



Public Health
England

Protecting and improving the nation's health

The impact of COVID-19 on gambling behaviour and associated harms

A rapid review

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Abbreviations

APPG	All-Party Parliamentary Group
BGC	Betting and Gaming Council
COVID-19	Coronavirus disease 2019
DCMS	Department for Digital Culture, Media and Sport
GGY	Gross gambling yield
OR	Odds ratio
PGSI	Problem Gambling Severity Index
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
UN	United Nations

You can find a full list of definitions and technical terms in the [gambling glossary](#).

1. Summary

1.1 Background

The coronavirus (COVID-19) pandemic has had an unprecedented impact on life throughout the world. Within the UK, measures introduced to curb transmission rates included the repeated closure of land-based gambling venues, and the cancellation of live sports events. However, not all gambling was affected, with National Lottery products and online gambling remaining available. This report explores the impact that COVID-19 and the related restrictions have had on gambling behaviour and associated harms. It aims to address the following questions:

1. What impact has COVID-19 had on gambling behaviour?
2. What impact has COVID-19 had on harms associated with gambling?

1.2 Methodology

This study used a rapid review methodology. We conducted database searches from 1 January 2020 to 1 October 2020 and searched a range of websites for grey literature on 22 October 2020. Full text articles were screened by one reviewer and checked by a second. This process was repeated for data extraction and the results presented as a narrative synthesis.

1.3 Results

Nineteen studies (reported in 22 papers) examined the impact of COVID-19 on gambling behaviour. Almost all studies (17) were based on survey data. While 9 of these studies found an overall reduction in gambling during the first UK lockdown in March 2020, 12 studies found a small group of people who increased their gambling, or started using new gambling products. This group were more likely to experience harm from gambling (found in 8 studies), to be younger in age (found in 7 studies) and to be male (found in 6 studies).

Nine studies contained data on harms associated with gambling during COVID-19. Three studies found that gambling during COVID-19 restrictions was associated with poorer mental health outcomes. A further 3 studies also found that gambling during COVID-19 restrictions was associated with higher alcohol use and 2 studies found an association with financial difficulties.

1.4 Conclusions

There was consistent evidence that overall gambling reduced during the initial COVID-19 lockdown period (March to June 2020). A small proportion of people gambled more during this period, attributing this to boredom and more free time. Most of the studies relied on self-reported data and so results should be interpreted with caution.

2. Background

2.1 Gambling venue closure

COVID-19 has had an unprecedented impact on the world. As of 29 April 2021, there has been nearly 149 million confirmed cases and over 3.1 million deaths internationally (1).

To control the spread of the virus, governments put in place restrictions on social contact, as well as other non-pharmacological interventions, such as practicing good hand hygiene. In the UK, the Prime Minister announced a requirement for people to stay at home and for all non-essential shops and business premises to close on the 23 March 2020 (2). For this review, we refer to this period as 'lockdown' or 'COVID-19 restrictions'. The non-essential business premises that were forced to close included:

- pubs
- betting shops
- bingo halls
- arcades
- casinos
- live racing venues (3)

This limited access to gambling within the UK to gambling online and National Lottery products. A timeline of these restrictions in England is presented in [Figure 1](#).

While some experts recognised that closing land-based gambling venues would lead to a decrease in some forms of gambling, there were concerns that people may move to higher risk forms of gambling online (4) and this may lead to a shift to online gambling in the long term (3). There were also worries that stress, boredom and financial pressures could lead to new gambling participation or an increase in issues for people with gambling problems (5). These changes to day-to-day life could also remove safeguards from gambling harm, especially for people in recovery (4).

These concerns were shared by Members of Parliament and experts in the field, leading to appeals to the gambling industry to behave responsibly (6). These concerns are recorded in:

- a letter from the All-Party Parliamentary Group on Gambling Related Harm on 3 April 2020 (7)
- a letter from clinicians and academics raising concerns about gambling advertisements during lockdown on 8 April 2020 (8)
- a press release from the Department for Digital, Culture, Media and Sport (DCMS) on 21 April 2020 urging the gambling industry to protect people with gambling problems (9)

- the United Nations Sustainable Development Group also advocated for tighter regulation of gambling to protect vulnerable people during the COVID-19 pandemic in June 2020 (10)

In response, the Betting and Gaming Council (BGC), who represent around 90% of the non-lottery gambling industry within the UK (11), made 10 pledges on what they expected from their members during this time (12). They also agreed to voluntarily remove gambling advertisements from radio and TV from 7 May 2020, for 6 weeks, until at least 5 June (13). However, the end date of the removal of advertisements is not confirmed and neither of these interventions have been independently evaluated.

Research is emerging on the impact that lockdown restrictions have had on gambling. Adfam, a UK charity for families affected by addiction, reported that lockdown had a negative impact on family members of people with an alcohol, drug or gambling problem (14).

A text mining analysis conducted on Twitter reported that some people were concerned about gambling addiction during lockdown, but others felt that the closure of gambling venues could be an opportunity for respite for some gamblers (15).

It is not clear how lockdown has affected gambling behaviour and associated harms. This review seeks to use existing data to better understand the issue.

