Gambling-related harms evidence review: the economic and social cost of harms
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# Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACC</td>
<td>Alternative Claims Count database</td>
</tr>
<tr>
<td>AOR</td>
<td>Adjusted odds ratio</td>
</tr>
<tr>
<td>APMS</td>
<td>Adult Psychiatric Morbidity Survey</td>
</tr>
<tr>
<td>AUD</td>
<td>Australian Dollar</td>
</tr>
<tr>
<td>BGPS</td>
<td>British Gambling Prevalence Survey</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>COI</td>
<td>Cost-of-illness</td>
</tr>
<tr>
<td>DfT</td>
<td>Department for Transport</td>
</tr>
<tr>
<td>DWP</td>
<td>Department for Work and Pensions</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross domestic product</td>
</tr>
<tr>
<td>GGY</td>
<td>Gross gambling yield</td>
</tr>
<tr>
<td>GMCA</td>
<td>Greater Manchester Combined Authority</td>
</tr>
<tr>
<td>HMT</td>
<td>Her Majesty’s Treasury</td>
</tr>
<tr>
<td>HO</td>
<td>Home Office</td>
</tr>
<tr>
<td>HSE</td>
<td>Health Survey for England</td>
</tr>
<tr>
<td>ISA</td>
<td>Individual savings account</td>
</tr>
<tr>
<td>JSA</td>
<td>Jobseeker’s Allowance</td>
</tr>
<tr>
<td>MHCLG</td>
<td>Ministry of Housing, Communities and Local Government</td>
</tr>
<tr>
<td>MoJ</td>
<td>Ministry of Justice</td>
</tr>
<tr>
<td>NDTMS</td>
<td>National Drug Treatment Monitoring System</td>
</tr>
<tr>
<td>NICE</td>
<td>National Institute for Health and Care Excellence</td>
</tr>
<tr>
<td>OCU</td>
<td>Opiate and/or crack cocaine use</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>ONS</td>
<td>Office for National Statistics</td>
</tr>
<tr>
<td>PGSI</td>
<td>Problem Gambling Severity Index</td>
</tr>
<tr>
<td>PHE</td>
<td>Public Health England</td>
</tr>
<tr>
<td>PSSRU</td>
<td>Personal Social Services Research Unit</td>
</tr>
<tr>
<td>QALY</td>
<td>Quality-adjusted life year</td>
</tr>
<tr>
<td>QoL</td>
<td>Quality of life</td>
</tr>
<tr>
<td>SMR</td>
<td>Standardised mortality ratio</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>YLL</td>
<td>Years of life lost</td>
</tr>
</tbody>
</table>

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

Introduction

This report brings together evidence on gambling prevalence, harms and costs to estimate the annual economic burden of gambling in England. It builds on previous reports in this area, such as Thorley, and others, (1, 2), that estimated the cost to government associated with problem gamblers in Great Britain (England, Wales and Scotland). It also makes use of the evidence collected as part of Public Health England (PHE) gambling-related harms review. This analysis is the latest attempt to estimate the economic and social cost of gambling in England, adopting a broad perspective on costs, subject to data availability.

Costing gambling-related harms

As set out in Table 1, we estimated the annual economic burden of harmful gambling to be about £1.27 billion (in 2019 to 2020 prices). This included £647.0 million (51%) of direct costs to government and £619.2 million (49%) of wider societal costs associated with suicide.

The analysis refers to harmful gambling, which includes individuals screened as ‘at-risk’ and ‘problem gamblers’ using the Problem Gambling Severity Index (PGSI). The Health Survey for England estimates there are about 1.76 million harmful gamblers (at-risk or problem gamblers) in England and of these, about 168,000 people are problem gamblers (3). The PGSI defines problem gamblers as individuals who gamble to a degree that compromises, disrupts or damages family, personal or recreational pursuits (and is indicated by scoring 8 or more on the PGSI).

The national and international evidence base in this area is limited. For this reason, the figure of £1.27 billion is an underestimate of the true scale of the total economic burden of gambling. The analysis aims to cover both at-risk and problem gamblers, but evidence quantifying harms for both groups is very limited. Other data limitations mean that we have only partially costed some harms (such as financial, health, employment and education, crime), while we have not costed others at all (such as cultural harms or impact on relationships).
**Table 1. Estimated excess cost of harm associated with gambling, by type of harm and type of cost (£millions, 2019 to 2020 prices)**

<table>
<thead>
<tr>
<th>Type of harm</th>
<th>Domain</th>
<th>Sub-domain</th>
<th>Cohort</th>
<th>Central estimates</th>
<th>Government costs</th>
<th>Wider societal costs</th>
<th>All costs (£ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct costs (£ millions)</td>
<td>Intangible costs (£ millions)</td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td></td>
<td>Statutory homelessness</td>
<td>Adults</td>
<td></td>
<td>62.8</td>
<td>N/A</td>
<td>62.8</td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td>Total health harms</td>
<td></td>
<td></td>
<td>342.2</td>
<td>619.2</td>
<td>961.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deaths from suicide</td>
<td>Adults</td>
<td></td>
<td>N/A</td>
<td>619.2</td>
<td>619.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depression</td>
<td>Adults</td>
<td></td>
<td>335.5</td>
<td>N/A</td>
<td>335.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alcohol dependence</td>
<td>Adults</td>
<td></td>
<td>4.7</td>
<td>N/A</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illicit drug use</td>
<td>17 to 24 years</td>
<td></td>
<td>2.0</td>
<td>N/A</td>
<td>2.0</td>
</tr>
<tr>
<td>Employment and education</td>
<td></td>
<td>Unemployment benefits</td>
<td>Adults</td>
<td></td>
<td>79.5</td>
<td>N/A</td>
<td>79.5</td>
</tr>
<tr>
<td>Criminal activity</td>
<td></td>
<td>Imprisonment</td>
<td>Adults</td>
<td></td>
<td>162.5</td>
<td>N/A</td>
<td>162.5</td>
</tr>
<tr>
<td><strong>Excess cost (£ millions)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>647.0</strong></td>
<td><strong>619.2</strong></td>
<td><strong>1,266.1</strong></td>
</tr>
</tbody>
</table>

Note: Figures may not sum due to independent rounding. Where N/A is indicated, analysis was not undertaken.
The analysis has not been able to cost individual financial harms to gamblers and affected others (harmful gamblers’ family and closest network). However, research acknowledges that this is one of the most significant individual harms arising from gambling, with significant private costs to gamblers themselves, their families and friends. One recent study showed that gambling activity is associated with:

- financial distress
- lower financial inclusion
- poor or lack of financial planning (4)

Also, spending more money on gambling is associated with smaller:

- amounts spent on insurance and mortgage repayments
- total savings
- pension contributions

Acknowledging these limitations, the analysis has made use of the best available evidence. For health harms, we have taken evidence from the PHE gambling-related harms review. For other areas of harm, we have drawn evidence from a specific economic literature search. Most of the evidence has not attempted to, or not been able to, establish causal links between gambling and harms. So, it is important to note that the estimates contained in this paper are the economic and social costs of harm associated with gambling and have not necessarily been caused by gambling. We need further research in this area to establish causal links between economic harms and gambling.

**Recommendations**

**Research**

Future research in England should aim to expand the depth and breadth of the evidence base on people experiencing gambling-related harms, including affected others. Researchers should design these studies to measure causality. Higher quality evidence would allow for a closer estimate of the true scale of the total economic burden of gambling.

A range of stakeholders could develop this research, including:

- government
- academia
- charities
- the healthcare system
- regulators

We need further research on the effectiveness and cost-effectiveness of interventions to prevent gambling-related harms to help people with gambling problems and affected others.
This should focus on interventions with the potential to affect individual behaviour change and make an impact at scale. We also need research on the impact of further regulation on gambling activity to evaluate their effectiveness to reduce gambling-related harms.

**Improved information and services**

To get more complete estimates of the direct and indirect costs of gambling-related harms, we should put greater emphasis on the financial harms for at-risk and problem gamblers. Direct costs represent the diversion of resources towards managing gambling, such as treating gambling behaviour. Indirect costs refer to resources being unavailable for other productive use, such as the costs to the criminal justice system or costs of unemployment benefits.

There is a need for improved screening, diagnosis and treatment of gambling-related health problems. This will enable researchers to make robust estimates of the cost to the health and social care system.

Connected to this is the need to address current inequities for people accessing treatment services for gambling-related health harms.
1. Introduction

Concern about the harms associated with gambling has been increasing in the UK. In response to this, the 2018 to 2019 remit letter confirming Public Health England’s (PHE) priorities included the request for PHE 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” (5).

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” (6).

The aim of this economic study is to estimate the annual economic burden of gambling-related harm in England. The evidence in this area is not extensive.

In this report, the introduction summarises the current evidence on economic and social costs of harmful gambling in the UK and England, as well as other developed countries. The methods outline the populations of interest and the general approach to costing gambling-related harm. We present the main analysis for each type of harm where there was robust evidence available, followed by a discussion of the results. We then present the main conclusions of the report.

1.1 Current evidence on economic and social costs of harmful gambling

We conducted a structured literature review to identify the social and economic costs that had been analysed both within the UK and internationally, with a focus on Organisation for Economic Co-operation and Development (OECD) countries. We conducted searches in Ovid MEDLINE and EBSCO Econ Lit using keywords for gambling and its related harms. We screened and selected studies that described relevant economic and social costs. You can find an overview of the literature review method in Appendix A.

We complemented the results from the electronic search with more focused searches and papers identified through an external reference group. The external reference group’s role was to inform and guide the project team undertaking the review. We also arranged meetings with external academic experts working in this area to ensure we identified the main sources of economic evidence related to gambling.

We used the literature review to provide an overview of the previous work done on the cost of gambling-related harms, as well as using it as a source of evidence for the economic analysis.
UK and English evidence

There have been very few attempts to quantify the costs of gambling-related harm in England and the UK. At the time of writing this report, we found only the Institute for Public Policy Research report ‘Cards on the table’ (1) that quantified the cost of gambling-related harm from the government perspective within the British context. We know that further relevant economic analysis is underway, commissioned by the Gambling Commission, but the results have yet to be published.

Thorley, and others, (1) estimate the fiscal cost to government of problem gamblers in Great Britain (England, Wales and Scotland) in 2015 to 2016. The specific results for England estimate a cost between £200 million and £570 million. These costs include provision of healthcare, unemployment benefits, statutory homelessness and costs related to the criminal justice system.

Gambling-related harms are receiving more attention. The House of Lords Select Committee on the Social and Economic Impact of the Gambling Industry (7) has recently published a report. It says, among other things, wider social impact should be considered when anyone is analysing gambling-related harm. These wider social impacts include:

- financial cost to the individual
- health problems
- the impact on family relationships
- employment
- quality of life

One recent study provides a conceptual framework for the potential gambling-related harms and their social costs in England (8). These impacts include not only the fiscal cost included in Thorley, and others (1), but expands on other areas such as relationships (the impacts on partners, family and friends, and the community) and money and debt. These impacts are both borne by the person living with gambling addiction and their close family and carers. The work provides over 50 potential metrics for analysis grouped in each of the 3 main areas (health, resources and relationships). Given the breadth of the framework, the study proposes a ‘Foundation model’ focusing on 10 metrics is proposed as a starting point to estimate some of the social costs associated with gambling-related harms.

From a private or individual perspective on the economic and social costs of gambling-related harm, one working paper by Pryce, and others (9), estimates the total income loss for problem gamblers. The paper suggests this could be as high as £31 billion annually in England. However, these results need a careful interpretation. The analysis has a potential risk of bias and the data used (British Gambling Prevalence Survey is from 2010 when online gambling was not so common) may have many limitations, so may not represent the current patterns of harmful gambling activities in the UK.
International evidence

In general, there is a lack of international evidence on the costs associated with gambling-related harms.

The most recent figures from Australia estimated the total cost of gambling-related harms in the state of Victoria to be 7 billion Australian dollars (AUD) in 2014 to 2015 (about £3.85 billion using 2020 exchange rates) (11). This total cost was for an estimated population of 549,288 of gamblers at all levels of risk (or 12.9% of the adult population in Victoria, which is 4.4 million). The population of gamblers was stratified using the Problem Gambling Severity Index (PGSI) and sourced from a previous analysis by Browne, and others, 2016 (10). This prevalence is 3 times higher than the one estimated for England and used in our analysis, as shown in Table 2 of the methods section.

The costs include:

- financial
- emotional and psychological
- productivity loss and work impacts
- criminal justice system
- relationships and family
- impacts on health services

In this analysis, the major components of the cost of gambling are borne by gamblers themselves and the people around them (financial costs, emotional and physiological impact and relationships). The AUD 7 billion figure relates to all gambling groups and decreases to AUD 2.4 billion (about £1.32 billion) when considering only the most severe, but less prevalent, problem gamblers. Previous work in Australia estimated total costs between AUD 4.7 and AUD 8.4 billion (between £2.85 and £4.61 billion) per year in 2008 prices (12). In this year, the general population was 21.6 million (13).

In Europe, one study estimated the social costs of gambling in the Czech Republic at between €541 and €619 million (about £481 and £551 million) in 2012 (14). The size of the general population was 10.5 million in this year (15). Personal and family costs accounted for nearly two-thirds (63%) of total costs, whereas crime, productivity losses and suicide each accounted for around 12% to 13% of total costs.

Focusing only on the healthcare costs of gambling-related harms, a study in Germany estimated that pathological and problem gamblers cost an extra €218 million (about £194 million) to the healthcare treatment system each year (over the period 2008 to 2011). It found 12.5% of the total costs were directly caused by online gambling (16). The general population was 80.2 million in 2011 (15).
In the US, a study estimated the average total annual expenditure on healthcare of a patient diagnosed with pathological gambling to be between $9,523 and $14,505 (about £7,113 and £10,848) in 2012 (17). It found pharmaceutical expenditures represented around 16% to 22%. Whereas European countries may share similarities in healthcare coverage and public financing of healthcare, healthcare in the US is organised very differently to the UK, so it is unlikely that these figures are little more than illustrative.

The evidence review has shown that there is a clear gap in the assessment of the true scale of the total economic burden of gambling. The analysis presented here aims to add evidence on England to the existing body of knowledge.
2. Methods

The aim of this study is to estimate the annual economic burden of gambling-related harm in England. We use data from 2019 to 2020 and extrapolate average cost estimates to the English population experiencing different levels of harmful gambling.

To cost gambling-related harms, we used evidence from PHE’s gambling-related harms review. Where there were gaps in this evidence, we supplemented this with evidence from a structured literature review (described in the Introduction). Economic evaluations and cost analyses gather information from different sources such as the effect size of an intervention, or the unit costs of delivering an intervention. It is common that these data inputs are published for different years and timeframes. This report presents all cost estimates for the financial year 2019 to 2020 and where required, we have uprated costs using HM Treasury’s gross domestic product (GDP) deflator (18).

The overarching method for this work was pre-registered as an analytical plan on the Open Science Framework.

