkouris, Stephanie, Thomas, Anna, Shandley, Kerrie et al. (2016) An Update on Gender Differences in the Characteristics Associated with Problem Gambling: a Systematic Review. Current Addiction Reports 3	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Mestre-Bach, G., Granero, R., Mora-Maltas, B. et al. (2022) Sports-betting-related gambling disorder: Clinical features and correlates of cognitive behavioral therapy outcomes. ADDICTIVE BEHAVIORS 133	- Population Only included treatment-seeking participants with gambling disorder
Moore, Louis H 3rd and Grubbs, Joshua B (2021) Gambling Disorder and comorbid PTSD: A systematic review of empirical research. Addictive behaviors 114: 106713	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and 1 was identified.
Mora-Salgueiro, Javier, Garcia-Estela, Aitana, Hogg, Bridget et al. (2021) The Prevalence and Clinical and Sociodemographic Factors of Problem Online Gambling: A Systematic Review. Journal of gambling studies 37(3): 899-926	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Morasco, Benjamin J; Vom Eigen, Keith A;	- Other protocol criteria

Study	Reason for exclusion
Petry, Nancy M (2006) Severity of gambling is associated with physical and emotional health in urban primary care patients. General hospital psychiatry 28(2): 94-100	Study country not in protocol: US
Moreira, D., Pinto, M., Almeida, F. et al. (2016) Time perception deficits in impulsivity disorders: A systematic review. Aggression and Violent Behavior 27: 87-92	- Reference standard Mixed reference standard. Systematic review includes studies with both included (harmful gambling) and excluded (other impulsivity disorders) reference standards, with results not presented separately for target reference standard. Included studies were checked for relevance to protocol – and none were identified.
Morrison, Laurie (2017) Nga Pou Wahine: Gambling misuse and Maori women in New Zealand. Gambling disorders in women: An international female perspective on treatment and research.: 268-278	- Publication type Book chapter
Muelleman, Robert L, DenOtter, Tami, Wadman, Michael C et al. (2002) Problem gambling in the partner of the emergency department patient as a risk factor for intimate partner violence. The Journal of emergency medicine 23(3): 307-12	- Other protocol criteria Study country not in protocol: US
Nehlin, C.; Nyberg, F.; Jess, K. (2016) Brief Intervention Within Primary Care for At-Risk Gambling: A Pilot Study. Journal of Gambling Studies 32(4): 1327-1335	- Test No index test administered.
Nigro, Giovanna, Matarazzo, Olimpia, Ciccarelli, Maria et al. (2019) To chase or not to chase: A study on the role of mentalization and alcohol consumption in chasing behavior. Journal of behavioral addictions 8(4): 743-753	- Population Participants did not present to a non-gambling specialist setting.
Nordmyr, J. and Forsman, A.K. (2020) A systematic review of psychosocial risks for gambling and problem gambling in the Nordic countries. Health, Risk and Society 22(34): 266-290	- Study design Mixed study designs. Systematic review includes studies from both included (for example, cross-sectional) and excluded (for example, qualitative) study designs, with results not presented separately for target study designs. Included studies were checked for relevance to protocol – and none were identified.
Ondo, William G and Lai, Dejian (2008) Predictors of impulsivity and reward seeking behavior with dopamine agonists. Parkinsonism & Related Disorders 14(1): 28-32	- Other protocol criteria Study country not in protocol: US
Parke, A Griffiths, M Pattinson, J Keatley, D (2018) Age-related physical and psychological vulnerability as pathways to problem gambling in older adults. JOURNAL OF BEHAVIORAL ADDICTIONS 7(1): 137 - 145	- Population Participants did not present to a non-gambling specialist setting.
Parke, A.; Griffiths, M.; Irwing, P. (2004) Personality traits in pathological gambling: Sensation seeking, deferment of gratification and competitiveness as risk factors. Addiction Research and Theory 12(3): 201-212	- Population Participants did not present to a non-gambling specialist setting.
Pavarin, Raimondo Maria, Fabbri, Chiara, Fioritti, Angelo et al. (2021) Gambling Disorder in an Italian Population: Risk of Suicide Attempts and Associated Demographic-Clinical Factors	- Population Only included participants with harmful gambling diagnosis.