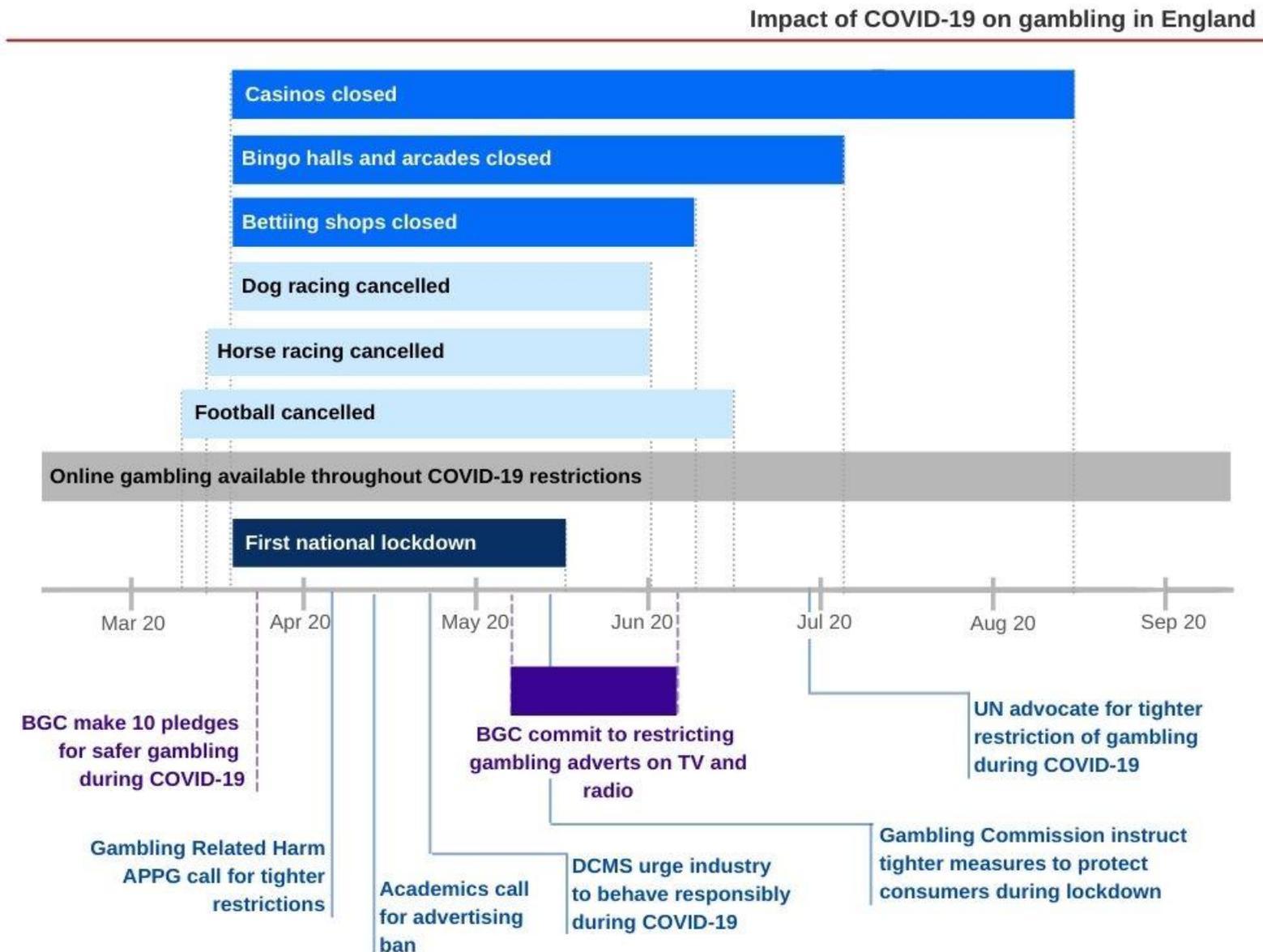
2.2 Objective

The purpose of this rapid review is to identify and assess evidence on how COVID-19 restrictions (lockdown) have affected gambling, defined in the Gambling Act 2005 as gaming, betting or participating in a lottery (16) and related harms. This review only includes participation in these activities for money, and so excludes any studies exploring gaming that is free to play, or free to play after purchase.

This review aims to answer 2 research questions:

1. What impact has COVID-19 had on gambling behaviour?
2. What impact has COVID-19 had on harms associated with gambling?

Figure 1. Timeline of COVID-19 restrictions on gambling in England



The government announced the first national lockdown in March 2020 meaning that casinos, bingo halls, arcades and betting shops all closed, and dog racing was cancelled. Football matches and horse racing were cancelled just before the lockdown came into place. The government started to lift the restrictions of the first national lockdown on 10 May 2020. Dog and horse racing resumed in early June 2020, closely followed by betting shops reopening and football resuming. Bingo halls and arcades reopened in early July 2020 and casinos reopened in August 2020. Online gambling was available throughout COVID-19 restrictions. Important events relating to gambling that happened during lockdown include:

- the BGC making 10 pledges for safer gambling during the pandemic
- the Gambling Related Harm All-Party Parliamentary Group (APPG) calling for tighter restrictions
- academics calling for an advertising ban
- DCMS urging the gambling industry to behave responsibly during the pandemic
- the BGC committing to restricting gambling advertising on TV and radio between May and June 2020
- the Gambling Commission instructing tighter measures to protect consumers during lockdown
- the United Nations (UN) advocating for tighter restriction of gambling during the pandemic

Methodology

For this project, we chose to use a rapid review methodology. This uses the same rigour and principles of a systematic review but with streamlined methods to produce results in a timely fashion (17).

We undertook an initial scoping search to identify any completed systematic reviews on this topic. When none were identified, we decided to do a full rapid review of primary studies in line with procedures of the COVID-19 Evidence Team at Public Health England (PHE) (18).

3.1 Protocol

We produced a protocol before the literature search began, which specified the research question and the inclusion and exclusion criteria. The protocol is available on Prospero [CRD42020210487] (19).

