Public Health England

Protecting and improving the nation's health

Harms associated with gambling

An abbreviated systematic review

Contents

Abbreviations

ANOVA	Analysis of variance
AOR	Adjusted odds ratio
AUD	Alcohol Use Disorder
AUDADIS	Alcohol Use Disorders and Associated Disability Interview Schedule
AUDIT-C	Alcohol Use Disorders Identification Test
BMI	Body mass index
CDI	Child Depression Inventory
CDID-SF	Composite International Diagnostic Interview – Short Form
CI	Confidence interval
CoI	Conflict of interest
CPGI	Canadian Pathological Gambling Index
DCMS	Department for Digital, Culture, Media and Sport
DSM	Diagnostic and Statistical Manual of Mental Disorders
DSM-IV-MR-J	DSM-IV-Multiple Response-Juvenile
DUD	Drug Use Disorder
EGM	Electronic gaming machine
GAD	Generalised Anxiety Disorder
GAM	Gambling Assessment Module
ICD	International Classification of Disease
IPV	Intimate partner violence
HR	Hazard ratio
LCA	Latent class analysis
LCTM	Latent class trajectory modelling
MINI	Mini International Neuropsychiatric Interview
OECD	Organisation for Economic Co-operation and Development
OR	Odds ratio
PESQ	Personal Experience Screening Questionnaire
PGSI	Problem Gambling Severity Index
PHE	Public Health England
PHQ	Patient Health Questionnaire
PICO	Population, intervention/issue, comparison and outcome
QoL	Quality of life
SCI-GD	Structured Clinical Interview for Gambling Disorder
SD	Standard deviation
SMR	Standardised mortality ratio

SOGS	South Oaks Gambling Screen
SOGS-RA	South Oaks Gambling Screen, Revised for Adolescents
UK	United Kingdom
US	United States of America

You can find a full list of definitions and technical terms in the gambling glossary.

1. Summary

1.1 Background

This review is one of a series of reports by Public Health England (PHE) on different aspects of gambling-related harm. It aims to answer the following research questions:

1. What harms are associated with gambling among children and adults?
2. What harms are associated with different levels of gambling severity among children and adults?

Severity was defined broadly and included different levels of engagement or spending, or symptoms of gambling disorder.

1.2 Methods

An abbreviated, systematic methodology was used to identify, critically appraise and synthesise published research studies. The review protocol was pre-registered. Searches covered January 2005 to December 2014 (systematic reviews and meta-analyses) and January 2015 to July 2020 (primary observational and qualitative studies). English language academic literature published in countries within the Organisation for Economic Co-operation and Development (OECD) were included. All measures of association (quantitative studies) were considered. Studies which assessed an intervention were excluded. Electronic searches were conducted in Ovid Medline, Ovid Embase, Ovid PsycINFO, NICE Evidence and EBSCO SocIndex. A range of websites were used to identify relevant literature not published in academic journals. Reference lists of included studies were investigated. Experts were consulted to help identify any additional eligible studies.

Studies were split into those that assessed a temporal relationship (gambling preceded harm) and those that did not. Those that assessed a temporal relationship all underwent full data extraction and critical appraisal using either the Newcastle Ottawa Scale or the Critical Appraisal Skills Programme qualitative checklist. The studies that did not assess a temporal relationship underwent partial data extraction, no critical appraisal and were summarised, but not in detail. This approach ensured the breadth of harms from gambling were included, while also focusing the results and discussion on the most appropriate studies, to enhance the certainty of findings. A narrative synthesis was undertaken, and the body of evidence was assessed using the GRADE CERQual principles of methodological limitations, relevance, coherence and adequacy.

1.3 Studies and reviews selected

After duplicate screening, 53 studies underwent full data extraction and risk of bias assessment because in these studies it was possible to determine that gambling preceded harm. This included 21 time-based quantitative studies (15 longitudinal or case control designs and 6 that used latent class trajectory modelling (LCTM) or latent class analysis (LCA)) and 32 qualitative studies. Two hundred and thirty 9 studies underwent partial data extraction and no risk of bias assessment (138 cross-sectional, 93 descriptive and 8 reviews) because in these studies it was not possible to determine that gambling preceded harm.

1.4 Results

Financial harms

Only one time-based quantitative study with low risk of bias reported on financial harms. It found that greater numbers of electronic gaming machines in an area led to a greater number of registered bankruptcies.

Thirty qualitative studies reported that gambling by adults was associated with financial problems such as debts, erosion of savings or pensions, having to do without basics like food and clothing, and serious outcomes such as bankruptcy and homelessness. Financial harms affected the gambler, their close associates and wider society. Financial harms had legacy effects, with children of gamblers being affected.

In addition, one systematic review, 35 descriptive studies and 30 cross-sectional studies reported on the links between gambling and debt and other types of financial harm, both for the gambler and affected others.

Relationship disruption, conflict or breakdown

Two time-based quantitative studies reported on relationship harms (both moderate risk of bias).

The first reported non-significant relationships between gambling problems and self-reported intimate partner violence (IPV) victimisation or perpetration among adults. The second reported that adult moderate risk and problem gambling at baseline significantly predicted lower levels of family functioning and social support over time compared to low-risk and no gambling.

Relationship harms featured in 28 qualitative studies. Respondents reported arguments and relationship strain between the gambler and their friends and families, which sometimes rippled out to affect wider family networks. Instances of gambling-related domestic or family abuse were reported. Children of gamblers were also affected.

There were also 2 systematic reviews, 37 descriptive studies and 22 cross-sectional studies that reported on gambling and various measures of relationship harm (for example divorce, abuse, marital dissatisfaction) to gamblers and affected others.

Mental and physical health harms

Seventeen time-based quantitative studies investigated mental and physical health harms (2 low, 13 moderate and 2 high risk of bias). One time-based quantitative study (with a low risk of bias) compared standardised mortality ratios (SMR) for adult patients with gambling disorder (as defined by an International Classification of Disease-10 primary or secondary diagnosis) to the general population. It found that people with gambling disorder had an elevated all-cause mortality.

Another study explored the relationship between gambling and quality of life for young adults. It found that young adults in the ‘high harm’ group (defined as those with moderate or severe gambling at baseline and follow-up as measured by the Structured Clinical Interview for Gambling Disorder (SCI-GD)) had a significantly lower quality of life score. Another reported that a high-harm group (with moderate-severe gambling disorder as measured by the SCI-GD) had significantly higher mean body mass index (BMI) scores than lower harm groups: mean BMI=27.2 (SD=8.0) and 23.8 (SD=4.5) respectively.

Twelve time-based quantitative studies reported on various measures of drug, alcohol and tobacco use, and 11 reported on mental health disorders. Anxiety and depression were the most measured mental health disorder. Most of these studies focused on adolescents or young adults and the results were mixed. The only time-based quantitative study conducted in England reported that moderate risk or problem gambling at age 17 (as measured by the Problem Gambling Severity Index) predicted future drug use and mild alcohol use disorder (AUD) (but not moderate or severe AUD). It also reported that moderate risk or problem gambling at age 20 predicted depression at age 24 but not other mental health disorders. Studies on mental health disorders and alcohol, tobacco and drug use suffered from methodological biases.

Two time-based quantitative studies (rated low and moderate risk of bias) suggest an important link between gambling and suicide. However, there were mixed findings about gender. The first study showed that men (but not women) with a diagnosed gambling disorder had a significantly elevated risk of death from suicide compared to the general population. The second study reported that suicidal events were a little more than twice as common among lifetime problem gamblers compared to non-gamblers, but the association was significant only for women not men.

Almost all qualitative studies reported physical and mental health harms to the adult gambler or their close associates. Gamblers neglected caring properly for themselves and experienced emotions such as:

- guilt
- shame
- loss of self-esteem
- loneliness
- sleep problems

Gamblers reported co-occurring alcohol and drug-related problems. Self-harm and suicide attempts were described. In the qualitative studies, close associates also reported negative emotional, psychological and health impacts. These included anxiety, depression and sleep problems. Health harms were included in 7 reviews and 72 descriptive and 115 cross-sectional studies. The most commonly investigated harms were drug, alcohol or tobacco use and various mental health outcomes.

Employment and educational harms

Only one time-based quantitative study (moderate risk of bias) reported on employment and educational harms. This single study showed that a higher level of gambling participation in children aged 14 did not significantly predict a decrease in parental-reported academic performance at age 17.

In the qualitative studies, adult gamblers lost jobs, were demoted or resigned due to gambling. Gambling was associated with loss of concentration on work activities, showing up late, not turning up for work or turning up after no sleep. Close associates of gamblers also reported their work performance being affected. Work colleagues and employers also suffered. Child gamblers noted difficulties at school. Children of gamblers also noted difficulties at school because of the chaotic home life associated with a gambling parent. Absenteeism, job turnover, withdrawal from education or reduced educational attainment represent societal harms. Fourteen descriptive and 17 cross-sectional studies reported on the links between gambling and educational harms.

There were no systematic reviews.

Criminal and anti-social behaviour

Three time-based quantitative studies considered gambling and crime (1 low and 2 moderate risk of bias). In all 3, problem gambling was not associated with future crime or anti-social behaviour.

Four of the qualitative studies specifically focused on crime, with 3 describing how gambling caused crime. However, crime by adult gamblers was a common theme in other qualitative

studies and was often due to the gambling-related financial difficulties. Close associates and wider society were affected by criminal activity. For example, gamblers took out loans in another person's name, stole from friends and family and committed fraud.

There was one review on crime or anti-social behaviour, 18 descriptive and 21 cross-sectional studies considered a range of outcomes including theft, property crime, arrests, time in prison and breaking rules.

Cultural harms

In this review, the term 'cultural harms' refer to the tension between gambling and cultural practices and beliefs, and normalisation (where an activity and the associated harms become perceived as typical). No time-based quantitative studies investigated cultural harms. Seven qualitative studies reported on a dissonance between gambling and cultural beliefs or cultural practices, or reduced ability to meet the expectations of a community and the impact of this. Twelve studies reported on the process of 'normalisation' where gambling and the associated harms are seen as normal and perpetuated to the next generation. The strong links between gambling and sports may facilitate this process.

Gambling and gaming

One qualitative study involving young people aged 11 to 24 years reported that gambling-like activities in gaming (loot boxes and skin betting) were addictive. They also said that games were designed to make it difficult to enjoy without buying loot boxes. They perceived the gambling-like activity in gaming as normal.

1.5 Discussion and implications

Gambling can lead to a wide range of harms to the gambler, their close associates and wider society. These can be long-lasting and intergenerational. Most of the available evidence is on harms to individuals. There is qualitative evidence on harms to close associates but less (qualitative or quantitative) on societal harms. Identifying specific harms according to different gambling severity was a challenge due to differences in how severity was measured across studies.

However, there was evidence from the cross-sectional studies that people with higher levels of gambling involvement and more severe gambling disorder experienced the greatest degree of harm. There was some evidence from qualitative studies that certain populations are most at risk of harm and gambling may exacerbate inequalities. This review identified no systematic reviews that assessed the temporal relationship between gambling and harm, so the review is based on primary studies published between January 2015 and July 2020.

There is adequate evidence that gambling causes financial harms to the adult gambler and their close associates, including their children. Debt is a key harm that triggers other harms. There is also adequate evidence that adult gambling causes relationship harms, which can affect others.

In terms of health, one study showed a higher SMR among adults with gambling disorder than the general adult population, but further research would be needed before a strong conclusion can be made. There is some qualitative evidence that adult gambling causes emotional, psychological and physical harms to the gambler and close associates. The relationship between gambling and substance use and mental health is unclear, however there is evidence that gambling causes suicidal events, which include attempted and completed suicides, among adults.

Evidence shows that gambling can cause employment and educational harms for adults and children, but the evidence is limited. The evidence does not show that gambling predicts crime on a population level, but qualitative evidence shows that gambling-related debt causes some gamblers to commit crimes that affect others and wider society. There is qualitative evidence that the widespread acceptance of gambling normalises this activity and the harms associated with it. One qualitative study with young adults suggested that gambling within gaming (loot boxes and skin betting) was addictive, more work on this is needed.

There were few studies from the UK, and while evidence from OECD countries is relevant, it may not necessarily be directly translatable. Most of the studies on gambling were cross-sectional and it is not possible to determine if gambling preceded the harm. The time-based quantitative and qualitative studies had some biases and conflicts of interest and funding sources may have affected the qualitative studies. It is likely that any conflict of interest would underestimate harm.

1.6 Conclusions

Collecting routine data on gambling across government organisations (for example, the criminal justice and welfare systems) would allow us to measure societal harms.

Future policy development should consider policies that will have the greatest potential to prevent and reduce gambling-related harms. Gambling-related debt is an important driver of harm and should be a focus for future policy.

Recent reviews on interventions are focused on the individual, with little focus on population-level interventions. Interventions at all levels should be considered to reduce harm.

2. Introduction

According the Health Survey for England, in 2018, 54% of people in England aged 16 and over had taken part in some form of gambling activity during the previous 12 months. Excluding the National lottery this dropped to 40% of people (1). There is growing concern internationally about the types and scale of harms caused by gambling. Gambling-related harms are thought to exist on a spectrum from mild to severe and those that meet the diagnostic criteria for gambling disorder (such as people who fulfil the diagnostic criteria set out in the Diagnostic and Statistical Manual of Mental Disorders) represent only a small fraction of all those that are negatively affected by their gambling. Gambling-related harms affect the gambler and wider society (2).

In March 2018, the Public Health England (PHE) remit letter from the Health Minister, outlining PHE's priorities for 2018 to 2019, included the request to 'inform and support action on gambling-related harm as part of the follow up to the Department for Digital, Culture, Media and Sport-led (DCMS) review of gaming machines and social responsibility' (3).

In May 2018, DCMS published their response to the consultation on proposals for changes to gaming machines and social responsibility measures. In it, they announced that "PHE will conduct an evidence review of the health aspects of gambling-related harm to inform action on prevention and treatment" (4).

This review will answer the following research questions:

1. What harms are associated with gambling among children and adults?
2. What harms are associated with different levels of gambling severity among children and adults?

Severity was defined broadly using multiple indicators such as different levels of engagement or spending, or symptoms of gambling disorder.

3. Methods

An abbreviated methodology was used to provide a systematic assessment of the evidence in a shorter time than a traditional review. This approach supports government to make policy decisions more quickly (5). The EPPI-Reviewer software was used to manage the records and data throughout the review, except where Excel spreadsheets were used to extract data and for risk of bias assessments. The methods were established before the review commenced (PROSPERO reference CRD42019154757) (6).

3.1 Definitions

Gambling

The Gambling Act (2005) defines gambling as:

"any kind of betting, gaming or playing lotteries. Gaming means taking part in games of chance for a prize (where the prize is money or money's worth), betting involves making a bet on the outcome of sports, races, events or whether or not something is true, whose outcomes may or may not involve elements of skill but whose outcomes are uncertain and lotteries (typically) involve a payment to participate in an event in which prizes are allocated on the basis of chance" (7).

Gambling-related harms

A study in the Journal of Clinical Medicine in 2018 defined gambling related harms as:

"the adverse impacts from gambling on the health and wellbeing of individuals, families, communities and society" (8).

We undertook scoping work to help develop our research protocol. Since there was no definitive, internationally agreed definition of gambling-related harms, we used Langham and others' framework of gambling-related harm to conceptualise the different dimensions of harm (9).

The conceptual framework separates harms into types and temporality. The types of harms are:

- financial
- relationship disruption, conflict or breakdown
- emotional or psychological distress
- cultural
- reduced performance at work or study
- criminial activity
- detrements to health

Temporality refers to the notion that a harm can occur at the first single engagement with gambling and continue even after a person has stopped. These are:

- general
- crisis
- legacy

In reality, identifying what constituted a harm was a challenge, as has been recognised previously (9). Most of the studies identified in the searches were cross-sectional or focused on co-occurring gambling and harms, rather than assessing a causal relationship. Some harms were bidirectional and could also be risk factors for gambling (for example, mental health disorders). To fulfil the broad aim of this review, and capture all potential harms, we included any negative outcome that could conceptually be caused by gambling or could be on a causal chain (for example, relationship breakdown that was caused by arguments about gambling-related debt).

Langham and others' article on understanding gambling-related harm includes an infographic outlining the conceptual framework.

Gambling severity

The review aimed to identify harms associated with different levels of gambling severity. This can be measured in many ways, so it aimed to identify the harms associated with gambling in general, but also the negative consequences of gambling at different levels of engagement. For example, the harms associated with low frequency or low spending gambling compared to gambling at problematic levels.

This review included studies that defined harmful gambling in different ways, for example, according to screening tools such as the Problem Gambling Severity Index (PGSI) and the Diagnostic and Statistical Manual of Mental Disorders (DSM). The PGSI contains 9 diagnostic criteria, and a score of between 0 and 27 is possible. A score of 1 to 2 is 'low risk gambling', 3 to 7 is 'moderate risk gambling' and 8 and over is 'problem gambling' (10). The DSM-IV contains 10 diagnostic criteria for 'pathological gambling', and possible scores are between 0 and 10, with a score of 3 or over indicating problem gambling (11). A new edition of the DSM, the DSM-V, has since been published and has reclassified 'gambling disorder' with possible scores between 0 and 9 (12).

3.2 Eligibility criteria

We searched for studies that looked at the harms from gambling on 3 groups.

1. Gamblers.
2. Close associates of gamblers (for example friends and family).
3. Wider society.

We used PICO (population, intervention or issue, comparison and outcome) parameters to develop the search. We included studies that included:

- populations of adults and children of all ages, including studies that focus on sub-groups of the population (for example, by sex, deprivation, geographical location or from an institution)
- the issue of gambling in all forms, including gambling-related aspects of gaming (see definitions)
- no comparisons (descriptive studies) and any type of comparison (comparative studies, for example, non-gambling general population versus gamblers)
- harm to any of the 3 groups

Study design was added to better focus the work. Controlled trials (randomised or otherwise) were not included because the focus of this review was not on assessing an intervention. It is also not ethical to conduct trials on this topic. We included quantitative and qualitative designs because both are relevant to fulfilling the aim. Timeframe (follow-up time) was not applicable to study selection.

3.3 Other inclusion criteria

Language

We used English. We did not include other languages as we were not able to translate.

Publication dates

We chose 2005 as the earliest date of publication, because in this year the government issued proposals to reform the law on gambling (the Gambling Act). Also, in the 2005 to 2006 financial year, the Economic and Social Research Council and Responsibility in Gambling Trust provided £1 million of funding for research on problem gambling, which significantly increased research capacity (13) and publications on this issue. However due to the large volume of publications for years 2005 and 2020, the searches were split into 2 parts.

1. Part 1: years 2005 to 2014.
2. Part 2: years 2015 to 2020.

Splitting the searches into 2 parts ensured coverage of a long timeframe but also a more focused investigation of the most recent primary evidence.

Where a study had 2 publication dates (printed and online), the study was included if either was within the date range.

Study design

For the study's design, part 1 covered systematic reviews of primary studies, including integrative reviews (which combine quantitative and qualitative studies) and meta analyses. Part 2 covered observational and qualitative studies.

Publication type

We included both peer reviewed studies and grey literature, the latter of which is relevant literature published in non-academic databases.

Setting

We included studies that were based within the Organisation for Economic Co-operation and Development (OECD), because these would be most similar to the UK context. Reviews that included studies from more than one country were considered on a case-by-case basis (we included reviews with more than half of the studies from OECD countries).

3.4 Exclusion criteria

Study design

We excluded mapping reviews, scoping reviews, reviews of reviews ('umbrella' reviews), and narrative reviews that did not report a formal methodology ('opinion pieces'). We also excluded studies where the primary or secondary aim of the study was not focused on identifying the harms associated with gambling, and studies that assessed the effect of an intervention.

3.5 Search strategy

We employed a comprehensive search to identify both academic and grey literature. A Senior Information Scientist in PHE developed the search strategy, which was peer reviewed by a second Information Specialist in PHE. We ran the database and grey literature searches on 11 September 2019 and 20 November 2019 respectively (main searches). These searches were re-run on 7 July 2020 and 29 July 2020 (updated searches) respectively to ensure the review included the most up to date evidence.

Electronic searches

We searched the following databases:

- Ovid Medline
- Ovid Embase
- Ovid PsycINFO
- NICE Evidence
- EBSCO SocIndex

The Ovid Medline search is presented in the appendices (Appendix A). This was translated for other databases. The search looked for terms in the title, abstract, author keywords and thesaurus terms (such as MeSH [Medical Subject Headings] in Medline) where available. To search for systematic reviews, we used a validated review filter for the Ovid databases, and the NICE Evidence searches was limited to Secondary Evidence only. A validated review filter was not available for EBSCO SocIndex, so we created a set of search terms to search for reviews.

Grey literature

We searched for reports and other relevant literature that may not be published in databases using Google and the websites listed below. The key words used were gamble, gambling, betting, casino, lottery, lotteries and loot box. Each website was also browsed. They were:

- Gamble Aware InfoHub
- Gambling Commission
- GambLib (Gambling Research Library)
- Gam Care
- National Problem Gambling Clinic
- Gordon Moody Association
- Gamblers Anonymous
- Open Grey
- Gam-Anon
- Gambling Information Resource Office Research Library
- Advisory Board for Safer Gambling
- Gambling Watch UK
- Australian Gambling Research Centre
- Gambling Research Exchange Ontario
- Citizens Advice Bureau
- Be Gamble Aware
- Problem Gambling, Wigan Council
- Gambling Compliance
- Gambling Watch UK
- Child Family Community Australia
- International Centre for Youth Gambling Problems and High-Risk Behaviours

- Gambling and Addictions Research Centre
- Alberta Gambling Research Institute
- Responsible Gambling Council
- Problem Gambling Foundation of New Zealand
- Gambling Commission New Zealand
- Victorian Responsible Gambling Foundation

Screening

Five reviewers completed aspects of screening. Reviewers followed the same screening processes for the main and updated searches. For all stages of screening, a member of the review team resolved disagreements that the reviewers could not resolve. Pilot work showed that some references identified in the search for systematic reviews were primary studies. So, we undertook a preliminary title and abstract screen on references identified in the part 1 search to exclude primary studies. This was done independently and 20% of each reviewers' screened references were checked for accuracy by a second reviewer.