2.1 Population of analysis

Analysis from the Health Survey for England 2018 shows that over half of the population in England take part in gambling. This equates to 24.5 million people, as reported in PHE’s gambling prevalence analysis report. Our analysis takes a broad perspective by including people with severe levels of problem gambling but also people with a lower level of risk (19). To do this, we stratified evidence of gambling-related harm by individuals’ level of risk, according to the Problem Gambling Severity Index (PGSI). The 3 groups of gamblers are:

1. Low-risk gamblers.
3. Problem gamblers.

In total, we estimate the at-risk gambling population in England to be around 1.76 million. Table 2 provides estimates of the prevalence in each of the groups. We combine both low-risk and moderate risk in certain areas of this report and refer to them as at-risk gamblers.
Table 2. Prevalence of at-risk gambling in England by PGSI score

<table>
<thead>
<tr>
<th>Type of gambler by PGSI score</th>
<th>Central prevalence</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low estimate</td>
</tr>
<tr>
<td>Low risk (PGSI score 1 to 2)</td>
<td>1,213,830</td>
<td>990,317</td>
</tr>
<tr>
<td></td>
<td>2.7%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Moderate risk (PGSI score 3 to 7)</td>
<td>377,242</td>
<td>273,240</td>
</tr>
<tr>
<td></td>
<td>0.8%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Problem gambler (PGSI score 8 or more)</td>
<td>168,149</td>
<td>102,185</td>
</tr>
<tr>
<td></td>
<td>0.4%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Total</td>
<td>1,759,221</td>
<td>1,365,742</td>
</tr>
<tr>
<td></td>
<td>3.9%</td>
<td>3.4%</td>
</tr>
</tbody>
</table>

Source: PHE analysis adapted from the 2018 Health Survey for England (3)

At a population level, gambling-related harms experienced by lower risk gamblers can be greater at aggregate level than harms experienced by problem gamblers, given the size of these populations. However, despite interest in estimating gambling-related harms experienced by the at-risk populations, we did not find enough evidence to do so consistently throughout the analysis. So, some of the analysis will only estimate harms for problem gamblers, as shown in Table 4 in the next section.

Another population of interest are the affected others of gamblers and the harms they experience. PHE’s gambling prevalence analysis report estimates based on YouGov data for England. Gambling-related harm for this population can also take different forms, such as financial harm and relationship deterioration. However, this population has not been explicitly analysed in this report and we think this should be a future area of research.

2.2 Perspective of analysis and types of costs

The goal of this analysis is to estimate the potential economic and social costs of gambling-related harm experienced by the English population classified as at-risk and as problem gamblers. It is not within the scope of PHE’s Gambling-related harms evidence review to undertake a cost-benefit analysis of other estimates of benefits associated with gambling activity.

Gambling-related harm is considered both a public health and wider societal problem and the literature identifies a list of potential harms derived from risky gambling activity.
We identified the potential cost categories included in the analysis through PHE’s gambling-related harms review, which builds on the Langham, and others (20), conceptual framework, complemented by the economic structured literature review (summarised in the Introduction).

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
- criminal activity
- detriments 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

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

The intended approach was to include data relating to all these dimensions, although we excluded cultural harm because of a lack of data.

These gambling-related harms affect the individual (which can potentially be monetised as private costs) and third parties including affected others and the wider society (external costs).

Typically, cost-of-illness analysis only include external costs caused by the illness or health condition itself (21). The standard government approach to economic evaluation and impact assessment focuses on external costs because these justify government intervention and regulation. Private costs borne by individuals are excluded from these analyses, given the underlying assumption that these private costs are offset by private benefits. While this assumption may hold true in many situations, it is less likely when rational choice is compromised by addictive behaviour.

In the case of at-risk and problem gambling, private costs such as financial harms (debt, loss of available income) are an important proportion of the total harm experienced by the individual (1, 11).
On external costs associated with gambling-related harm (those costs that affect others than the gambler), previous work has been done in Australia (Browne, and others, (11)) and other countries (as described in the Introduction). Appendix B reports an extensive list of harms considered in the analysis of social costs in Victoria, Australia (11).

The approach here adopts a framework developed for the UK by Wardle, and others (8). This framework takes into consideration the specifics of our setting and data availability. Whereas the framework provides over 50 metrics of gambling-related harm, Wardle, and others (8), also propose a simplified model to start with, the ‘Foundation model’. This is formed of the areas that currently are likely to have evidence and data, so gambling-related harms can be costed. The areas of the Foundation model are:

- loss of employment
- experience of bankruptcy or debt
- loss of housing or homelessness
- crime associated with gambling
- relationship breakdown or problems
- health-related problems
- suicide and suicidality

Table 3 adapts this Foundation model, mapping the suggested metrics above with the Langham, and others, conceptual work (20). It also shows whether our analysis has costed each metric and the entity that bears that cost, which can be either government or wider society. We have added the metric ‘opportunity cost’ within financial harms as this is an important harm that is not included in the original Foundation model. Given the cross cutting nature of health, we have combined 2 pillars from Langham, and others (20), ‘emotional and psychological distress’ and ‘decrements to health’, into a ‘health’ category. As mentioned earlier, costs can be borne by the individual as well as external or third parties, which in turn we can classify as government. This is because governments are the main funders of services, such as healthcare and justice services, and the wider society, for example victims of gambling-related crime. Due to data limitations, the cost estimates presented are mainly those borne by the government.
### Table 3. Potential harms and actual costs estimate in our analysis

<table>
<thead>
<tr>
<th>Domain (Wardle, and others, 2018)</th>
<th>Harms (Langham, 2014)</th>
<th>Metric (proposed in the Foundation model by Wardle, and others, 2008)</th>
<th>Cost estimate produced in our analysis</th>
<th>Government costs&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Wider societal costs&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources</td>
<td>Employment</td>
<td>Number of job losses, increased claims on benefit system</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Financial</td>
<td></td>
<td>Opportunity cost of gambling (not included in the original Foundation model)</td>
<td>No cost attached given the lack of robust data, but we do discuss the evidence</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bankruptcy, Debt Relief Orders</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased use of debt services</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Homelessness applications</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Crime</td>
<td>Crimes committed</td>
<td>Partially, only crimes with a conviction</td>
<td>Yes</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Relationships</td>
<td>Relationships</td>
<td>Divorce, separation, relationship breakdown</td>
<td>No, due to lack of robust UK and England data available</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased use of relationship services</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<sup>a</sup> Government costs

<sup>b</sup> Wider societal costs
## Gambling-related harms evidence review: the economic and social cost of harms

<table>
<thead>
<tr>
<th>Domain (Wardle, and others, 2018)</th>
<th>Harms (Langham, 2014)</th>
<th>Metric (proposed in the Foundation model by Wardle, and others, 2008)</th>
<th>Cost estimate produced in our analysis</th>
<th>Government costs(^a)</th>
<th>Wider societal costs(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Health and emotional stress</td>
<td>Experience of stress, depression, anxiety, non-suicidal self-harm, other mental and physical health conditions, substance abuse and misuse</td>
<td>Yes, association of gambling with depression, alcohol and drug addiction</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of suicides and suicide attempts</td>
<td>Partially, only suicides (we do not cost suicide attempts)</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Note:**

\(^a\) Government costs: costs borne by government that involve the loss of resources that could otherwise be used for consumption or investment.

\(^b\) Wider societal costs: costs borne by external parties beyond government. This potentially includes costs to the economy (for example, productivity costs), to private companies, to victims of gambling-related crime or the value of a life lost.
As shown in Table 3 above, the analysis has been able to produce cost estimates for:

- financial harms (statutory homeless applications only)
- health
- work and employment
- criminal activity

We estimate most costs from the government perspective where there is evidence of a fiscal or taxpayer cost in the literature. These tangible costs borne by government involve the loss of resources that could otherwise be used for consumption or investment (22). We can classify these costs as:

- direct costs, such as healthcare resources directly used to address gambling-related harm
- indirect costs, which relate to resources that are unavailable for other productive use (for example, costs associated with lost productivity, such as a person’s lost wages due to missing work, or their income forgone due to a premature death)

In one type of harm it was possible to produce an estimate of intangible costs. These costs represent disease burden rather than resource loss (23). This harm was the loss of life through suicides associated with gambling-related harms. Here, we attach a cost estimate to the loss of life from suicides through the estimated social value of a life. In this case, we estimate this cost from a wider societal perspective instead of a government one.

There are harms for which it was not possible to produce cost estimates due to a lack of robust evidence. This is the case for relationships, where the PHE gambling-related harms evidence review did not identify quantitative estimates of relationship break-ups or using relationship services associated with gambling. We discuss financial harms in the context of relevant new evidence for the UK (4), but we do not cost these due to a lack of appropriate data.

Finally, it has not been possible to produce cost estimates in all sub-domains (see Table 4) for the entire population of interest, namely both at-risk and problem gamblers (these groups are also grouped and referred as harmful gamblers). Some evidence is only available for the latter group, such as criminal activity, unemployment benefits estimates or suicides. Table 4 shows each of the cost components and the population to which they apply.
Table 4. Estimation of costs produced by gambling-related harms by type of gambling population

<table>
<thead>
<tr>
<th>Type of harm</th>
<th>Sub-domain</th>
<th>Analysed population</th>
<th>At-risk gamblers</th>
<th>Problem gamblers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>Statutory homelessness</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Health</td>
<td>Deaths from suicides</td>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Alcohol dependence</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Illicit drug use</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Employment and</td>
<td>Unemployment benefits</td>
<td></td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criminal activity</td>
<td>Imprisonment</td>
<td></td>
<td>N/A</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: PHE analysis

Data inputs

For the health analysis, we only extracted parameter estimates of harms through the harms review, including odds ratios, probabilities and resource use. This was because we did not find longitudinal evidence on the other domains of harm from the PHE gambling-related harms evidence review. We sourced data on crime, statutory homelessness and employment use inputs from other studies found outside the harms review, specifically Thorley, and others (1). Appendix C provides a summary table of all the data inputs used in the analysis.

We got unit cost data from a range of sources, including:

- PHE’s own estimates of cost of illness
- NHS reference costs
- Personal Social Services Research Unit cost estimates for health and social care (24)
- Home Office’s economic and social costs of crime database (25)
- Greater Manchester Combined Authority Research Team database (previously named New Economy) for unemployment, statutory homelessness and more (26)

We provide details on each of the data inputs and their sources in each of the costing chapters.
2.3 Approach to estimating costs

The analysis mainly estimates direct costs that represent the diversion of resources towards the management of gambling in the different areas of analysis. For example, criminal activity is an estimate of the direct cost of imprisonment, which includes the costs to the criminal justice system. This is quantified by calculating the excess costs between a defined gambler risk group compared to the non-gambler population. The estimates represent costs associated with gambling, but it is not possible to say that these costs were caused by gambling. This is due to the limited evidence on harms in the population that are attributable to gambling, often referred to as attributable fractions for the population.

We also make estimates of the intangible costs of suicide associated with gambling. For example, intangible costs are those associated with loss of quality and length of life, expressed as quality-adjusted life years (QALYs) or as statistical life years (SLYs).

The following example shows the approach applied to estimating the excess cost of an individual with depression associated with gambling:

\[
\text{Cost of harm} = (N_G - N_P) \times C_1
\]

Where:
- \(N_G\) = estimated number of gamblers with depression
- \(N_P\) = estimated number of gamblers expected to have depression if had same rate of depression as the general population
- \(C_1\) = unit cost of an individual with depression

In this example, we estimate the cost of depression associated with gambling. We do this by calculating the difference between the number of gamblers implied to have depression (if they had the same rate of depression as the general population) with the associated prevalence estimate for each harm. We then assign a unit cost to this difference to estimate the total cost of the harm.
3. Financial harms

We have analysed the cost of financial harms of gambling from 2 perspectives:

1. The cost to the individual.
2. The direct costs to government to provide support to people who are homeless.

We discuss each perspective in turn.

3.1 Cost to the individual

The gross gambling yield (GGY) is the regulated net revenue (after payment of winnings) earned by gambling operators in Great Britain. We can interpret this as the amount of money gamblers have lost during a given year. For 2019 to 2020, the GGY was estimated to be £14.2 billion (27). As discussed in the methods section, this can be considered as a private transfer from individuals to the gambling industry. This transfer of money may or may not follow (in the case of a gambling addiction or disorder) a rational choice from people that gamble, of which there are estimated to be around 24 million in England (3).

For our sub-population of analysis, which is people at-risk and problematic gamblers (around 1.8 million in England), this expenditure may not follow a rational decision-making process given the addictive behaviour. Financial harms can take many different forms. In some extreme cases this can be a catastrophic event where the individual loses all wealth and livelihood. Indeed, financial harm associated with or caused by problem gambling may be one of the most obvious and prevalent harms.

People who gamble may experience an erosion of savings and financial resources together with a loss of extra money to spend on both luxury items (such as holidays and electronics) and non-luxury items (such as family outings, social activities or taking part in artistic, cultural, sporting or educational activities). In some instances, people who gamble may even lose the ability to meet basic needs, such as buying food, essential medications, clothing, housing, children’s educational requirements and transport costs. To continue funding their gambling activity, people may get into debt or finance it another way (like having a second job or selling properties). Also, people may lose the ability to meet expenditure with long-term consequences like opting out of a pension scheme (20).

Recent quantitative evidence concludes that gambling activity is associated with financial distress, lower financial inclusion, and poor or lack of financial planning. These results are derived from a random sample of 102,195 Lloyds Bank customers and their monthly transactions during 2018. The data consistently shows that higher gambling expenditure is associated with worse financial outcomes (4). For illustration, the analysis shows that a 10% increase in absolute gambling spend is associated with:
Gambling-related harms evidence review: the economic and social cost of harms

- an increase in payday loan uptake by 51.5%
- an increase in credit card use by 11.2%
- the likelihood of missing a mortgage payment by 97.5%

Also, higher gambling activity is associated with smaller spends on insurance and mortgage repayments, smaller total savings, and smaller pension contributions.

The analysis on Lloyds Bank transaction data included gambling transactions, such as offline and online bookmakers, casinos, lotteries, and other providers of gambling services (4). Cash transactions made in betting shops and transactions at other types of retailers (for example, a lottery ticket at the supermarket) are not captured. Among the customers that made at least one gambling transaction during the year (43% of the sample), the median number of transactions was 12 (mean was 56), with a median year spend of £125 (mean was £1,345). This is about a median of 0.5% of monthly spending (mean of 4%). The difference between the median and the mean shows that the distribution is highly skewed to the right: the top 10% of gamblers spend over £1,800 on gambling in the calendar year, close to 8% of their total spending. The regression analysis controls for age, gender and annual income. It does not include either co-morbidity data or PGSI scores, so we cannot tell if at-risk or problem gamblers were included in the sample, an important limitation in this costing exercise for our purposes (4). Even so, the study was a significant first attempt to understand the relationship between gambling and individual outcomes on a larger scale using UK data.