3.2 Sources searched

On 5 October 2020, we searched electronic databases for sources to review. They were:

- Ovid MEDLINE
- Ovid Embase
- Ovid PsycINFO
- NICE Evidence and SocIndex via EBSCO
- medRxiv preprints
- World Health Organization (WHO) COVID-19 Research Database

The review included a range of grey literature. This is defined as information which is not published through traditional channels (20), including from academia, government and industry. This is because gambling is an emerging topic with limited evidence published in peer review journals.

We conducted the search for grey literature on 22 October 2020. Websites searched included:

- GambleAware
- Gambling Commission
- GambLib
- Gam Care
- National Problem Gambling Clinic
- Gordon Moody Association
- Gamblers Anonymous
- OpenGrey
- Gam-Anon
- Gambling Information Resource Office Research Library
- Advisory Board for Safer Gambling
- Gambling Watch UK
- Australian Gambling Research Centre
- Gambling Research Exchange Ontario
- Citizens Advice Bureau
- Gambling Compliance
- Child Family Community Australia
- International Centre for Youth Gambling Problems and High-Risk Behaviours
- Gambling and Addictions Research Centre
- Alberta Gambling Research Institute
- Responsible Gambling Council
- Problem Gambling Foundation of New Zealand
- Gambling Commission New Zealand
- Victorian Responsible Gambling Foundation

We supplemented the searches for grey literature with papers identified before we started the review through general monitoring of the situation around COVID-19 and gambling.

We also searched reference lists of included papers. Finally, we contacted the gambling-related harms review external reference group to identify any papers that may have been missed during searches.

3.3 Search strategy

We conducted database searches for papers published between 1 January 2020 and 1 October 2020. Search terms covered important aspects of the research question. You can see the search strategy for Ovid Medline in [Appendix 1](#).

3.4 Inclusion and exclusion criteria

Article eligibility criteria are summarised in [Table 1](#).

Table 1. Inclusion and exclusion criteria

Criteria	Included	Excluded
Population	Adults and children, all ages, including studies that focus on subgroups of the population To include both gamblers, close associates of gamblers (such as friends and family) and wider society	Not applicable (N/A)
Settings	All settings and countries	N/A
Context	COVID-19 outbreak	Other diseases
Intervention or exposure	Exposure to COVID-19 outbreak	N/A
Outcomes	Gambling participation Gambling behaviour Gambling intensity Harms to gamblers, close associates of gambler and wider society	N/A

Criteria	Included	Excluded
	Gambling initiation, urges or escalation	
Language	English (due to lack of capacity for translation)	N/A
Date of publication	1 January 2020 to 1 October 2020	N/A
Study design	Observational studies Qualitative studies Modelling studies	Guidelines Opinion pieces Systematic reviews Narrative, rapid and scoping reviews
Publication type	Published and preprint	N/A

3.5 Screening

We conducted the screening process using Rayyan, an online tool which that allows multiple researchers to collaborate on a systematic review (21).

One reviewer screened each study's title and abstract to decide on its inclusion or exclusion, with a second reviewer checking 10% of the studies to ensure consistency. Disagreements on decisions were resolved by discussion.

Full text articles were then screened for inclusion by one reviewer and these decisions were checked by a second reviewer. This was completed using a combination of Rayyan and EndNote X9. Any disagreements were resolved by discussion, and issues that could not be resolved were referred to a third reviewer.

Screening grey literature was done using the same process and was completed using Microsoft Excel.

3.6 Data extraction and quality assessment

Data extraction was completed using Microsoft Excel by one reviewer and checked by a second. Any discrepancies were discussed and resolved. You can find a summary table of the main findings from each study in [Appendix 2](#).

Due to the rapid nature of this work, we did not use a validated risk of bias tool to assess the quality of studies. Instead, we assessed the risk of bias based on research design and sources of bias of both published and grey literature studies. These include (but are not limited to):

- population or sample
- exposure
- outcome

These were included as headings in the data extraction table and filled in using the first reviewer's judgement. They were verified and added to by a second reviewer before being summarised into bullet points in [Appendix 2](#). Given the nature of the topic, we also considered the funding source and conflicts of interest, which are reported in [Appendix 2](#).

We considered variations across populations and subgroups, for example cultural variations or differences between ethnic, social or vulnerable groups, where the evidence was available. We describe these in the [Data on inequalities](#) section.

Following data extraction, themes that emerged from study findings were noted by the first reviewer and were discussed among the research team to reach a consensus on how to present the findings. We decided to separate the findings by research question and then present the data thematically.

For the first research question: 'What impact has COVID-19 had on gambling behaviour?' we took a grounded approach, which is when themes emerge when the data is analysed ([22](#)).

For the second research question: 'What impact has COVID-19 had on harms associated with gambling?' we identified and organised the data by the dimensions of gambling harm identified by Langham and others ([23](#)). We had already developed eligibility criteria based on these dimensions of gambling harm for the wider gambling review, so we decided to use these for this COVID-19 review to maintain consistency.

We presented the results by country as gambling legislation and responses to COVID-19 vary between countries. We described UK studies first due to their relevance.