Study	Reason for exclusion
using Electronic Health Records. Journal of gambling studies	
Perese, Lana M, Bellringer, Maria E, Williams, Maynard M et al. (2009) Two years on: gambling amongst Pacific mothers living in New Zealand. Pacific health dialog 15(1): 55-67	- Population Participants did not present to a non-gambling specialist setting.
Petry, NM (2000) Gambling problems in substance abusers are associated with increased sexual risk behaviors. Addiction (Abingdon, England) 95(7): 1089-100	- Other protocol criteria Study country not in protocol: US
Petry, NM, Kolodner, KB, Li, R et al. (2006) Prize-based contingency management does not increase gambling. Drug & Alcohol Dependence 83(3): 269-273	- Other protocol criteria Study country not in protocol: US
Porchet, Roseline I, Boekhoudt, Linde, Studer, Bettina et al. (2013) Opioidergic and dopaminergic manipulation of gambling tendencies: a preliminary study in male recreational gamblers. Frontiers in behavioral neuroscience 7: 138	- Study design Non-randomised and non-consecutive selection of participants.
Prilutskaya, M.V. and Kuliev, R.S. (2016) Gambling Behavior in People at Different Levels of Risk of Pathological Gambling. Neuroscience and Behavioral Physiology 46(6): 682-687	- Other protocol criteria Study country not in protocol: Kazakhstan
PUBLIC HEALTH, ENGLAND (2021) Risk factors for gambling and harmful gambling: an umbrella review: a review of systematic reviews and meta-analyses.: 140	- Study design Systematic review of systematic review. Included studies checked for possible includes - none were identified.
Punia, K., DeVillaer, M., MacKillop, J. et al. (2021) Understanding the Overlap Between Cannabis Use and Gambling Behaviour: A Systematic Review of Empirical Findings and Consideration of Policy Implications. Current Addiction Reports 8(1): 35-56	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and 1 was identified.
Quilty, Lena C; Avila Murati, Daniela; Bagby, R Michael (2014) Identifying indicators of harmful and problem gambling in a Canadian sample through receiver operating characteristic analysis. Psychology of addictive behaviors : journal of the Society of Psychologists in Addictive Behaviors 28(1): 229-37	- Study design Non-randomised and non-consecutive selection of participants.
Quilty, Lena C, Watson, Chris, Robinson, Jennifer J et al. (2011) The prevalence and course of pathological gambling in the mood disorders. Journal of gambling studies 27(2): 191-201	- Study design Non-randomised and non-consecutive selection of participants.
Raylu, Namrata and Oei, Tian Po (2004) Role of culture in gambling and problem gambling. Clinical psychology review 23(8): 1087-114	- Study design Narrative review
Richard, Jeremie, Fletcher, Emilie, Boutin, Stephanie et al. (2020) Conduct problems and depressive symptoms in association with problem gambling and gaming: A systematic review. Journal of behavioral addictions 9(3): 497-533	- Population Mixed population. Systematic review includes studies with both included (18 years old and over) and excluded (under 18 years old) participants, with results not presented separately for target population. Included studies