Two reviewers screened the title and abstract of all remaining references (all those remaining from the part 1 preliminary screen plus all those identified in the part 2 search) independently according to the inclusion and exclusion criteria. Each reference was then coded as either 'included' or 'excluded'.

Two reviewers screened the title and abstracts of the grey literature and any fulfilling the inclusion or exclusion criteria were uploaded to EPPI reviewer.

Every full text paper was screened independently by 2 reviewers according to a coding framework that was set up in advance. While screening the full texts, we realised that that there were few observational studies and systematic reviews that identified whether gambling came before harm. Most of quantitative studies used a cross-sectional design or reported co-occurring harms and gambling. In these studies, it was not possible to define gambling as the exposure and harm as the outcome. Given that the purpose of this review was to identify the breadth of harms associated with gambling, the review team decided to include these studies, as excluding them would have significantly limited the review. However, we also decided to report these separately and to focus the review on the studies that assessed a temporal relationship (where gambling came before the harm).

So, there was a second stage of full text screening that split the quantitative studies into those where we could identify a temporal relationship either through the study design or analysis (from here on referred to as 'time-based quantitative'), and studies that did not (from here on referred to as 'descriptive' and 'cross-sectional'). Descriptive studies included prevalence data on harms or harm scores and cross-sectional studies measured associations between gambling or levels of gambling severity and harms. We excluded a small number of studies at data extraction stage after further consideration by the review team. The list of studies that were excluded and the reasons for their exclusion is reported in the appendices (Appendix B).

Agreement

The inter-rater agreements for screening in both the main and updated searches were all above 90% for each reviewer pair.

Additional searches

When conference abstracts were identified in the searches, the reviewers looked at whether the study had ever been published in full and included those that fulfilled the inclusion or exclusion criteria. We examined reference lists of included studies for other studies that fulfilled the inclusion or exclusion criteria. The final list of included studies was sent to the gambling-related harms review external reference group and they suggested other studies. The external reference group's role was to inform and guide the project team undertaking the review. These studies were screened against the inclusion and exclusion criteria and were either unsuitable or were already included.

3.6 Data extraction and risk of bias

Data extraction tables were pilot tested before being used and signed off by the external reference group. The review team planned to contact authors for essential missing information and clarification but in practice this was not necessary. For the time-based quantitative studies and the qualitative studies, 2 reviewers independently extracted the data and undertook a risk of bias assessment. Data from systematic reviews, descriptive and cross-sectional studies was extracted but there was no risk of bias assessment (because in these studies it was not clear that gambling came before harm). Data for these 3 types of study was extracted by one reviewer and checked by a second.

The Newcastle Ottawa Scale (14) and the Critical Appraisal Skills Programme (CASP) qualitative checklist (15) were used to assess the risk of bias of the time-based quantitative studies and qualitative studies respectively. There is no universally adopted scoring system for the Newcastle Ottawa Scale for studies considered to have a low, moderate or high risk of bias and so the following overall categories were adopted respectively: 7 to 9, 4 to 6 and 1 to 3. Qualitative papers started with a low risk of bias rating. This increased to medium if there was one major source of bias or more than one minor source of bias. The risk of bias score was increased to high if there was more than one major source of bias or many minor sources of bias. Any disagreements on scoring were resolved within reviewer pairs.

3.7 Analysis

We employed a narrative synthesis using text to summarise the findings (16). First, we summarised the results of the included studies according to the harm pillars of our conceptual framework and who was affected (the gambler, their close associates or wider society), based on the information in the data extraction tables. Given the broad nature of the review, we wanted to describe the findings rather than explain them, although we provided theories when

the evidence supported this. We included an appraisal of the quality of the literature to assess the risk of bias of individual studies. We provided differences by sub-group (according to the PROGRESS-Plus framework for characteristics of potential inequalities (17)) where this was reported in the literature.

Secondly, we assessed the body of evidence. Given the heterogeneity of the evidence it assessed and synthesised according to the 4 principles laid out in the GRADE CERQual approach (18):

1. The methodological limitations of the studies that make up the evidence (this was done using the risk of bias ratings for individual studies, though not using a formal approach due to the inclusion of different study designs).
2. The relevance of findings to the review question.
3. The coherence of the findings.
4. The adequacy of data supporting the findings.

The reviewers and members of the external reference group assessed the synthesis in relation to the evidence presented in the results to confirm its accuracy.

3.8 Deviations from the protocol

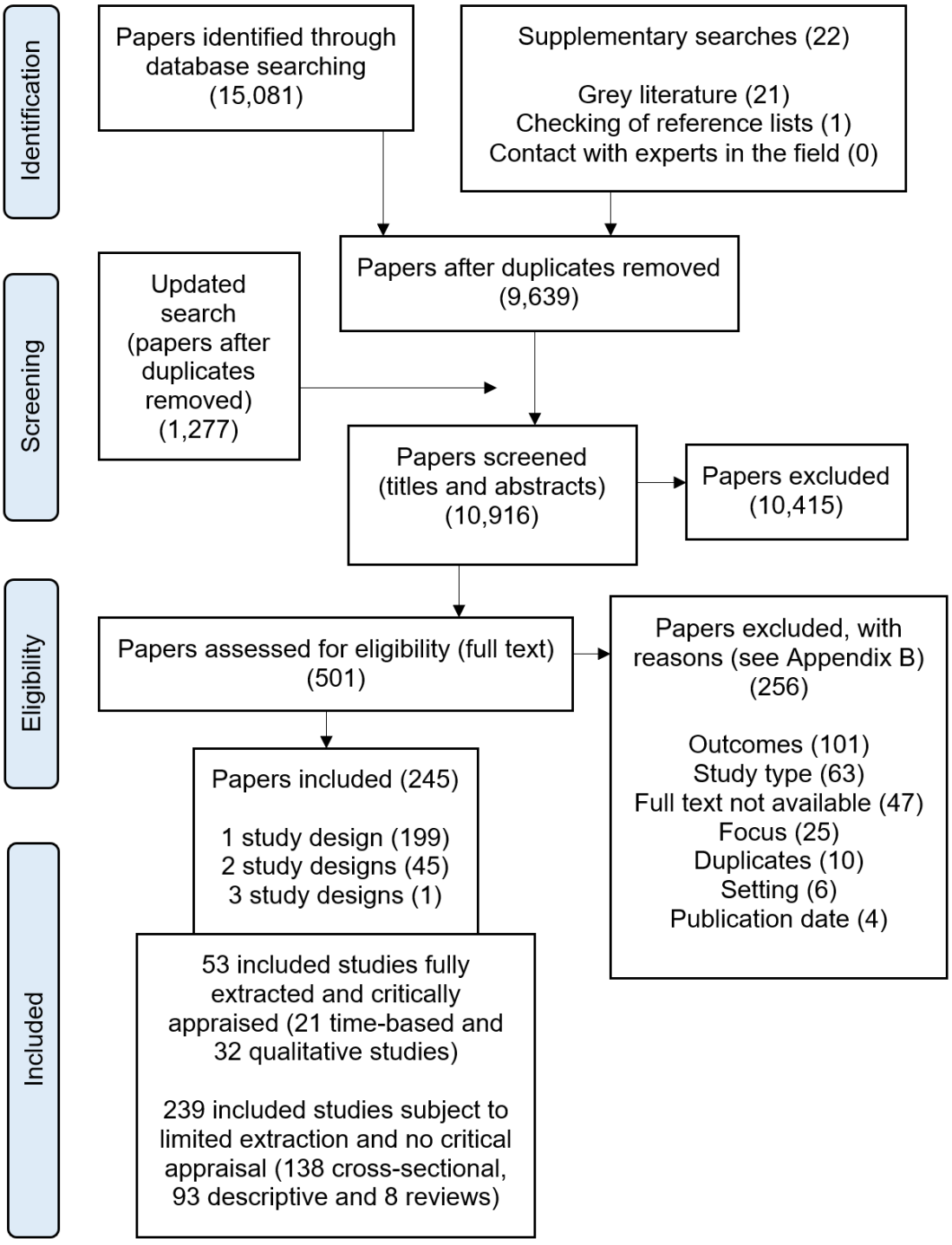
We treated descriptive and cross-sectional studies and systematic reviews separately because it was less clear that gambling came before harm. Less information was extracted from these studies and there was no critical appraisal. Data was extracted by one reviewer and checked by a second rather than being extracted by 2 reviewers independently and compared. We took this approach to ensure that the review covered the breadth of harms identified in the literature while focusing specifically on harms caused by gambling.

4. Study selection and description

4.1 The study selection process

Figure 1 below summarises the study selection process.

Figure 1: PRISMA diagram

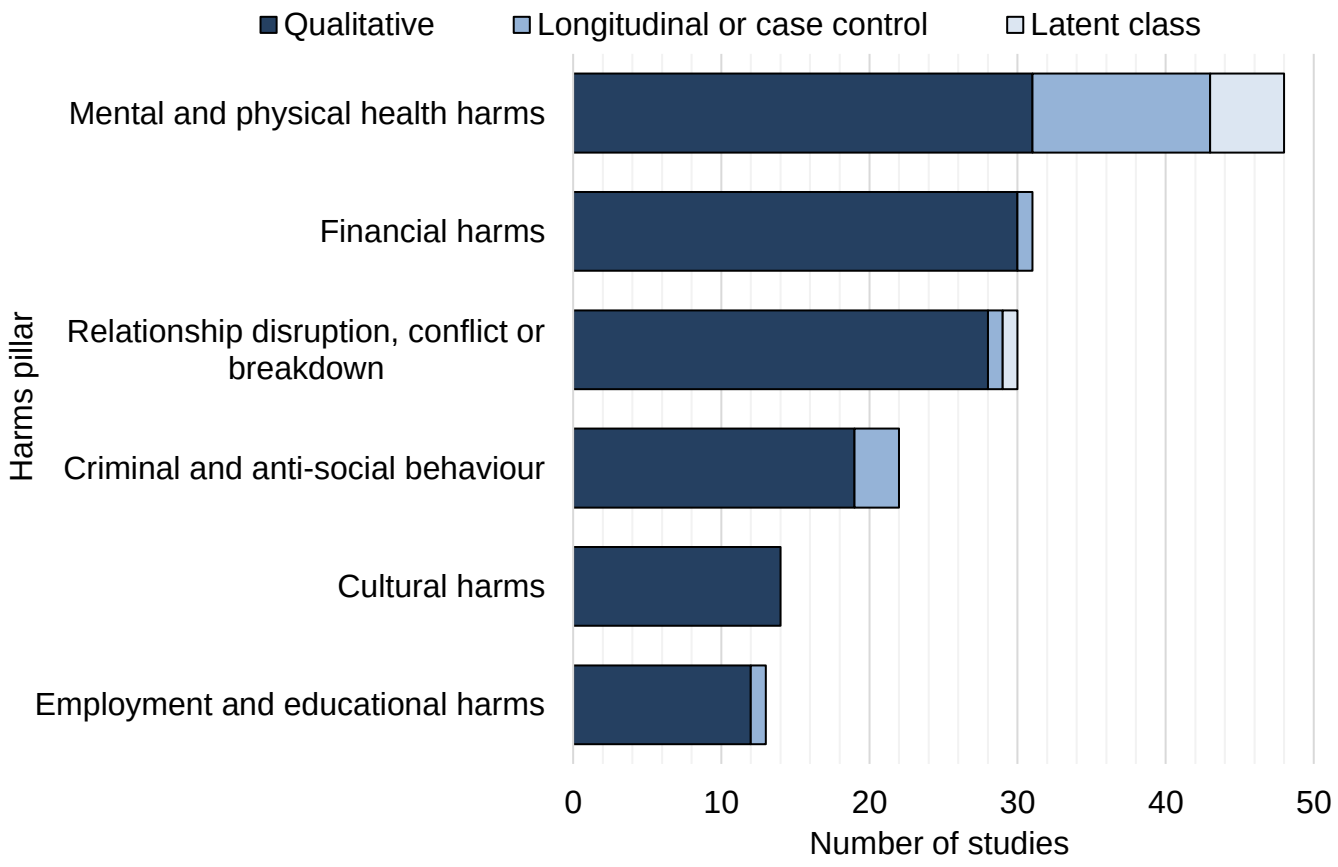


The database search returned 15,081 papers, with an additional 22 identified through supplementary searches (21 from grey literature, and one from reference lists). We removed duplicates. The updated search carried out in 2020 added another 1,277 papers. The title and abstract of all 10,916 papers were screened and 10,415 were excluded. After assessing the full texts of the remaining 501 papers, we excluded another 256. You can see the reasons why these studies were excluded in Appendix B.

Our review includes a total of 245 papers. Some papers included relevant data from more than one study design (for example descriptive and cross-sectional or descriptive and qualitative) and so were included in more than one section of the review. There were 292 studies across the 245 papers. There were 21 time-based quantitative studies. These were split into longitudinal or case control studies and those that used LCTM or LCA (see Appendix C and Appendix D respectively for summaries of these studies). There were also 32 qualitative studies (summarised in Appendix E). The review largely focuses on these results (Figure 2).

In addition, there were 8 systematic reviews, 93 descriptive and 138 cross-sectional studies (summarised in Appendix F, Appendix G and Appendix H respectively). The results are presented in pillars based on the conceptual framework. Given that the systematic reviews did not assess a temporal relationship (and so did not undergo a full assessment) the review is based on evidence from January 2015 to July 2020.

Figure 2: Number of studies per study type and harm pillar



4.2 Descriptions of studies and reviews selected

Time-based quantitative studies

The review identified 15 longitudinal or case control studies (see Appendix C for a summary of these studies (19 to 33)). Eleven studies used a prospective cohort design (19 to 24, 28, 29, 31 to 33), 3 used a retrospective cohort design (20, 25, 26) and one study used a retrospective case-control design (30).

Length of follow-up ranged from 2 to 16 years. These studies were from:

- Australia (N=4 (20, 23, 27, 29))
- Canada (N=4 (19, 21, 31, 32))
- US (N=3 (22, 28, 33))
- Sweden (N=2 (25, 30))
- Italy (N=1 (26))
- UK (N=1 (24))

At the time of recruitment, 8 studies recruited children or adolescents aged 11 to 19 years (22, 24, 26, 27, 29, 31 to 33), 6 recruited adult populations (18 years and over (19, 21, 23, 25, 28, 30)), and one study did not use participants and instead used area-level claims for bankruptcy (20).

The studies varied in how they measured gambling. They could use more than one way of measuring gambling, however most studies (N=10) used a validated measure of gambling including:

- PGSI (21, 23, 30)
- International Classification of Diseases (ICD) classification (25, 26)
- South Oaks Gambling Screen (SOGS) (30, 32)
- CPGI (19)
- AUDADIS-4 pathological gambling (28)
- Gambling Assessment Module (GAM-IV-S (33))

Four studies did not use validated measures of gambling (22, 24, 27, 29). For example, defining problem gamblers as those losing $500 or more in the last year due to gambling (22), or by splitting past 12 month gambling participation into ‘no gambling’, ‘less than weekly’, or ‘weekly gambling’ (24). One study used administrative data on the number of gambling venues in an area as a proxy for gambling prevalence (20). Four studies were rated as low risk of bias and 11 as moderate (appendices I to L). The main methodological weaknesses were using self-reported data for exposure and outcome measures, loss to follow up and missing data.

There were also 5 relevant studies that used LCTM and one LCA (see Appendix D for a summary of these studies (34 to 39)). Length of follow-up ranged from 3 to 11 years. Most studies (N=4 (34 to 36, 39)) were from Canada, with one study from Switzerland (37) and one from the US (38). At the time of recruitment, 4 studies recruited adults aged 18 years and over (34, 36 to 38) and 2 reported on children or adolescents aged between 13 and 17 years (35, 39). The studies varied in how they measured gambling, and all used a validated measure including:

- PGSI (34, 36)
- DSM (37, 39)
- SOGS (35)
- SCI-GD (38)

Four were rated as moderate risk of bias and 2 as high (summarised in Appendix M and Appendix N). The main methodological weaknesses were samples not being representative and not being able to demonstrate that the outcome of interest was absent at baseline.

Qualitative studies

Of the 32 qualitative studies (see Appendix E for a summary of these studies, (40 to 71)):

- 12 included gamblers only (40 to 51)
- 3 included close associates only (52 to 54)
- one included gambling-specific key informants only (55)
- 6 included gamblers and either close associates, gambling-specific key informants or both (56 to 61)
- one was on the views of young people[1] (71)

The remaining 9 studies included either other, mixed or unclear populations (62 to 70).

Of the 12 studies that included gamblers only:

- 4 included current gamblers (40, 43, 46, 49)
- 3 included current problem gamblers (42, 44, 51)
- 3 included current and remitted problem gamblers (41, 47, 50)
- one included problem gamblers who had gambled in the previous 3 years (although the exact timeframe for their gambling was unclear (45))
- one included gamblers who were incarcerated (48)

[1] Who may or may not have gambled.

Studies were conducted in the following countries:

- UK (N=8 (49, 52, 60, 61, 63, 64, 67, 71))
- Australia (N=7 (42, 45, 48, 57, 59, 66, 68))
- Finland (N=5 (44, 46, 53, 65, 69))
- US (N=3 (40, 43, 50))
- Sweden (N=2 (51, 62))
- New Zealand (N=2 (55, 58))
- Canada (56), France (N=1 (41))
- South Korea (N=1 (47))
- Norway (N=1 (54))
- Poland (N=1 (70))

The total number of participants across studies was 1,608. Qualitative data also came from:

- an unspecified number of participants who completed free text responses in an online survey completed by 222 participants (52)
- an unspecified number of stakeholders across 17 organisations (67)
- observations of 278 attendees at over 20 Gambling Anonymous meetings (61)
- 55 cases of gambling-related embezzlement reported in newspapers (62)

Using the CASP qualitative checklist, only one study was rated as having a low risk of bias, 9 were rated as moderate and the remaining 22 were rated as high (see Appendix O and Appendix P). The most frequently encountered methodological weakness across qualitative studies was failing to consider the role of the researchers (their positionality[2]) in collecting and analysing data.

Systematic reviews

We identified 8 systematic reviews. None assessed the temporal relationship between gambling and harm (see Appendix F for a summary of these studies (72 to 79)). Three reviews included a meta-analysis (72 to 74). Reviews included studies from non-European countries, a mix of European and non-European countries, or the countries were unclear or unspecified. Reviews included a range of populations and ages.

[2] In qualitative research factors such as power differential or differences in background experiences and characteristics between the researchers and participants can affect the validity and reliability of the research. Lack of positionality does not mean findings were biased, but rather the reviewers could not assess this. Declaring any conflicts of interest or financial support equally affects both qualitative and quantitative research and was assessed separately (see the section on conflicts of interest and funding).

Descriptive studies

Our review identified 93 descriptive studies (see Appendix G for a summary of these studies (42, 51, 52, 60, 69, 80 to 167)), most of which were from the US (N=20), followed by:

- Australia (N=18)
- GB or UK (N=11)
- Canada (N=7)
- Finland (N=7)
- Sweden (N=5)
- Spain (N=4)
- France (N=4)
- Italy (N=2)
- Poland (N=2)
- New Zealand (N=2)
- Brazil (N=1)
- Czech Republic (N=1)
- Denmark (N=1)
- Germany (N=1)
- Ireland (N=1)
- Isle of Man (N=1)
- Portugal (N=1)
- Switzerland (N=1)
- Switzerland and Belgium (same study population) (N=1)
- multiple countries (N=2)

The descriptive studies included a range of populations and age groups.

Cross-sectional studies

Our review identified 138 cross-sectional studies (see Appendix H for a summary of these studies (19, 42, 57, 81, 83, 84, 86, 87, 89, 90, 94, 98, 104, 107, 109 to 113, 120, 121, 124, 127 to 131, 133, 135, 138, 140, 143 to 145, 150, 151, 156, 160, 162, 163, 166 to 263)). These studies were from:

- the US (N=32)
- Australia (N=23)
- Canada (N=15)
- UK, GB, England and Scotland or England only (N=11)
- Finland (N=10)
- Sweden (N=7)
- Italy (N=6)
- Spain (N=6)
- France (N=4)

- Denmark (N=3)
- Germany (N=3)
- Switzerland (N=2)
- Portugal (N=2)
- Japan (N=2)
- Poland (N=1)
- New Zealand (N=1)
- Greece (N=1)
- Isle of Man (N=1)

Two studies did not report the geography for their study. The remaining 6 studies included a mix of countries. The cross-sectional studies included a range of different populations and age groups.

5. Results

5.1 Financial harms

Time-based quantitative results

We identified one longitudinal retrospective cohort study that reported on bankruptcy (20). This area-level study, conducted in Australia, aimed to examine whether changes in the number of electronic gaming machine (EGM) venues in a given local area is associated with changes in the rates of bankruptcy. The study had a low risk of bias. The study used data from 225 local areas across Australia's 3 largest states[3] between 2011 and 2018. Data on the number of EGM venues per year for each local area was taken from venue-level administrative databases. An EGM venue was defined as any business with at least one licensed EGM.