The latest statistics from a study undertaken by GambleAware (28) show that out of a sample of 6,900 people:

- 71% had debts due to gambling (with the remaining 29% not reporting any gambling debt at that time)
- 26% had debts up to £5,000 related to gambling
- 45% had debts over £5,000, were bankrupt or in an Individual Voluntary Arrangement (a special arrangement to pay back debts)

The data is not presented by PGSI scores but according to the report most of these gamblers (who at the time of the analysis were treated within gambling services) were screened as problem-gamblers (having a PGSI score of 8 and over). The data also shows that gamblers reported spending a median of £1,000 and a mean of £2,102 on gambling in the previous 30 days before assessment. This is a considerable amount of resource dedicated to gambling and these average spend figures are very different to the ones reported in Muggleton, and others, (4), as mentioned above (median year spend of £125 and mean of £1,345). However, caution is needed when comparing such figures as the populations are not the same across different analyses.

PHE’s gambling-related harms evidence review has identified one quantitative study providing evidence on financial harms (29). The study examines whether changes in the number of
electronic gaming machine (EGM) venues in a given local area are associated with changes in
the rates of serious financial problems. However, we considered that the outcomes of the
analysis are not particularly relevant here as the study does not report the absolute effect, only
the marginal effect of one extra venue in a local area of Australia.

The structured literature review did not identify the UK or England estimates of the likelihood of
a gambler (identified by their PGSI score) experiencing financial harms compared to a no-
gambler, or financial harms experienced by different groups of at-risk gamblers. Some studies,
for example Wardle, and others (8), have considered costing bankruptcies and increased use
of debt services. However, it has not been possible to identify published data to estimate the
rates of bankruptcies and use of debt services for people who experience whatever risk of
gambling activity compared with the general adult population in England.

The limited evidence available meant that no costing analysis was possible for financial harms
to the individual.

For future work in this area, it would be desirable to produce causal evidence, for a
representative sample in England, of the impact of gambling activity by at-risk and problem
gamblers on financial outcomes. The research should also mainly avoid looking at expenditure
or consumption (opportunity cost of gambling expenditure) and debt.

3.2 Homelessness cost to government

Introduction

The longitudinal relationship between gambling and homelessness is under researched.
Separately, both are public health concerns but concurrently, evidence on gambling
contributing to the risk of homelessness remains scarce given the complexity in strongly
establishing causation.

Sharman, and others (30), conducted the first quantitative study in this area in the UK to
improve the evidence base to understand this relationship. They used a cross-sectional design
to measure levels of gambling involvement in people accessing housing services in
Westminster, London. The study assessed gambling diagnosis using the PGSI and included
shelters, hostels and day centres. It found that of the homeless population, 8.3% were low-risk
gamblers, 3.3% were moderate gamblers, 11.6% were problem gamblers and 76.8% registered
no risk of harmful gambling. For comparison, in the general population in England, 2.7% are
low-risk gamblers, 0.8% are moderate-risk gamblers, and 0.4% are problem gamblers (3).
This indicates a higher rate of problem gambling in a service-accessing homeless population
compared to the general adult population. The gambling population comprised of more men
(41%) than women (22%) at all risk levels, where gender could be identified. This evidence
represents the largest cohort of gamblers in homeless services analysed to date, using a
sample of 456 people.
Sharman, and others (31), have continued to advance this work by researching the longitudinal relationship between gambling and homelessness. In a sample of 72 participants from homeless centres in Westminster, London, they explored the proportion of gamblers who experienced a problem with gambling before entering homelessness services. Findings showed 61.5% of at-risk gamblers and 82.4% of problem gamblers experienced gambling before they became homeless. This study provides evidence on the positive correlation between harmful gambling and homelessness.

Methodology

In general, our analysis updates the approach taken by Thorley, and others (1). But it uses calculated attribution rates to consider the possible causal relationship between the proportion of gamblers in statutory homeless services who experienced at-risk or problem gambling before becoming homeless (30, 31).

Data inputs

The analysis draws on several parameters:

1. The age-standardised prevalence of people experiencing at-risk and problem gambling (3).
2. The percentage of people in homeless services who report gambling, using the calculated positive association between gambling and access of homeless services from Sharman, and others (30, 31).
3. The number of successful statutory homeless applications under the prevention duty recorded by the Ministry of Housing, Communities and Local Government (MHCLG), equivalent to 148,670 in 2019 (32).
4. The mid-year estimate for the number of households in England from the Office for National Statistics (ONS), reported at 23,385,139 in 2019 (33).

We sourced the annual cost per statutory homeless application from the Greater Manchester Combined Authority (GMCA) unit cost database (26), whose unit costs are based on a report published by Shelter (34). Annual costs refer to one-off homelessness applications and ongoing costs, which include:

- the cost of a court desk scheme (the amount paid by the Legal Services Commission per case handled by a court desk service)
- an application decision
- 4 weeks in temporary accommodation
- administration costs of a new letting

We realise that the landscape for homeless support services has changed considerably over the decade and average time in temporary accommodation within a year may be longer than 4
weeks. The reported annual cost per case has been uprated using the HMT GDP deflator (18) and equates to £2,929 in 2019 to 2020 prices.

Calculations

We used the percentage of people in homeless services who report gambling to estimate the odds ratios between the prevalence of at-risk (low-risk and moderate-risk) and problem gamblers who experience homelessness and use homeless services in Westminster, London compared to the English population. We assumed that the proportion of gamblers accessing 3 housing services in London can be scaled-up to the rest of England. This results in increased odds of accessing homelessness services of 1.49 for low-risk gamblers, 1.71 for moderate-risk gamblers and 15.96 for problem gamblers. The source research study reported that people who were gamblers in the homeless service were predominantly men (246 men and 18 women). To adjust for gender differences, we used the prevalence rate for male at-risk and problem gamblers instead of the gambling prevalence for the whole population.

The analysis compares the number of successful statutory homeless applications with the ONS mid-year estimate of the number of households in England (33) to calculate the number of statutory homeless applications per household across the year. This is equivalent to 0.006 applications per household on average in 2019. Multiplying this by the calculated odds ratios produces an estimate of the number of expected applications per gambler household by type of gambler (low-risk 0.009, moderate-risk 0.011 and problem gambler 0.101). The resulting excess number of statutory homeless applications per household is multiplied by the central gambling prevalence figures for at-risk and problem gamblers (including 95% confidence intervals (CI)), to estimate the number of statutory homeless applications in 2019 associated with harmful gambling only (21,438; 95% CI 14,005 and 28,871). We use these estimates in the calculations that lead to the results in Table 5 below.

The direct cost is then calculated by multiplying the annual cost per application to the number of excess statutory homeless applications.

Results

Table 5 below presents the results of the excess direct costs of homelessness associated with harmful gambling. The estimate of 21,438 (95% CI 14,005 and 28,871) excess statutory homeless applications associated with at-risk and problem gambling in England equates to £62.8 million (95% CI £41.0 million and £84.6 million) in 2019 to 2020 prices.
Table 5. Excess cost of homeless services associated with at-risk and problem gambling

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of statutory homelessness applications(^a)</td>
<td>11,184</td>
<td>8,683–13,686</td>
</tr>
<tr>
<td>All at-risk and problem gamblers expected to have applications</td>
<td>32,623</td>
<td>22,688–42,557</td>
</tr>
<tr>
<td>Excess homelessness applications associated with gambling</td>
<td>21,438</td>
<td>14,005–28,871</td>
</tr>
<tr>
<td><strong>Excess direct costs (£ millions)</strong></td>
<td>62.8</td>
<td>41.0–84.6</td>
</tr>
</tbody>
</table>

Notes:
\(^a\) indicates at-risk and problem gamblers (men only)
Figures may not sum due to independent rounding

Limitations

The analysis has several limitations. First, the analysis is limited to costing the associations between gambling and statutory homeless applications only. It does not analyse or cost the association between people who sleep rough who are harmful gamblers. We recommend further consultation with experts working in the homelessness and rough sleeping field. This is because we need to improve data collection and to develop a more robust methodology to analyse a larger sample of the homeless population who are vulnerable to gambling.

Second, we assumed that the proportion of gamblers accessing 3 housing services in London can be scaled-up to the rest of England. Experts acknowledge that this is a crude assumption since the London sample will not be representative of the English population accessing services, not least because of the variation in homeless support services across the country.

Third, the sample of people analysed is more representative of men accessing homeless services, meaning there are further limitations to generalising the findings from Sharman, and others (30, 31), to the broader population. Nevertheless, this remains the best evidence available.
4. Health harms

Gambling has the potential to affect all areas of health, mental health, happiness and wellbeing, affecting individuals, families, the economy and wider society. There are some international studies indicating that gambling problems are associated with poorer health (11, 35).

Cowlishaw and Kessler (35) conclude that there is a disproportionate burden of gamblers using healthcare services but they were unable to infer causality. They found that problem gambling has likely implications for mental health but given the complexity of the relationship they could not “infer mechanisms that underlie cross-sectional associations”.

To address this issue, further research has analysed results taken from longitudinal studies on gamblers and health, which strengthen the associations of these relationships (36 to 38). The studies identified associations with suicides, depression, drug and alcohol use for gamblers compared to non-gamblers in the UK and countries that could be generalised to the English population. We sourced evidence from OECD countries that we deemed to be of high quality with a low-to-moderate risk of bias.

We applied odds ratios from these studies to English gambling prevalence data, where an odds ratio greater than 1.0 indicates an increase in odds of an event among gamblers compared to non-gamblers and non-problem gamblers. Odds ratios can report an inflated likelihood of an event occurring, when prevalence is high (above 10%), compared to relative risk ratio. However, due to data limitations, we did not calculate risk-ratios in this analysis. We used the odds ratios from the identified studies as a measure of strength of association between the exposure and the outcome (39). As gambling prevalence is lower than the 10% threshold (2.7% are low-risk gamblers, 0.8% are moderate-risk gamblers and 0.4% are problem gamblers), both odds ratios and relative-risk ratios are considered to have similar magnitude. For suicides, we used standardised mortality ratios (SMR), as this is the main data metric available.

The estimated health and healthcare costs associated with gambling include:

- suicides
- treatment of depression
- treatment of alcohol dependence
- treatment of illicit drug use

We discuss each of these elements in turn.
4.1. Suicides

Introduction

In 2019, the suicide rate in England was 10.8 deaths per 100,000 population (5,316 deaths) and men accounted for around three-quarters of suicide deaths registered (42), and similar trends remained in 2020.

There is a growing evidence base analysing the relationship between gambling and suicides but studies within this area for England are scarce. However, there is no official data or registries reporting the number of suicides associated with or caused by gambling in England, so we need to use alternative sources identified through PHE’s gambling-related harms evidence review for our analysis.

Gambling with Lives estimates deaths related to gambling between 250 and 650 every year in the UK, a minimum of one every working day, representing between 4% to 11% of total suicides. These estimates are based on some of the same sources we use for our analysis identified in the gambling-related harms evidence review as discussed below.

Wardle, and others (40, 41), examined the data available to assess this association in England in more detail. The results showed that 1 in 20 problem gamblers had made a suicide attempt in the past year. They also showed that problem gamblers were significantly associated with lifetime suicide attempts, reporting an increase in odds of 3.3 compared to non-gamblers. The results from this study are the first to analyse the lifetime association between suicide attempts comparing people with and without problem gambling behaviours. The analysis is limited to using the 2007 Adult Psychiatric Morbidity Survey and does not conclude causation between gambling and suicidality.

Karlsson, and others (36), explored the relationship between suicide rates and gambling disorder compared to the general population in Sweden. They used a large sample of 2,099 individuals followed up between 2006 and 2016. They found that problem gamblers were 19.3 times and 9.6 times more likely to die by suicide compared to the general population in younger (20 to 49 years) and older (50 to 74 years) age groups, respectively. The increased risk factor associated with gambling was also consistent for men in younger and older age groups. No statistically significant result was found for women.

When comparing these 2 studies, the results across both support the association between suicidal behaviours (deaths and attempts) with problem gambling. However, when making comparisons by gender, the evidence from Karlsson, and others (36), better fits the latest data
available on gambling prevalence and suicide rates in England. This is because the gambling prevalence data for England shows that men are more likely to be problem gamblers than women (about 179,700 men compared to 24,500 women (3)) \(^1\). And from ONS data on suicides, men have a higher age-standardised suicide rate than women (men 16.7 compared to 5.2 women, rate per 100,000 people (42)). Furthermore, Karlsson, and others (36), use the PGSI to identify problem gamblers whereas Wardle, and others (40, 41), use the DSM-IV instrument.

In 2018, the prevalence of problem gambling in Sweden was equivalent to 0.6% (43) and is similar to the prevalence in England (0.4%). Given this, and the outcome of interest is death from suicide associated with gambling, the analysis of suicides presented here draws upon the evidence from Karlsson, and others (36).

**Methodology**

**Data inputs**

The analysis makes use of several parameters from the literature and routinely collected datasets:

1. Age-standardised prevalence of people experiencing problem gambling.
2. Directly standardised mortality ratios (SMRs) estimated from Karlsson, and others (36), for all persons as well as disaggregated by age and gender for Sweden.
3. Rate of suicide deaths per 100,000 people by the ONS, disaggregated by gender and 5-year age bands for all persons in England and 20-year age bands for men in England and Wales (42).
4. National life expectancy tables published by the ONS (44).
5. The proportion of a statistical life year in full health, equivalent to 94.9% (45).
6. Unit cost of £60,000 per statistical life year from the HMT Green Book (46).
7. The discount rate for health of 1.5%, declining to approximately 1.3% after 30 years from the HMT Green Book (46).

**Calculations**

The ONS age-standardised suicide rates for 2019 (42) are multiplied by the prevalence of problem gambling in the general adult population (0.4%, sourced from the HSE (3)) to first estimate the number of gamblers who died by suicide in England for all persons (25; 95% CI 14 and 44). Multiplying this figure by the age-standardised SMRs (sourced from Karlsson, and others (36)), produces an estimate of the expected number of suicides (434; 95% CI 257 and 746). Calculating the difference between these figures results in the estimated number of deaths by suicide associated with problem gambling only (409; 95% CI 242 and 702).

\(^1\) Counts by persons will not sum due to rounding.
The intangible cost is then calculated by multiplying the number of excess deaths by suicide by the intangible unit cost. To calculate the intangible unit cost, additional model parameters are required. These are:

1. The estimated number of years of life lost (YLL), which is the difference between average life expectancy and the average age of death by suicide by sex.
2. The proportion of a life year in full health.
3. The unit cost of a statistical life year.

Given the lack of data to assume otherwise, we assume that the average age of a death by suicide associated with gambling is equivalent to the average age of death by suicide in the general adult population. We used ONS life tables to calculate the number of life years lost due to death by suicide (44). ONS data shows men aged 45 to 49 years had the highest age-specific suicide rate (25.5 deaths per 100,000 men). The median value of this range, 47 years, is used as a proxy of the average age of suicide for men. For women, ONS data shows that the 50 to 54 years age group had the highest age-specific suicide rate (7.4 deaths per 100,000). We used the median value of this range, 52 years, as a proxy of the average age of death by suicide for women. According to ONS life tables, the life expectancy for males aged 47 is 34.22 years and women aged 52 have a life expectancy of 32.62 years. The average YLL for both sexes (34.22 and 32.63) is equivalent to 33.42 years, which we interpret as the number of life years lost for all persons.