Study	Reason for exclusion
	were checked for relevance to protocol – and none were identified.
Riley, B.J., Oster, C., Rahamathulla, M. et al. (2021) Attitudes, risk factors, and behaviours of gambling among adolescents and young people: A literature review and gap analysis. International Journal of Environmental Research and Public Health 18(3): 1-14	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Roberts, A., Rogers, J., Sharman, S. et al. (2021) Gambling problems in primary care: a systematic review and meta-analysis. Addiction Research and Theory 29(6): 454-468	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and 1 was identified.
Rogier, Guyonne, Beomonte Zobel, Sara, Morganti, Wanda et al. (2021) Metacognition in gambling disorder: A systematic review and meta-analysis. Addictive Behaviors 112: npag-npag	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Sacco, Paul, Cunningham-Williams, Renee M, Ostmann, Emily et al. (2008) The association between gambling pathology and personality disorders. Journal of psychiatric research 42(13): 1122-30	- Other protocol criteria Study country not in protocol: US
Schreiber, Liana Renee Nelson; Odlaug, Brian Lawrence; Grant, Jon Edgar (2012) Recreational gamblers with and without parental addiction. Psychiatry research 196(23): 290-5	- Population Participants did not present to a non-gambling specialist setting.
Sellman, J Douglas, Adamson, Simon, Robertson, Paul et al. (2002) Gambling in mild-moderate alcohol-dependent outpatients. Substance use & misuse 37(2): 199-213	- Study design Unclear. Lack of information on the participant selection method (if participants were randomly or consecutively selected).
Sharman, S Dreyer, J Aitken, M Clark, L Bowden-Jones, H (2015) Rates of Problematic Gambling in a British Homeless Sample: A Preliminary Study. JOURNAL OF GAMBLING STUDIES 31(2): 525 - 532	- Study design Non-randomised and non-consecutive selection of participants.
Sharman, S., Dreyer, J., Clark, L. et al. (2016) Down and out in london: Addictive behaviors in homelessness. Journal of Behavioral Addictions 5(2): 318-324	- Study design Unclear. Lack of information on the participant selection method (if participants were randomly or consecutively selected).
Shorey, Ryan C.; Anderson, Scott; Stuart, Gregory L. (2012) Gambling and early maladaptive schemas in a treatment-seeking sample of male alcohol users: a preliminary investigation. Addictive Disorders & Their Treatment 11(4): 173-182	- Other protocol criteria Study country not in protocol: US
Stromme, Rune, Borstad, Karine Holthe, Ro, Andrea Eftang et al. (2021) The Relationship Between Gambling Problems and the Five-Factor Model of Personality: A Systematic Review and Meta-Analysis. Frontiers in	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries.

Study	Reason for exclusion
psychiatry 12: 740235	Included studies were checked for relevance to protocol – and none were identified.
Subramaniam, Mythily, Wang, Peizhi, Soh, Pauline et al. (2015) Prevalence and determinants of gambling disorder among older adults: a systematic review. Addictive behaviors 41: 199-209	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Sullivan, Sean; Brown, Robert; Skinner, Bruce (2008) Pathological and Sub-clinical Problem Gambling in a New Zealand Prison: A Comparison of the Eight and SOGS Gambling Screens. International Journal of Mental Health and Addiction 6(3): 369-377	- Population Non-randomised and non-consecutive selection of participants.
Tabri, Nassim, Xuereb, Silas, Cringle, Natalie et al. (2022) Associations between financial gambling motives, gambling frequency and level of problem gambling: a meta-analytic review. Addiction (Abingdon, England) 117(3): 559-569	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Tackett, Jennifer L, Rodriguez, Lindsey M, Rinker, Dipali V et al. (2015) A personality-based latent class analysis of emerging adult gamblers. Journal of Gambling Studies 31(4): 1337-1351	- Other protocol criteria Study country not in protocol: US
Takamatsu, Stephanie K, Martens, Matthew P, Arterberry, Brooke J et al. (2016) Depressive symptoms and gambling behavior: Mediating role of coping motivation and gambling refusal self-efficacy. Journal of Gambling Studies 32(2): 535-546	- Other protocol criteria Study country not in protocol: US
Theule, Jennifer, Hurl, Kylee E, Cheung, Kristene et al. (2019) Exploring the Relationships Between Problem Gambling and ADHD: A Meta-Analysis. Journal of attention disorders 23(12): 1427-1437	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Tse, S., Hong, S.-I., Wang, C.-W. et al. (2012) Gambling behavior and problems among older adults: A systematic review of empirical studies. Journals of Gerontology - Series B Psychological Sciences and Social Sciences 67b(5): 639-652	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Vaddiparti, K. and Cottler, L.B. (2017) Personality disorders and pathological gambling. Current Opinion in Psychiatry 30(1): 45-49	- Study design Narrative review
van Timmeren, Tim, Daams, Joost G, van Holst, Ruth J et al. (2018) Compulsivity-related neurocognitive performance deficits in gambling disorder: A systematic review and meta-analysis. Neuroscience and biobehavioral reviews 84: 204-217	- Population Mixed population. Systematic review includes studies with both included (presenting to a non-gambling specialist setting) and excluded (presenting to a gambling treatment setting) participants, with results not presented