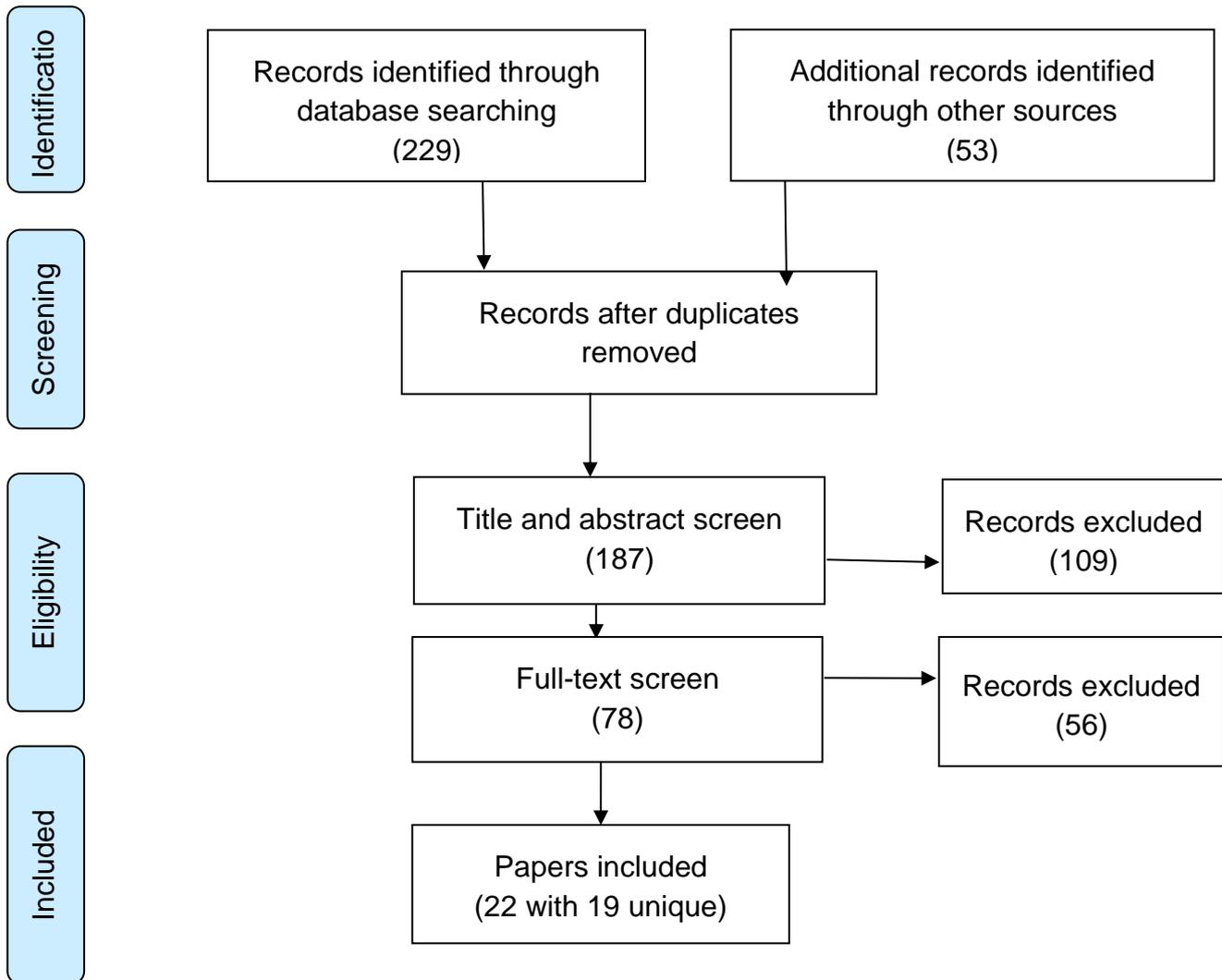
3. Evidence

4.1 Records included in the review

The database search returned 229 records, and 53 additional papers were identified through other sources. After removing duplicates, 187 records were screened by title and abstract and 78 full text articles were assessed for eligibility. You can see the papers that were excluded at full text screening stage and the reasons for exclusion in [Appendix 3](#).

There were 22 papers included in the review, which contained 19 unique studies. One study was published twice (grey literature report and journal article) (24, 25) and another study was published 3 times to show updated data, but the data is presented together in this review (26 to 28). You can find more information on this process in Figure 2 below.

Figure 2. PRISMA diagram



All papers included in the review were observational studies, with most using online surveys to collect data. Eight were published in peer-reviewed journals (24, 29 to 35) and the other 14 were grey literature. Of the grey literature publications, 3 were reports (25, 36, 37), 5 were research briefings (38 to 42) and 6 were survey results published on websites, some of which also had supporting data tables (26 to 28, 43 to 45).

There were:

- 6 studies from the UK (18, 26 to 28, 36, 38, 43, 44)
- 4 studies from Sweden (30, 31, 33, 34)
- 3 studies from Australia (37, 39, 40)
- 2 studies from Canada (24, 25, 42)

- 1 study from Spain (32)
- 1 study from New Zealand (41)
- 1 study from the USA (35)
- 1 study that reported on data from Sweden, Germany, Finland and Norway (29)

You can find full details of the studies in [Appendix 2](#).

There were restrictions on gambling due to COVID-19 in all the countries included in this review, to some extent. On 14 March 2020, Spain announced a nationwide lockdown (46). Similarly Ontario, Canada, declared a state of emergency on 17 March 2020, which included closing schools, public facilities and businesses such as gambling venues (24). On 25 March 2020, New Zealand declared a national lockdown, which closed most businesses (47). There was a similar closure of gambling venues, among other businesses and restrictions on movement in Australia (39). Throughout the USA, casinos were closed in March and April 2020 (35).

Additionally, sports betting was affected as live sporting events were cancelled or postponed throughout Europe (29), Australia (48), New Zealand (49), the USA (50) and Canada (51).