Literature suggests that it is incorrect to assume that an individual with no specific health condition is in excellent health. This is because they may have other health conditions out of scope for analysis, which would inflate the health benefits calculated (45, 47). To remain conservative when valuing life years lost, we used published health state utility values (see glossary) for the general adult population with no health conditions as our baseline. With one life year assumed to equal 94.9% in full health (45), it is estimated that 31.73 life years lost in full health per individual. Multiplying this figure by the 409 deaths by suicide associated with problem gambling only, results in an estimated 12,978 life years lost for all people.

Multiplying a unit cost of £60,000 per statistical life year (46) by the number of healthy YLL produces an estimate of the intangible unit cost (£1.9 million). This unit cost of £60,000 is often referred to as the ‘human cost’ element by the Department for Transport in their approach to valuing the average cost of a fatality (48). The intangible cost represents the willingness-to-pay to avoid the pain, grief and suffering associated with a fatality.

The intangible unit cost for the first 30 YLL for an individual is multiplied by a discount rate of 1.5% to convert future costs into present values, and we use a declining rate of 1.29% for the 3.42 YLL beyond 30 years. (49). This produces a discounted intangible unit cost of one suicide equivalent to £1.51 million. The discounted intangible unit cost is multiplied by the excess number of deaths from suicide to yield the excess intangible cost of death from suicide associated with problem gambling.
Results

Table 6 presents the results of the estimated number of suicides associated with problem gambling only in England in 2019 to 2020 prices. The estimate of 409 (95% CI 242 and 702) suicides associated with problem gambling only results in a cost of £619.2 million (95% CI £366.6 million and £1.1 billion). The estimated 409 suicides figure falls within the range of 250 to 650 suicides related to gambling estimated by Gambling with Lives, as reported earlier in this section.

Table 6. Excess cost of suicides associated with problem gambling

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Estimate of the number of suicides in problem gamblers based on the suicide rate of the general population</td>
<td>25</td>
<td>14–44</td>
</tr>
<tr>
<td>B. Estimate of the number of suicides in problem gamblers based on the research estimate for problem gamblers</td>
<td>434</td>
<td>257–746</td>
</tr>
<tr>
<td>C. Estimate of the number of suicides associated with problem gambling only (B minus A)</td>
<td>409</td>
<td>242–702</td>
</tr>
<tr>
<td><strong>Excess intangible costs</strong>&lt;sup&gt;a&lt;/sup&gt; (£ millions)</td>
<td><strong>619.2</strong></td>
<td><strong>366.6–1,062.8</strong></td>
</tr>
</tbody>
</table>

Notes:
<sup>a</sup>willingness-to-pay to avoid a fatality.
Figures may not sum due to independent rounding.

Limitations

We acknowledge that applying the Swedish SMR figures to the English gambling population is a possible limitation of this analysis. For example, Karlsson, and others (36), report the median age of suicide death in Sweden is 32.5 years compared to 47 years in England. This means the results from the Swedish population appear to have a greater concentration of suicides among younger people, so the costs presented here are potentially an underestimate. Nevertheless, as already noted, there are similarities between the prevalence of problem gambling between the 2 countries (0.6% of the Swedish population and 0.4% of the English population respectively).

We recommend that future research builds-on the published work by Wardle, and others (40, 41), on suicide attempts to analyse the number of deaths by suicide linked to gambling in England. This research could potentially use ONS mortality datasets and NHS Digital’s Hospital Episode Statistics.
4.2. Depression

Introduction

PHE’s gambling-related harms evidence review identified 2 longitudinal cohort studies (37, 38) providing evidence on the association between gambling and depression with statistically significant results.

Afifi, and others (37), followed up a random sample of young adults aged 18 to 20 in Canada for 5 years and surveyed at 4 timepoints (up to the age of 25 years). This was to examine whether gambling over the previous year was significantly associated with the incidence of mental health conditions. The study identified at-risk or problem gambling using the PGSI and measured mental health conditions using the Composite International Diagnostic Interview – Short Form instrument. Results showed that gambling was associated with increased odds of major depressive disorder (adjusted odds ratio (AOR) 1.98, 95% CI 1.14 and 3.44), with the odds ratio adjusted for sociodemographic variables. General anxiety disorder and obsessive-compulsive disorder, when analysed separately, had no statistically significant adjusted odds ratio in the past 12 months.2

Emond, and others (38), conducted a longitudinal prospective study of gambling in late adolescence and early adulthood in England. The analysis used the Avon Longitudinal Study for Parents and Children cohort in England which followed-up children born in the nineties and collected information over 25 years across 70 time points. This was to measure the progression of gambling behaviour and associated consequences. The study identified at-risk and problem gambling using the PGSI and measured depression using the Computerised Interview Schedule – Revised (CIS-R) assessment tool. Results found that moderate risk or problem gambling behaviour at age 20 was significantly associated with depression at aged 24 years for a small minority of people, reporting an odds ratio of 2.29 (95% CI 1.28 and 4.12).

We used the evidence base from Afifi, and others (37), to estimate the cost of the association between gambling and depression given that this study reported results for a broader population of harmful gamblers.

2 ‘Any mental health condition’ was also found statistically significant. This groups together depression, general anxiety disorder and obsessive-compulsive disorder. Given depression appears to be the main condition behind this result, this analysis identifies the cost of depression associated with gambling only.
**Methodology**

**Data inputs**

The analysis draws on several parameters from the literature and published datasets:

1. The age-standardised prevalence of people experiencing at-risk and problem gambling (3).
2. The prevalence of depression in the adult population published by NHS digital, reported at 11.6% in 2019 (50).
3. The association between gambling and depression from a longitudinal study in Canada (37).

We sourced the annual direct cost of depression from a study by Public Health England (51). The cost includes primary care (GP time), secondary care and prescription costs. It also refers to the total healthcare costs of an individual suffering from depression, so not just the cost of treating their depression. In 2015 to 2016, this was estimated at £1,392 for men and £1,686 for women. We have updated all unit costs to 2019 to 2020 prices using the HMT GDP deflator (18).

**Calculations**

NHS Digital’s Quality and Outcomes Framework (QOF) prevalence rate for depression is multiplied by the central prevalence figures for at-risk and problem gamblers. This will estimate the number of gamblers with depression in the general adult population (216,848; 95% CI 144,118 and 339,512). Multiplying these figures by the research estimate of association between gambling and depression (adjusted-OR 1.98 (37)) produces the number of at-risk and problem gamblers expected to have depression (429,358, 95% CI 285,354 and 672,234). The difference, \( N_G - N_P \), between these figures produces an estimate of the number of people with depression associated with at-risk and problem gambling only (212,511; 95% CI 141,236 and 332,722), as shown in the following formula:

\[
\text{Cost of harm} = (N_G - N_P) \times C_1
\]

Where:

- \( N_G \) = estimated number of gamblers with depression
- \( N_P \) = estimated number of gamblers with depression if had same rate of depression as the general population
- \( C_1 \) = unit cost of an individual with depression

The annual cost per case for an individual with depression, \( C_1 \), (51) is multiplied by the respective number of people with depression to estimate the excess cost of depression associated with gambling.
Results

In England, the estimate of 212,511 people (95% CI 141,236 and 332,722) with depression associated with at-risk and problem gambling only is equivalent to £335.5 million (95% CI £221.7 million and £529.6 million) in 2019 to 2020 prices. Table 7 presents the results.

Table 7. Excess cost of depression associated with gambling

<table>
<thead>
<tr>
<th>A. Estimate of the number of at-risk and problem gamblers who have depression based on the prevalence of depression in the general population</th>
<th>Estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>216,848</td>
<td>144,118–339,512</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Estimate of the number of at-risk and problem gamblers expected to have depression based on the research estimate of at-risk and problem gamblers</th>
<th>Estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>429,358</td>
<td>285,354–672,234</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. Estimate of the number of people with depression associated with at-risk and problem gambling only (B minus A)</th>
<th>Estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>212,511</td>
<td>141,236–332,722</td>
<td></td>
</tr>
</tbody>
</table>

Excess direct costs (£ millions) | 335.5 | 221.7-529.6 |

Note: Figures may not sum due to independent rounding.

Limitations

Despite the strengths of the evidence used in the analysis (37), the evidence is for a small cohort of adults aged 18 to 20 for Canada and applied to adults in England.

Furthermore, the adjusted odds ratio for depression presented in the report grouped at-risk and problem gamblers together, meaning the analysis does not differentiate the level of harm between at-risk and problem gamblers. We would expect to see varying levels of risk between types of gambler, given that low-risk gamblers, for example, are likely to experience fewer or no negative consequences from their gambling activity (52).

We recommend that analysis exploring the causal relationship between gambling and depression continues but uses a larger sample of people with depression who are vulnerable to gambling. This will produce results that can be differentiated by level of gambling risk (low-risk, moderate-risk and problem gambler).

4.3. Alcohol dependence

Introduction

PHE’s gambling-related harms evidence review identified one longitudinal cohort study that reported a statistically significant association between gambling and alcohol dependence (37).
The longitudinal analysis by Afifi, and others (37), compared the interaction between gambling over the previous year and alcohol dependence in Canada. The study identified at-risk or problem gambling using the PGSI and measured alcohol use using the Alcohol Dependence Scale. Results showed that gambling increased the odds of alcohol dependence 2.2 times (95% CI 1.17 and 4.13) in adults aged 18 to 20, where the odds ratio was adjusted for sociodemographic variables. We considered that the evidence from this study could be generalised to the English context, given the OECD report showing that alcohol consumption is broadly comparable between the UK (9.8 litres per capita) and Canada (8.2 litres per capita).

Methodology

Data inputs

The analysis uses several parameters from the literature and nationally published datasets:

1. The age-standardised prevalence of people experiencing at-risk and problem gambling (3).
2. The prevalence of alcohol dependence for adults in England from PHE’s alcohol dependence prevalence estimates (53). This reported that 587,000 individuals were alcohol-dependent in 2017 to 2018 and the alcohol dependence prevalence rate was 1.34 per 100 of the adult population.
3. The association between gambling and alcohol dependence from a longitudinal study in Canada (37).
4. The number of people in community treatment for alcohol dependence published by the National Drug Treatment Monitoring System (NDTMS) at PHE. This was about 75,500 people (54). When comparing the number in treatment to the number of alcohol-dependent individuals, it is estimated that 13% were in community treatment in 2017 to 2018.

Community alcohol treatment is funded by local authorities through the public health grant. We combined datasets on local authority reported expenditure on substance misuse treatment published by MHCLG with data provided by NDTMS on total days in community treatment. This gave us the annual cost per individual receiving alcohol treatment, estimated at £1,200 (54 to 56). We uprated unit costs to 2019 to 2020 prices using the GDP deflator (18). The analysis does not consider the costs of NHS treatment.

Calculations

Given the lack of available data, we assumed that the alcohol dependent prevalence rate is constant across all age groups. We multiplied the central prevalence of at-risk or problem gamblers by the alcohol dependent prevalence rate to estimate the number of gamblers who

---

3 The OECD define alcohol consumption as the annual sales of pure alcohol in litres per person and is measured in litres per capita (people aged 15 years or older).
are alcohol dependent in England (23,594; 95% CI 18,316 and 28,871). Multiplying this figure by the research estimate of the increased odds of gamblers being alcohol dependent (adjusted-OR 2.2, (37)) produces the expected number of at-risk and problem gamblers who are alcohol dependent (51,906; 95% CI 40,296 and 63,515). Calculating the difference between these figures produces an estimate of the number of people with alcohol dependence associated with at-risk and problem gambling only (28,312; 95% CI 21,980 and 34,645).

We considered the costs to the alcohol treatment sector only to avoid double-counting with other areas of this report which have calculated direct or intangible costs associated with gambling. This involves estimating the number of alcohol-dependent individuals in community treatment. Multiplying the 28,312 excess individuals with alcohol dependence associated with at-risk and problem gambling by the 13% of people calculated to be in community alcohol treatment, nationally, produces an estimate of 3,646 people (95% CI 2,830 and 4,461).

The estimated number of at-risk and problem gamblers in alcohol treatment is multiplied by the calculated unit cost of alcohol treatment to estimate the excess direct cost of people in treatment associated with gambling.

**Results**

The analysis estimates 28,312 people (95% CI 21,980 and 34,645) have alcohol dependence associated with at-risk and problem gamblers, and of these, it’s estimated that 3,646 (95% CI 2,830 and 4,461) receive alcohol treatment in England. This equates to £4.7 million (95% CI £3.6 million and £5.7 million) in 2019 to 2020 prices. Table 8 presents the results.

**Table 8. Excess cost of alcohol dependence associated with gambling**

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Estimate of the number of alcohol dependent at-risk and problem gamblers based on the alcohol dependent prevalence of the general population</td>
<td>23,594</td>
<td>18,316–28,871</td>
</tr>
<tr>
<td>B. Estimate of the number of alcohol dependent at-risk and problem gamblers based on the research estimate for at-risk and problem gamblers</td>
<td>51,906</td>
<td>40,296–63,515</td>
</tr>
<tr>
<td>C. Estimate of the number of alcohol dependent people associated with at-risk and problem gambling only (B minus A)</td>
<td>28,312</td>
<td>21,980–34,645</td>
</tr>
<tr>
<td>D. Estimate of the number of alcohol dependent people in treatment associated with at-risk and problem gambling only</td>
<td>3,646</td>
<td>2,830–4,461</td>
</tr>
<tr>
<td>Excess direct costs (£ millions)</td>
<td>4.7</td>
<td>3.6–5.7</td>
</tr>
</tbody>
</table>

Note: Figures may not sum due to independent rounding.
Limitations

The analysis has several limitations. First, the results reported by Afifi, and others (37), show an increased risk for at-risk and problem gamblers, where gambling severity was grouped by at-risk and problem gamblers due to a lack of meaningful difference between type of gambler. This is similar to the finding above for depression, and it means our analysis cannot differentiate the risk of gambling associated with alcohol dependence by type of gambler.

Second, given the limited data on the number of people in the general adult population who are alcohol-dependent by age, we assume that the prevalence rate is equal across all age groups.

Third, the analysis assumes that a gambler who is alcohol-dependent has the same behavioural characteristics as other alcohol-dependent individuals. We use NDTMS data on the proportion of the prevalent alcohol-dependent individuals who are in community treatment and apply this to the excess number of prevalent alcohol-dependent individuals associated with gambling.

The analysis includes only direct costs of community alcohol treatment. This is a conservative assumption as there are also other additional costs associated with alcohol-dependent individuals (57). For example, the indirect costs associated with crime or lost productivity. We explore a broader perspective to cost alcohol dependence in the sensitivity analysis (see Discussion).

We recommend further consultation with experts working in addictions to develop a more robust methodology to explore the causal relationship between gambling and alcohol dependence. This methodology could use a larger sample of people with alcohol dependence who are vulnerable to gambling to produce results that can be differentiated by level of gambling risk (low-risk, moderate-risk and problem gambler).