Data on the number of personalised insolvencies were taken from the Australian Financial Security Authority. This included all bankruptcies, debt agreements and personal insolvency agreements assigned at the local area based on the debtor's residence. Multivariate linear regression was conducted, which included the following area-level covariates:

- number of non-gaming pubs and clubs
- unemployment rate
- population count

Overall, one additional venue was estimated to increase the number of registered bankruptcies by 1.80 per year (95% confidence interval (CI) = 0.39, 3.21). This relationship was largely brought about by non-business personal bankruptcies. For example, one additional venue was estimated to increase the number of non-business personal bankruptcies by 1.44 per year (95% CI = 0.24, 2.65). The estimated coefficient from the business-related personal bankruptcies was approximately 5 times smaller and not statistically significant. These findings suggest that increases in the number of EGM venues in a local area are associated with increases in financial bankruptcy.

Qualitative results

Financial difficulty and debt caused by gambling, which was often severe, was a prominent harm across nearly all (N=30) of the qualitative studies (40 to 67, 69, 70). Adult gamblers used up benefit payments, income or salary to fund their gambling behaviour (46, 60, 63, 67). Gamblers also used up inheritances, exhausted savings or pensions, lost assets such as

[3] New South Wales, Victoria and Queensland.

homes having defaulted on mortgage payments or businesses, and had to sell personal possessions (40, 41, 43, 44, 46, 48, 50, 52, 53, 55, 57, 59, 64, 65, 67, 70).

Gamblers used credit cards to pay off other cards (known as 'kite flying') so while they were paying money back, the interest meant the amount they owed was still large. They also took out loans (for example, instant and payday), used 'loan sharks', lived off overdrafts or borrowed money from others (44, 46, 48 to 51, 57, 60, 65 to 67, 69, 70). Interest repayment rates in one study could be as high as 520% (48) and in another study a gambler had £15,000 debt from payday loans (49).

Gamblers ended up having less or not enough money for daily or basic expenses for themselves or their families (for example, food, rent or petrol) and bills. They could not 'make ends met'. They were also unable to afford luxuries like holidays (40, 43, 44, 46, 48, 50, 57, 60, 66, 67). Studies reported that gambling led to bankruptcy (56, 57, 70) and eviction and homelessness (57, 60, 64, 66, 67, 70). Box 1 shows quotes from stakeholders and gamblers about financial harms.

Box 1: Financial harms to the gambler, illustrative quotes

> "So a story we see repeated every 2 weeks is that payday arrives, the person has a budget, they've had advice on how to manage their money and they know what it [the budget] looks like. Come payday they'll go to the Post Office because these guys can't have bank accounts, so the only way is for them to draw out all their cash in one go, then they've got cash in hand and they walk into the newsagents with every intention of just getting tea bags and milk, but £80 will go on scratch-cards straightaway, but then the guilt kicks in, they stop accessing services because of the guilt, but to comfort themselves they'll go out and gamble either scratch-cards or in the bookies; scratchcards seem more appealing to those with low levels of literacy and numeracy, they're more inclined to do scratch-cards rather than at the bookies." (Stakeholder (67))
>
> "Yesterday I closed my online gambling account for good because our playing got out of control. I had chosen a limit to my account, but of course we gambled up to the limit in a very short period of time. So I opened a new online gambling account without limits. I played on slot machines and got back 20 euros. My partner was less lucky… Because I was a little bit drunk, I didn't notice that he had gambled his whole salary away. Then he suggested that we should take instant loans. I disagreed, because we haven't paid off the previous instant loans." (Gambler (46))
>
> "Well, it's, if you take loans, you have to take loans, and you otherwise earn well but you have to take some trash loans: it's quite troubling….I had, in the end… I took loans with text messages and so. But the same it is, those unsecured consumer credits, they have insane interests. There's no sense, no reasonable person would do that." (Gambler (44))

"Wages, but at the time I risked everything; I risked rent, money for bills, petrol. There's been several instances where I've been paid, so that's a month's wage gone in, that's obviously got to pay rent, bills, food, petrol, living expenses for a month, and I've blew it in an hour." (Gambler (60))

"Yeah, ... let's say the last thing I would've wanted to do was waste money on completely useless things such as clothes or food." (Gambler (44))

"I've had weeks where I've had bills due and I've been gambling with my mates because we haven't caught up and seen them for ages, then we end up gambling. Then I'm stinging for about a month just trying to catch back up. That's what you do [laughs] … Sometimes it can be very stingy, [laughs] you're just eating not much … I'll buy just tuna or [laughs] just 2 minute noodles or sometimes I eat whatever's in the cupboard really." (Gambler (57))

"I brought myself into a credit spiral and to bankruptcy in general." (Gambler (70))

"I ended up being homeless – walking out of my home and living in my car because going to the pokies [gambling machines] it was so much more important at the time. I was in a really bad spot, and my daughter was only a little girl. She was just like a little baby, and it didn't matter, because she was so tiny, she could sleep – it'll be fine – I didn't think anything – my mum will take her – it's okay – I can sleep in the car … I was in the car for only just a short a time. I ended up staying in my car for about 2 weeks – maybe 3 weeks." (Gambler (57))

The financial hardship caused by gambling affected others, particularly people in close relationships like intimate partners with close financial ties to the gambler (see Box 2 for illustrative quotes). Many of the issues affecting the adult gambler could affect the whole family. Gamblers could be in debt to their close associates (for example, family members or friends) or reliant upon them for money (40, 42, 65, 66). Close associates were unable to afford daily expenditures and essentials like food, clothing or rent (40, 52, 53) and also experienced loss of homes (54). Gamblers took out loans and other credit in the name of close associates or stole and exploited money from them (42, 44, 52, 53, 60, 66, 69). Close associates sometimes had to take control of the gambler's finances (54, 61) or take on additional employment to cover their living costs (52) and felt manipulated into providing financial support (60).

Box 2: Financial harms to others, illustrative quotes

"She [sister] went broke and came and asked me for $100. I gave it to her. Then she won $900 and I told her, 'I think you need to cash out, that's when you can give my money all back to me.' So she cashed out and she had $900+ and she said, 'Well I put money in this machine so I'll give you $27.' I said, 'Oh no you won't. You're going to give me $100." (Sister of a gambler (40))

"... with them and their family group … they all lend and borrow off each other. One half of the group will be propping up the other half of the group on week one and then on week 2 it will switch and it will revolve around in this circle. It's like this mini-economy, I guess, of money lent and borrowed." (Gaming Manager (45))

"We had a lovely big house. I paid the first 6 months and then he was meant to pick up the payments, which he said that he did and then one day I came home to find we had been evicted and all my stuff was being moved out. I had a 4-month old baby. We managed to talk the landlords in to giving us another week in the property because they realised I didn't know and I think that they just felt sorry for me because obviously I was hysterical." (Partner of a gambler (52))

"How can we pay the rent and feed our family? We did not talk about his relapse. He said he was sorry and life continued. I used all my savings that I had put aside in case the baby got sick and there were bills. There is nothing left in the savings account. I have tried to start saving again, but it is not very easy as my partner is unemployed." (Partner of a gambler (53))

"He built up terrible debts and I don't know, probably £17,000 or something…over a few years and used credit cards and things all the time to acquire the debt. Oh yes, then we helped him with it. I think we paid off a big chunk of it but we said he had to pay a part of it, so he would feel responsible for some of it, and so he did do that. Then he had a relapse again." (Mother of a gambler (52))

"I forged the signature of my ex-partner in a written application and I applied the loan, Euro 4000 as I remember. The loan was then paid into the account of my ex-partner." (Gambler (69))

"I am so disappointed and sad. He must be relieved for having told me about his gambling habit, but now what? Should I take control of our finances? Should I only give him lunch money for the canteen? The greatest loss is the loss of trust, not the loss of money, though I cannot understand how someone can use his family members' money as his own." (Partner of a gambler (53))

"He manipulated me over and over again, and that was very difficult. I look back and I was emotionally abused and manipulated with finances, really, all so he could just carry on with what he wanted to do with his life and his addiction." (Partner of a gambler (60))

Gambling debts resulted in harm to the gamblers' children (see Box 3 for illustrative quotes). Gamblers borrowed or took money from their children (40, 41). The lack of money meant children went without essentials such as their school uniform and other clothing, food and toys (42, 45, 58, 60). In some cases, a child's possessions were sold (55).

Box 3: Financial harms to children, illustrative quotes

> "My children have gone without, there are unpaid debts, never had the money to go away." (Gambler (42))
>
> "What happened was about a year leading up to it, it was things like school uniform was an issue, things like lunch money." (Child of a gambler (60))
>
> "He sold his son's PlayStations and equipment like that, just to feed his addiction. He really harmed his relationship with his children, they were really angry with their father." (Professional (55))
>
> "I mean for a lot of people, especially the worst harm is to the kids. Because they're the ones that don't have toys, they don't have food." (Affected other (58))
>
> "As a family, we've lost quite a lot, and I would say the loss came from the repossession of the house. That's a massive kick in the teeth. You look back and think 'Gosh, I was really, really affected by that.' At the time, I didn't think it had affected me emotionally." (Child of a gambler (60))

Financial harms had long-lasting and serious effects, which could continue even after a person's gambling might have stopped. For example, gambling was associated with having no money to pass onto children as the child's trust fund was spent (40). Financial problems were described as long-term and cyclical as the gambler went through periods of abstinence and then relapse (52). Gamblers and their families could become trapped in cycles of poverty or debt and have reduced financial security in older age (42, 57).

Financial harms were also wide reaching. Gambling-related debts can be 'written off' and the associated administration costs associated with bankruptcy cases and social support payments represents a wider harm to society (57). Participants in a study conducted in Australia suggested the ease of securing credit (to gamble) and government regulation were contributing to the detrimental impact of gambling at the societal level (57). In a study about the Pacific Island people of New Zealand, a culture where gift giving was commonplace, gamblers were unable to fulfil the financial commitments to the wider community (55).

Descriptive, cross-sectional and systematic review results

There were 35 descriptive studies that identified financial harms. Nineteen descriptive studies that reported on debt and erosion of savings (42, 52, 60, 102, 103, 113, 116, 117, 120, 121, 123, 124, 126, 131, 134, 136, 137, 146, 161). Where comparisons were made by gambling severity, measures of debt generally increased from non-gambler to problem gambler Debt was also seen among non-problem gamblers, but was less severe. The descriptive studies also suggested that debt was experienced by affected others, for example family members of problem gamblers (52, 60). A further 16 descriptive studies reported on financial harms more

generally, without specifying the type of financial harm (52, 84, 85, 93, 100, 104, 105, 108, 113, 118, 128, 138, 147, 149, 154, 165).[4] Again, where reported by gambling risk status, reports of financial harms increased from low-risk gamblers to problem gamblers. Five descriptive studies reported on homelessness (60, 131, 155, 161, 164) with the rate being highest among problem gamblers. One descriptive study reported on the social costs of gambling in the Czech Republic. This study found the overall social costs in 2012 ranged between €541,619,000 and €619,608,000, with family harms accounting for 63% of social costs (165).

There were 30 cross-sectional studies that considered financial problems related to gambling (42, 57, 84, 94, 107, 113, 120, 121, 124, 128, 131, 138, 156, 182, 183, 188, 195, 199, 201, 209 to 211, 214, 215, 228, 232, 236, 243, 248, 261). In general, these studies showed an association between gambling severity (measured in different ways) and a range of financial harms. Three of the 4 studies that considered homelessness said this was significantly positively associated with gambling participation or gambling severity (209, 232, 243) while the fourth found no association (210).

Only one review examined financial harms (79), specifically bankruptcy, which the author noted was the most studied of any of the indices of problem gambling. Most studies found rates of personal bankruptcy increased after casinos were introduced[5] (12 studies, while 3 studies found it did not). This was also the case when different individual forms of gambling were introduced, such as lotteries and electronic gaming machines (3 studies, although 1 study found no increase).

5.2 Relationship disruption, conflict or breakdown

Time-based quantitative results

This review identified 2 time-based quantitative studies that reported on relationship problems (28, 34). One longitudinal prospective cohort study, from the US, reported on IPV. This study aimed to examine the relationship between gambling problems and incidents of physical IPV controlling for axis I and II mental health disorders (28).[6] The study had a moderate risk of bias. The study used data from the US Epidemiologic Survey on Alcohol and Related Conditions (NESARC), which used stratified sampling and followed respondents over 3 years between (financial years 2000 to 2001 and 2004 to 2005). Respondents were aged 18 years and over at recruitment. During wave one, 43,093 respondents were recruited. This fell to 34,653

[4] The study by Bonnaire 2017 (based on the same study population) included descriptive data on ‘financial situation perceived as difficult’ but this repeated data in Bonnaire 2016 so is not reported here or in the summary table.
[5] In some studies, this referred to a change in national policy that allowed casinos to open but in other studies information on the context was unclear.
[6] Axis II disorders include personality (and developmental) disorders, and all other mental health disorders are included as axis I disorders.

respondents in wave 2 (3 years later), 25,631 of which were in a married or cohabitating relationship and completed the IPV questions. Gambling problems were measured using the Alcohol Use Disorders and Associated Disability Interview Schedule-DSM-IV Version (AUDADIS-IV) at recruitment. This also measured axis I and axis II mental health disorders, and substance use disorders.

IPV victimisation and perpetration was measured in wave 2 using the Conflict Tactics Scale. This includes aspects such as slapping, kicking or punching, threatening with a weapon, cutting or bruising, forcing sex, and causing injury that required medical care. After controlling for sociodemographic factors, the presence of gambling problems was associated with increased odds of physical IPV perpetration for men and women compared to people with no gambling problems (men's odds ratio (OR) = 2.62 (95% CI = 1.22, 5.60); women's OR = 2.87 (95% CI = 1.29, 6.42)). However, after adjusting for axis I and axis II mental health disorders, the associations were generally reduced. For example, after adjusting for mood and anxiety disorders, the associations between gambling problems and physical IPV perpetration was significant for men (OR = 2.37, 95% CI = 1.08, 5.20) but not women (OR = 2.21, 95% CI = 0.95, 5.12). When further adjusting for alcohol and drug use and applying personality analysis, associations between gambling problems and physical IPV perpetration among men also became non-significant. The analysis including all covariates showed that alcohol use disorder (measured using the AUDADIS-IV) and axis II mental health disorders were significant predictors of physical IPV perpetration among men, while all axis I and II disorders (mood, anxiety and personality disorders),and substance use were associated with perpetration among women.

In both men and women, after controlling for sociodemographic factors, the presence of at-risk gambling (1 to 2 symptoms) was associated with increased odds of physical IPV victimisation compared to no gambling problems (men's OR = 1.54 (95% CI = 1.03, 2.30); women's OR = 1.64 (95% CI = 1.03, 2.59)). In women, the presence of problem gambling (3 or more symptoms) was also associated with physical IPV victimisation: OR = 2.97 (95% CI = 1.31, 6.74). However, when additional adjustments were made for co-occurring mental health disorders, all associations between gambling problems and physical IPV victimisation were no longer significant. The analyses including all covariates showed that alcohol use disorder, drug use, and personality disorders were significant predictors of physical IPV victimisation among men, while all mood, anxiety, alcohol use, and personality disorders were associated with victimisation among women.

Though initially gambling problems were associated with increased odds of physical IPV perpetration and victimisation among men and women, these relationships were substantially reduced and non-significant when controlling for other mental health disorders and alcohol and drug use disorders. It may be that other psychiatric disorders that co-occur with gambling problems may be responsible for associations with IPV. So, it may be helpful to consider gambling problems and IPV alongside other complex mental health disorders.

The second time-based quantitative study, conducted in Canada, used LCTM to evaluate the influence of gambling problems on long-term trends in family adjustment (family functioning and social support) and interpersonal functioning (social support). It also examined whether annual measures of gambling problems have short-term effects or predict time-specific decreases in family or interpersonal adjustment (34). The study was rated as having a moderate risk of bias. The study recruited adults aged over 18 years in Canada[7] who were either 'at-risk' (defined as those who had spent CAD$10 or more on gambling in a typical month) or the general population (who had not spent CAD$10 or more on gambling in a typical month). There were 4,121 respondents at the start, which represented a response rate of 21.3%. The final analytical sample, which included people with data from at least 2 time points, was 3,798.

Data was first collected for this study in 2006 and follow-up data was collected in 2010. Gambling problems were measured using the PGSI, which was only administered if respondents had gambled on 3 or more days or spent the same or more than CAD$10 in the past year. Due to small numbers, categories were merged, so those with a PGSI score of 3 or more were classed as moderate-risk or problem gamblers, while those with a PGSI of 1 to 2 were classed as at-risk. Family functioning was measured using a single question: "How would you rate your overall family functioning in the past 12 months?", with possible answers ranging from "very poor" to "excellent". Social support was assessed using 5 items from the non-support scale of the Personality Assessment Inventory (PSI)[8]. Relationship satisfaction was evaluated among respondents who were married or in common-law relationships, using the Kansas Marital Satisfaction Scale (KMS). Moderate-risk or problem gambling significantly predicted lower levels of family functioning and social support compared to low risk or no gambling. All relationships were independent of major depression, generalised anxiety and substance use problems.

Qualitative results

Relationship harms featured in 28 of the 32 qualitative studies (40 to 47, 49 to 60, 62 to 67, 69, 70). By definition, relationship harms affect both the gambler and their close associates. Some relationship harms had long-lasting, inter-generational impacts. Studies often reported arguments, fights, conflict and relationship strain between the gambler and their family and friends. In relation to intimate partners this often culminated in relationship breakdown and separation. In many cases the strain on relationships was a result of financial difficulties and the dishonesty or loss of trust caused by the gambler hiding their behaviour or financial losses (40 to 44, 46, 47, 49, 52 to 57, 59, 60, 62, 65 to 67, 69, 70). Gambling-related domestic or family abuse was reported. The abuse could be verbal, emotional or physical and was mostly directed

[7] Ontario.

[8] (1) 'Most people I'm close to are very supportive'; (2) 'if I'm having problems, I have people I can talk to'; (3) 'people I know care about me'; (4) 'my friends are available if I need them'; and (5) 'I like being around my family'.

towards the intimate partners of gamblers. Physical violence was usually perpetrated by a man on their female partner. This could either be a male gambler on their female non-gambling partner or a male non-gambler on their female gambling partner (suggested to be caused by frustration at not being able to control their partner's gambling behaviour). Male gamblers could also intimidate and manipulate their female partners into giving them money (58, 60). In other studies, the exact nature of the domestic or family abuse was less clear (59, 64, 66, 70). You can read illustrative quotes in Box 4.

Over and above the general family arguments and breakdown, other specific harms to children were noted (see Box 5 for illustrative quotes). Sometimes these related to the financial problems outlined above. Studies described adult gamblers neglecting their duties to their children, which included failing to provide their children with food, spend time with them and collect them from school (41, 46, 50, 52, 59, 66, 70). Gamblers struggled to balance gambling with parenting (46). Sometimes children took on the parental role, keeping an eye on their parent while gambling online or lending them money (41, 46). Children were asked to keep their families gambling a secret and witnessed violence and threatening behaviour in the home (for example, from an illegal money lender (58)). Sometimes children were taken away from the family and placed in care (46, 55). A study specifically from the perspective of female partners of male gamblers with children spoke about the loneliness of parenting alone as they took on the parental role of the gambler (54).

Box 4: Relationship harms to the gambler and others, illustrative quotes

> "In the early days, the lies I had to tell my wife killed our relationship. I'd lose 600 [pounds]in a day and then have to come up with some lie." (Gambler (42))
>
> "Lost 2 relationships to it, lost 3 children, and lost the house to it … a big impact." (Gambler (42))
>
> "The family isn't all together for Easter or Thanksgiving or on anything like that. So on Easter, we, Ellie and I, tell our husbands, 'We're going up to my cousins for an Easter brunch.' But we don't. We go to the casino instead." (Gambler (40))
>
> "I don't trust anything my mother says now. I won't believe anything she says unless it's verified by somebody external, whether it's my sister or whether it's paperwork … So there's no trust there whatsoever. Our personal relationships are very strained for a very long time; in fact they still are." (Affected other (57))
>
> "Oh God … home life has been very stressful, lots of guilt and shame and worries and tension." (Gambler (42))
>
> "And now I have no one I can talk to, because I don't want to burden my parents with this [partner's gambling] anymore. Because they get so angry. And then they also get a bit angry with me." (Partner of a gambler (54))

> “He manipulated me over and over again, and that was very difficult. I look back and I was emotionally abused and manipulated with finances, really, all so he could just carry on with what he wanted to do with his life and his addiction.” (Partner of a gambler (60))

> “One time, after I had the baby, the police were called because I took his cards away from him and he went absolutely crazy. I had quite a few bruises where he attacked me.” (Ex-partner of a gambler (60))

> “I [treated] a husband who went in [to prison] for domestic violence and I found out later that it was because of the wife’s gambling… she’s the cause of his anger management [issues] and frustration. He got so frustrated, didn’t know exactly how to take control.” (Professional (58))

> “What can I do? It is not easy to leave with the children because I am financially dependent on him (how ironic, but it is true). The condition for us to stay together is that he quits gambling.” (Affected other who gambled (53))

Box 5: Relationship harms to children, illustrative quotes

> “I've got kids and you know, it was like – yeah, so some days I would have been like, especially on a weekend, maybe 8 to 10 hours watching sports. Yeah, so it was just a whole lot of wasted time … I'd try and fit in a couple of hours during the day, but because my wife, she does a bit with them as well and so yeah, it wasn't enough time with my kids. So I just got to the point where it was like, man, this has got to stop.” (Gambler (57))

> “I’ve heard about children becoming the parent. The role reversal where in single family where the mum was the gambler. The child taking the responsibility of the financial situation. The child was more a parent with financials and also to the younger children.” (Treatment Provider (57))

> “It has changed the way I communicate with my 2 children, son 10 years old and daughter 16 years old. I’m less patient with them or I cut myself off from them after a gambling episode. Then, I isolate myself and lock myself in my bedroom.” (Gambler (42))

> “I feel that I ruin my children’s life by gambling online and not spending enough time with them. Then I snap at my children and my partner when I’ve lost my money online.” (Gambler (46))

The effect of gambling on relationships with close associates had a wider ripple effect. For example, a parent of a problem gambler talked about having arguments with other non-gambling family members about the best way to help the gambler (52). Female partners of problem gamblers described having to defend their decision to stay with the gambler, causing arguments with their own parents (54). Partners of problem gamblers lied to their own families (53).