Sweden took a different approach to controlling the spread of COVID-19 and did not impose a national lockdown. Instead, they implemented a range of restrictions including closing schools and banning gatherings of more than 50 people. Businesses remained open with social distancing rules (52). But some gambling premises, such as Svenska Spel's Casino Cosmopol chain, did close temporarily due to COVID-19 (53) and most national sporting events were postponed (34).

4.2 Risk of bias

Most studies in this review use self-reported data and do not have baseline data. So, they rely on participants recalling how often they gambled before and during lockdown. There is a risk of recall bias in these situations as participants could under or overestimate their gambling behaviours.

Most studies recruited their samples through market research companies, which may not be representative of the general population or of gamblers. Online surveys about gambling could attract participants with an interest in this topic and there could be a risk of selection bias within these studies.

Only 8 of the studies included were published in peer-review journals, while 14 were grey literature publications. These varied significantly in quality with some providing very limited information on methodology, no clearly defined aim and no access to data tables.

While some papers tested the statistical significance of their findings, particularly those in peer-reviewed journals, several provide only descriptive statistics. These studies can give us an

insight into changes in gambling-related behaviour due to COVID-19, but they should be interpreted with caution due to the issues described.

You can find the full notes on risk of bias for each study in [Appendix 2](#).

4.3 What impact has COVID-19 had on gambling behaviour?

All 22 papers identified contained information about gambling behaviour. The following section is split into 5 themes that emerged at the data extraction phase. These include:

- initiation of gambling
- gambling frequency, intensity and spend
- online gambling
- motivations for changes in gambling behaviour
- harmful gambling

Papers are reported on in multiple themes and are grouped geographically where practical. You can find full details of each study in [Appendix 2](#).

Initiation of gambling

Initiation of gambling includes evidence on people gambling for the first time during the COVID-19 pandemic, as well as those who already gamble opening new accounts and trying new forms of gambling.

There were 7 studies that provided evidence on this topic ([26 to 28](#), [35](#), [37](#), [38](#), [42 to 44](#)), one was published in a peer-reviewed journal ([35](#)) and the rest were grey literature. All studies used online surveys to collect data, of which 4 were from the UK ([26 to 28](#), [43](#), [44](#)), 1 was from Australia ([37](#)), 1 was from the USA ([35](#)) and 1 was from Canada ([42](#)).

UK evidence

The UK Gambling Commission commissioned 2 surveys to collect data on gambling behaviour during the COVID-19 pandemic.

The first was a general population survey of around 2,000 participants a week, conducted in March, April and May 2020. Between 0.2% and 0.4% of participants reported starting gambling for the first time during lockdown ([26 to 28](#)). Only 2% of participants gambling in the previous 4 weeks reported setting up new gambling accounts during this time. However, 31% of participants gambling in the previous 4 weeks and 48% (248) of engaged gamblers (those participating in 3 or more gambling activities in the previous 4 weeks) had tried one or more new gambling activities for the first-time during lockdown. It was also found that younger people (aged 18 to 34) were more likely to try new gambling activities during lockdown ([28](#)).

The second survey, completed in July and August 2020, used a UK representative sample of 3,389 participants. This survey showed that, before COVID-19 restrictions, 57% of participants were non-gamblers and 43% were gamblers. Findings showed that 4% of respondents who did not gamble before COVID-19 restrictions began gambling online during lockdown. When lockdown restrictions eased in mid-June 2020, 2.6% reported that they had stopped gambling, 0.6% had continued gambling online and 1.1% had started gambling in person. Of those who gambled before the COVID-19 pandemic, 2.2% moved to gambling online during lockdown.

Post-lockdown it was found that 0.8% of participants had continued to gamble online, 0.4% had moved back to gambling in person and 0.6% were engaging in a mixture of online and land-based gambling. A further 5.6% of participants started using a new online gambling product. Since the end of lockdown, 0.7% continued using the new product and 4.9% did not (43).

In populations of gamblers the proportion of people taking up new gambling activities was higher than in general population surveys. One UK survey of 3,866 sports bettors found that 17.3% of male and 16.6% of female participants started using new gambling products during lockdown (38). A second UK study of 537 online gamblers found that 26% of all online gamblers (32% females, 22% males) and 41% of regular online gamblers (those reporting gambling at least once a week) had signed up for new gambling accounts since the start of the lockdown (44).

International evidence

Three further surveys were conducted internationally in Australia, Canada and the USA. An Australian study of 2,019 gamblers found that 30% of participants had signed up for new online gambling accounts during lockdown (37). Also, 15% (424) of casino gamblers surveyed had started to gamble online while land-based casinos were closed in the USA. Participants who migrated to online gambling during lockdown were also more likely to display problem gambling than those who gambled only in land-based venues (35).

In a Canadian survey of 1,500 people, 6% of all participants had signed up for a new online gambling account during lockdown. This increased to 18% in participants who gambled. Men (8%) were more likely to sign up for new accounts than women (5%). Younger people aged 18 to 29 were most likely to sign up for new gambling accounts (10%) compared to other age groups. Participants aged 60 and over were least likely to sign up for a new gambling account (4%) (42).

Gambling frequency, intensity and spend

Ten studies, published in 12 papers, provided evidence on changes in gambling frequency, intensity and spend during lockdown (26 to 28, 30, 33, 34, 36, 37, 40, 41, 43, 45). Three were published in peer-reviewed journals (30, 33, 34) and 9 were grey literature, which included 2 reports (36, 37), 2 research briefings (40, 41) and 5 publications of data on websites (26 to 28, 43, 45).