4.4. Illicit drug use

Introduction

PHE’s gambling-related harms evidence review identified one longitudinal prospective study addressing the relationship between gambling and drug use. The longitudinal analysis by Emond, and others (38), explored the progression of gambling behaviour and associated consequences over time. It used the Avon Longitudinal Study for Parents and Children cohort in England, which collected over 25 years’ worth of data across 70 time points. They identified low-risk and moderate-risk or problem gambling using the PGSI. Results found that a small minority of young adults aged 17 to 24 had a low-risk, moderate-risk or problem gambling
behaviour associated with subsequent harmful drug use. The adjusted odds ratio for illicit drug use indicated 1.49 (95% CI 1.07 and 2.06) times increase for younger adults (aged 17 to 24) who were low-risk gamblers and a 1.95 (95% CI 1.06 and 3.61) times increase for younger adults (aged 17 to 24) who were moderate-risk or problem gamblers.

Methodology

Data inputs

The analysis uses several inputs sourced from the literature to quantify harms and routinely published datasets on prevalence:

1. Age-standardised prevalence of at-risk and problem gamblers (3).
2. The research estimate of association between gambling and illicit drug use among people aged 17 to 24 years in a longitudinal study in England by Emond, and others, (38). They report an AOR of 1.49 among low-risk gamblers and an AOR of 1.95 for moderate-risk or problem gamblers.
3. The national prevalence rate of people who use illicit opiates and/or crack cocaine (or opiate and crack cocaine users (OCUs)) published by PHE. This reported 314,000 OCUs in 2016 to 2017 and prevalence rates per 1,000 of the adult population disaggregated by 3 age bands: 15 to 24 years, 25 to 34 years and 35 to 64 years (58).

Given that the evidence from Emond, and others (38), reports on younger adults aged 17 to 24, the analysis uses the OCU prevalence rate for 15 to 24 years only, equivalent to 4.62 per 1,000 people. PHE reports data on the national average number of OCUs not in community treatment on its Health Profiles database (59), estimated at 52.1%. From this, 47.9% of people are calculated to be in community treatment.

Like alcohol treatment, community drug treatment is also funded by local authorities through the public health grant. MHCLG publishes data on local authority annual reported expenditure on adult drug treatment (55). Activity data on the total number of days in treatment are provided by NDTMS (54). We have used these datasets to calculate the average cost per person in drug treatment in a given year, estimated at £2,700 (56). We uprated unit costs to 2019 to 2020 prices using the GDP deflator (18). The analysis does not consider the costs of NHS treatment.

Calculations

We multiplied the central prevalence of low-risk and moderate-risk or problem gamblers by the national OCU prevalence figures to estimate the number of gamblers who are illicit drug users by age in the general population (2,330; 95% CI 1,777 and 3,140). Multiplying these figures by

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4 This study defines illicit drug use as cocaine, crack and other drugs so we use data on opiate and/or crack cocaine users (OCU) published by the NDTMS for our analysis.
the increased odds of illicit drug use (AOR 1.95) from Emond, and others (38), produces the expected number of gamblers with OCU dependence (3,817; 95% CI 2,882 and 5,213). The difference between these figures produces an estimate of the number of people with OCU dependence associated with at-risk and problem gambling only (1,487; 95% CI 1,105 and 2,074).

Using the same approach to costing alcohol dependence, we took the approach to monetising the number of illicit drug users associated with gambling from the community treatment perspective. Given the available evidence that 47.9% of OCUs receive drug treatment, it is estimated that 712 people (95% CI 529 and 993) are in community drug treatment associated with gambling.

This figure is multiplied by the calculated unit cost of drug treatment to estimate the excess direct cost of people in treatment associated with gambling.

**Results**

The analysis estimates that 1,487 people (95% CI 1,105 and 2,074) aged 17 to 24 use illicit drugs associated with at-risk and problem gambling in England. Of these, it’s estimated that 712 (95% CI 529 and 993) receive community drug treatment. This equates to £2.0 million (95% CI £1.4 million and £2.7 million) in 2019 to 2020 prices. Table 9 presents the results.

**Table 9. Excess cost of illicit drug use associated with gambling**

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Estimate of the number of illicit drug users who are at-risk and problem gamblers based on the OCU prevalence of the general population</td>
<td>2,330</td>
<td>1,777–3,140</td>
</tr>
<tr>
<td>B. Estimate of the number of illicit drug users who are at-risk and problem gamblers based on the research estimate for at-risk and problem gamblers</td>
<td>3,817</td>
<td>2,882–5,213</td>
</tr>
<tr>
<td>C. Estimate of the number of illicit drug users associated with at-risk and problem gambling only (B minus A)</td>
<td>1,487</td>
<td>1,105–2,074</td>
</tr>
<tr>
<td>D. Estimate of the number of illicit drug users in treatment associated with at-risk and problem gambling only</td>
<td>712</td>
<td>529–993</td>
</tr>
<tr>
<td><strong>Excess direct costs (£ millions)</strong></td>
<td>2.0</td>
<td>1.4-2.7</td>
</tr>
</tbody>
</table>

Note: Figures may not sum due to independent rounding.

**Limitations**

The results present only a partial picture of the total cost, given that the increased odds of illicit drug use reported is for a cohort of adults aged 17 to 24 only. In England, the NDTMS reports higher opiate and/or crack cocaine use prevalence numbers in older age groups. So, we can
expect the cost to be significantly higher if the evidence allowed us to analyse a wider cohort (58).

The analysis makes several assumptions. First, we assumed that a gambler who uses opiates and/or crack cocaine has the same behavioural characteristics as a drug user who is a non-gambler. We use NDTMS data on the proportion of the prevalent OCUs who are in treatment and apply this to the excess number of prevalent illicit drug users associated with gambling.

Second, the analysis includes direct costs of drug treatment. This is a conservative assumption as there are additional direct, indirect and intangible costs associated with individuals who use opiates and/or crack cocaine (60). For example, the direct costs of crime or the indirect costs of lost productivity. We explore a broader perspective to costing illicit drug use in the sensitivity analysis (see Discussion).

We recommend further consultation with experts working in addictions to develop a more robust methodology to explore the causal relationship between gambling and illicit drug use. The methodology could use a larger and broader sample of people with drug dependence who are vulnerable to gambling.

4.5. Quality of life

There is growing evidence showing an association between at-risk and problem gambling with reduced quality of life (QoL) (10, 11, 61). Quality of life can be captured through different measures and is used to calculate quality-adjusted life years (QALYs). This is a summary metric that takes account of the number of years lived adjusted by the QoL experienced in particular health states. For example, it is not the same to live an additional 20 years in full health or with minor health conditions than to live these 20 years with a chronic health condition. In England, the National Institute for Health and Care Excellence (NICE) uses QALYs when evaluating the cost-effectiveness of health technologies to be funded by the NHS.

It is reasonable to assume that a person experiencing depression or other mental health conditions associated with gambling addiction could experience a deterioration in their quality of life if the condition is not addressed. The evidence on QoL for gamblers in England is scarce given the limited number of economic evaluations on health-related interventions to prevent gambling (2, 9). The international evidence base is slightly more developed (10, 11, 61).

There is emerging evidence from the 2018 HSE (3) on quality of life. This uses the EQ-5D-5L instrument, a generic instrument used to measure health, as its QoL measure for at-risk gamblers and problematic gamblers. It captures all 5 dimensions for gambling but only one domain of EQ-5D. That domain is mental health, which is particularly relevant to gambling. This suggests the EQ-5D instrument may not have much sensitivity to fully capture the impact that harmful gambling has on a person’s quality of life. To our knowledge, there is no data available
on the duration an individual has been in that specific health state for. So, this instrument will only give a partial measure of QoL relating to gambling-related harm.

Given these limitations to calculating QALYs lost for at-risk and problem gamblers in England, we do not consider QALYs in this report. But we have completed analysis on the intangible cost element of death from suicide.

For future work, we recommend that an instrument more specific to mental health is used in favour of EQ-5D which can better reflect the impact of at-risk and problem gambling on an individual’s quality of life.

4.6. Gambling treatment

Gambling treatment is concentrated across 4 main providers in England. These providers are the National Gambling Treatment Service:

1. GamCare. Provides the GambleAware helpline and treatment, prevention services, youth outreach programme and a criminal justice programme for gambling.
3. The London Problem Gambling Clinic based in Central and North West NHS Foundation Trust. Provides individual and group treatment for people with more severe addictions.

All 4 providers are centrally funded by GambleAware, a large charity provider where fundraising activities include requesting the gambling industry to donate 0.1% of their annual gross gambling yield. This was equivalent to £10.05 million in 2019 to 2020. Latest total expenditure figures for 2018 to 2019 report that GamCare and the Gordon Moody Association spent £7.9 million on charitable and support activities. GamCare and the Gordon Moody Association receive further funding for their work from other sources, including gambling industry stakeholders. No treatment provision for gambling is currently funded by the NHS but there is a commitment to roll out gambling treatment in the NHS Long Term Plan.

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5 Refers to a new service established in Hertfordshire to explore gambling across all aspects of the criminal justice system.
6 Gross gambling yield is defined as the total amount retained by the gambling industry after paying winnings but before deducting operational costs. You can find more information at the Gambling Commission’s website.
In 2019 to 2020, there were 9,008 people who accessed treatment for gambling in England. Of these, 7,473 were identified as gamblers and 1,535 as others who may not directly gamble but whose lives have been affected by those who gamble (28). Counselling was the most common treatment intervention received by people who gamble (97.2% of all contacts) followed by cognitive behavioural therapy (2.7%). For other people in treatment, counselling (99.4%) and psychotherapy (0.3%) were the most commonly received treatment interventions. Although length of time in treatment by intervention type is not publicly available, among people who had received and ended treatment in 2019 to 2020, treatment lasted 9 weeks for people who gamble and 7 weeks for associated others.

Using figures from the HSE on the number of at-risk and problem gamblers in England (3), this implies that just 0.5% of individuals meeting these definitions accessed treatment in 2019 to 2020. This potentially reflects the lack of access to, and provision of, gambling treatment services in England. There is also limited evidence available on the cost-effectiveness of gambling treatment.

Similarly, we expect that there is significant under-reporting of gambling as a reason for hospital admissions. The HES for 2018 to 2019 reports 375 hospital admissions specific to gambling. Hospitals coded these admission using the International Classification of Diseases, tenth revision (ICD-10) codes for pathological gamblers and gambling and betting (65). This is likely to be a significant underestimate given the low use of gambling-specific ICD-10 codes by healthcare professionals. This suggests individuals are likely to be diagnosed with another health condition before receiving gambling-specific treatment, such as a mental health condition or substance misuse, as found by Pavarin, and others (66). So, it is likely that the direct costs of gambling treatment are instead captured by other health-related costs.

We have not included the direct costs of gambling treatment in our central estimates of the economic burden of gambling. This is due to the severe limitations of the data and cost-effectiveness of the interventions offered. It also helps us to avoid double-counting with other areas of health harms that we have costed elsewhere (such as the costs of depression).

We need additional research into the effectiveness and cost-effectiveness of specific treatment interventions by type of gambler. This research will help establish a treatment pathway that identifies at-risk and problem gamblers earlier. This is then to be followed by an effective implementation strategy to ensure that healthcare professionals use the treatment pathway to enable identified gamblers to access the available, gambling-specific services.

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7 See ICD-10 f63.0 Pathological Gambling and Z72.6 Gambling and Betting.
5. Employment and education harms

5.1 Introduction

Langham, and others (20), explores different ways in which gambling activity can reduce performance at work and study. A first-level impact is absenteeism due to time spent gambling, or second order harm of absenteeism due to lack of transport or ill-health because of gambling. So, the impact of gambling-related harm on work and employment can be wide, such as absenteeism, inability to work or unemployment.

Work is also very closely linked with financial harms. Loss of employment and subsequent loss of wages will exacerbate financial harms people already experience, although in England they would be partly offset by unemployment benefits. Not taking up employment or study opportunities due to gambling behaviour can have long-term impacts in gaining future employment (or study) and in the ability to generate future income, creating significant legacy harms (20). These harms potentially affect both the people that gamble and their affected others.

When analysing the type of harms we can cost in this area, there are several data shortages. PHE’s gambling-related harms evidence review identified one quantitative study (67) analysing the relationship between gambling participation and academic performance among a population-based sample of twin pairs in Canada. However, gambling participation and academic performance become not significant once the analysis controls for impulsivity and socio-family adversity (an index created from parental educational level, parental occupational status and the mother’s or father’s age at the birth of the first child). So, we have not included this evidence in the analysis.

One recent study concludes that gambling is associated with a higher risk of future unemployment in the UK (4). This positive relationship is notably stronger at high levels of gambling, with employed people in the highest percentiles of gambling having a 6% likelihood of experiencing future unemployment. These results draw on a sample of 6.9 million active Lloyds Bank customers in each month of 2013, following them up across the next 5 years between 2014 and 2019. However, this analysis has limitations that prevent us from using the results in this costing analysis. This is mainly because of the lack of co-morbidity data, including lack of PGSI scores. Even so, it is a valuable study in the growing body of gambling-related research in the UK.

In this area of analysis, the Foundation model (8) refers to the number of job losses or increased claims on the benefit system caused by or associated with gambling activity. This can be estimated using survey and unemployment data.
The HMT Green Book guidance recommends adopting a wider societal perspective when undertaking an economic evaluation or appraisal (46). This implies that transfer payments like unemployment benefits should be excluded from the analysis. These payments are economic transfers from different agents within the system (in this case from the public sector to private individuals) and the overall net effect to the economy remains equal, so there is no need for their inclusion in the calculations.

Given data limitations, the analysis undertaken here adopts a government (rather than wider societal) perspective, following what other studies in this area have done or recommend (1, 8, 11). For example, a wider societal perspective could undertake a productivity loss analysis. This is done typically using a human capital approach, measuring the potential lost productivity given the employee’s sickness or incapacity to work due to gambling addiction. This type of analysis aims to capture the loss to public or private sector employers from sickness absence. Unfortunately, it was not possible to find data on sickness absence due to gambling addictive behaviour. So, the analysis presented here focuses on a different approach that indirectly estimates the potential costs of unemployment to government alone.

The analysis follows the same approach taken by Thorley, and others (1), where costs are estimated in an indirect way and use different sources of data. Despite its limitations, this is the only estimate made to date in the English context and no better data has been identified to test a different method. Where possible, the analysis updates all the data inputs, as explained below.

**5.2 Methodology**

The analysis focuses on estimating the excess direct costs of unemployment benefits associated with problem-gambling for the financial year 2019 to 2020, excluding at-risk gamblers (low and moderate) due to lack of available data.

**Data inputs**

One of the most important components for this analysis is the probability of a problem gambler claiming unemployment benefits compared to a non-problem gambler. Thorley, and others (1), estimate this probability to be 2.65, which means that being a problem gambler was associated with being 2.65 times more likely to be claiming Jobseeker’s Allowance (JSA) compared with non-problem gamblers (significant at 99.9%). This is the only estimate we have found in the literature for England.