At the community level, relationship harms can damage social cohesion, with individuals becoming isolated or excluded. This contributes to intergenerational harms and legacy harms. Furthermore, communities can become divided in their attitudes towards gambling harm, which manifest when issues such as applications for increased gambling licences are put forward for approval (57).

Descriptive, cross-sectional and systematic review results

Thirty-seven descriptive studies reported on relationship harms. Twenty-five descriptive studies reported on outcomes relating to harms to the family or children of gamblers either from the point of view of gamblers or others directly affected (42, 52, 60, 80, 84, 100, 103 to 105, 107, 108, 114, 118, 123, 126, 136 to 138, 144, 146, 147, 150, 153, 154, 158). Eleven reported on divorce and problems in intimate relationships (52, 60, 84, 90, 103, 123, 124, 136, 150, 158, 167). There were 13 descriptive studies that reported on outcomes relating to IPV or family violence, or physical, verbal or sexual violence (52, 88, 93, 109, 135, 141, 144 to 147, 159, 161, 166). A number of studies sampled adult gamblers in treatment, and among this group, experience of family violence in the past 12 months ranged from 11.3% (159) to 50% (88). Problem gamblers reported social damages (118) and feeling socially isolated (161).

There were 22 cross-sectional studies that reported on relationship harms associated with gambling (57, 104, 107, 109, 124, 135, 145, 166, 183, 185, 186, 191, 200, 211, 215, 226, 228, 232, 241, 244, 245, 248). In general, findings were somewhat mixed. Twelve studies showed either an association between gambling severity and a variety of relationship harms or a significant difference in the prevalence of relationship harms between different gambling groups (57, 107, 109, 166, 185, 186, 200, 211, 228, 232, 241, 243). Relationship harms here include:

- spending less time with family
- marital satisfaction
- family arguments
- violence
- loneliness

Five other studies presented more mixed results, for example, gambling severity was associated with relationship problems with the gambler's spouse but not with their family (124, 145, 183, 191, 226, 248). One study reported no such association (245). Some of these differences may relate to the different populations sampled (for example, students, treatment-seeking gamblers or people who were recovering from gambling disorder). The 3 studies that examined spouses or affected others reported significant differences in the harms they experienced compared with those reported by the gambler (104, 135, 215).

Two reviews examined relationship harms and gambling (73, 79). The first of these was a meta-analysis looking at IPV and the second was a systematic review that looked at divorce, but included only 2 studies. In the meta-analysis, there were some unclear findings, but most studies included in the analysis found a significant association between problem gambling and

IPV victimisation. All studies showed a significant relationship between problem gambling and IPV perpetration (73). The results on divorce from the systematic review were unclear (79).

5.3 Mental and physical health harms

Time-based quantitative results

All-cause mortality

One longitudinal retrospective cohort study investigated the effect of gambling disorder on all-cause mortality in Sweden (25). This study aimed to investigate SMRs for patients with gambling disorder to compare mortality in this population to the general population. This study had a low risk of bias. It used national registers containing high-coverage information on diagnoses and mortality, namely a hospital patient register, and cause of death register. The study used data from 2005 to 2016. During this time, 2,172 people received a diagnosis of gambling disorder and for these people there were 1,024 hospital admissions and 5,236 medical appointments in outpatient care. The final analytical sample included 2,099 people aged 18 and over. Gambling disorder was defined using ICD-10, which could be included as a primary or secondary diagnosis. SMRs were calculated for overall mortality for men and women separately for the following age categories: 20 to 74 years, 20 to 49 years, and 50 to 74 years (Table 1).

The SMR results for overall mortality showed a 1.8-fold increase in mortality for people aged 20 to 74 years with a gambling disorder diagnosis compared to the general population. Mortality was 1.5 times greater than that of the general population for men with a gambling disorder diagnosis in this age group and 2.1 times greater for women. For people aged 20 to 49 years, mortality was 6.2 times greater than that of the general population, 4.6 times for men and 10.5 times for women. There was no significant increase in the age category 50 to 74 years. Age at first diagnosis of gambling disorder significantly predicted all-cause mortality (Hazard Ratio = 1.04, 95% CI = 1.02, 1.07). Taken together, this study showed that patients with gambling disorder have an elevated risk of premature all-cause mortality compared to those without gambling disorder.

Table 1: Standardised mortality ratios stratified by sex and age

	20 to 74 years old		20 to 49 years old		50 to 74 years old	
	SMR	95% CI	SMR	95% CI	SMR	95% CI
All persons	1.8	1.4, 2.2	6.2	4.1, 8.4	1.3	0.9, 1.8
Men	1.5	1.1, 1.9	4.6	2.7, 6.5	1.2	0.8, 1.7
Women	2.1	1.0, 3.3	10.5	2.7, 18.2	1.3	0.3, 2.3

Quality of life

One study using LCTM explored the relationship between gambling and quality of life (QoL) in the US (38). The study had a high risk of bias. The study aimed to identify latent subtypes of disordered gambling based on symptoms, then compared whether QoL was different between these groups at the time of recruitment.[9] Overall, 573 non-treatment seeking adults who had gambled at least 5 times in the previous year were recruited between the ages of 18 and 29 years and were followed-up over 3 years. Gambling symptoms were measured using the Structured Clinical Interview for Gambling Disorder (SCI-GD). QoL was measured using the Quality of Life Inventory. The statistical analysis of gambling problems and depressive symptoms supported a 3-group solution:

1. The 'high harm group' had moderate to severe gambling disorder at baseline and remained symptomatic at follow-up (5.5% of the sample).
2. The 'intermediate harm group' had problem gambling that reduced over time (19.5% of the sample).
3. The 'low harm group' were essentially asymptomatic (75.0% of the sample).

Analysis of variance (ANOVA) was then used to explore differences in baseline QoL scores between the identified longitudinal gambling subtypes. Gamblers in the high harm group had a significantly lower QoL score (average (mean) score = 38.6, standard deviation (SD) = 18.9) compared to the intermediate harm group (mean score = 43.5, SD = 11.0) and low harm group (mean score = 47.2, SD = 11.1).

Body mass index

Our review identified one LCTM exploring the relationship between gambling and body mass index (BMI) at the time of recruitment[10] (38). The study was rated as having high risk of bias and the methodological details are described in the previous section on QoL. The study aimed to identify latent subtypes of disordered gambling based on symptoms, then compared whether BMI was different between these groups. The interviewer collected and measured participants' BMI then compared this between gambling groups. After analysing gambling problems and depressive symptoms, participants were split into 3 groups (high, intermediate and low harm) and compared. Gamblers in the high harm group had significantly higher BMI scores (mean BMI = 27.2, SD = 8.0) compared to the intermediate harm group (mean BMI = 26.2, SD = 6.5) and low harm group (mean BMI = 23.8, SD = 4.5). It should be noted that these statistical differences were marginal and varied a lot.

[9] Note that the groups were formed longitudinally, but the harms were identified at a single time at the point of recruitment.
[10] Note that the classes were formed longitudinally, but the harms were identified at a single time at the point of recruitment.

Drug, alcohol and tobacco use

We identified (19, 23, 24, 26, 27, 29, 31 to 33) and 3 used LCA or LCTM (37 to 39). One longitudinal prospective cohort study reported on alcohol and cannabis use (31). This study examined the relationship between gambling participation and alcohol and drug use among a population-based sample of twin pairs in Canada. The study had a moderate risk of bias. There were 1,324 participants who were recruited at birth between 1995 and 1998. Measures were collected when children were aged 14 and 17 years. Gambling participation was measured using the South Oaks Gambling Screen Revised for Adolescents (SOGS-RA). Since frequencies for any gambling activity were very low, outcomes were split into 2 groups: “never” and “at least once”. Substance use was measured using the Personal Experience Screening Questionnaire (PESQ), which gives an average score across 4 items measuring the frequency of:

- alcohol use
- cannabis use
- other drug use
- binge drinking

For each substance-related item people were split into 2 groups according to frequency: “never” and “at least once”. Being involved in gambling at age 14 years contributed to escalating drug and alcohol use between the ages of 14 to 17 years (beta = -0.10).[11]

A longitudinal prospective cohort study aimed to examine whether past-year, at-risk or problem gambling was associated with alcohol (19). The study had a moderate risk of bias. The study used data from a Canadian[12] survey that used random sampling, convenience sampling and snowball sampling and recruited respondents aged 18 to 20 years in 2007. Respondents were followed-up for 5 years and surveyed at 4 time-points (up to the age of 25 years). At the start of the study, there were 679 respondents, 517 of which completed the survey at all 4 timepoints (76.1%). At-risk or problem gambling was identified using the PGSI. Alcohol dependence was measured using the Alcohol Dependence Scale. Results showed that at-risk or problem gambling at baseline was significantly associated with increased odds of alcohol dependence (adjusted odds ratio [AOR] = 2.20, 95% CI = 1.17, 4.13) at cycles 2 to 4. Taken together, these findings suggest that at-risk or problem gambling in early adulthood was associated with greater risk of new onset alcohol dependence over the next 5 years. This suggests a period in a person’s lifespan where preventing gambling problems is important as it may reduce alcohol dependence later in early adulthood.

[11] The standard error for this specific finding was not reported however the authors state that “standard errors varied between .03 and .09 for all study variables in the model”.
[12] Manitoba.

Another longitudinal prospective cohort study from Australia aimed to examine the relationship between problem gambling and alcohol use, daily tobacco use, and drug use (23). The study had a moderate risk of bias. The study used a sub-sample of a larger community sample recruited using stratified random sampling as part of the Tasmanian Longitudinal Gambling Study. The sub-sample included data from waves 2 and 3 only (data collected at different times).[13] Overall, there were 1,109 respondents providing data for either wave 2 or wave 3. Of these, 820 had follow-up data one year later (follow-up was between 2013 and 2014).[14] Gambling was measured using the PGSI and split into 'ever' and 'never' gambled. Alcohol use was measured using the Alcohol Use Disorders Identification Test (AUDIT-C), tobacco use was identified as daily use or not, and drug use was measured as having used drugs at least once in the last year. There were no significant relationships between any gambling at the start of the study and hazardous alcohol use (OR = 0.66, 95% CI = 0.3, 1.45), daily tobacco use (OR = 0.84, 95% CI = 0.25, 2.85), or drug use (OR = 1.09, 95% CI = 0.27, 4.4) at follow-up. No interaction effects were identified for age or gender in any of the analyses.

A longitudinal prospective cohort study carried out in the US aimed to investigate the relationship between onset of gambling and subsequent alcohol, cannabis and tobacco smoking (33). This study had a moderate risk of bias. The study included 1,349 young people and adolescents aged between 13 and 19 years from 767 families. Follow-up ranged between 4 and 6 years, and data was collected at 2-year intervals. Gambling was measured using the Gambling Assessment Module (GAM-IV-S). This assesses whether participants have gambled more than 5 times in their lifetime. Age at onset of alcohol, cannabis and tobacco use was measured as the age the participant recorded first using these substances. Results were reported separately for sex and ethnicity. Results showed that in White boys, gambling was associated with an increased risk of alcohol use before the age of 15 years but not after (hazard ratio (HR) = 2.48, 95% CI = 1.22, 5.02). Among African American boys, gambling was associated with an increased risk of alcohol use before and after the age of 15 years (HR = 1.71, 95% CI = 1.30, 2.23). Among White girls, there was no relationship between gambling and alcohol use, however among African American girls, gambling was associated with an increased risk of alcohol use before and after the age of 15 years: HR = 1.61 (95% CI = 1.14, 2.28). For both sexes and all ethnicities, gambling was not associated with tobacco use. Finally, gambling increased the risk of cannabis use in African American boys (HR = 1.90, 95% CI = 1.38, 2.62), but not in any other group.

A longitudinal retrospective cohort study aimed to estimate the prevalence of pathological gambling in Italy. It also looked at whether a diagnosis of drug and alcohol dependence came before or after the pathological gambling diagnosis (26). The study had a moderate risk of bias.

[13] Since mental health variables were not collected in wave one and this was an outcome of interest – see mental disorders section.
[14] The original survey had a longer follow-up between 2011 and 2014.

Participants were aged over 17 years and had received a diagnosis of pathological gambling (ICD-9 or ICD-10 definition) for the first time between the years 2000 and 2016. Electronic records were used to identify these people, gathering data from hospital records, public drug treatment services and community mental health centres. This covered a population catchment area of about 868,000 residents across the period of the study. Between 2000 and 2016, 680 subjects had a first diagnosis of pathological gambling. Data for all variables was taken from the electronic databases including diagnoses, date of first contact and diagnostic assessments. After first contact for pathological gambling, 2.8% of subjects were diagnosed with drug dependence and 1.5% with alcohol dependence. On average, 3 years passed between the first admission for pathological gambling and the subsequent contact for drug dependence. This was an average of 2 years for alcohol dependence. Before receiving a pathological gambling diagnosis, 7.9% of subjects were diagnosed with drug dependence and 7.4% with alcohol dependence. On average, 5 years passed between the first contact for substance dependence and the first diagnosis of pathological gambling. This was an average of 6 years for alcohol dependence. The findings of this study highlight an important overlap between pathological gambling and drug and alcohol dependence in addiction units, psychiatric and hospital services. Most participants were diagnosed with drug or alcohol dependence before being diagnosed with pathological gambling, however some participants with a diagnosis of pathological gambling went on to also be diagnosed with drug or alcohol dependence (2.8% and 1.5% respectively).

A longitudinal prospective cohort study aimed to examine the relationship between gambling and frequency of combined alcohol and drug use using a representative twin sample of adolescents (32). This Canadian study had a moderate risk of bias. The study used data from a population-based longitudinal study recruiting twins born between 1996 and 1998 in Quebec. In total 1,300 twin pairs were recruited and followed up between 2015 and 2017 at ages 17 and 19 years. The final analytical sample was 746 individuals. Gambling was measured using the SOGS-RA, and alcohol and cannabis use was measured using the average score for 2 items: the frequency of alcohol use and frequency of cannabis use (assessed using the Personal Experience Screening Questionnaire [PESQ]). Results showed that gambling participation at age 17 years did not significantly predict alcohol and cannabis use at age 19 years (b = 0.03).

A longitudinal prospective cohort study aimed to examine the relationship between problem gambling patterns and the combined frequency of alcohol, cannabis and other drug use and frequency of binge drinking (29). The study had a moderate risk of bias. The study used data from the Youth Development Study, which recruited students aged 17 to 24 years from Australia[15] and the US,[16] though this study analysed Australian data only. Respondents were recruited in 2002 and followed up in 2010 and 2012. The initial survey recruited 2,884 respondents, reducing to 2,261 for those who had completed the survey in 2010 and 2012

[15] Victoria.
[16] Washington State.

(missing data for problem gambling was not imputed). The study did not list sampling techniques but noted that the sample was state-representative. Problem gambling was derived from 2 questions:

1. “Have you ever tried to keep your family or friends from knowing how much you gamble?”
2. “Has there ever been a time when you thought you had a gambling problem?”

Respondents were classified as problem gamblers if they answered yes to either of these questions. Alcohol, cannabis and other drug use was combined and measured as the frequency of use in the past 12 months. No significant longitudinal relationships between gambling and the combined use of alcohol or drugs or binge drinking were identified.

Another longitudinal prospective cohort study investigated the relationship between problem gambling and tobacco, alcohol and drug use among young people aged between 17 and 24 years in England (24). The study had a moderate risk of bias. The study used the Avon Longitudinal Study of Parents and Children cohort, which recruited children aged 6 years in financial year 1997 to 1998 and followed them until 2018. The sample sizes completing the PGSI that were used in the analysis were 3,757 at age 17 years, 4,340 at 20 years, and 4,345 at 24 years.

Due to low numbers, ‘moderate risk’ problem gamblers were pooled with ‘problem gamblers’ for the analyses. Participants self-reported cigarette smoking was measured as the percentage of weekly smokers compared to those that did not smoke weekly. Alcohol consumption was measured as the DSM4 criteria of alcohol abuse use disorder (AUD) (yes or no). Drug use was measured as the ever using cocaine, crack or ecstacy in the past 12 months. Moderate or problem risk gambling at age 17 was significantly associated with harms at aged 24 years including past 12 month ever use of cocaine, crack or ecstacy (OR = 1.95, 95% CI = 1.06, 3.61), and mild AUD (but not moderate or severe) (OR = 2.44, 95% CI = 1.27, 4.66). There was no association between gambling and weekly smoking between ages 17 and 24 years. Moderate or problem risk gambling at age 20 was significantly associated with harms at aged 24 years including weekly smoking (OR = 1.84, 95% CI = 1.24, 2.73), past 12 month ever use of cocaine, crack or ecstacy (OR = 1.79; 95% CI = 1.16, 2.75) and moderate or severe (but not mild) AUD (OR = 3.70, 95% CI = 1.98, 6.91).

The final longitudinal prospective cohort study on alcohol and drug use examined the relationship between problem gambling patterns and behavioural outcomes including alcohol, tobacco and drug use (29). The study had a moderate risk of bias. This study uses the same data and methodology as the previous Scholes-Balog study (29) although includes different outcomes and a slightly different final sample used in the analysis. In fully adjusted analyses, there was no significant longitudinal relationship between problem gambling and using alcohol, tobacco, cannabis or other drugs at least once in the past 12 months.

There were 3 studies using LCTM or LCA that focused on alcohol, drug or tobacco use (37 to 39). The first LCTM study aimed to identify latent subtypes of disordered gambling based on symptoms and then compared whether smoking and alcohol consumption was different between these groups at the time of recruitment[17] (38). The study, conducted in the US, had a high risk of bias. Methodological details are described in the section on QoL. Smoking was defined as the self-reported number of packs smoked per day. Alcohol consumption was measured as the number of self-reported drinking days per week. After analysing gambling problems and depressive symptoms, participants were split into 3 groups (high, intermediate and low harm) and compared. Gamblers in the high harm group smoked a significantly higher number of packs of cigarettes per day (mean packs per day = 0.41, SD = 0.53) compared to the intermediate harm group (mean packs per day = 0.19, SD = 0.33) and low harm group (mean packs per day = 0.09, SD = 0.24). On alcohol consumption, gamblers in the high harm group had a significantly higher number of drinking days per week (mean days per week = 2.4, SD = 2.1) compared to the intermediate harm group (mean days per week = 1.5, SD = 1.3) and low harm group (mean days per week = 1.3, SD = 1.4).

There were 3 studies using LCTM or LCA that focused on alcohol, drug or tobacco use (37 to 39). The second latent trajectory modelling design measuring alcohol use aimed to examine whether changes in problem gambling and the frequency of binge drinking over time were related among adolescents aged 13 to 16 years. Data was collected between 2006 and 2011 in Canada (39).[18] The study had a moderate risk of bias. The final analytical sample consisted of 436 respondents with complete data. Problem gambling was measured using the DSM-IV-MR-J (DSM-IV-Multiple Response-Juvenile), which is based on the DSM-IV. Binge drinking was assessed using the question “How often in the past 12 months have you had 5 or more drinks on one occasion?” Response options were ‘never’, ‘less than once a month’, ‘once a month’, ‘2 to 3 times a month’, ‘once a week’, and ‘more than once a week’. Overall, the analysis showed that baseline levels of problem gambling symptoms were not associated with changes in the frequesncy of binge drinking over time.

The final study using LCA investigated whether gambling was a risk factor for alcohol, cannabis and smokeless tobacco use between the ages of 20 and 23 years (37). Male participants were enrolled from army recruitment centres in Switzerland in 2010 to 2013 and were followed up until 2012 to 2013.[19] This study had a high risk of bias. A total of 7,563 participants consented to take part, of which, 4,989 had complete follow-up data. At each follow-up, gambling was measured by asking participants how many times in the last 12 months they had spent money on 7 gambling activities. These were:

[17] Note that the classes were formed longitudinally, but the harms were identified at a single time at the point of recruitment.
[18] Alberta.
[19] Where army recruitment is still mandatory for 20 year old males.

- lottery playing (for example, lottery, scratch cards, lotto or bingo, sports events)
- electronic lotteries
- gambling machines (for example, slot machines, poker automat machines)
- gambling tables in casinos (for example roulette, blackjack, poker)
- internet gambling
- gambling in private settings
- other gambling activities

Participants were then split into those who had ‘never’ gambled or gambled ‘at least once a year’. Alcohol use was measured by asking participants about the frequency of their binge drinking, defined as drinking at least 6 standard drinks (10g of alcohol per standard drink) in one occasion, at least once or not in the previous 12 months. Participants were also asked whether they:

- use cigarettes daily or not
- have ever used smokeless tobacco products (such as snus, snuff, chewing tobacco)
- use cannabis more than once a week

Based on these questions, alongside other socidemographic variables, 6 groups were formed, which were:

- non gamblers
- lottery players only
- electronic and casino gamblers
- casino only gamblers
- private gamblers
- extensive gamblers

Table 2 shows the 6 different gambling groups and their ranking for prevalence of binge drinking, tobacco, smokeless tobacco and cannabis use, with 1 being the highest risk and 6 being the lowest risk.