Study	Reason for exclusion
	separately for target population. Included studies were checked for relevance to protocol – and none were identified.
Vandenberg, B, Livingstone, C, Carter, A et al. (2021) Gambling and homelessness: A systematic review and meta-analysis of prevalence. Addictive behaviors 125: 107151	- Other protocol criteria Mixed study countries. Systematic review includes studies from both included and excluded study countries, with results not presented separately for target countries. Included studies were checked for relevance to protocol – and none were identified.
Velotti, P, Rogier, G, Beomonte Zobel, S et al. (2021) Association between gambling disorder and emotion (dys)regulation: A systematic review and meta-analysis. Clinical psychology review 87: 102037	- Population Systematic review only included studies using community and clinical samples of people experiencing harmful gambling (participants did not present to non-gambling specialist setting).
Victorian Responsible Gambling Foundation (2021) Gambling problems, risk factors, and implications in Australian veterans .	- Population Participants did not present to a non-gambling specialist setting.
Victorian Responsible Gambling Foundation (2013) The relationship between gambling, significant life events, co-morbidity and associated social factors .	- Study design Qualitative
Victorian Responsible Gambling Foundation Longitudinal protective factors for problem gambling and related harms: Building resilience among young adult gamblers.	- Population Participants did not present to a non-gambling specialist setting.
Victorian Responsible Gambling Foundation (2020) Gambling and homelessness among older people: an exploratory study.	- Study design Non-systematic literature review and qualitative study
Victorian Responsible Gambling Foundation (2017) Problem gambling in people seeking treatment for mental illness.	- Reference standard Participation in harmful gambling not measured
Villalba, A.C., Garcia, J., Ramos, C. et al. (2019) Mental disorders in young adults from families with the presenilin-1 gene mutation E280A in the preclinical stage of Alzheimer's disease. Journal of Alzheimer's Disease Reports 3(1): 241-250	- Other protocol criteria Study country not in protocol: Colombia
Weinstock, Jeremiah; Blanco, Carlos; Petry, Nancy M (2006) Health correlates of pathological gambling in a methadone maintenance clinic. Experimental and clinical psychopharmacology 14(1): 87-93	- Other protocol criteria Study country not in protocol: US
Wiebe, Jamie M D and Cox, Brian J (2005) Problem and probable pathological gambling among older adults assessed by the SOGS-R. Journal of gambling studies 21(2): 205-21	- Population Participants did not present to a non-gambling specialist setting.
Zink, A, Herrmann, M, Fischer, T et al. (2017) Addiction: an underestimated problem in psoriasis health care. Journal of the European Academy of Dermatology and Venereology : JEADV 31(8): 1308-1315	- Study design Unclear. Lack of information on the participant selection method (if participants were randomly or consecutively selected).

Excluded economic studies

No economic evidence was reviewed at full text and excluded from this review.

Appendix K Research recommendations – full details

Research recommendations for review question: What factors, either alone or in combination, suggest that a person is participating in harmful gambling?

No research recommendations were made for this review question.