The benefits system in England has since changed. The Universal Credit system is now fully implemented and has replaced the previous JSA system. For this reason, the analysis updates most of the inputs in the Thorley, and others (1), analysis. However, we still use the probability of claiming unemployment benefits, estimated by Thorley, and others (1).
The calculations also require the total number of claims due to lack of employment during the period of analysis. For this, the analysis uses the database Alternative Claims Count (ACC) (specifically ‘Table 3 Benefit Group’ found in the ACC database) from the Stat-Xplore data portal run by the Department of Work and Pensions (DWP) (68). The ACC statistics measure the number of people claiming unemployment benefits by modelling what the count would have been if Universal Credit had been in place since 2013 with the broader span of people this covers. This allows us to examine previous trends as well as extracting the data for 2019 to 2020. The analysis here is solely for England whereas Thorley, and others (1), included data for the whole of Great Britain.

The analysis adds together the 3 different categories reported in the ACC to get a total estimate of the number of people claiming unemployment-related benefit. They are:

1. Jobseeker’s Allowance.
2. Universal Credit – Searching for Work conditionality (excluding people on the health journey pre-Work Capability Assessment).
3. Estimates of those additional claimants who would have been Searching for Work under Universal Credit had it existed over the entire period from 2013.

For the period of analysis 2019 to 2020, we extracted the following data:

1. Stock of ACCs in England in April 2019 (adding together the categories ‘Jobseeker's Allowance’, ‘Universal Credit Searching for Work’ and ‘Additionals’).
2. The total of ACCs ‘on-flows’ in England for the period April 2019 to March 2020. On-flows are defined as the number of people claiming unemployment related benefits in month t, who were not claiming in the previous month (t-1).

The analysis estimates a total number of 3,053,164 claims in England for 2019 to 2020.

The analysis also requires an estimate of the cost of an individual being unemployed, which we took from the GMCA unit cost database (26). The government (or fiscal) annual cost of an individual being unemployed is estimated to be £13,139 in 2019 to 2020.

As Thorley, and others (1), note, this annual figure needs to be adjusted by the length of an unemployment spell. The Official Labour Market Statistics Nomis database (69) provides information on the median duration of an unemployment spell using ‘off-flows’ data. Off-flows are defined as the number of people no longer claiming unemployment related benefits in month, t, who were claiming in the previous month (t-1).

The analysis estimates a historic average duration for the last 5 years (from 2014 to 2015 to 2019 to 2020) of the median duration reported in each month during this period. We used a 5-year period to smooth fluctuations in the economic cycle. The length of an unemployment spell is estimated to be 13 weeks for the period 2014 to 2015 to 2019 to 2020. Adjusting the annual
figure of £13,139 by a duration of 13 weeks provides an estimate of £3,285 in 2019 to 2020 values.

Finally, we need estimates of the working-age population (16 to 64 years) in England. This was estimated to be 35,049,467 in 2018, according to ONS (70). We use working-age population (rather than active population) to reflect important flows from the inactive population into employment and vice versa.

We source prevalence estimates of problem-gamblers (PGSI score of 8 or higher) from the HSE 2018 (3). The central estimate value for England is 168,149 (95% CI 102,185-234,113, see Table 2).

**Calculations**

The analysis estimates the number of additional claims for unemployment benefits made by a problem gambler compared to a non-problem gambler (which includes low and mid risk gamblers and non-gamblers). The number of claims made per working-age individual is 0.09 (total claims divided by the total working age population) and this ratio is then multiplied by 2.65. This is the probability of a problem gambler claiming unemployment benefits compared to a non-problem gambler. This results in a ratio of 0.23. The difference between the estimated and expected number of claims per working-age individual produces an estimate of the number of claims only associated with a problem gambler (0.14). This figure is multiplied by the prevalence estimate of problem gamblers to calculate the number of unemployment claims only associated with problem gambling in 2019 (24,212; 95% CI 14,714 and 33,711).

The estimated number of claims associated with problem gambling is then multiplied by the cost of one unemployment spell (£3,285) to calculate the excess direct cost of unemployment benefits associated with problem gambling.

**5.3 Results**

The excess costs to government of unemployment benefits associated with problem gambling is estimated to be £79.5 million (95% CI £48.3 million and £110.7 million) in 2019 to 2020 prices. Table 10 presents the results.
Table 10. Excess cost of unemployment benefits associated with problem gambling

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Estimate of the number of problem gamblers receiving unemployment benefits based on the number of claims made by the general population</td>
<td>14,647</td>
<td>8,901–20,394</td>
</tr>
<tr>
<td>B. Estimate of the number of problem gamblers receiving unemployment benefits based on the research estimate of the number of claims made by problem gamblers</td>
<td>38,860</td>
<td>23,615–54,104</td>
</tr>
<tr>
<td>C. Estimate of the number of unemployment benefit claims associated with problem gambling only (B minus A)</td>
<td>24,212</td>
<td>14,714–33,711</td>
</tr>
<tr>
<td><strong>Excess direct costs (£ millions)</strong></td>
<td><strong>79.5</strong></td>
<td><strong>48.3-110.7</strong></td>
</tr>
</tbody>
</table>

Note: Figures may not sum due to independent rounding.

The results presented in Table 10 are higher than the ones reported by Thorley, and others (1), for England, which estimated costs between £30 and £80 million. This is partly due to updating the costs of unemployment benefits received by individuals, but also other parameters such as the number of claims submitted during the period of our analysis. During this period, we saw 40% more claims for the general adult population (in our baseline calculations) than in Thorley, and others (1).

5.4 Limitations

Results are only estimated for the problem gambling sub-population, excluding at-risk gamblers (low and moderate risk), as the evidence is limited for this group. Also, the estimate of problem gamblers being 2.65 times more likely to claim for unemployment benefits than non-problem gamblers is the only figure for England available from the literature. The results may also be sensitive to other parameters such as the number of claims for unemployment benefits, which are likely to vary according to the economic cycle.

These costs are estimated in an indirect way and under a set of assumptions as explained above. Ideally, more accurate analysis could be done if data were available from a national registry or equivalent, like NDTMS.

Finally, the analysis does not capture other types of costs such as indirect or intangible costs related to unemployment. It only refers to one part of work harms overall, as we have not been able to cost absenteeism and other potential harms due to a lack of data.
As a recommendation for future work, it would be desirable to collect information and evidence on the impact of both at-risk and problem gambling on productivity (absenteeism, inability to work or study and unemployment) with a representative sample of the population of interest in England.

6. Criminal activity

6.1 Introduction

There has been some evidence found linking problem gambling with criminal activities. A range of international studies have consistently found that there is a higher proportion of individuals who are classified as problem gamblers in prison populations than there are in the non-prison population (10, 71 to 73).

Lahn and Grabosky (71) suggest that despite the prevalence of the link between gambling and offending, the literature has not established a clear causal link. They highlight that while for some problem gamblers their offending is “instrumental to their gambling”, in many cases there is a “co-symptomatic” relationship between problem gambling and crime, and indeed instances where problem gamblers’ offences are simply “coincidental to their gambling”.

May-Chahal, and others (72), have attempted to address this issue of causality in their study in which they surveyed a sample of the prison population in England. They conducted a survey of 2 prisons in England, one male and one female, receiving a total of 423 responses. The survey focused on gambling behaviour before being in prison to construct PGSI scale scores and included questions that were designed to assess whether gambling was related to current offending.

The survey found that 10.4% of men and 5.9% of women were defined as problem gamblers using the PGSI scale. This was significantly higher than the rates among the general adult population reported at 0.4%. Respondents were also asked whether they considered that their current offence was linked to gambling. They found that 5.4% of men and 3% of all women considered that their current offence was linked to gambling.

6.2 Methodology

To calculate the criminal justice system costs only associated with problem gambling in England, the analysis estimates the direct cost of imprisonment associated with the estimated prison population that have committed offences associated with problem gambling.
Data inputs

The Ministry of Justice (MoJ) records the prison population in England and Wales on a monthly basis, typically on the last day of each month (74, 75). Between April 2018 and March 2020, according to MoJ statistics, the average prison population in England and Wales was 82,181 (estimated to be 77,250 for England only).

For the central (and low) estimates, the analysis adopts a somewhat conservative approach of measuring problem gambling in the prison population by using the figures that directly link offences to gambling. Based on data from the MoJ between 2018 and 2020, the average male proportion of the prison population was 95.56% (74, 75). As such, using the survey figures from May-Chahal (72), the weighted proportion of the total prison population that linked their current offence to gambling is 5.29%.

\[
\text{Weighted average} = \left( G_M \times P_M \right) + \left( G_F \times (1 - P_M) \right)
\]

Where:
- \( G_M \) = % of males that link current offence to gambling
- \( G_F \) = % of females that link current offence to gambling
- \( P_M \) = % of males in prison, on average

The same study also collected survey information that measured the rate of problem gambling among participants (scoring 8 or more on the PGSI scale). The survey found that 10.4% of men and 5.9% of women were defined as problem gamblers, amounting to a weighted prison population rate of 10.2%.

Both prevalence estimates are significantly higher than the prevalence of problem gambling among the non-prison population in England. According to the PGSI central prevalence figure, there are 168,149 problem gamblers (95% CI 234,113 and 102,185). Combining these figures with the 2019 ONS mid-year population estimates of the adult population in England, the national prevalence rate of problem gambling is about 0.4% (95% CI 0.5% and 0.3%).

Calculations

Using these national prevalence rates of problem gambling, it is possible to estimate the implied number of problem gamblers in the prison population (290; 95% CI 386 and 232). We can then compare this with the research estimate of problem gambling in prison from May-Chahal, and others (72), to calculate the expected number of people in the prison population who have linked their offence to problem gambling (4,089; 95% CI 4,089 and 7,880). The

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You should note that while this study looks only at the cost of gambling in England, the MoJ aggregates prison statistics across both England and Wales. So, we have adjusted prison statistics using the proportion of crimes committed in England.
difference between these 2 figures produces an estimate of the number of people in prison associated with problem gambling only (3,799; 95% CI 3,703 and 7,648).

The analysis combines these prevalence and population estimates with the direct costs of imprisonment to calculate the excess imprisonment costs associated with problem gambling. Her Majesty’s Prison and Probation Service compiles unit costs per prisoner on an annual basis (25, 75). In 2019, this was estimated to be £41,136 per prisoner, representing a weighted average across public sector and contracted-out prisons. We uprated unit costs to 2019 to 2020 prices using the HMT GDP deflator (18).

6.3 Results

The estimate of 3,799 (95% CI 3,703 and 7,648) people in prison with an offence associated with problem gambling is equivalent to an excess direct cost of £162.5 million (95% CI £158.4 million and £327.2 million) in 2019 to 2020 prices. Table 11 contains the rounded results for our central estimates and the 95% CI.

It is worth noting that the 95% CI estimates are constructed, counter-intuitively, using the inverse of the high and low gambling prevalence population estimates. This is because the high prevalence estimate results in a higher expected prison population, and in turn, a lower excess prison population, and the other way around.

Table 11. Excess cost of imprisonment associated with problem gambling

<table>
<thead>
<tr>
<th>Estimate of the number of prisoners who are problem gamblers based on the prevalence of problem gambling in the general population</th>
<th>Estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>290</td>
<td>386–232(^a)</td>
</tr>
<tr>
<td>B.</td>
<td>4,089</td>
<td>4,089–7,880</td>
</tr>
<tr>
<td>C.</td>
<td>3,799</td>
<td>3,703–7,648</td>
</tr>
<tr>
<td>Excess direct costs (£ millions)</td>
<td>162.5</td>
<td>158.4–327.2</td>
</tr>
</tbody>
</table>

Notes:
\(^a\) Lower and upper 95% CI appear counter-intuitive – but are inverse of high and low estimate (as explained above). Figures may not sum due to independent rounding.
6.4 Limitations

Despite the strengths of the evidence used, the analysis has several limitations. First, the approach relies on the survey results from May-Chahal, and others (72). The survey necessarily relied on participants to self-report the crimes for which they were serving sentences and was drawn from a sample of prisoners from category C prisons9. Despite this, aside from an over-representation of drug-related crimes, the crimes reported were broadly representative of crimes nationally.

Second, the analysis only focuses on the direct costs of imprisonment, and not the wider economic and social costs of crime more generally. The direct costs of imprisonment are about £3.5 billion ((75), 2019 to 2020 prices) per year as of 2019. This is a relatively small proportion of the total social and economic costs of crime, which are estimated to be £55 billion ((25), 2019 to 2020 prices). The analysis does not attempt to estimate the wider costs associated with crime that is linked to problem gambling. This is primarily due to an issue of attribution as it cannot be said with certainty that the surveyed prison population is representative of crimes committed, given that many will not result in a prison sentence. So, the approach is conservative. It is reasonable to suggest that the economic and social costs would be significantly higher than the direct costs of imprisonment included in this analysis.

The authors of this report would echo the recommendation for further research in this area put forward by Wardle, and others (2018). We discussed with MoJ analysts the possibility of applying data science scraping techniques to court records to estimate the number of crimes in which gambling was a contributing factor. This would build upon our work, which (as above) relies heavily on extrapolating from the survey undertaken by May-Chahal, and others (2012). This was not taken forward for this report because primary analysis of databases was outside of the remit and scope of this analysis.

Despite supporting this as an area of further research, it is worth noting that this approach would have an important limitation which is that mentions of gambling in court records cannot necessarily attribute problem gambling as a causal factor, but only associations.

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9 There are 4 categories of prisons: category A represents the highest level of security, with category D the lowest. There is no representation from categories A, B and D.
7. Discussion

7.1 Estimated excess cost of harm associated with gambling

For England, the estimated excess direct cost to government associated with at-risk and problem gamblers is equivalent £647.0 million and the excess cost to wider society is equivalent to £619.2 million in 2019 to 2020.