One study used data from a gambling company and a national database to conduct a timeseries analysis (34) and the others used online surveys. One of the surveys had baseline data (36), the rest relied on participants recalling their level of gambling before COVID-19 restrictions.

UK evidence

Four studies were conducted in the UK, which all showed a reduction in gambling during lockdown (26 to 28, 36, 43, 45).

The first conducted in May 2020 used a general population sample of 9,067 and a further sample of 1,686 gamblers and affected others. This study also used baseline data from a previous study in October 2019 to examine change in gambling behaviour over time. It found that in May 2020, 57% of participants reported engaging in any gambling activity in the last 12 months, a reduction from 61% in October 2019. The number who had gambled during the last 4 weeks (during the lockdown) reduced from 49% in October 2019 to 39% in May 2020.

Engagement in all gambling activities was reduced, apart from online casino games (1.5% in October 2019 compared with 2.3% in May 2020). Most gamblers reported that during lockdown they were gambling about the same amount (52%) or less (41%). However, 4% were gambling more and this rose to 20% in people with a gambling problem.

Younger gamblers (aged 18 to 34) were more likely to increase their gambling frequency and spend compared to older age groups. Gambling spend was similar to frequency, with most participants spending the same or less on gambling during lockdown (36).

PHE's *Wider Impacts of COVID-19 on Health (WICH) tool* uses survey data from a general population sample (sample details reported on the WICH tool). This showed a reduction in the number of people gambling from 38.7% before lockdown to 33.8% during lockdown in the 16th release of data (13 May to 10 August 2020). This reduction during lockdown was seen when the data was broken down by all gambling activities, by gender and by age group.

The shift to gambling less during lockdown appeared to be more pronounced in people who gambled less frequently (about once a month), whereas those who gambled fortnightly or more were likely to gamble the same amount or to increase their gambling during lockdown.

Younger people (aged 18 to 24) reported the largest changes in gambling behaviour (38.0% gambling less and 26.1% gambling more). These changes generally lessened with increasing age (45).

In the first survey commissioned by the UK Gambling Commission, described in the previous section, it was found that gambling remained stable between 16 April and 18 June with a range of 28% to 32% participating. There was an increase in sports betting around the time that Premier League football returned, while at the same time there was a decrease in betting on virtual sports. Of all participants surveyed, 8% had decreased their time or money spent on

gambling and 3% had increased their time or money spent gambling, with younger people aged 18 to 34 being more likely to increase their gambling (26 to 28).

Data from their second survey showed that 25% of participants reduced their spend on gambling during lockdown while 12% reported an increase. When lockdown restrictions eased, 70% reported spending the same as they did before lockdown (43).

International evidence

Most international studies showed a similar pattern with gambling being reduced overall or more participants reducing their gambling during COVID-19 restrictions than the number who increased their gambling (30, 33, 34, 40, 41). Three studies were conducted in Sweden.

The first study was a time-series analysis which used data from the Swedish Gambling Authority on initiated gambling sessions and data from Sweden's largest gambling provider on daily amounts wagered. They reported a decrease in total gambling activity from early March, with a reduction in the range of 10% to 15% from what was forecast for this period (34).

The second study was a general population survey of 2,016 participants, which found that most respondents reported no change to their gambling (51%). While a small proportion reported an increase in gambling (4%), the proportion who reported a decrease in gambling (7%) was larger. In gamblers, 9% reported gambling losses during lockdown (last 30 days), which were higher than a typical 30-day period (30).

The third study looked at a sample of 327 Swedish elite athletes. It found that most participants had not gambled before or during COVID-19 restrictions (48%). While 33% reported that their level of gambling had not changed, 12% reported gambling less and 7% reported gambling more (33).

An Australian survey of 764 gamblers also found reductions in gambling, with most gamblers either stopping (10%) or decreasing their time gambling (64%) since the start of lockdown restrictions. Only 11% had increased their time spent gambling and 15% were gambling about the same amount. The median average monthly gambling spend reduced to \$200 AUD from \$450 AUD before lockdown (40).

A general population survey of 925 people in New Zealand found that participants were gambling less in the last 2 weeks compared to before lockdown. The study showed that people were gambling less on all types of gambling products (41).

Another Australian survey of 2,019 gamblers saw differing results. This study found that although more participants reported not gambling at all during lockdown (from 3.6% pre-lockdown to 7.9% during lockdown), the frequency of gambling had increased significantly. The proportion of people gambling at least once a week increased from 79% to 83% and gambling 4 or more times a week increased from 23% to 32%. It also found that males and younger people

(aged 18 to 34) were significantly more likely to increase their gambling frequency and spend (37).

Online gambling

We identified evidence on online gambling in 11 studies, appearing in 10 papers (24, 25, 29, 31, 34, 35, 37, 39 to 42, 44). Of these papers, 5 were published in peer-reviewed journals (24, 29, 31, 34, 35) and the others were grey literature. Two of the studies used data on gambling transactions (29, 34), while the rest used survey data.

UK evidence

Only one study reported on online gambling in the UK. In a sample of 537 online gamblers, it found that 30% were gambling more online, while 32% were gambling about the same and 37% were gambling less compared to before lockdown.

When looking at regular online gamblers (those reporting gambling once a week or more), 39% were gambling more often, 25% were gambling the same amount and 34% were gambling less compared to before lockdown. Of the respondents whose online betting activity had increased since the start of the the COVID-19 pandemic, 34% were concerned that they were spending too much money that they could not afford on online betting. A further 30% had concerns that they were developing a gambling addiction (44).