Table 2: Characteristics of gambling classes and prevalence of harm rankings

Class	Characteristics	% of sample	More than monthly binge drinking	Daily cigarette use	Daily smokeless tobacco use	Weekly cannabis use
1. Non-gamblers	Low probability of engaging in any gambling activity	67.7%	6 (lowest)	6 (lowest)	6 (lowest)	6 (lowest)
2. Lottery only	High probability of playing the lottery and a low probability of engaging in any other gambling activity	6.7%	5	5	4	4
3. Electronic and casino gamblers	High probability of playing the lottery and electronic lottery, gambling machines, and gambling tables in casinos, and a low probability of engaging in all other gambling activities	2.3%	4	1 (highest)	5	3
4. Casino gamblers	High probability of playing the lottery and playing gambling tables, a moderate probability of playing electronic gambling machines, and a low probability of engaging in other gambling activities	16.6%	3	4	2	5

Class	Characteristics	% of sample	More than monthly binge drinking	Daily cigarette use	Daily smokeless tobacco use	Weekly cannabis use
5. Private gamblers	High probability of gambling in private settings and playing the lottery, a moderate probability of playing gambling tables in casinos, and a low probability of engaging in all other gambling activities	4.0%	1 (highest)	3	1 (highest)	2
6. Extensive gamblers	High probability of participating in all gambling activities	2.7%	2	2	3	1 (highest)

Extensive gamblers significantly differed from non-gamblers in all outcomes. This suggests that non-gamblers have the lowest prevalence of at least monthly binge drinking, weekly cannabis use, daily tobacco use and ever use of smokeless tobacco, whereas extensive gamblers have the highest prevalence. Significant differences were found between non-gamblers and casino gamblers, private gamblers, and extensive gamblers for binge drinking. For daily cigarette use, non-gamblers differed significantly from electronic lottery and casino gamblers, casino gamblers, private gamblers and extensive gamblers. For smokeless tobacco, lottery only gamblers, casino gamblers and private gamblers differed significantly from non-gamblers. Though the group of ‘extensive gamblers’ was small, it was associated with higher levels of gambling, binge drinking, weekly cannabis use, and smokeless tobacco.

Mental health disorders, including suicide

We idendified 11 time-base quantitative studies that measured mental health disorders. Eight of these were longitudinal or case control studies (19, 21, 23 to 27, 30) and 3 were LCA or LCTM designs (35, 36, 38).

The first longitudinal prospective cohort study aimed to examine whether past-year at-risk or problem gambling is associated with incident mental health disorders (19). The study had a moderate risk of bias. Methodological details are described in the section above on drug, alcohol and tobacco use. Mental health disorders (any mental disorder, major depressive disorder and generalised anxiety disorder) were measured using the Composite International Diagnostic Interview – Short Form (CIDI-SF).

Results from the study showed that at-risk or problem gambling at baseline was significantly associated with increased odds of incident major depressive disorder (for the first time) (adjusted odds ratio (AOR) = 1.98, 95% CI = 1.14, 3.44), and any mental disorder (AOR = 3.84, 95% CI = 1.89, 7.79) between years 3 and 5 of follow-up. There was no significant relationship between at-risk or problem gambling and generalised anxiety disorder. These findings suggest that at-risk or problem gambling in early adulthood was associated with greater chance of new onset mental health disorders over the next 5 years, particularly depression. This suggests a period in someone's lifespan where preventing gambling problems is very important as preventing at-risk or problem gambling may reduce a new onset of depression later in early adulthood.

A second longitudinal prospective cohort study examined the relationship between problem gambling and depression and anxiety in Australia (23). The study had a moderate risk of bias. Methodological details are described in the section on drug, alcohol and tobacco use. Depression was assessed using the Patient Health Questionnaire-2 (PHQ2) and generalised anxiety was measured using the Generalised Anxiety Disorder-2 (GAD-2). There was no evidence of an association between any-risk gambling at the start of the study and major depressive disorder (OR = 1.33, 95% CI = 0.55, 3.17) or generalised anxiety disorder (OR = 1.15, 95% CI = 0.54, 2.45) at follow-up over time. No interaction effects were identified for age or gender in any of the analyses.

A longitudinal retrospective cohort study undertaken in Italy, aimed to estimate the prevalence of pathological gambling, and whether an additional clinical diagnosis of a mental health disorder came before or after the pathological gambling diagnosis (26). The study had a moderate risk of bias. Methodological details are described in the section on drug, alcohol and tobacco use. Mental disorders were defined as an ICD-10 clinical diagnosis. After first diagnosis of pathological gambling, 6.3% of participants were subsequently diagnosed with any mental health disorder. On average, one year passed between the first admission for pathological gambling and the subsequent contact for any mental health disorder. Before receiving a pathological gambling diagnosis, 24.6% of subjects were diagnosed with any mental health disorder. On average, 7 years passed between the first contact for any mental health disorder and the first diagnosis of pathological gambling.

Though most participants were diagnosed with comorbid disorders before being diagnosed with pathological gambling, the findings of this study highlight an important overlap between pathological gambling and mental health disorders in addiction units, psychiatric services and hospitals.

A longitudinal prospective cohort study aimed to assess the relationship between problem gambling and depression (21). The study had a low risk of bias. Data was taken from a Canadian survey that used and recruited people aged 18 to 20 years in 2007. Respondents were followed up for 5 years and surveyed over 4 timepoints at 12 to 18 month intervals. At the start of the study, there was a sample of 679 respondents, decreasing to 530 at the end of

follow-up (78%). Gambling was measured using the PGSI. The incidence (first experience) of depression was measured using the CID-SF major depressive episode subscale, as were changes in depressive symptoms among those with depression. Results showed that problem gambling at baseline was associated with incident major depressive disorder at follow-up but was not related to changes in the severity of symptoms of major depressive disorder in people who had depression at the start of the study.

Overall, the results of this study suggest there is a longitudinal relationship between problem gambling and incident depression among young adults, but not changes in the severity of depressive disorder symptoms over time. So, active screening for and treatment of co-occurring mental health disorders such as depression might be useful among people with problem gambling who are seeking help. However, we cannot assume that treating problem gambling will resolve depression, or vice versa, since these disorders were unrelated over time.

A longitudinal prospective cohort study aimed to investigate the relationship between problem gambling and internalising symptoms (which are predominantly symptoms occurring in anxiety and depression) (27). The study had a moderate risk of bias. Methodological details are described in the section on drug, alcohol and tobacco use. Internalising symptoms were evaluated using the 10-item K-10 Kessler psychological distress scale, which uses a past 30-day recall period.

Overall, results of this study showed that there was no significant longitudinal relationship between problem gambling at recruitment and internalising symptoms at follow-up (coefficient = -1.23, 95% CI = -3.06, 0.61). These findings suggest that there is no relationship between problem gambling and internalising symptoms over the span of 2 years in early adulthood. However, problem gambling was measured using a brief measure of whether the respondent answered positively to at least 1 of 2 questions on self-reported problems.

A longitudinal retrospective case-control study aimed to explore the age of onset of problem gambling and comorbid psychiatric conditions among lifetime problem gamblers (30). The study had a moderate risk of bias. The study used the Swedish longitudinal gambling survey, which started in 2008 and followed participants up in 2011 and again in 2013. In total there were 2,991 participants recruited (591 cases and 2,400 controls), reducing to 1,876 at follow-up. Cases were defined as participants who had ever experienced problem gambling, defined as a score of 3 or more on SOGS-Revised lifetime measure. Controls were those who did not have problem gambling and were frequency-matched to the cases based on sex and age with approximately 3 controls for each case. Measures of psychiatric comorbidity included the prevalence of mood, anxiety, and substance use disorders. These were measured using the Mini International Neuropsychiatric Interview (MINI) and were split into either ‘never’ or ‘ever’ having experienced them. Age of onset was determined by asking participants how old they were when they first experienced a psychiatric issue or problem gambling. For female cases, all mental health disorders were diagnosed before gambling onset. Problem gambling was the last condition to occur at a mean age of 22.6 years (SD = 8.6 years). For male cases, gambling

started about one year earlier than any of the comorbid conditions, compared to controls (mean case age of onset = 16.0 years SD = 5.3 years, mean control age of onset = 16.9 years SD = 6.1 years).

These findings suggest that there may be gender specific patterns in the association between problem gambling and psychiatric comorbidity. All psychiatric conditions were more common among women than men, however only males tended to experience problem gambling first. The risk of cases having a lifetime pyschiatric condition was at least double that of controls.

A longitudinal prospective cohort study aimed to investigate the relationship between problem gambling and depression and anxiety among young people between 17 and 24 years in England (24). The study had a moderate risk of bias. Methodological details are described in the section on drug, alcohol and tobacco use. Depression and anxiety were measured using the Computerised Interview Schedule – Revised (CIS-R). There was a significant association between moderate risk or problem gambling between ages 17 and 20 (OR = 2.29, 95% CI = 1.28, 4.12) but not between ages 17 and 24 years. No significant relationships were seen between gambling and anxiety across any age range.

Two longitudinal or case control studies were identified that reported on suicides (25, 30). The first was a longitudinal retrospective cohort study that investigated SMRs for patients with a gambling disorder compared to the general population of Sweden (25). This study had a low risk of bias. Methodological details are described in the section on all-cause mortality. SMRs were calculated for suicidal events for men and women separately for the following age categories: 20 to 74 years, 20 to 49 years, and 50 to 74 years (table 9).

Overall, standardised mortality ratios for suicide showed a 15.1 times increase for people aged 20 to 74 years with a gambling disorder compared to the general population. For 20 to 49 year olds the SMR was 19.3 and in 50 to 74 year olds it was 9.6 (Table 3). For men alone, the SMR was 12.1 (14.3 for 20 to 49 year olds and 9.5 for 50 to 74 year olds). When women and men were considered separately, the results were significant for men but not women. Age at first gambling disorder diagnosis did not significantly predict suicide death (HR = 1.02, 95% CI = 0.99, 1.06). Taken together, this study showed that, among this small group of people with gambling disorder who died between 2005 and 2016, suicide was the leading cause of death. Patients with gambling disorder had a higher risk of suicide compared to those without gambling disorder. This was particularly pronounced among younger people (aged less than 49 years).

Table 3: Standardised mortality ratios for suicide stratified by sex and age

	20 to 74 years old		20 to 49 years old		50 to 74 years old	
	SMR	95% CI	SMR	95% CI	SMR	95% CI
All persons	15.1	8.7, 21.6	19.3	9.8, 28.7	9.6	1.2, 18.0
Men	12.1	6.5, 17.7	14.3	6.5, 22.0	9.5	1.2, 17.8
Women	16.1	-2.1, 34.4	30.1	-4.0, 64.2	-a	-a

Note:
[a] No documented suicides in this category

The second study on suicide was a longitudinal retrospective case-control study that aimed to examine the risk of suicide among problem gamblers and the order of suicidal events (such as suicidal thoughts) in relation to problem gambling (30). The study had a moderate risk of bias. Methodological details are described above in this section on mental health disorders. Suicidal events were a little more than twice as common (OR = 2.2) among problem gambling cases compared to non-problem gambling controls. For both cases and controls, suicidality (not specified) was more common among women. Of the female cases, 13.5% had experienced suicidal events before gambling onset, whereas only 2.7% of the male cases had experienced suicidal events. The association between sucicidal events and gambling onset was statistically significant for the women, but not for the men.

There were 3 studies based on LCTM that explored the relationship between gambling and mental health disorders (35, 36, 38). The first aimed to identify groups of gambling problems and depressive symptoms from late adolescence to young adulthood (ages 17 to 28 years) (35). It had a moderate risk of bias. Participants were part of an ongoing longitudinal study that started in 1984 and recruited children from Canadian schools (mean age = 6.02 years, SD = 0.52 years). Gambling and depression data were collected at ages 17, 23 and 28 years. The final analytical sample with complete data included 888 men. Gambling problems were measured at 17 years using the SOGS-RA and at 23 and 28 years using the SOGS. Depressive symptoms were measured at 17 years using the Child Depression Inventory (CDI), which is a self-reported tool assessing affective, cognitive, motivational and somatic symptoms of depression. At ages 23 and 28 years, the DSM-IV was used to assess symptoms of depression. The analysis of gambling problems and depressive symptoms supported a 6-class solution (Table 4).

Table 4: Class characteristics based on gambling problems and depressive symptoms

Class	Characteristics	% of sample
1	Low gambling problems - Low depressive symptoms	76.9%
2	Low gambling problems – High depressive symptoms	12.4%
3	Low gambling problems – Moderate depressive symptoms	7.9%
4	High gambling problems – High depressive symptoms	1.8%
5	High gambling problems – Low depressive symptoms	0.07%
6	High gambling problems – Moderate depressive symptoms	0.03%

Results showed that participants with low gambling problems and high gambling problems were most likely to be classified as having low depressive symptoms (conditional probability = 0.92 and conditional probability = 0.77, respectively). Compared to participants who had low level of gambling problems at both the start and end of the study, participants who had high levels of gambling problems at both the start and end of the study were more likely to be classified as having moderate (conditional probability = 0.11 versus 0.03) and high depressive symptoms (conditional probability = 0.12 versus 0.04).

The second study using LCTM to investigate mental health disorders aimed to find trends over time in problem gambling and depression among people aged 18 to 20 years. Data was collected between 2007 and 2011 in Canada (36).[20] The study had a moderate risk of bias. The initial sample was 679 respondents, reducing to an analytical sample of 517 that had complete follow-up data. Problem gambling was measured using the PGSI and depression was measured using the CIDI-SF. People were split into 5 groups based on their gambling problems and depressive symptoms. The first group was made up of people with ‘low stable problem gambling with initially moderate but declining depression’ (5.2% of the sample). The second group was the largest (80.9% of the sample) and had ‘low initial problem gambling, which declined over time, and low initial depression, which increased over time’. The third group had 'moderate stable problem gambling over time, with no depression’ (2.1% of the sample). The fourth group was characterised by ‘low stable gambling over time with moderate levels of depression’ (2.0% of the sample). The fifth group had ‘low stable problem gambling, with initially high, but declining, levels of depression’ (9.1% of the sample).

The third LCTM study on mental health disorders, conducted in the US, aimed to identify latent subtypes of gambling disorder based on symptoms. It also compared whether the occurrence of

[20] Manitoba.

mental health disorders was different between these groups at the time of recruitment[21] (38). The study had a high risk of bias. Methodological details are described in the section on QoL. Occurrence of mental health disorders was measured using the Mini International Neuropsychiatric Interview (MINI). Using responses to the SCI-GD and MINI, alongside sociodemographic variables, people were split into 3 groups and compared: a 'high harm' group who had moderate-severe gambling disorder at the start and end of the study (5.5% of the sample), an 'intermediate harm' group who had problem gambling at the start of the study which reduced over time (19.5% of the sample), and a 'low harm' group who had almost no symptoms at study start or end (75.0% of the sample). Gamblers in the high harm group had a significantly higher presence of at least one mental health disorder (68.8% of the group) compared to the intermediate harm group (55.9% of the group) and low harm group (29.0% of the group).

Qualitative results

Thirty-one qualitative studies reported that gambling was the cause of emotional, psychological or health harms to adult gamblers or close associates (40 to 67, 69-71). In general, emotional and psychological harms were related to debts, lying, committing crime, concerns about the future, and not being able to stop gambling, which then resulted in negative health outcomes. Examples of emotional and psychological harms included experiences of anxiety, fear, stress, worry, emotional distress or breakdown and despair (41, 45, 46, 48, 50, 51, 56, 57, 59, 60, 62, 63, 65 to 67, 70). Gamblers also experienced depression, which was often associated with financial difficulties (41, 43, 45, 50, 51, 61, 63, 66). Depression was described as being caused by gambling, although sometimes depression and gambling were comorbidities. Gambling also brought on general feelings of hopelessness, desperation and feelings of worthlessness(44, 56, 67).

Gamblers experienced guilt, shame, embarrassment, stigma or loss of self-esteem. These negative emotions were associated with negative experiences and thoughts such as:

- having spent their child's trust fund to finance their gambling
- failing to provide for their family
- being unable to fulfil their parenting role
- being unable to fulfil the expected community obligations
- committing gambling-related crime (40, 41, 43 to 48, 50, 51, 55, 57 to 60, 62 to 64, 66, 67, 70)

Gamblers experienced feelings of loneliness and social isolation (41, 45, 51, 56, 70), which could prevent a gambler seeking help.

[21] Note that the classes were formed longitudinally, but the harms were identified at a single time at the point of recruitment.

Gambling was associated with sleep problems, personal neglect and lack of self-care (including not eating, maintaining personal hygiene, attending hospital appointments or taking medicines), headaches and physical pain and sickness (43, 45, 47, 50, 51, 56, 57, 62, 67). Gamblers also reported co-occurring or elevated alcohol or drug use or dependence and drinking while gambling could result in bad decisions (46, 47, 56, 59, 66, 70). Self-harm, suicide attempts and suicidal thoughts or ideation among gamblers also featured in many studies in the review (46, 47, 49, 50, 56 to 58, 60 to 62, 64, 66, 70). One UK study with young people suggested that gambling was an overall risk to health and wellbeing (71). A study in the UK showed that having less money to buy medication could exacerbate existing health problems, increasing the burden of disease at the community level, and the costs of providing services (57). Box 6 provides illustrative quotes.

Box 6: Health harms to gamblers, illustrative quotes

> "I tell myself I'm not going to make it, that I'm less than nothing, I insult myself. That I'm less than nothing, that I'm shit, that I'm worthless." (Gambler (41))
>
> "You'd rather die than have everyone known what you did." (Gambler (41))
>
> "I do feel guilty if I spend what I call too much … I do get angry with myself if I spend too much… I get angry with myself for being stupid … Oh yeah, you go through all of it. The guilt, resentment, the stupidity … Oh you hate yourself." (Gambler (57))
>
> "Oh God … home life has been very stressful, lots of guilt and shame and worries and tension." (Gambler (42))
>
> "Makes me feel very depressed. You know, it lowers my self-esteem." (Gambler (45))
>
> "Sick, ashamed, angry and guilty." (Gambler (45))
>
> "It took a long time for me to actually come forward and kind of admit that I had a problem. Yeah. It obviously took a long time to get over that. The shame, as you say, there's the shame of it. And just to be able to come out and say it." (Gambler (45))
>
> "It's feeding issues of low-self-esteem and increased levels of anxiety, if you're anxious for pay-day, but also don't want it to happen as you're stuck in a cycle. So it's tied up with mental health, given that it leads to the complete mismanagement of money, you're then looking at adults with severe hygiene issues, everything from personal hygiene to looking after the state of the flat, nutritional poverty and relational poverty as well. Because if you've got no money you tend to be hanging out with those who also have no money." (Stakeholder (67))
>
> "I got really, really bad migraines and when … when you're sitting in front of them you tend not to have your lunch … I just get migraines now but for a long time I had really

> severe bad heads, headaches and that was the gambling. I don't know whether it was the lights, the bells, the whistles or I think it's too, you get very aggressive and very bitter. Your insides are in knots, that can't be good for anybody." (Gambler (57))
>
> "I had a person die with me, a heart attack, had massive heart attack, because of the stress, and he died, because of their gambling." (Treatment Provider (57))
>
> "We get very high suicide ideation with gambling. It's higher than alcohol and other drugs." (Treatment Provider (57))
>
> "I first attended GA [Gamblers Anonymous] over 10 years ago. I saw my problem very much as a financial one, and people in the meeting did too. The advice that I received was very helpful but it was financially focused. I was a young working man and soon sorted out my debts, I then thought that I didn't need GA anymore. Seven years and an attempted suicide later, I was back in that room. I had pretty much given everything to the gambling industry and I nearly lost my life." (Gambler (61))

Close associates of gamblers also experienced emotional, psychological and health impacts related to gambling (see Box 7 for illustrative quotes). For example, close associates, especially intimate partners, felt stressed, anxious and fearful of gambling-related debt, becoming homeless, having to leave the gambler and become a single parent and having to provide emotional support to the gambler (40, 42, 52, 53, 60). Families of problem gamblers also felt depressed (42, 60) and hopeless (52, 53) and reported feelings of failure, guilt, self-blame, reduced self-worth, anger and resentment (52, 54, 56, 57). They felt guilty for providing financial support to the gambler (53) or not noticing the problem (57) and embarrassed about staying with a gambler when they had lost money (54). Similar to the gambler, family members felt a sense of shame associated with the gambling (42, 52 to 54), which could impact on their willingness to seek help. Intimate partners felt isolation and loneliness. This was related to, for example, having to deal with the practical and emotional aspects of everyday life alone and not wanting to turn to friends and family for support because they were embarrassed and ashamed (52, 54).

Studies reported intimate partners failing to properly care for themselves due to the exhaustion associated with living with a problem gambler (52) and experiencing sleep problems (52, 54). Two studies reported partners of gamblers terminating a pregnancy because they had no money to buy the necessary items to care for a child (52) and to have the energy to support her gambling partner (58). In one of the studies, the participant reported terminating her pregnancy had later led to a suicide attempt (52). Three studies reported on emotional, psychological and health impacts of gambling on children due to having to keep secrets, not understanding the world of gambling addiction and witnessing arguments in the home or between a gambling parent and 'loan shark'. Children of gamblers experienced a loss of confidence and low mood (58) or stress (60). Children's distress at their parent's gambling could also manifest as physical health symptoms like stomach pains or trouble sleeping (54). The impacts on children could

also extend into later life. In one study an adult child of a gambler described how the chaotic life they experienced while growing up resulted in anxiety problems later in life (60).