This provides a combined estimate of approximately £1.27 billion, as shown in Table 12. This is a conservative figure and an underestimate of the true size, because for some harms the analysis has only estimated costs of harm for problem-gamblers (and not for at-risk gamblers). Also, most harms have been costed only partially (such as financial, health, crime and work harms), while others have not been costed at all (such as relationships and cultural harms).
Table 12. Estimated excess cost of harm associated with gambling, by type of harm and type of cost (£ millions, 2019 to 2020 prices)

<table>
<thead>
<tr>
<th>Type of harm</th>
<th>Sub-domain</th>
<th>Cohort</th>
<th>Government costs</th>
<th>Wider societal costs</th>
<th>All costs (£ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direct costs (£ millions)</td>
<td>Intangible costs (£ millions)</td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>Statutory homelessness</td>
<td>Adults</td>
<td>62.8</td>
<td>N/A</td>
<td>62.8</td>
</tr>
<tr>
<td>Health</td>
<td>Total health harms</td>
<td></td>
<td>342.2</td>
<td>619.2</td>
<td>961.3</td>
</tr>
<tr>
<td></td>
<td>Deaths from suicide</td>
<td>Adults</td>
<td>N/A</td>
<td>619.2</td>
<td>619.2</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>Adults</td>
<td>335.5</td>
<td>N/A</td>
<td>335.5</td>
</tr>
<tr>
<td></td>
<td>Alcohol dependence</td>
<td>Adults</td>
<td>4.7</td>
<td>N/A</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>Illicit drug use</td>
<td>17 to 24 years</td>
<td>£0.0</td>
<td>N/A</td>
<td>2.0</td>
</tr>
<tr>
<td>Employment and education</td>
<td>Unemployment benefits</td>
<td>Adults</td>
<td>79.5</td>
<td>N/A</td>
<td>79.5</td>
</tr>
<tr>
<td>Criminal activity</td>
<td>Imprisonment</td>
<td>Adults</td>
<td>162.5</td>
<td>N/A</td>
<td>162.5</td>
</tr>
<tr>
<td><strong>Excess cost (£ millions)</strong></td>
<td></td>
<td></td>
<td><strong>647.0</strong></td>
<td><strong>619.2</strong></td>
<td><strong>1,266.1</strong></td>
</tr>
</tbody>
</table>

Notes: Figures may not sum due to independent rounding. Where N/A is indicated, analysis was not undertaken. Source: PHE analysis.
This analysis produces new cost figures associated with gambling in England. It should be noted that these figures are higher than those set out in Thorley, and others (1), which estimated an excess cost to government in England between £200 million and £570 million per year (2015 to 2016 prices). There are several reasons that explain the difference between these estimates, not limited to the different price year (this analysis reports costs in 2019 to 2020 prices). These include:

- analysing both at-risk and problem gamblers
- updating the approaches for each harm where the use of more recent evidence permits
- broadening the perspective to consider costs to wider society

We discuss the differences below.

**At-risk and problem gamblers**

The current analysis includes at-risk gamblers, whereas Thorley, and others (1), concentrate solely on problem gamblers. The analysis presented here estimates the excess cost for at risk-gamblers at £321.6 million, which is an associated harm that has not previously been costed. Wider costs to society are included here in addition to government costs, which are the focus of Thorley, and others (1). Table 13 updates Table 4 (see Methods) to illustrate the costs that we have estimated by type of harm and by type of gambler.
Table 13. Excess cost of harm associated with gambling-by type of harmful gambler (£millions, 2019 to 2020 prices)

<table>
<thead>
<tr>
<th>Type of harm</th>
<th>Sub-domain</th>
<th>Analysed population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>At-risk gamblers only (£ millions)</td>
</tr>
<tr>
<td>Financial</td>
<td>Statutory homelessness</td>
<td>15.9</td>
</tr>
<tr>
<td>Health</td>
<td>Total health harms</td>
<td>305.6</td>
</tr>
<tr>
<td></td>
<td>Deaths from suicide</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>299.7</td>
</tr>
<tr>
<td></td>
<td>Alcohol dependence</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>Illicit drug use</td>
<td>£1.6</td>
</tr>
<tr>
<td>Employment and Education</td>
<td>Unemployment benefits</td>
<td>N/A</td>
</tr>
<tr>
<td>Criminal activity</td>
<td>Imprisonment</td>
<td>N/A</td>
</tr>
<tr>
<td>Excess cost (£ millions)</td>
<td></td>
<td>321.6</td>
</tr>
</tbody>
</table>

Notes: Figures may not sum due to independent rounding. Where N/A is indicated, analysis was not undertaken.

Source: PHE analysis.
Table 13 shows that 75% of the estimated excess costs relate to problem gamblers, despite representing only 10% of the total population of analysis (Table 2, see Methods). This is because the analysis has not been able to cost the same types of harm for both at-risk and problem gamblers. For example, evidence on suicides (which represents almost half of the estimated excess costs at 49%), work and employment, and crime were only available for problem gamblers. In turn, this translates into a higher average cost per problem gambler (£5,618) than an at-risk gambler (£202) in 2019 to 2020 prices. These average cost figures are not entirely comparable because the costs included in each are not the same. But we could expect that the more severe cases have a higher average cost than the less severe ones. However, at-risk gamblers represent 90% of the identified gambling population that might be experiencing some level of harm. So, this could imply higher total costs for this population. The current findings do not show these higher costs, and future research should continue to study at-risk gamblers to cost the extent of their gambling-related harms.

Using more recent evidence and costs to wider society

We based the health, crime and homelessness analyses presented here on different evidence and approaches to those reported by Thorley, and others (1).

For the health harms associated with gambling, the analysis draws on the longitudinal studies identified from PHE’s gambling-related harms evidence review. In the case of estimating the associated cost of suicides, the analysis estimates the intangible costs only. As such, the analysis presents a broader perspective to include costs to wider society, rather than a narrower perspective that considers government costs alone. The intangible cost to suicide (£619.2 million) represents 49% of the estimated £1.27 billion. The health analysis also includes at-risk gamblers in the calculations where possible. For example, when costing depression, alcohol dependence and illicit drug use. The cost figure for health harms accounts for 76% of all estimated costs.

The analysis on criminal activity presented here and that undertaken by Thorley, and others, have both used results from May-Chahal, and others (72). This publication surveyed a sample of prisoners to measure problem gambling in UK prisons. This was to estimate the direct costs of imprisonment associated with problem gambling. Both the central estimates are based upon the conservative measure of problem gambling for which survey participants linked their current offence to gambling. However, the approach in this report differs in several ways, which explains why the estimated range is higher.

On homelessness, we present the costs for the population who receive statutory homeless support only and so do not consider people sleeping rough. Similarly to Thorley, and others (1), the methodology to estimate costs draws on evidence by Sharman, and others (30), to estimate the increased likelihood of gamblers needing statutory homeless support. It then adjusts this likelihood based on the latest evidence on the proportion of people who report at-risk and problem gambling before entering homeless services (31).
In relation to employment and education, where we follow a similar approach to Thorley, and others (1), the analysis updates the data inputs to generate parameters beyond unit costs. This results in higher cost estimates for the problem gambling population.

This analysis is the second attempt to cost harms associated with problem gambling in England (together with Thorley, and others (1)), and the first analysing costs associated with at-risk gambling as well. At the time of writing, further relevant work is underway, commissioned by the Gambling Commission, which builds on the previous work by Wardle, and others (8). But the results are not yet available. It is encouraging that the evidence base in this field is growing as one of the main challenges encountered in the analysis here has been the lack of appropriate data and evidence.

7.2 Sensitivity analysis

We completed a sensitivity analysis on the domains of harm to address some of the main areas of uncertainty in the analysis. This comprises of:

1. Changes to harmful gambling prevalence figures, which draws on the lower and upper 95% confidence interval.
2. Changes to the approach. For example, changing the unit cost to monetise the level of harm.

We present the results of the sensitivity analysis in Table 14 to show the impact of changes in the main parameters.
### Table 14. Sensitivity analysis showing the impact on estimated excess costs (£ millions, 2019 to 2020 prices)

<table>
<thead>
<tr>
<th>Type of harm</th>
<th>Domain</th>
<th>Sub-domain</th>
<th>Main analysis (central estimate) (£ millions)</th>
<th>Sensitivity analysis</th>
<th>Change to approach(^a) (£ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Main analysis (central estimate) (£ millions)</td>
<td>Change to prevalence figures</td>
<td>Lower 95% CI (£ millions)</td>
</tr>
<tr>
<td>Financial</td>
<td></td>
<td>Statutory homelessness</td>
<td>62.8</td>
<td>41.0</td>
<td>84.6</td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td>Total health harms</td>
<td>961.3</td>
<td>593.3</td>
<td>1,600.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deaths from suicide</td>
<td>619.2</td>
<td>366.6</td>
<td>1,062.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depression</td>
<td>335.5</td>
<td>221.7</td>
<td>529.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alcohol dependence</td>
<td>4.7</td>
<td>3.6</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illicit drug use</td>
<td>2.0</td>
<td>1.4</td>
<td>2.7</td>
</tr>
<tr>
<td>Employment and education</td>
<td></td>
<td>Unemployment benefits</td>
<td>79.5</td>
<td>48.3</td>
<td>110.7</td>
</tr>
<tr>
<td>Criminal activity</td>
<td></td>
<td>Imprisonment</td>
<td>162.5</td>
<td>158.4</td>
<td>327.2</td>
</tr>
<tr>
<td><strong>Excess cost (£ millions)</strong></td>
<td></td>
<td></td>
<td><strong>1,266.1</strong></td>
<td><strong>841.1</strong></td>
<td><strong>2,123.4</strong></td>
</tr>
</tbody>
</table>

**Notes:**

\(^a\) Figures based on central gambling prevalence figure.

\(^b\) Figures have not been explored for these domains and instead refer to the calculated central cost estimates. Figures may not sum due to independent rounding.
Table 14 shows the lower and upper 95% confidence intervals for gambling prevalence, published by HSE (3). These replace the central gambling prevalence figure used in the analysis on all the domains of harm. We present the results throughout the report for each domain. We also present them collectively here compare with the central cost estimate.

There are 3 domains of harm where we have conducted a sensitivity analysis on the approach, based on the central gambling prevalence figure.

A change in the unit cost of alcohol dependence

The sensitivity analysis assigns the global cost per alcohol-dependent case, equivalent to £2,422 in 2019 to 2020 prices, to the excess number of at-risk and problem gamblers estimated to be alcohol-dependent (28,312, see Table 8). This replaces the unit cost for community alcohol treatment used to calculate the central estimate. The unit cost includes the direct, indirect and intangible cost of alcohol, such as alcohol-related healthcare, criminal activity and loss of productivity. We calculate this unit cost using the reported cost of alcohol-related harm, equivalent to £21 billion in 2012 (57) and the estimated number of regular alcohol-consuming adults in England10 equivalent to 10 million for 2014 (76).

A change in the unit cost of illicit drug use

The sensitivity analysis assigns the global cost per opiate and/or crack cocaine user, equivalent to £58,000 in 2017 to 2018 prices (60), to the excess number of 17 to 24 year olds estimated to use illicit drugs associated with gambling (713, see Table 9). This replaces the unit cost for community drug treatment used to calculate the central estimate. The unit cost comprises direct, indirect and intangible costs relating to drug-related crime, health harm and wider societal impacts, such as lost productivity and the costs to significant others from drug misuse.

A change to the approach to quantifying gambling-related homelessness

The sensitivity analysis draws on evidence from Sharman, and others, (30, 31) to calculate attribution rates, equivalent to:

- 6% for low-risk gamblers
- 2% for moderate-risk gamblers
- 9% for problem gamblers

Applying these to the total number of statutory homeless applications produces an estimate of the total number of applications directly attributable to gambling (26,489, 18% of all

10 A regular drinking adult is defined as individuals that drink more than 14 units of alcohol per week.
applications). We assigned a unit cost of £2,929 (2019 to 2020 prices) to calculate the excess cost of statutory homeless applications related to gambling.

7.3 Limitations and recommendations for future research

Most of the limitations of this analysis are related to the availability of data for England, which shows the need for substantial research in this area. We explain the limitations of the analysis in turn.

The analysis presented here estimates costs associated with gambling and not costs caused by gambling. There is a lack of quantitative causal evidence for many of the harms described in conceptual papers such as Langham (20) and Wardle, and others, (8). The latter lists over 50 different metrics of gambling-related harms and it proposes a simplified model (the 'Foundation model'), which the analysis has attempted to follow wherever possible.

Future research in England should aim to expand the causal evidence base on the best available of these harms. For example, there could be a sub-population of individuals experiencing depression due to harmful gambling. However, the current evidence does not show this causal evidence. In the case of tangible costs, greater emphasis on the financial harms would be needed, given the likely negative impact on at-risk and problem gamblers' livelihoods and for which there is not much robust information. Where papers from PHE’s gambling harms review were not available, we based the analysis on evidence from the structured literature review. This included grey literature, such as Thorley others (1) about work and employment.

In the case of intangible costs (which refer to attributes for which there is not a market, such as people’s lives, emotional suffering, or time), these could include the emotional suffering of affected others, their quality of life and the potential distress of relationship break-ups. Due to data limitations, the analysis only estimates the social value of lives lost associated with problem gambling (through deaths from suicide). Future research should generate robust data on the causality of gambling and these types of harms so that they can be appropriately costed. PHE’s gambling-related harms evidence review of qualitative studies partially fills the gap in the evidence, although there remains limited evidence from England or the UK.

Good quality evidence is needed not only for problem gamblers but also for at-risk gamblers (low and moderate risk), as they are also likely to suffer from gambling-related harms which, at an aggregate level, will be substantial. The cost estimates we present here include low and moderate-risk gamblers for some parts of the health and statutory homelessness analysis but not for all cost components, due to lack of data.

There are inherent difficulties of using international evidence to estimate costs in England. The analysis uses international evidence only in cases where there was consensus that it was
robust. For example, we use Swedish evidence to cost deaths by suicide and Canadian evidence to cost depression and alcohol dependence (36, 37). This highlights the caution that is needed when trying to extrapolate international evidence into a costing analysis, as there are differences in the gambling environment. For example, there are different regulatory rules, methods of gambling and gambling cultures (2).

Currently, gambling addiction is likely to be underdiagnosed and undertreated in England. The funding of treatments for gambling in England relies heavily on private funding through GambleAware instead of NHS funds, even if the provision of these services is through the NHS itself. The roll-out of these services across England would need to be expanded to enable more equitable access to treatment services. It is likely that many patients are currently treated through other clinical pathways associated with gambling, such as depression and substance misuse, which we have costed here from a government perspective.

The analysis does not include GambleAware’s expenditure figures for gambling treatment services for the following reasons:

1. Expenditure figures might not reflect the real cost of provision.
2. To avoid potential double-counting, given that the analysis costs other harms associated with gambling, such as depression.
3. These expenditure figures will be an underestimate of the treatment cost given the limited access to these services.

Finally, policy makers in local and national government need future research on the effectiveness and cost-effectiveness of interventions to treat gambling addiction, so that any future roll-out of services is evidence-based.
8. Conclusions

The estimated excess cost to government and wider society associated with at-risk and problem gamblers is a conservative figure for the total cost of gambling-related harm in England, using available but incomplete metrics. This is mainly due to data limitations and the scarce evidence base to identify the harms caused by gambling-related behaviour. More evidence produced by the research community, government departments and local government is needed to quantify the true costs of gambling-related harm both from an individual and from a wider perspective.

Putting the £1.27 billion central cost estimate into perspective, the cost associated with harmful gambling is almost half of the value of the public health grant that local authorities receive to deliver public health prevention interventions, equivalent to £3.13 billion in 2019 to 2020 (78).

Comparisons with the overall costs of other risk factors for health are not straightforward because of differences in methods, data and evidence available. However, such comparisons are still likely to be made and so it is important to be clear on what is included within particular estimates to be transparent. Figures such as the cost to society of drug-related harm, estimated at £19.3 billion in 2017 to 2018 prices (60), or the annual cost of alcohol-related harm, estimated at £21 billion in 2012 (57), are often used to highlight the health and wider harms associated with particular behaviours.