International evidence

While most papers saw a reduction in online gambling during the COVID-19 restrictions, 2 papers found an increase (24, 25, 37).

Two studies used a timeseries analysis to assess online gambling data (29, 34). The first was a Swedish study using data on initiated gambling sessions and daily amounts wagered (as described above). It reported a significant decrease in online betting after the 11 March 2020 (by 74.8%). However, there was a smaller but significant increase in online casino gambling (8.63%) during the same period (34). The second, a study of 5,396 online sports bettors from Sweden, Germany, Finland, and Norway found that after 7 March 2020 the percentage of sports bettors using casino games decreased and after 10 March all gambling rapidly declined (29).

The first study also found that low-intensity online gambling remained the same during this period, but that high-intensity online gambling significantly decreased by 8.3% (34). The second study found there was a significant reduction in gambling and wagering across all sports bettors regardless of how much they gambled (29).

The first study that showed an increase in online gambling was based in Canada. In a group of 2,005 gamblers, 9.7% had gambled online only and 13.6% had gambled online and at land-based venues in the past 12 months. However, during COVID-19 restrictions, the proportion of participants who had gambled online increased to 54%. Males and younger adults were more likely to have gambled online during lockdown restrictions (24, 25).

The second study was based in Australia. In a group of 2,019 gamblers, participants gambling online increased from 62% to 78% (37).

A further study in Sweden found that 997 participants who gambled online in the 12 months before completing the survey were likely to maintain their gambling during COVID-19 restrictions. Online horse betting was maintained by 90% of participants, online casino games by 81%, online poker by 74% and online bingo by 72% (31).

Four further studies of both gamblers and general populations (sample sizes ranging from 424 to 1,000 participants) reported that while online gambling had increased for some, they represented a smaller proportion of participants compared to the number who reduced their online gambling (35, 39 to 41).

One study reported that men were more likely than women to engage in online gambling, as were younger respondents, and that increased online gambling grew with income level (39).

Finally, a general population survey in Canada of 1,500 participants found that the number of online gamblers who reduced or increased their online gambling during lockdown was similar. It found 26% were gambling more than usual or much more than usual and 27% were gambling less than usual or much less than usual. However, online gamblers were a small proportion of participants as most reported no online gambling before or during COVID-19 restrictions (42).

Motivations for changes in gambling behaviour

Six studies, in 7 papers, provided evidence on motivations for changes in gambling behaviour (24, 25, 35 to 37, 40, 43). Of these papers, 2 were published in peer-reviewed journals (24, 35) and the rest were grey literature. All studies used an online survey to collect data and 3 also described qualitative data (36, 37, 40). There were 2 surveys from the UK (36, 43), 2 from Australia (37, 40), 1 from Canada (24, 25) and 1 from the USA (35).

In the UK, reasons for gambling less included not having the desire to gamble (30%), preferred types of gambling being unavailable (28%) and having less disposable income (11%). Some participants also said that shopping less had reduced opportunities to take part in gambling, particularly on National Lottery products (36).

Reasons for gambling less in Australia were broadly similar to the UK (40). Also, some participants said lockdown was an opportunity to change their gambling behaviour (37, 40).

Both in the UK and internationally, reasons given for gambling more included boredom or more free time (35 to 37, 40, 43), having more disposable income (36), being isolated due to COVID-19 (24, 25) and to reduce stress and anxiety (35). There was evidence that some participants had increased their gambling in the hope that they would generate more income (43) or have a big win (36).

Harmful gambling

There were 7 studies, in 8 papers, that provided information on harmful gambling during COVID-19 restrictions (24, 25, 30, 31, 33, 36, 38, 40). Some used the Problem Gambling Severity Index (PGSI), which screens gamblers to determine if they are experiencing harm due to their gambling. Results can find that gamblers are experiencing:

- no negative consequences from their gambling (score of 0)
- low-risk harms from gambling (score of 1 or 2)
- moderate-risk harms from gambling (score of between 3 and 7)
- problem gambling, where an individual is experiencing high levels of harm from gambling (score of 8 or more) (54)

Of these papers, 4 were published in peer-reviewed journals (24, 30, 31, 33) and 4 were grey literature, with 2 being reports (25, 36) and 2 research briefings (38, 40). All studies used online surveys to collect data. Two studies were completed in the UK (36, 38), 3 in Sweden (30, 31, 33), 1 in Canada (24, 25) and 1 in Australia (40).

In the UK, one study found that the proportion of gamblers experiencing some level of gambling risk (PGSI 1 or more) who gambled at least once a week reduced from 60% to 49% during lockdown. However, 9% of this group reported spending more on gambling during lockdown (36).

Another UK study of 3,866 sports bettors found that participants with a gambling problem (PGSI 8 or more) were more likely to start gambling on new activities during lockdown (50.2%) than those with lower gambling risk severity or non-problem gambling (38). It also found that they were more likely to take up riskier gambling activities, such as online casino or slots gambling (18.2%).

A Swedish general population study of 2,016 participants found that a higher PGSI score was associated with increases in all gambling types during COVID-19 restrictions (30). An association between increased gambling during COVID-19 and a higher PGSI score was also found in a survey of 327 elite athletes in Sweden (33).

In another Swedish study of 997 past-year online gamblers, participants with moderate-risk and problem gambling were more likely to have gambled in the past 30 days on land-based casino gambling ($p < 0.01$), electronic machine gaming ($p = 0.003$) and sports betting ($p < 0.01$), than those who had not gambled in the past 30 days (31). Also, people who participated in high-risk gambling were more likely to report that COVID-19 had influenced their decision to gamble online (24, 25) and to increase their gambling spend and frequency (40).