Again, the qualitative evidence suggests that debt is the main factor here. Given the fact that gambling causes debt, which sometimes leads to bankruptcy and homelessness, and significant relationship problems, it is not surprising that people who gamble experienced the negative mental health states described above. It is also not surprising that the loved ones of a gambler, faced with debts, arguments and going without basic necessities, experienced similar mental and physical responses.

Box 7: Health harms to others, illustrative quotes

> “I feel so exhausted that I don’t take proper care of myself, so any time I have as down time I just want to sleep, I just want to eat, and I pick up junk food and things like that to eat. I don’t feel like exercising or taking care of myself. Those are a real push for me to do. I know that if I do them I feel better but it’s that kind of cycle of it.” (Intimate partner of a gambler (52))
>
> “I am sure that it made me more alcohol dependent. I mean I could hardly ever drink a whole bottle of wine in an evening, but I needed it every night. I needed 3 or 4 glasses every night. The drink deadens it. I think all the sadness of it. I think by drinking and overeating. The drink certainly deadens it and it sort of numbs it so you can’t think about it, and it’s also a bit abusive in that I do it even though I know it’s not good for me." (Parent of a gambler (52))
>
> “I was very angry and disappointed in them and I was furious and I maintained that anger for quite a long time. I felt like they'd betrayed us and wandered off and done their own thing and ignored us.” (Affected other (57))
>
> “I'm very stressed, and my children as well, to be honest. I'm stressed when somebody is knocking on my door or a letter arrives because I don't know what to expect.” (Ex-partner of a gambler (60))
>
> “It’s embarrassing, that he should gamble and lose all our money and that I am with him.” (Partner of a gambler (54))
>
> “The job I feel that I’ve done, I’ve been in this alone. There has been a lot… I’ve gone for months, hardly with any sleep. Because I’ve had to see to it that the kids are fine and that everything around here is all hunky dory so that no one can pick on me for anything.” (Partner of a gambler (54))

One final group of people who were emotionally affected were those working within the gambling arena. Staff working in gambling venues were distressed at seeing the long-term effect that gambling was having on some gamblers. For example seeing people losing their

homes or experiencing family breakdown. They feared job loss if they spoke up about the harms people were experiencing from gambling. Staff working in treatment and support services were also impacted emotionally, for example, through supporting a gambler who was suicidal (57). Gambling is often celebrated for providing jobs but seemingly there is much less focus on the potential emotional effect of these jobs on staff.

Descriptive, cross-sectional and systematic review results

Drug and alcohol use was the physical and mental health harm covered in the largest number of descriptive studies (N=41 (81, 83, 86, 88, 90 to 93, 97, 103, 105, 107, 110 to 113, 115 to 118, 122 to 124, 127, 129, 131, 133, 136, 140, 146, 148 to 151, 155 to 158, 161, 163, 166))[22]. In general, across studies, a relatively high prevalence of drug or alcohol use was reported for gamblers. Twenty one descriptive studies reported on smoking (81, 86, 88, 93, 97, 112, 115 to 118, 122, 133, 136, 146, 151, 155 to 157, 161, 162, 166)[23]. Where comparisons were made by gambling risk status, the prevalence of smoking tended to be higher in problem gamblers compared to non-problem gamblers.

Twenty seven descriptive studies reported on mental health disorders (82, 83, 87, 90, 93, 99, 103, 118, 119, 122, 124, 125, 129, 131, 134, 136, 139, 148, 149, 151, 155, 157, 158, 160, 161, 163, 167)[24]. Generally, the prevalence of mental health disorders increased with increasing gambling risk. Mental and emotional wellbeing were also covered in 25 descriptive studies and measured a range of outcomes across different populations (42, 52, 60, 84, 88, 92, 93, 101, 102, 105 to 108, 113, 118, 123, 126, 132, 136, 138, 146, 147, 153, 154, 156). There was evidence that psychological distress was more common among problem gamblers compared to non-problem gamblers (93, 146)[25]. Reports of gamblers feeling stressed, anxious and guilty were common. One study reported on stigma or shame, which increased with increasing gambling severity (108). Gambling and suicide was reported in 16 descriptive studies (52, 83, 89 to 91, 101, 103, 118, 125, 136, 150, 151, 157, 158, 161, 167). Among adult problem gamblers, the lifetime prevalence of attempted suicide ranged from 8% (52) to 21.7% (118). Among treatment seeking problem gamblers, prevalence of suicide attempts in the past year was generally lower (101, 161). Studies also documented reports of suicides among relatives of gamblers (52, 167).Gamblers' families also experienced distress, negative emotions, anger and hopelessness (52, 60, 88, 108, 146, 147, 153).

[22] The study by Bonnaire 2017 also included descriptive data on substance use but this repeated data from Bonnaire 2016 and so is not reported here or in the summary tables.
[23] The study by Bonnaire 2017 also included descriptive data on smoking but this repeated data from Bonnaire 2016 so is not reported here or in the summary tables.
[24] The study by Bonnaire 2017 also included descriptive data on psychological distress but this repeated data from Bonnaire 2016 and so is not reported here or in summary tables.
[25] The study by Bonnaire 2017 also included descriptive data on psychological distress but this repeated data from Bonnaire 2016 and so is not reported here or in the summary tables.

There were 8 descriptive studies that reported on outcomes relating to physical health such as chronic diseases and years of life lost (94 to 96, 107, 118, 136, 147, 152). Studies also covered outcomes related to diet and physical activity (N=4 (52, 81, 94, 98)), sleep (N=7 (52, 84, 94, 123, 136, 151, 154)), and self-harm (N=3 (105, 130, 150)).

There were 115 cross-sectional studies that reported on mental or physical harms (19, 34, 42, 57, 81, 83, 84, 86, 87, 89, 90, 94, 98, 104, 107, 111 to 113, 120, 124, 127, 129 to 131, 133, 134, 138, 140, 150, 151, 156, 160, 162, 163, 166, 167, 169 to 182, 184, 185, 187 to 189, 191 to 194, 196 to 203, 205 to 208, 210, 212 to 222, 224, 226 to 231, 234 to 240, 243, 245 to 254, 256 to 262).

In general, studies considered mental and physical health in relation to gambling severity. Most, studies reported a significant positive association between mental health harms, including substance use and gambling severity. Fewer cross-sectional studies considered physical health outcomes and the relationship for these was less consistent. Seventeen cross-sectional studies reported on use of drugs, tobacco smoking or alcohol specifically among children or young people who gambled. Eleven studies reported some associations (133, 140, 162, 166, 173, 174, 178, 184, 193, 214, 240), one found no associations (175) and 5 studies had mixed results (112, 180, 203, 224, 250). Five cross-sectional studies with children or young people who gambled examined mental health and found associations with suicide, psychological distress, depression, anxiety, stress or current low or negative mood (180, 193, 202, 214, 239).There was a large range of different types of harms considered and different ways these harms were measured, which made it difficult to synthesise results for cross-sectional studies.

Seven reviews examined the health harms associated with gambling (72, 74 to 79). One meta-analysis reported prevalence rates of comorbid disorders occurring with problem and pathological gambling among gamblers from community samples. Nicotine dependence and substance use disorder were the most prevalent comorbid disorders. Authors suggested these rates were relatively high and in line with wider literature about co-occurring disorders among treatment seeking gamblers (74). A further meta-analysis examined prevalence of problem gambling among people in substance use treatment (for alcohol, drugs or opiates). Authors suggested problem gambling levels were similar to the rates of other disorders (not defined) more readily acknowledged among this population (72). Another review focussed on tobacco dependence and suggested that rates were higher among problem gamblers (in treatment and other settings) compared with the general population (78). The other reviews considered suicide, QoL (79) and a range of health harms (76, 77) but the results were inconclusive. The final review considered the health of adult prisoners who gamble but found no relevant studies (75).

5.4 Employment and educational harms

Time-based quantitative results

We found only one time-based quantitative study that considered educational harms and none that considered employment harms. This single longitudinal prospective cohort study, conducted in Canada, and examined the relationship between gambling and academic performance among a population-based sample of twins (31). The study had a moderate risk of bias. Methodological details are described in the section on drug, alcohol and tobacco use. Academic performance was measured by parental reports of how well each twin was doing at school using a 5-point scale from 1 (much below average) to 5 (much above average) and the overall score from both parents was averaged. Results showed that a higher level of gambling participation at age 14 predicted a decrease in academic performance between 14 and 17 years. When accounting for impulsivity and socio-family adversity[26], the relationship between gambling participation and academic performance became non-significant.

Qualitative results

The effect of gambling on work or study featured in 12 of the qualitative studies (41, 43, 44, 49, 50, 52, 56, 57, 60, 62, 66, 70). Two studies specifically focused on work. One considered workplace embezzlement by problem gamblers (62) (see the section on crime) and the second examined how gambling affected work and non-work life (43).

Gamblers' employment situations were affected by gambling. Gamblers lost jobs, were demoted, or resigned due to gambling (43, 49, 50, 56, 60, 62, 66, 70). Gambling was also associated with:

- a loss of focus
- reduced concentration on work activities
- preoccupation with gambling
- showing up late
- not turning up to work
- turning up at work after no sleep through gambling
- conflict with employers (41, 43, 49, 50, 57, 62)

One study noted that the gambler's lack of money to buy food or afford transport to get around was associated with their inability to engage at work (57). In 2 studies, gamblers said that gambling was an obstacle to employment. They felt there was no point having income because

[26] Socio-family adversity was a composite measure taking into account the educational and occupational level of both parents, mother's and father's age at birth of the first child, and family structure.

it would be wasted on gambling (44, 60). Quotes about employment and educational harms to gamblers are provided in Box 8.

Box 8: Employment and educational harms to gamblers, illustrative quotes

> "Sometimes she'd have a day off work or she'd come into work and she'd be really quiet because she'd been out all night." (Affected other (57))
>
> "I got fired because I was using the corporate card purchasing gift cards for myself. I had no legal consequences. My company allowed me to pay restitution and leave with a good recommendation." (Gambler (50))
>
> "I actually treat people who are in huge crises, for example when they have lost their jobs, homes, or contact with the family, who can no longer stand the debts and the creditors who bother them. These are situations when their whole lives have started to collapse." (Treatment provider (70))
>
> "You just can't concentrate on anything. You work, and you just worry about getting money." (Gambler (43))
>
> "I used to get as much work as I could done between 8.30 and 1pm just to free up a few hours so I could gamble on whatever was on - horses, tennis, football, the darts. Get my work done so I could sit on the computer backing horses. I'd batter away on my phone too. I'd be at that Monday to Friday." (Gambler (49))
>
> "I felt at times on the verge of breakdown. I left 2 jobs over it because as soon as I got paid I'd paid my bills, and then I'd lose the rest of my wage. For 2 weeks of the month, I'm skint. I was thinking, 'I'm not working for nothing.' I left work and I phoned GamCare and they put me onto one of these counselling things. So for 12 weeks I didn't work. It was drastic, but it needed to be done." (Gambler (60))
>
> "Because, for example, many times I've had an inhibition of going to work. I've never worked for many months, for several months in a row. The inhibition is about, for example, using all incoming money on gambling, so what's the point of working anymore?" (Gambler (44))

Close associates reported feeling 'mentally absent' at work, having a reduced 'desire or ability to work' given the stress associated with their loved one's gambling, poor work performance, and absenteeism through having to address the gambler's needs (see Box 9) (52, 57). The wife of a problem gambler said that her poor performance at work (which was a consequence of gambling-related ill health) led to a formal warning and threats of disciplinary proceeding (52). Gamblers stole from work (44). Work colleagues and employers also suffered. Gamblers lied and abused the trust of their employer (56, 60, 62). At the company level, gambling was

associated with negative financial and reputational impacts for the organisation (especially in the case of a small business (62)).

Box 9: Employment and educational harms to others, illustrative quotes

> "It impacted me at work. I'm a professional…and even though I tried to keep it a secret people could tell there was something wrong. Over the years people can tell. I felt a real amount of shame telling people, I felt like it was my fault, I felt really ashamed saying what was going on. I didn't tell people that he was in rehab – he was out of the country, he was away, I was on my own, etc. I felt a lot of shame. It affected my work, just feeling cloudy headed, like a fogginess. Just that brain ticking over, preoccupied with whatever is going on. Yeah, not being present." (Intimate partner of a gambler (52))
>
> "Sometimes I'm at work and in the course of different things that have happened, yeah, I'll get a call or something and I'm affected in the sense of, you know, I might have had to leave work to go and deal with something or I can't think about my work and focus on it." (Sibling of a gambler (52))
>
> "I ended up cutting back uni to only 2 subjects and working and things like that, because I couldn't survive on student benefits and things like that … Yeah, so I did one or two subjects per semester, it took me twice as long as anyone else, but I got through in the end." (Affected other (57))
>
> "It's hard to explain but after a binge he gets incredibly low and then I'm sort of on call, getting him, you know, we've gone to urgent care a few times. Trying to help him go to job fairs and things which I now seem to realise is not my job but I've taken a lot of time off work. I'm lucky that I have a job that is not 9 to 5, I'm more in sales so I'm on the road a bit more so it's a little bit easier, I don't answer to anyone directly but it does impact. It impacts your mental state, some days you just feel like staying in bed." (Partner of a gambler (52))
>
> "I can give you hundreds of examples how it's affected other people. For instance, the company that I stole from. They gave me a job, promoted me to a position where I was in charge of finances, 100% trust. They were a small family business who treated me like a son and I completely abused their trust. And that is something that still haunts me." (Gambler (60))

Child gamblers noted difficulties at school such as getting in trouble for gambling or having concentration problems, and some withdrew from education (43). Children of gamblers experienced educational difficulties because of the chaotic home life associated with a parent gambling (see Box 10 for illustrative quotes) (60). Gambling-related family debt and arguments affect a child's schooling, which is likely to have considerable legacy effects in terms of their future ability to thrive.

Box 10: Educational harms to children, illustrative quotes

> "If I wasn't in trouble at school for gambling I was in trouble for skipping school to go gamble or I was skipping school for fighting over some money or something." (Gambler (43))
>
> "I had got bad grades in school because I was gambling." (Gambler (43))
>
> "In terms of the effect that it had, it's not as simple as your father has a gambling-related issue and then you develop mental health problems. It's really, really complex. There was massive chaos in the home for a number of years whilst we were still in education. I dropped out of college at the time. I was in quite a horrible relationship where I shouldn't have been. And if we weren't in such a bad place as a family, then maybe I wouldn't have been in that relationship for as long as I was. My brother and sister had similar issues to education. My brother has developed severe anxiety since then. If there are arguments now, he gets panic attacks. My sister became really, really withdrawn for a long time. My mother, massive, massive issues for her as well." (Child of a gambler (60))

Absenteeism and job turnover costs the economy. Withdrawal from education or reduced attainment also affects the community and society through the impact on workforce skill levels and future employability (57).

Descriptive, cross-sectional studies and systematic review results

Fourteen descriptive studies reported on employment harms, using various measures (52, 80, 100, 107, 118, 123, 136, 137, 146, 147, 150, 154, 161, 165), and 7 reported on educational harms (52, 80, 107, 137, 146, 147, 154). One study suggested that the employment and education of gamblers' families was also affected. Reduced performance due to tiredness or distraction (as a result of their loved one's gambling) was most common, followed by using work or study time to assist with matters arising from their loved one's problem gambling or the problem gambler being late from work or education (52). However, in another study, among adult respondents reporting experiencing at least one gambling-related harm in the past year, work and study harms were the least frequently reported harm (besides the 'other' harms category) (154).

There were 17 cross-sectional studies that considered the association between gambling or gambling severity and educational and employment outcomes (57, 107, 124, 168, 172, 183, 190, 200, 203, 210, 211, 215, 222, 228, 240, 243, 250). Seven studies explored the relationship between gambling and employment outcomes, such as work impairment or low workplace morale. Of these, 3 studies reported a significant relationship between gambling and negative employment outcomes (190, 228, 243), 2 reported no significant relationship (183, 200) and 2 reported mixed results (124, 172). Seven studies explored the relationship between gambling and school outcomes, such as lower school grades. Of these, 4 studies reported a significant relationship (168, 203, 210, 240), one reported no significant relationship (250) and one

reported a significant relationship for girls but not boys (222). One study showed that gambling risk groups (as measured by PGSI) was significantly linked to high and low levels of exclusion from school (57). Three studies combined work and study harms as a single measure, all of which reported a significant relationship between gambling and work and study harms (107, 211, 215).

No systematic reviews considered the association between gambling and educational or employment harms.

5.5 Criminal and anti-social behaviour

Time-based quantitative results

We identified 3 longitudinal studies that reported on crime (22, 24, 29). A longitudinal prospective cohort study aimed to examine the relationship between problem gambling and criminal behaviour in young adulthood in the US (22). The study had a low risk of bias. The study used data from the National Longitudinal Study of Adolescent to Adult Health, which began in financial year 1994 to 1995 with 21,000 adolescents completing wave 1 interviews. Respondents were interviewed again in financial years 2001 to 2002 and 2008 to 2009 with a total of 15,701 from the original sample re-interviewed. Overall, the analysis included 12,227 respondents with all 3 waves of data collection. Gambling was self-reported and problem gamblers were defined as respondents who reported losing more than $500 in a year through gambling. Criminal behaviour was measured by asking respondents whether and how often they engaged in criminal behaviour in the past 12 months including:

- deliberately damaging property
- stealing
- using a weapon to get something from someone
- selling drugs
- getting into fights

Responses to these questions were then used to create 3 groups. These were:

- people who reported any crime (overall crime)
- people who reported financial crime
- people who reported violent crime (crimes involving physical violence or use of a weapon)

To account for differences in background characteristics of problem and non-problem gamblers and their possible influence on the relationship between gambling and crime, propensity scores were calculated. This means the study was statistically matched non-problem gamblers and problem gamblers based on their individual similarities and differences. Results showed that problem gambling did not predict criminal behaviour.

A second longitudinal prospective cohort study aimed to examine the relationship between problem gambling patterns and crime (29). The study had a moderate risk of bias. Methodological details are described in the section on drug, alcohol and tobacco use. Criminal and antisocial behaviour were also measured by assessing the frequency of participation in the following behaviours in the past 12 months:

- carrying a handgun
- carrying a knife
- stealing something worth less than $50
- stealing something worth more than $50
- selling illegal drugs
- stealing a motor vehicle
- attacking someone with the idea of seriously hurting them
- illegally accessing a computer network, system or files
- purposely damaged or destroyed other people's property

Each type of antisocial behaviour was measured on a 5-point scale ranging from 1 (never) to 5 (10 or more) and the 9 items were averaged to obtain an overall score of antisocial behaviour. In fully adjusted analyses, there was no significant relationship problem gambling and antisocial behaviour.

A longitudinal prospective cohort study aimed to investigate the relationship between problem gambling and crime among young people between 17 and 24 years in England (24). The study had a moderate risk of bias. Methodological details are described in the section on drug, alcohol and tobacco use. The study did not describe how crime was measured and moderate risk or problem gambling was defined as answering yes to at least one of the following questions:

1. "Have you ever tried to keep your family or friends from knowing how much you gamble?"
2. "Has there ever been a time when you thought you had a gambling problem?"

In this study, moderate risk or problem gambling at age 17 was not associated with crime at age 24 years.

Qualitative results

Four of the qualitative studies specifically explored crime and gambling by adults including:

- gambling-related employee embezzlement (62)
- the role of gambling in drugs offences among women prisoners (48)
- the role that problem gambling played in police crime reports (69)
- betting-motivated crime and corruption in sport (68)

More specifically, Binde (2016) assessed what constitutes a ‘typical’ case of gambling-related employee embezzlement in Sweden. First the gambler loses all their available money. Then they might get a loan, ‘borrow’ (steal) money from friends’ and family’s bank accounts, or ‘borrow’ (steal) small amounts from the company before embezzlement becomes routine and they steal a large amount of money (62).

In the second study, Vietnamese-Australian women prisoners used the drugs trade to pay gambling-related debts, with some ending up serving sentences of many years (48). The third study used police records to identify the link between problem gambling and crime. Lind (2015) identified reports of property crimes at home (for example identity theft), property crimes at work (for example embezzlement from an employer) and other crimes (for example assault), usually due to gambling-related financial hardship (69).

Finally, Lastra (2018) interviewed people involved in elite sports (rugby league, swimming and water polo). Participants reported that betting-motivated crime did not occur in these sports, but also suggested that transnational organised crime relating to sports betting was possible (68).

However, crime was a common harm and featured in 19 qualitative studies (41, 42, 44, 48, 50, 53, 56 to 58, 60 to 62, 64 to 70). Some studies reported gamblers being involved in sex work (41, 44, 64, 65). Gambling-related crime affects the gambler, their close associates and wider society. Like other harms, involvement in crime was often due to the financial difficulties arising from gambling-related debts.

As mentioned in the relationships section, gambling was also the cause of domestic violence, which sometimes ended in the police being called and, in some cases, imprisonment (58, 60). Close associates were affected. Adult gamblers committed fraud, for example tax, credit, public spending and business. This included taking out loans or other forms of credit in another person’s name. They also stole from family and work colleagues (41, 42, 44, 50, 53, 56, 57, 67, 69, 70). These actions by the gambler damaged their relationships. Family members (for example, an aunt and mother-in-law) and employers, were the victims of gambling-related embezzlement (41, 50, 56, 60 to 62, 69). The sums of money embezzled could be as high as tens or hundreds of thousands and could lead to prison sentences (61, 62). In some studies, gambling resulted in violence and child neglect, as described under relationship harms. Illustrative quotes for criminal and anti-social behaviour harms to the adult gambler and others are reported in Box 11.