Table 15 shows the different types of costs included in the gambling analysis presented here and in the alcohol estimates produced by the Cabinet Office (57). Differences in the overall results are not only due to the types of cost included, but also in the methodology used to cost each of the components and the total population affected by each of these types of cost.

Table 15 also highlights the relatively limited data (in both breadth and quality) and evidence available for gambling compared to alcohol. For example, the alcohol figures include the costs of healthcare problems that can be wholly or partially attributed to alcohol consumption, but this is not possible with gambling. The gambling healthcare analysis, and all the different types of analysis included in this report, are only able to estimate costs associated with gambling addiction. There is a pressing need for evidence to establish gambling-related attributable fractions for all types of harm to provide more robust estimates of costs caused by gambling activity.
Table 15. Types of costs included in the alcohol and gambling cost estimates

<table>
<thead>
<tr>
<th>Type of costs included in the analysis</th>
<th>Alcohol (2000 to 2001 estimates)</th>
<th>Gambling (2019 to 2020 estimates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare costs (costs to government only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated costs (primary and secondary care)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Attributed costs (primary and secondary care)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Partially attributed costs (primary and secondary care)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>A&amp;E (including ambulance services)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Specialist treatment services</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Other healthcare costs</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Crime (costs to government and to the wider society)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criminal justice system</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Services for victims and other government related costs</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cost to victims (emotional impact, property loss, lost productivity) and costs in anticipation to crime</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Productivity and employment (costs to government and to the wider economy)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment benefits</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Absenteeism and reduced unemployment</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Lost output due to premature death</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Sources: Cabinet Office (57) and PHE analysis

Greater understanding of gambling-related harms and improving routine data collection will also help estimate the costs attached to those harms. Data can be collected through population-level surveys, such as the Understanding Society academic study, to incorporate additional questions to those included in the Health Survey for England. For instance, this could be more reliable data on socio-economic variables, such as income and receipt of universal credit, as well as questions related to potential financial harms.
Also, gambling could draw on experience from the alcohol and drug misuse field. For example, the gambling treatment sector could create a national registry like the NDTMS. The Data Reporting Framework, initiated in 2015 and funded by GambleAware (28), appears to signal the start of this, but it is still in its infancy compared to the rich dataset offered by NDTMS.

Finally, diagnosing people’s gambling addiction and providing gambling treatment services in the NHS is one of the most important challenges for policy makers. Our analysis highlights scattered provision of NHS services whose funding heavily relies on private funding from GambleAware.

We acknowledge that 14 new gambling clinics will be created in England, as part of the NHS Long Term Plan, to enable more equitable access to treatment services (79). However, the lack of current treatment provision has probably meant less research in this area, which can also explain the shortage of robust and high-quality evidence in England.

At the international level, a recent systematic literature review also highlights the lack of studies analysing the cost-effectiveness of public health interventions targeting problematic gambling behaviour (80). Future evaluation of the effectiveness and cost-effectiveness of interventions is also needed to inform policy, both at an individual and population level.
9. Interests and acknowledgements

Competing interests

The authors declare that they have no competing interests.

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We thank Virginia Wright, Georgia Rendall and Sandy Knight for conducting the structured literature review, Paul Bivand for his guidance on the use of DWP data and labour statistics and the wider gambling review team for their input and review of the final report.
Appendix A. Literature review methodology

We developed search terms for the harms associated with gambling review (which we published the protocol for on PROSPERO at PROSPERO 2019 CRD42019154757) (81). We combined these terms with economic terms (such as ‘health economics’, ‘costs and cost analysis’, ‘direct costs’ and ‘health expenditures’) for the purpose of this study. We conducted the searches in Ovid MEDLINE and then translated them into a format to also search EBSCO Econ Lit.

In addition, we found grey literature online from websites, including:

- GambleAware InfoHub
- Gambling Commission
- GambLib (Gambling Research Library)
- GamCare
- 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

An initial screening by the 4 reviewers identified irrelevant studies based on the titles and abstracts and excluded them. Reviewers were paired and independently screened 10% of each other’s screening to check for consistency of the included or excluded papers. Consistent with the gambling-related harms review, we considered inter-rater acceptability of 90% as sufficient, in line with guidance from the National Institute for Health and Care Excellence (82) on title and abstract screening. If agreement was less than 90%, we investigated the reason and repeated screening. We brought disagreements to the Senior Economic Advisor and Head of Evidence Application for resolution.

Following a sifting of the literature, we assessed the 10 included papers for quality and applicability to the social and economic impact of gambling-related harms study. Data extract templates for cost-of-illness studies exist but these can be extensive and so resource intensive. Given resource constraints at the time of this review, we designed 16 below to incorporate enough information for the reviewer to decide, and the reader to see, whether we should consider the results of a paper for use in the gambling-related harms study. We extracted relevant data into tables that were pilot tested before being used.
The quality appraisal stage grouped studies as:

1. High quality: assumptions clear and relevant, as well as apt statistical, economic techniques and sensitivity analyses used.
2. Medium quality: assumptions inferable, as well as apt statistical and economic techniques, and no sensitivity analysis.
3. Low quality: assumptions not clearly stated, as well as poor use or absence of statistical and economic techniques, and no sensitivity analysis.

To determine applicability, we grouped studies as:

2. High: UK-wide, England and Wales or other devolved nations.
3. Medium: comparable countries (developed economies) or English local authorities.
4. Economies in transition, developing economies or federal states in developed economies.

We used the resulting papers to provide an overview of previous work on the cost of gambling-related harms, as well as a source of evidence for the economic analysis, as presented in the Introduction.

**Table 16. Example of data extract template**

<table>
<thead>
<tr>
<th>Authors (year):</th>
<th>Title of paper:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abstract</td>
</tr>
<tr>
<td></td>
<td>Setting</td>
</tr>
<tr>
<td></td>
<td>Study timeframe</td>
</tr>
<tr>
<td></td>
<td>Problem gambling definition</td>
</tr>
<tr>
<td></td>
<td>Type of gambling</td>
</tr>
<tr>
<td></td>
<td>Population</td>
</tr>
<tr>
<td></td>
<td>Summary of method</td>
</tr>
<tr>
<td></td>
<td>Perspective</td>
</tr>
<tr>
<td></td>
<td>Resource quantification method</td>
</tr>
<tr>
<td></td>
<td>Data sources</td>
</tr>
<tr>
<td></td>
<td>Health</td>
</tr>
<tr>
<td></td>
<td>Social care</td>
</tr>
<tr>
<td></td>
<td>Productivity</td>
</tr>
<tr>
<td><strong>Authors (year):</strong></td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>---</td>
</tr>
<tr>
<td><strong>Title of paper:</strong></td>
<td></td>
</tr>
<tr>
<td>Crime</td>
<td></td>
</tr>
<tr>
<td>Intangible</td>
<td></td>
</tr>
<tr>
<td>Other costs</td>
<td></td>
</tr>
<tr>
<td>Statistical techniques</td>
<td></td>
</tr>
<tr>
<td>Stated and justified assumptions</td>
<td></td>
</tr>
<tr>
<td>Sensitivity analysis</td>
<td></td>
</tr>
<tr>
<td>Results</td>
<td></td>
</tr>
<tr>
<td>Strengths</td>
<td></td>
</tr>
<tr>
<td>Limitations</td>
<td></td>
</tr>
<tr>
<td>Industry involvement</td>
<td></td>
</tr>
<tr>
<td>Applicability rating</td>
<td></td>
</tr>
<tr>
<td>Quality rating</td>
<td></td>
</tr>
<tr>
<td>Relevance</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B. Cost of gambling framework

Table 17 presents the cost categories of gambling framework developed by Browne, and others, in 2017 for Victoria, Australia. The framework aimed to assess the social costs associated with gambling in Victoria in financial terms. The cost categories include gambling-related harm impacts in the domains of financial impacts, emotional and psychological costs, relationship and family impacts, crime, productivity loss and work impacts, and costs to the Victorian state and local governments.

Table 17. Cost categories of gambling framework, Australia

<table>
<thead>
<tr>
<th>Cost category</th>
<th>Sub-category</th>
<th>Cost attributed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial impacts</td>
<td>Total opportunity cost of gambling spend</td>
<td>Gambler</td>
</tr>
<tr>
<td></td>
<td>Bankruptcy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost of administration</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Unpaid debts</td>
<td>Affected others and community</td>
</tr>
<tr>
<td></td>
<td>Illegal offshore wagering</td>
<td>Gambler</td>
</tr>
<tr>
<td>Emotional and psychological</td>
<td>Depression – emotional distress to the gambler</td>
<td>Gambler</td>
</tr>
<tr>
<td></td>
<td>Attempted suicide – emotional distress to the gambler</td>
<td>Gambler</td>
</tr>
<tr>
<td></td>
<td>Suicide ideation – emotional distress to the gambler</td>
<td>Gambler</td>
</tr>
<tr>
<td></td>
<td>Other emotional or psychological costs to the gambler</td>
<td>Gambler</td>
</tr>
<tr>
<td>Relationships and family</td>
<td>Divorce and separation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial cost to the gambler</td>
<td>Gambler</td>
</tr>
<tr>
<td></td>
<td>Emotional distress to the gambler</td>
<td>Gambler</td>
</tr>
<tr>
<td></td>
<td>Emotional distress to affected others</td>
<td>Affected others</td>
</tr>
<tr>
<td></td>
<td>Experiences of violence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emotional distress to the gambler</td>
<td>Gambler</td>
</tr>
<tr>
<td></td>
<td>Emotional distress to affected others</td>
<td>Affected others</td>
</tr>
<tr>
<td></td>
<td>Suicide attempts of gambler – impact on affected others</td>
<td>Affected others</td>
</tr>
<tr>
<td>Cost category</td>
<td>Sub-category</td>
<td>Cost attributed to</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td><strong>Crime</strong></td>
<td>Fatality by suicide of gambler – impact on affected others</td>
<td>Affected others</td>
</tr>
<tr>
<td></td>
<td>Other emotional distress to affected others</td>
<td>Affected others</td>
</tr>
<tr>
<td></td>
<td>Police system cost</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Court system cost</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Corrections system cost</td>
<td>Government</td>
</tr>
<tr>
<td><strong>Productivity loss and work impacts</strong></td>
<td>Productivity loss to business</td>
<td>Community (business)</td>
</tr>
<tr>
<td></td>
<td>Cost of job loss</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loss of income</td>
<td>Gambler</td>
</tr>
<tr>
<td></td>
<td>Job search cost to the gambler</td>
<td>Gambler</td>
</tr>
<tr>
<td></td>
<td>Employer staff replacement costs</td>
<td>Community (business)</td>
</tr>
<tr>
<td></td>
<td>Unemployment benefits</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Cost of absenteeism to business</td>
<td>Community (business)</td>
</tr>
<tr>
<td></td>
<td>Cost of crime to business</td>
<td>Community (business)</td>
</tr>
<tr>
<td></td>
<td>Cost of fatality by suicide</td>
<td>Community (business) and government</td>
</tr>
<tr>
<td><strong>Cost to Victorian Government</strong></td>
<td>Policy, regulation, research (including treatment funding)</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Direct costs to local governments in Victoria</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Health and human services systems</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Mental health sector</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Homelessness services</td>
<td>Government</td>
</tr>
</tbody>
</table>
## Appendix C. Data sources of harms and costs on gambling

Table 18 outlines the main sources of evidence used to estimate the cost of harm associated with gambling.

### Table 18. Data sources of harms and costs on gambling

<table>
<thead>
<tr>
<th>Domain</th>
<th>Sub-domain</th>
<th>Sources of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Deaths from suicide</td>
<td>Age-specific English prevalence numbers by type of problem gambler - source: HSE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age-specific suicide rate per 100,000 population for England - source: ONS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Average age of death from suicide - source: ONS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Years of Life Lost - estimated using ONS National Life Tables.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit cost of YLL from suicide - £60,000 per life year using HMT discount factors. Source: HMT Green Book.</td>
</tr>
<tr>
<td>Health</td>
<td>Depression</td>
<td>Age-specific English prevalence numbers by type of problem gambler - source: HSE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prevalence rate for depression (All 18+ years) - source: NHS Digital GP QOF register, 2019-20.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Annual cost per case for an individual with depression - source: PHE (2020) HSC costs of a selection of health conditions and multi-morbidities.</td>
</tr>
<tr>
<td>Health</td>
<td>Illicit drug use</td>
<td>Age-specific English prevalence numbers by type of problem gambler - source: HSE.</td>
</tr>
<tr>
<td>Domain</td>
<td>Sub-domain</td>
<td>Sources of evidence</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Health</td>
<td>Alcohol dependence</td>
<td>Prevalence rate per 1,000 population for opiate and/or crack cocaine use for England, 2016-2017 (latest published year) - source: PHE-NDTMS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Odds ratio for gambling impact on hard drug use - source: Emond A, Griffiths MD, Hollén L. A longitudinal study of gambling in late adolescence and early adulthood: Follow-up assessment at 24 years.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% OCU prevalence in substance misuse treatment - source: PHE-NDTMS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Annual cost per case for an individual in drug misuse treatment for opiates and/or crack cocaine use - source: PHE analysis.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Claims Count (ACC) from the Stat-Xplore data portal run by the Department of Work and Pensions (DWP) - Table 3 Benefit Group- Source: DWP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Median length of an unemployment spell is taken from the Official Labour Market Statistics NOMIS database. Source:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain</td>
<td>Sub-domain</td>
<td>Sources of evidence</td>
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<tr>
<td>-----------------------------</td>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Official Labour Market Statistics.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Working age population (16 to 64 years) in England. Source: ONS Interactive pyramid website.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit Cost Database produced by the Greater Manchester Combined Authority (GMCA) Research Team. The government/fiscal annual cost of an individual being unemployed was estimated to be £13,139 in 2019 to 2020.</td>
</tr>
<tr>
<td>Crime and antisocial</td>
<td>Imprisonment costs</td>
<td>Prison population data in the UK. Source: Ministry of Justice</td>
</tr>
<tr>
<td>behaviour</td>
<td></td>
<td>Adult population (16+ years) in England. Source: ONS Interactive pyramid website.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Survey data used to estimate the proportion of prisoners who are defined as problem gamblers, and those who link their current offences to gambling, are from May-Chahal, and others. (2012).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Costs of imprisonment per prisoner is taken from the Ministry of Justice HM Prison and Probation Service Annual Reports and Accounts 2018-19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit costs per prisoner on an annual basis is £41,136 in 2019. Source: The Ministry of Justice HM Prison and Probation Service (MoJ, 2019).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of successful statutory homeless applications. Source: MHCLG.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Annual cost per statutory homeless application (costs include: one-off homelessness applications and ongoing costs, which</td>
</tr>
<tr>
<td>Domain</td>
<td>Sub-domain</td>
<td>Sources of evidence</td>
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<td>include the cost of a court desk scheme; an application decision; 4 weeks in temporary accommodation and administration costs of a new letting) - source: GMCA.</td>
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</table>
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