Box 11: Criminal and anti-social behaviour harms to the gambler and others, illustrative quotes

> “I would say the majority of them – the criminal stuff came after rather than the before. It would be the same sort of thing of slow escalation of taking from the money boxes in the house to taking from – getting money from loan sharks who then start to put the pressure on and what do you do next sort of scenario? A boss that might be a little bit lenient, get

the money from there or friends that sort of stuff, so and people that would normally probably never ever thought about doing such things in their lives." (Treatment Provider (57))

"The other thing that used to come up a bit with clients – especially with young women – was prostitution and it tended to be quite dangerous prostitution. So they'd lose a lot and couldn't afford to pay the rent so they'd put themselves in a very risky situation [street walking]." (Treatment Provider (57))

"Some [female gamblers] gamble until they lose so much money and then they take to prostitution; they sell themselves for some money. Sadly, they go back to gamble that money too. Sometimes, it is so embarrassing the way those gambling friends ask for money from people, especially those that they know in the casino." (Gambler (65))

"I forged the signature of my ex-partner in a written application and I applied the loan, euro 4000 as I remember. The loan was then paid into the account of my ex-partner." (Gambler (69))

"I was conservator for my aunt and had taken funds from her. I have a felony for embezzling her money. She was a vulnerable adult." (Gambler (50))

"That I stole money from someone, that was kind of a big deal. If you think about it, you wouldn't have done that in any other situation." (Gambler (44))

Gambling-related incarceration costs society. Direct costs are incurred through the investigation of crime and the judicial system. Indirect costs relate to the loss of social cohesion and a people not feeling safe (57). Societal costs are also incurred through gambling-related fraud.

Descriptive, cross-sectional studies and systematic review results

Crime and antisocial behaviour featured in 18 descriptive studies. Examples included:

- petty theft
- property crime
- being arrested or serving time in prison for a gambling-related offences
- using illegal sources of income (52, 69, 93, 101, 103, 105, 110, 126 to 128, 131, 136, 137, 142 to 144, 146, 166)[27]

[27] The study by Bonnaire 2017 also included descriptive data on crime (robbery) but this repeated data from Bonnaire 2016 so is not reported here or in summary tables.

Several studies were conducted with people who had had contact with the criminal justice system. For example, among male prisoners, 29.4% exhibited pathological gambling symptoms (126). A second study reported a prevalence of lifetime problem gambling as high as 60% in sample of prisoners (143). In a sample of male adults, pathological gamblers reporting using money from theft and illegal sources to fund their gambling (126).

There were 20 cross-sectional studies that reported on crime and gambling (57, 110, 127, 143, 144, 169, 199, 200, 204, 210, 211, 223, 228, 230, 232, 241, 242, 244, 245, 259), and one that included a study about breaking rules (203). Of the 20 studies, 15 reported a significant positive relationship between gambling and crime (110, 128, 143, 144, 169, 199, 204, 211, 223, 232, 241, 242, 244, 245, 259), as did the one study measuring rule breaking (203). Two studies showed no significant relationship (200, 210). One study was an LCA and reported more serious types of crime among the heaviest gambling group (230). Only one study did not show a significant relationship between gambling and crime (228). One study showed that crime harms (measured as part of an 'other' category that also included culture harms) was significantly linked to low and high levels of gambling (57). The strength of relationships were often different for different types of crimes and populations. On balance, the studies suggested that gambling severity was associated with crime.

Only one review examined crime (79). This concluded that measuring the impact is particularly complex and evidence is mixed but suggests that crime was associated with gambling in 10 out of 18 studies. For example, there was evidence of increases in gambling-related crime at the individual level, fatal alcohol-related road traffic accidents after casinos open and cases of fraud linked to gambling.

5.6 Cultural harms

Time-based quantitative results

We did not identify any time-based quantitative studies that reported on cultural harms.

Qualitative results

Cultural harms for the individual gambler and their close associates are closely linked but separate from relationship harms. Harms in this section include:

- the dissonance between gambling and cultural beliefs
- the impact of gambling on participation in cultural practices
- reduced ability to meet the expectations of the cultural community and the resulting disconnection with the cultural community (9, 57)

These type of cultural harms were reported in 7 studies (52, 55, 57 to 59, 64, 66). The impact was experienced by gamblers, close associates and the wider community. See Box 12 for illustrative quotes.

In their study on migrants to the UK, Bramley (2020) (64), reported that gambling-related financial losses had a big impact on men from Sub-Saharan Africa because of the loss of status. For those from the Islamic religion (which forbids gambling), the whole family could be negatively affected. Gambling is stigmatised in the Kurdish Turkish community and gamblers could become isolated. A second study highlighted that in the Asian community, parents would not want their children to marry the child of a gambler, thus demonstrating inter-generational cultural impacts (58). The family of gamblers feel shame more acutely in some cultural groups (52). It is likely that those who experience shame due to the cultural beliefs of their communities would find it particularly challenging to seek help and support for gambling problems.

In the Aboriginal communities of Australia and the Pacific people of New Zealand, gambling took people away from spending time enjoying cultural practices. Resources are shared with others in these communities and the gambler felt shame at having no money to give to others and letting the family down (55, 59). The collectivist culture of indigenous communities of Australia also meant that elderly relatives found it hard to refuse to give money to a gambler and could be easily exploited (66).

The cultural harms caused by gambling in the Indigenous inter-connected communities of Australia and New Zealand spread from the gambler to the family and the community. In this community, harms resulting from problem gambling behaviour (for example, financial losses, relationship distress, shame) meant the gambler felt a loss of belonging and isolation. Gamblers were seen as poor role models and were perceived to have lost their cultural values. Gamblers felt isolated and the community suffered. Community cohesion was reduced because traditional roles, rules and behaviours, which normally brought people together, were downgraded (55, 66).

The wider issue of gambling ‘normalisation’, where the activity and the harms associated with it become perceived as typical, was reported by 12 studies (40, 49-51, 55, 57 to 59, 64, 67, 68, 71). See Box 12 for illustrative quotes. Firstly, normalisation occurred through exposure to gambling by family members, friends or colleagues (40, 50, 51, 67). In an Australian study the participants saw gambling as part of the culture (68). In the UK, a study with migrants and workers who supported migrant communities suggested that migrants would find it easier to gamble in the UK because of the social acceptance of gambling, citing the “plethora of gambling advertising” and “prolific licencing of gambling premises” (64). Children were discussed as being susceptible to gambling normalisation due to early exposure to parental gambling, gambling environments (58) and activities such as gambling-based community fundraising (55). Gambling parents teach their children to gamble (50). Gambling is often a social opportunity which brings people together. Children learn how to gamble at a young age and accept it as a normal aspect of life (59). The strong links between gambling and sports facilitates this process, with gambling being a normalised aspect of ‘sports fandom’ for young people and a way to fit in with family and friends (49, 71). So, the harms caused by gambling carry into the next generation (57).

Box 12: Cultural harms to the gambler, affected others and society, illustrative quotes

> "We experienced the standard harms, as everybody else, finances, health, employment as well as employment opportunities et cetera. But … for a Pacific person, their role and responsibilities within that family context [is]…where one's sense of belonging comes. So for a problem gambler, one of the largest harms … is when it impacts … their families and communities. …In terms of harms for the individual there's the risk of isolating one's self from that unit and that connectedness, that defines who that person is. So the isolation from that collective wellbeing, so to speak, is extensive. Isolating oneself from that collective also means that at times this person can't contribute to the obligations that are associated with being part of that collective. So those pressures to contribute fall on other family members. …Because this person no longer can [contribute], there's also a loss of respect or a sense of a loss of respect within that family group and their community. That loss of respect can have huge detrimental consequences, potential suicidal ideation et cetera. That loss of respect reflects not only on that individual, but on their family who all have the same name." (Participant type not reported (55))

> "Yeah, my parents met in a casino and went to the casino every night for 30 years, so I grew up in a family of parents that went to casinos. They weren't addicted. They weren't in a bad way from it. They socially enjoyed gambling." (Gambler (67))

> "I gambled with my family before I finished elementary school. Dad taught us as kids. My siblings and parents gambled. I thought gambling was normal even if it was a problem. We socialized with other families by gambling. The cousins played with the cousins. All of the adults were smoking, drinking and gambling. All my immediate family members have trouble with gambling." (Gambler (50))

> "Gambling has ruined sport because you can't watch it without thinking 'I should put a fiver on first goal'. All my mates can't watch it without having a bet anymore. When I was younger, I couldn't wait to get home from school to see Man United playing in the Champions League … Now, I'm sat there thinking about what I should be betting on tonight. I can't remember the last time that I just watched the game like a real fan." (Gambler (49))

Descriptive, cross-sectional and systematic review results

Only one descriptive study reported on cultural harms (this study also featured in the qualitative studies). This study was from the UK and recruited a sample of adult family members of problem gamblers. It reported that 21% of participants felt shame within their religious or cultural community because of their loved ones gambling (52).

Only one cross-sectional study reported on cultural harms. (57). This study was from Australia and wanted to identify how well gambling discriminated between low and high levels of culture

harms. However, culture was included within an ‘other’ domain meaning little can be taken from the results in relation to this specific harm type.

There were no systematic reviews that reported on cultural harms.

5.7 Overall harms

All study designs

Samuelsson (51) interviewed current problem gamblers and described typical gambling trajectories and their associated level of harm in Sweden. These were:

1. Stable, low-frequency gambling with no or minor harms.
2. High-frequency but decreasing gambling with occasional harm. This involves some economic losses (when aged 18 to 25 years). Significant others could have objected to the time and money spent on gambling. Losses caused frustration and irritation, but no substantial psychological harms were evident.
3. Periodic and fluctuating gambling with moderate harm. This involves periodic negative consequences of varying degrees including economic (losses, debts and loans), psychological (self-reproach, anxiety, depression, insomnia) and social (isolation, strained or broken relationships with partners or friends). Shame and guilt occur.
4. High-frequency and increasing gambling with substantial harm. This is characterised by an overall increase in gambling participation over a period of years. Economic, psychological, relationship and social harms all appeared to varying degrees.

In one of the qualitative studies conducted in Australia, participants suggested there was a number of systematic gaps in terms of collecting data on gambling-related harms outside of treatment providers. For example, data on gambling was not captured as part of the welfare, criminal justice, health and coroner systems. So, harms were likely to be under-reported (57).

One descriptive study provided an overall estimate of gambling-related harm (not related to any specific harm). Among gamblers aged 23 to 75 years:

- 25.0% reported no harm
- 35.0% reported low harm
- 12.5% reported harm
- 27.5% reported substantial harm

In another descriptive study from Australia, problem gamblers reported the highest number of affected others (mean = 3.65) followed by moderate risk gamblers (mean = 3.20), then low risk gamblers (mean = 0.03) (114).

5.8 Gambling and gaming

This review specifically aimed to identify harms associated with the 'gambling element' of gaming[28] and this information is reported here separately. No time-based quantitative studies and only one qualitative study considered gaming (71). The qualitative study involved young people aged 11 to 24 years, who were not necessarily involved in gaming or gambling. Participants viewed the effects of gaming to be similar as using drugs or alcohol and that the gambling-like activities in gaming (loot boxes and skin betting) were addictive. Games were designed in a way to make it difficult to enjoy them without buying loot boxes. Respondents reported instances of excessive spending or using a parent's credit card for gaming. Participants did not mention loot boxes and skin betting as gambling but then said gaming and gambling were associated. They perceived the gambling-like activity in gaming as normal. See Box 13 for illustrative quotes.

Box 13: Gambling within gaming harms, illustrative quotes

> "Countless mobile and video games incorporate gambling, available to young people who are oblivious to the addictive and reckless behaviour it encourages." (Young person (71))

> "Loot boxes and packs ingrain a betting culture into young players. I believe this would make them to be more likely to be affected with a gambling addiction in the future and this is what I believe caused myself to spend excessive amounts on online betting." (Young person (71))

Four cross-sectional studies considered gaming, and all reported that problem gambling was significantly associated with problem gaming, video game addiction, loot box spending or video game frequency (175, 188, 196, 214). Six cross-sectional studies considered the association between gambling (usually problem gambling) and problematic internet use or internet addiction. Three of these were specifically among children or young people. Five of the 6 studies showed a significant association (168, 179, 202, 224, 259) and one showed no association (196). Cross-sectional studies do not show causality, and more work on the relationship between gambling, gaming and problematic internet use is needed.

[28] Computer and video games.

5.9 Inequalities

In general, the experience of harms outlined above in the qualitative studies were similar across populations. However, a few studies did highlight differences in harm in relation to individual demographic or population characteristics. It was suggested that migrants who gambled faced the same problems as the general population, but they had less of a 'safety net' due to the lack of friends or family (64). A study about people with health and social care needs suggested there are certain characteristics that make a person more at risk of gambling-related harm. For example:

- people with learning difficulties
- people with substance misuse disorders
- homeless people
- people taking certain prescribed medications (63)

A number of qualitative studies were about women specifically. One author suggested that women's gendered caring role meant they were more likely to take on the burden of dealing with gambling-related family problems. They were also more likely to internalise shame and embarrassment at being unable to address their partner's gambling-related harm (58). However, in other studies it was clear that men also took on the role of caring for families affected by a female gambler. In the study by Baxter, and others (2016) (56) the harm themes men and women identified had similarities and differences. For example, both stated that gambling destroyed relationships but only women specifically identified a 'financial harms' theme. For men, statements about financial problems came under the 'destruction of family and relationships' theme. Men and women may experience the harms associated with gambling differently, but these differences may be brought about by wider determinants of behaviour and experiences such as financial security and caring responsibilities. As is reported above, the cultural norms and practices of some societies could create additional harms for gamblers, their families and communities (see cultural harms – qualitative studies).

The time-based quantitative studies reported little additional information relevant to the PROGRESS Plus characteristics of inequalities, however 10 of the 15 studies recruited either young adults, adolescents or children (maximum age was 24 years). One study in Sweden found men with gambling disorder had larger SMRs compared to women with gambling disorder for all-cause mortality, and deaths from suicide. However, a second study on suicide suggested the opposite with an elevated risk of suicide death among women but not men (30). In the former study, SMRs were also larger for younger age groups compared to older age groups (25). A further Australian study found no interaction effects for age and gender in the relationships between any-risk gambling at start and hazardous alcohol use, daily tobacco use, any past 12 month drug use, major depressive disorder or generalised anxiety disorder (23). For mental health disorders, one study showed that among women, a diagnosis of a mental health disorder preceded a diagnosis of pathological gambling, whereas among men, a diagnosis of pathological gambling disorder preceeded a diagnosis of a mental health disorder

(30). Our single study investigating IPV perpetration and victimisation in relation to gambling showed no effect overall, with no effect reported for both men and women (28).

Finally, one study of adolescents in the US reported differences in the relationship between gambling and alcohol, cannabis and tobacco use between sexes and between White and African American races (33). Gambling increased the risk of alcohol initiation before the age of 15 years for all groups, but increased cannabis initiation only for African American boys, with no significant relationship for age of first tobacco use. For LCTM or LCA designs, PROGRESS-Plus indicators are not reported separately since features such as age and gender are variables that are used to define group membership.

5.10 Conflict of interest and funding

The following categories were used to report on funding (appendices C, D and E):

1. Direct industry funded: the researchers name a gambling industry company or an industry trade organisation (for example, the Betting and Gaming Council).
2. Indirect industry funded: funding was via a levy, or via a charity that is fully reliant on industry funding, or a regulatory settlement.
3. Not industry funded.
4. Co-funded.
5. Funding unknown.

Alongside funding for studies, reviewers also recorded any conflict of interest (CoI) noted by the study authors. Conflict of interest was recorded as either ‘No CoI declared’, ‘CoI declared’ or ‘No CoI was reported’. A declaration of industry funding (or indirect industry funding) was only recorded as a CoI if an author specifically declared this to be so. Authors who provided no such statement or who specifically said they had no CoIs were recorded as ‘CoI not reported’ or ‘No CoI declared’ respectively.

Complete information on CoI and funding source were available for 18 of the 21 included longitudinal or case control studies, none of which reported any relevant CoI or potential biases from funding source (19 to 27, 29, 30, 34 to 38). Three studies reported no industry funding but did not report their CoI, of which they had none (31, 32, 39). One study reported no CoI but did not report their funding source (28). Finally, one study did not report their funding source or CoI (33). Taken together, it is unlikely that this body of evidence suffers from large biases relating to either CoI or funding sources.

Complete information on CoI and funding source were available for 5 of 6 included LCTM or LCA, none of which reported any relevant CoI or potential biases from funding source (34 to 38). One LCTM did report their funding source (which was not industry funded) but did not report their CoI (39). Taken together, it is unlikely that this body of evidence suffers from large biases relating to either CoI or funding sources.

Complete information on both CoI and funding source was only available for around half (15) of the 32 qualitative studies (43 to 46, 49, 51, 53 to 56, 59, 62, 64, 69, 70). Three qualitative studies declared a CoI (41, 45, 64). Examples here included where an author(s) had received donations from gambling operators through corporate sponsorship. In another study the author had provided consultancies to organisations directly and indirectly benefiting from gambling, including governments and industry operators (45). One study was directly industry funded (for example, by the Finnish Foundation for Gaming Research, which was created by the Finnish gambling operators) (65) but the author did not report any associated CoI. Five studies were classified as indirect industry funded but the author either did not report any CoI or they declared no CoI. Examples here included studies funded by a charity that received industry funding (43, 52, 71), one funded by a consultancy (63) and another that received levy-type funds (70). Around half (14) of qualitative studies were categorised as not industry funded (44 to 46, 49, 51, 53 to 56, 59, 62, 64, 66, 69). All declared no CoI with only one study not reporting their CoI here. Only one study was co-funded (42) (funded for example by government, university and industry) and no associated CoI was reported. Taken together, it seems likely that this body of evidence suffers from at least some biases relating to either CoI or funding sources.

6. Discussion

This abbreviated systematic review includes 292 studies from 245 papers on harms to the gambler, their close associates and society. To our knowledge this is the most comprehensive review of evidence undertaken on gambling-related harm. By including a wide range of study designs, the review describes the breadth and scale of harms associated with gambling.

We concentrated on studies that assess a temporal relationship between gambling and harm. This focused the findings on the harms identified as being caused by gambling, and so enhances the certainty of the main findings. We acknowledge gambling may have benefits, but these are not the focus of this work. We synthesised the results using the GRADE CERQual principles (18).

6.1 Financial harms

There was only one time-based quantitative study that reported on financial harms. This showed that an increased number of electronic gaming venues in a local area increased the number of personal bankruptcies in that area. There is extensive evidence from almost all the qualitative studies that gambling directly causes financial harms to adult gamblers and their close associates.

The evidence on financial harms to children relates to them being affected by adult gamblers, rather than them being gamblers themselves. We noted that in 7 qualitative studies, debts or financial issues related to gambling were specifically harming children. For example, children went without essentials such as food or school items. Also, money meant for their futures, such as child trust funds, were diverted towards gambling.

The financial impacts of gambling on the gambler and their family and friends could be significant, long-lasting and intergenerational. While it is not possible to quantify the proportion of gamblers who experience financial harms from the qualitative evidence, serious outcomes such as bankruptcy, homelessness and child poverty have a considerable impact on those affected. Gambling-related debts being ‘written off’ and the administrative costs associated with bankruptcy and social support payments to people affected also represent a harm to wider society. The overall conclusion from the qualitative studies was that gambling-related debt was often the trigger for other harms.

Financial harms were the third most commonly reported harm among the descriptive studies. Typically, these studies reported a high prevalence of financial harms among gamblers (irrespective of gambling severity). This was particularly true for levels of debt, and several studies showed how affected others reported financial harms as a result of a loved one’s gambling.

Financial harms were the second most commonly investigated harm in the cross-sectional studies (after health harms). In general, the cross-sectional studies showed that financial harms were significantly positively associated with gambling participation and gambling severity.

The only review on financial harms reported that most included studies showed that bankruptcy increased after the opening of casinos or the introduction of various different types of gambling, such as lotteries and electronic gaming machines.

The studies that consider associations rather than causations are informative here. While financial problems may cause gambling, it is more probable that the reverse is true. Generally, in descriptive and cross-sectional studies, financial harms related to adult gamblers, not children.

Summary of studies

Methodological limitations[29]

The time-based quantitative study had a low risk of bias. We rated one qualitative study as having a low risk of bias, 9 as moderate and 20 as high.

Relevance

High.

Coherence

Results were coherent. Similar results were reported across different countries and populations (similar findings were reported by gamblers, their close associates and staff who support gamblers).

Adequacy

There is adequate evidence to support the finding that gambling causes financial harms to adults and others. This was a consistent finding across the qualitative studies and supported by one time-based quantitative study with a low risk of bias. However, we would want to include further high-quality longitudinal studies to help establish our certainty of this relationship and quantify the proportion of gamblers who experience financial harms. We would also want to include research on financial harms to children who gamble. Financial harms are likely related to levels of gambling severity.

[29] Assessed using the risk of bias rating.

6.2 Relationship disruption, conflict or breakdown

Only 2 time-based quantitative studies reported on relationship harms. In the first, moderate risk and problem gambling predicted lower levels of family functioning and social support compared to low risk or no gambling. In the second, there was no relationship between the prevalence of IPV victimisation or perpetration and gambling in adults once alcohol and drug use and mental health disorders were controlled for.

In total, 28 of the 32 qualitative studies described gambling directly causing relationship problems. Relationship harms affected the gambler and their close associates, including children. But these harms also had a 'ripple effect', spreading outwards to affect the wider family and friendship networks.

The impact of gambling on relationships could be significant, long-lasting and intergenerational. For example, 10 qualitative studies reported on the multiple difficulties associated with gambling that children can experience growing up. This includes:

- financial difficulties
- strain on relationships
- parents neglecting their parental duties

Some children were even taken away from parents or other people took on a parenting role for the gambler. The qualitative evidence suggests that debt may be a mediating factor in gambling and relationship problems. So, the severity of relationship problems is likely related to the severity of gambling-related debt. The qualitative studies reported incidents of interpersonal violence. While it is not possible to quantify the proportion of gamblers and affected others who experience relationship harms from the qualitative evidence, those affected described significant and sometimes life changing negative outcomes.

One review reported an association between gambling and IPV, although the exact nature of the relationship is not fully understood. A second review considered gambling and divorce and results were unclear. Thirty-seven descriptive studies reported on relationship harms, most of which focused on the impact of gambling on the family. But several also reported on intimate partner relationship breakdown. The prevalence of relationship harms among problem gamblers varied across the studies. However, affected others consistently reported high levels of relationship harms caused by the gambler.

There were 22 cross-sectional studies and findings were mixed. We found 12 studies that showed either an association between gambling severity and a variety of relationship harms or a significant difference in the prevalence of relationship harms between different gambling groups. Also, 6 other studies presented more mixed results, while one study reported no association. Three studies examined spouses or affected others.

Summary of studies

Methodological limitations[30]

We rated both the time-based quantitative studies as having a moderate risk of bias. We rated one qualitative study as having a low risk of bias, 8 as moderate and 19 as high.

Relevance

High.

Coherence

The overall results are coherent. Findings show that problematic gambling causes relationship difficulties. The exact relationship between problem gambling and IPV is unclear. Not all problem gamblers are perpetrators, or victims of IPV, but some are. Problem gambling may belong to a range of co-occurring risk factors for IPV, such as substance use and mental health disorders.

Adequacy

The results are adequate in providing an overall assessment that gambling causes relationship problems, which affect the gambler and close associates including children. This was a consistent finding across the qualitative studies. We need further high-quality longitudinal studies to help establish our certainty of this relationship and quantify the proportion of gamblers and affected others who go on to experience relationship harms. We also need them to identify the impact of gambling on specific outcomes, such as the incidence of IPV, divorce and child neglect.

6.3 Mental and physical health harms

The effect of gambling on physical and mental health was the main type of harm investigated by time-based quantitative studies. These time-based quantitative studies were entirely focused on the harms to the individual gambler rather than their close associates or wider society. One longitudinal study reported on SMR, which we can view as an overall measure of health and wellbeing. Rates of death were 1.8 times higher (95% CI = 1.4, 2.2) among people with a gambling disorder than the general adult population. This increased to 6.2 times (95% CI = 4.1, 8.4) for people in the 20 to 49 age group. This is an important study because it uses an objective outcome measure and had a low risk of bias. Another study reported that moderate or severe gambling at the start was also associated with a signficanlty lower quality of life score and higher body mass index.

[30] Assessed using the risk of bias rating.

In the time-based quantitative studies, anxiety and depression were the most measured mental health disorders. However, the studies often combined these disorders into a single outcome. Across studies sampling children and adult populations, findings were inconsistent, reporting both significant positive and non-significant relationships. For example, a UK study reported that moderate risk and problem gambling at age 20 was associated with depression at age 24, but not other mental health disorders. Additionally, a second study suggested that there is a higher prevalence of people with a clinically diagnosed mental disorder who received a subsequent clinical diagnosis of pathological gambling than pathological gamblers who received a subsequent diagnosis of mental disorders.

There was a large number of time-based quantitative studies on alcohol, tobacco and drug use. Most studies focused on adolescents or young adults and findings were mixed. The only time-based quantitative study conducted in the UK reported that moderate risk or problem gambling at age 17 was significantly associated with past 12 month use of cocaine, crack or ecstacy and mild AUD at age 24 but not weekly smoking. Between ages 20 and 24 years, moderate risk and problem gambling was significantly associated with weekly smoking, past 12 month cocaine, crack or ecstacy use and moderate or severe AUD.

Across the time-based quantitative studies, it was not clear whether mental health disorders, alcohol, tobacco and drug use:

- preceded gambling
- were caused by gambling
- were bi-directionally causative
- co-occurred and had a common antecedent

If bi-directionally causative, gambling may not cause a non-drinker to drink alcohol excessively, but a person could use gambling to cope with drinking and drinking to cope with gambling. These findings were supported by the qualitative results. It was clear that in some instances gambling caused the harm. For example, anxiety due to gambling-related debts. But in other instances, the exact temporal relationship between gambling and mental health problems or substance use was unclear. Nevertheless, gambling, mental health disorders and alcohol, tobacco and drug use appear to be related. Mental health and treatment services may therefore be helpful settings to identify and treat problem gambling.

Two time-based quantitative studies also explored suicide. Both showed an elevated risk of suicide death among gamblers. When split into men and women, one study showed the risk of suicide was significant for men only and the other for women only. These findings suggest that there may be gender specific patterns in the association between problem gambling and

suicide[31]. Both studies were from Sweden and looked at an adult population. Gambling was shown to come before and after suicide attempts which may suggest evidence of a reciprocal relationship, however further research is highly likely to change the estimate of effect. Self-harm and suicide events (attempts or ideation) among adult gamblers featured in many of the qualitative studies.

Thirty-one of the 32 qualitative studies identified physical and mental health harms due to gambling to either the adult gambler or their close associates. The harms were extensive and similar for gamblers, as well as those they affected. They included:

- fear
- stress
- anxiety
- depression
- sleep problems
- lack of self-care
- isolation

Three qualitative studies specifically noted the associated emotional effects on children of gamblers could be long lasting. The link between stress and ill health is well known. An accumulation of mental and physical harms over time could account for the higher rate of death among problem gamblers described above.

Three of 6 reviews[32] that examined health harms suggested that comorbidity is an issue among adult gamblers. For example, conditions like nicotine dependence were found to be prevalent in community samples of problem gamblers, as well as among clinical samples such as those accessing treatment for gambling disorder or alcohol or drug dependence. However, the studies that specifically examined suicide (based on 6 relevant studies) or QoL (based on 23 studies) suggested results were somewhat inconclusive. A large number of descriptive studies reported on mental and emotional wellbeing. And a small number reported on the physical health problems associated with gambling.

There were 115 cross-sectional studies that reported on mental and physical health harms, with most reporting on mental health. Substance use featured in a large number of studies. A small number of studies reported on harms specifically among children and young people who gambled. In general, studies reported a significant positive association between mental health harms and gambling severity for both adults and younger people.

[31] Or it may reflect that splitting the data into males and females meant the sample size become too small to detect a significant difference.
[32] A seventh review was identified but its search strategy identified no relevant studies.

The physical and mental health harms associated with gambling had wider societal consequences, such as those associated with people missing work. While not specifically stated in the evidence, we can assume that societal costs were incurred treating and caring for people experiencing gambling-related ill health.

Summary of studies

Methodological limitations[33]

We rated 2 of the time-based quantitative studies as having a low risk of bias, 13 as moderate and 2 as high. We rated one qualitative study as having a low risk of bias, 9 as moderate and 21 as high.

Relevance

High.

Coherence

The evidence is moderately coherent but varies by specific health outcome. It was a challenge to understand what mental and physical health outcomes we could conceptually define as harms caused by gambling. Researchers and policy makers need to further consider this.

It is clear from the qualitative evidence that gambling is related to negative mental and physical health outcomes. The relationship between gambling and mental health and alcohol, drug and tobacco use described in the time-based quantitative studies is complex. It is possibly causative, bi-directional or co-occurring. Nonetheless, the body of evidence highlights an important overlap between gambling and mental health disorders and alcohol, drug and tobacco use. Gambling, alcohol, drug and tobacco use and mental health appear related so considering them together in future research seems sensible. But considering them within the context of a broad review of the evidence such as this presented challenges. The heterogeneity between studies (looking at different populations, exposure and outcome measures) complicated our assessment of the relationship. The relationship is likely to be different for different people.

There is coherent evidence that gambling causes suicidal events (attempts and ideation) overall among adults, however there are uncertainties in how gender might affect this relationship.

Adequacy

Mental and physical health outcomes as a group were investigated by the largest number of studies, but this included a wide range of different outcomes and populations. So, further research in this area is needed.

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[33] Assessed using the risk of bias rating.

6.4 Employment and educational harms

We identified one time-based quantitative study that reported on academic performance and none on employment harms. The study on academic performance did not show a significant relationship between higher gambling participation and poorer academic performance between ages 14 and 17 when the characteristics of the children and their families were accounted for.

A small number of qualitative studies focused on the impact of gambling on work and study. These gave examples of how gambling affected the adult gamblers' and their close associates' ability to work, which we can view as having wider societal consequences. Work colleagues and employers were also negatively affected.

The qualitative studies also reported that the education of children who gambled and the education of children of gambling parents could be detrimentally affected. This suggests a long-lasting impact on children's ability to thrive.

There were no systematic reviews that considered employment or education. Fourteen descriptive studies and 17 cross-sectional studies considered employment and education and the types of employment and educational harms varied across studies. Findings from the cross-sectional studies were mixed about whether gambling was associated or not with employment and educational harms.

Summary of studies

Methodological limitations[34]

We rated the time-based quantitative study as having a moderate risk of bias. Six qualitative studies were rated as having a moderate risk of bias and 6 as high.

Relevance

High.

Coherent

The evidence from the qualitative studies of the negative impact of gambling on employment and education is coherent.

Adequacy

The evidence of the impact of gambling on employment and education is inadequate and we need further research in this area, particularly high-quality longitudinal studies. In particular, we need studies that separate the impact of gambling from other risk factors in children.

[34] Assessed using the risk of bias rating.

6.5 Crime and anti-social behaviour

The 3 time-based quantitative studies reported that problem gambling did not predict crime or anti-social behaviour. All these studies recruited young adults. All 3 studies used non-validated self-reported measures of gambling. They also all measured self-reported crime, which was often averaged or the measurement itself was not reported.

Four qualitative studies specifically focused on gambling-related crime, and 3 of these showed how gambling and crime were linked. However, crime by adult gamblers was a common theme across the qualitative studies. Crimes were generally acquisitive in nature and were committed to be able to afford to gamble or to pay off gambling-related debts. Close associates, such as family members, were often the victims of these crimes. Gambling-related crime has significant effects on victims. The cost of investigating and prosecuting these crimes, and the cost of writing off acquisitive crimes, are borne by wider society.

We included only one review that examined gambling-related crime. This found positive significant associations between (mostly) adult gambling and criminal acts in 10 of the 18 studies. The authros suggested the relationship was complex and that further research was needed to improve our understanding. Eighteen descriptive studies and 21 cross-sectional studies considered gambling and a range of outcomes related to crime and anti-social behaviour. Results from the cross-sectional studies were not conclusive but on balance, studies suggested a positive association between gambling severity and crime.

Summary of studies

Methodological limitations[35]

We rated one time-based quantitative study as low risk of bias and 2 as moderate. We rated 8 qualitative studies as having a moderate risk of bias and 11 as high.

Relevance

High.

Coherence

The qualitative and time-based quantitative studies present conflicting evidence, suggesting the data lacks coherence. However, what is clear is that, while not all adult gamblers commit crimes, some do, and this is directly linked to their efforts to tackle gambling-related debts. It is also conceivable that gambling does not predict crime in young adulthood and that criminal

[35] Assessed using the risk of bias rating.

behaviour develops over time and after developing significant debts. It is also likely that crime is under-reported.

Adequacy

The findings from the qualitative studies are adequate, but we need further high-quality longitudinal studies to confirm and quantify any potential link between gambling and crime. Given that people under-report socially undesirable behaviour, and that people might be particularly reticent to admit to committing crimes, identifying research approaches that do not rely on self-reporting would be beneficial.

6.6 Cultural harms

There were no time-based quantitative studies that examined cultural harms. Cultural harms affecting particular communities were indicated in 7 qualitative studies, while 12 studies considered gambling normalisation. Results from the qualitative studies show that gambling-related harms can be influenced by cultural norms and practices. As such, some wider societal harms are particular to specific communities. It is likely that gamblers and their families who experience shame caused by the dissonance between their cultural norms and gambling will find it particularly challenging to seek support.

The widespread acceptance of gambling by individuals, families and society means it is normalised in society, with gambling behaviours and gambling-related harms perpetuated to the next generation.

No reviews, one descriptive and one cross-sectional study considered cultural harms.

Summary of studies

Methodological limitations[36]

We rated the qualitative studies as having a moderate or high risk of bias.

Relevance

High.

Coherence

The evidence derived from qualitative studies was coherent in providing comparable findings.

[36] Assessed using the risk of bias rating.

Adequacy

The evidence was inadequate in defining the cultural harms of all communities. However, research on cultural harms needs to be highly specialised to the particular community in question. The widespread availability of gambling in the UK supports the evidence that gambling is a normalised activity.

6.7 Gaps in the evidence

Most of the available evidence is focused on harms experienced directly by people who were gambling. There is some qualitative evidence on the harms gambling causes to families, friends and colleagues. But there is less evidence (qualitative or quantitative) on wider societal harms. It is clear that harm to affected others and wider society has received much less research attention than harm to the gamblers.

Most of the time-based quantitative and qualitative studies included in the review were on adult gamblers with less focus on harms to children who gamble. There were 7 qualitative studies but only 1 time-based quantitative study from the UK. While evidence from other OECD countries is relevant, it is likely that the association between gambling and harms varies by country due to differences in gambling laws, access to gambling activities and attitudes to gambling.

There was a striking lack of time-based quantitative studies measuring financial harms, given that gambling involves spending money or money's worth. There were also few time-based quantitative studies on relationship harms and employment and education, or cultural harms.

6.8 Strengths and limitations

We based the review on rigorous systematic methods and registered it with PROSPERO before the review started. There was one deviation from the protocol and, while this was a significant change, it is clearly justified and reported (see section on methods). The review included a detailed search of both published and grey literature, reference list searching and used an external reference group to identify additional studies. Updated searches were also undertaken. So, the review fulfils its aim of being a comprehensive assessment of the harms associated with gambling.

The review identified no systematic reviews published between 2005 and 2014 that assessed the temporal relationship between gambling and harm (namely that gambling preceded the harm). It is possible that reviews published outside this date range did assess this relationship but were not included.

The primary studies included in the review were published between 2015 and 2020. We did not include primary studies published before 2015 that assessed a temporal relationship. The wide scope of the review and the heterogeneity of the study designs, populations and the ways

gambling and harms were measured made synthesising the evidence challenging. We identified these challenges before starting the review (6).

The review aimed to include studies whose primary or secondary aim was to identify harms associated with gambling. In some instances, this was hard to determine. Where we were unsure, we included the study because the review aimed to capture the full breadth of harms.

We focused primarily on studies that reported a temporal relationship between gambling and harm. This enhanced the quality of the conclusions. While most harms were easy to define, in other instances it was a challenge to determine if the outcome had the potential to be a harm caused by gambling. Other researchers have previously recognised the difficulty in identifying what constituted a harm (9). This was particularly true for some of the psychological conditions. We discussed all outcomes with a professor of addiction psychology. However, it is possible that we misclassified some outcomes as a harm when they were not an outcome that could be caused by gambling.

Some activities, such as the amount of money spent on gambling, could be thought of as both a measure of gambling severity and a measure of harm in cross-sectional and descriptive studies. This presented a challenge in classifying these measures consistently.

The review used composite measures, such as the PGSI, to categorise gambling severity. We did not include studies that reported scores from such measures but did not discuss the types, breath or extent of harms experienced. This was because we were interested in the types of harms caused by gambling, not prevalence.

The Newcastle Ottowa Scale asks about how outcomes and exposures were measured. These can be measured using robust tools, however at the analytical stage fall short. For example, though gambling was often measured using validated tools such as the PGSI, due to a low prevalence of problem gambling, some studies would modify this measure to having ever gambled or not. The same occurred for outcomes that were measured robustly, but then changed to ever or never at the analytical stage, such as ever or never used drugs. This clearly masks important differences and should be avoided in future research. This problem could be avoided by using larger samples or sampling strategies that over-represent groups of interest, such as drug users or people who commit crime. As such, for some studies, the methodological quality may be lower than is rated by the risk of bias tool.

We did not include studies published in languages other than English. However, the impact of this on the completeness of the evidence is small. Using the English language filter during database searching removed between 2.0% and 3.5% of the studies from the 3 main databases. We do not know the proportion of studies excluded on language that also fulfilled the inclusion and exclusion criteria. But this is likely to be small based on the results for English language studies.

The review aimed to capture harms caused by gambling in video games. The review found only one qualitative and 4 cross-sectional studies on gaming. The review included ‘loot boxes’ as a search term, but no other specific terms for gambling within gaming. However, to capture relevant studies, the database searches also included the general terms:

- game
- games
- gaming
- gamer
- video games

6.9 Implications for research and policy

Most studies on gambling-related harms are cross-sectional. Further high-quality quantitative research is needed using designs that assess the temporal relationship between gambling and harm. These studies must establish that the harm was not present at the outset of the study to increase our confidence in any causal relationship between gambling and that outcome. Harm to affected others and wider society has received much less research attention than on harm to the gambler and should be the focus of future research.

Collecting routine data on gambling across government organisations (for example, the criminal justice and welfare systems) would provide an opportunity to better measure societal harms. More research on the relationship between gambling within gaming, wider gambling participation and problematic internet use among children is also needed. There is evidence from the qualitative research that certain populations may be more at risk of gambling-related harm. This suggests gambling may exacerbate inequalities, but this also needs further consideration.

It was a challenge to identify harms according to gambling severity due to the heterogeneity in how severity was measured across time-based quantitative and qualitative studies. The cross-sectional evidence suggests that people with the highest gambling severity experience the greatest degree of harm. But this does not mean that people gambling at low severity experience no harm. Like other health risk behavours such as alcohol use, gambling is likely to follow a gradient with different levels of harm associated with different levels of gambling severity. So, an entire population approach to move the distribution of risks and harms seems appropriate.

We rated only one qualitative study as having a low risk of bias. The main bias identified across studies was researchers failing to describe and assess the impact of their positionality in collecting and analysing data. Most longitudinal studies had a moderate risk of bias. The main bias was using self-reports to measure the exposures and outcomes. Though, in some cases, there were concerns about loss to follow-up (people in the study dropping out) or handling of missing data. Most studies using LCTM and LCA had a moderate risk of bias. These studies

tended to suffer from less representative samples and were not always able to show that the outcome of interest was not present at baseline. Future research on gambling should address these weaknesses.

Policies should consider how to prevent and reduce gambling-related harm as a public health issue. Gambling-related debt should be given priority as it is a mediating factor in many other gambling-related harms.

While this review was not about interventions, we highlight 2 recent reviews on interventions that provide more information for policy-makers and practitioners. Like the evidence base on harms, evidence is focused on individual-level interventions with little focus on population-level interventions such as reducing supply or demand (265, 266). Evidence from alcohol research shows the following population-level interventions are the most effective and cost-effective for preventing and reducing harm:

1. Price regulation and taxation.
2. Marketing regulations.
3. Restrictions on the physical and temporal availability of alcohol (267).

These types of intervention warrant further investigation for gambling too.

7. Conclusions

There is adequate evidence, mostly from qualitative studies, that gambling causes financial and relationship harms for adults and close associates, especially intimate partners and children. But the proportion of people affected is not clear. It seems that gambling-related debt is a crucial harm and is the trigger for other harms.

The detrimental impact of gambling on relationships ripples outwards, detrimentally affecting wider family and friendship networks.

There is some evidence, mostly from qualitative studies, that gambling causes employment and educational harms and crime. However, further high-quality longitudinal designs are needed to confirm these findings, and the proportion of gamblers affected.

One study, with a low risk of bias, reported that the SMR of adults with gambling disorder was higher than the rate in the general adult population.

There is evidence from 2 longitudinal studies that gambling causes suicidal events (attempts, ideation and death by suicide) among adults. The relationship between gambling and suicide may be different for men and women. Other evidence of the impact of gambling on the mental health of gamblers and close associates is less coherent. While qualitative studies reported gambling was related to mental health issues, the time-based quantitative studies reported mixed evidence for depression and anxiety. The findings for the relationship between gambling and alcohol, tobacco and drug use was also mixed.

While there appears to be a relationship between gambling, mental health disorders and alcohol, tobacco and drug use, the exact nature of this relationship is unclear. Gambling could cause mental health disorders and alcohol, tobacco and drug use. Or it could be the other way around. Alternatively, another factor could be responsible for increasing both gambling and mental health disorders or alcohol, tobacco and drug problems. And it is probable that it will be different for different people.

Despite gambling being normalised within UK society, the weight of evidence across different study designs suggests it carries a risk of causing a wide range of harms to the gambler, close associates and society. These harms can be significant, wide-reaching and intergenerational and may exacerbate inequalities. These can also have a long-term negative impact on the children of some problematic gamblers. A whole-systems approach incorporating primary, secondary and tertiary prevention is likely to reduce gambling and its harms, and evidence from other health policy areas such as alcohol or tobacco may usefully be transferred to gambling under a public health approach.

8. Interests and acknowledgements

8.1 Competing interests

The authors declare that they have no competing interests.

8.2 Funding

This review was funded by PHE. Employees of PHE wrote this report.

8.3 Acknowledgements

The authors would like to thank the following people: Marguerite Regan, Clive Henn, Dr Felix Greaves, Professor John Marsden, Professor Paul Van Schaik, Zoe Clarke, Stephen Ollis and Alyson Duckett.

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Published September 2021
PHE gateway number: GOV-9697

PHE supports the UN Sustainable Development Goals