4.4 What impact has COVID-19 had on harms associated with gambling?

This section explores harms associated with gambling during COVID-19 restrictions. There were 9 studies, described in 10 papers (24, 25, 30, 32, 33, 35 to 37, 40, 41), that provided evidence on harms associated with gambling as defined by Langham's conceptual framework of gambling harm (23). We found data on 2 of the 7 dimensions of harm: financial harm and decrements to health. We divided the latter into mental health and alcohol, smoking and drug use. In this section we also report on data relating to individuals affected by someone else's gambling, but this was only found in 2 papers and the evidence was limited.

Of these papers, 5 were published in peer-reviewed journals (24, 30, 32, 33, 35) and 5 were grey literature (25, 36, 37, 40, 41). All studies used online surveys to collect data. All but one study used a cross-sectional methodology and we could not determine the direction of relationships between variables for these studies.

Mental health

Six studies looked at gambling during COVID-19 restrictions and the relationship this had with mental health. In a UK study there was no change in overall psychological distress (measured by the Kessler Psychological Distress Scale (K-10)) in gamblers from October 2019 to May 2020 (36).

In Canada, gamblers experiencing symptoms of moderate anxiety (OR 1.33, $p < 0.022$), moderately severe depression (OR 1.69, $p = 0.002$) and severe depression (OR 2.52, $p < 0.001$) were more likely to gamble online during lockdown. In a subsample of people who gambled online during COVID-19 restrictions, those with depression had nearly 5 times the odds and those with anxiety over 3 times the odds of having higher gambling risk severity (24, 25).

A general population survey of 2,016 participants in Sweden found that 74 participants who increased their gambling during COVID-19 restrictions was associated with psychological distress (measured by the Kessler Psychological Distress Scale (K-6)) (OR 1.55, $p < 0.001$) (30). In Spain, out of 26 gamblers receiving treatment, 46% (12) reported increased anxiety and 27% (7) reported increased depressive symptoms during lockdown (32).

A study looking at gamblers in Australia found that of those who substantially increased their gambling frequency during lockdown (84 participants), 10% reported severe distress and 35% reported moderate distress. There were similar findings for gamblers who substantially increased their time spent online gambling as a result of lockdown (133 participants) (40).

In contrast, another Swedish survey did not find an association between increased gambling during COVID-19 restrictions with depression and anxiety, but this survey looked at elite athletes and so is not representative of the general population (33).

Alcohol, smoking and drug use

There were 6 studies exploring gambling and alcohol, smoking and drug use during COVID-19 restrictions.

A UK study reported no change in high risk alcohol consumption (measured by the AUDIT-C score) or smoking status among gamblers between 2019 and 2020 surveys. However, this was not the case when looking at subsamples. In younger people who displayed problem gambling (aged 18 to 34), higher risk drinking increased from 20% in October 2019 to 31% in May 2020. This was also seen in black, Asian and minority ethnic (BAME) gamblers with 10% at higher risk levels in October 2019, increasing to 20% in May 2020 (36).

A Swedish study using a general population sample of 2,016 found that increased gambling during lockdown (reported by 77 participants) was associated with higher alcohol consumption (OR 2.68, $p < 0.001$) (30).

In a study of casino gamblers in the USA, increased online gambling during lockdown was associated with alcohol use ($p_{159}=0.169$, $p=0.032$) and tobacco use ($p_{127}=0.274$, $p=0.002$) (35).

In a Canadian study of gamblers, increased alcohol use during lockdown was associated with online gambling (OR 1.25, $p=0.042$), compared to those who did not gamble online during lockdown. In a subsample of people who gambled online during COVID-19 restrictions, high-risk gambling (138 participants) was associated with cannabis use (OR 2.71, $p < 0.001$), increased alcohol consumption (OR 2.07, $p=0.001$) and gambling under the influence of alcohol (OR 8.81, $p < 0.001$) or cannabis (OR 9.47, $p < 0.001$) (24, 25).

In contrast, an Australian study of 2,019 gamblers found that drinking and smoking prevalence was relatively stable during lockdown compared to levels before lockdown (37).

A Swedish study of elite athletes also reported no association between increased gambling during COVID-19 restrictions and increased alcohol consumption. However, this study is unlikely to be representative of the general population (33).

Financial harms

Two studies examined gambling during COVID-19 restrictions and the impact this had financially on participants.

A Canadian study of gamblers found that experiencing a negative impact on household income due to COVID-19 was associated with gambling online during lockdown (OR 1.21, $p=0.033$) compared to those who did not gamble online during lockdown. For people who gambled online during lockdown, high-risk gambling (138 participants) was associated with having work hours reduced (OR 2.44, $p=0.001$) and losing employment due to COVID-19 (OR 1.77, $p=0.007$) (24, 25).

An Australian study of gamblers found that 25% of people who substantially increased their gambling frequency during lockdown (84 participants) were having difficulties making ends meet (not defined). This was also the case for 30% of people who had substantially increased their time spent online gambling during lockdown (133 participants). The same study also found that 188 participants with financial difficulties due to COVID-19 were more likely to spend more money on gambling during lockdown (40).

Affected others

Only 2 studies asked participants if they were negatively affected by someone else's gambling.

In the UK, slightly less people reported being affected by someone else's gambling in May 2020 (6%) compared to October 2019 (7%) (36). In New Zealand, around 9% were affected by someone in their households gambling post-lockdown, which is similar to levels before lockdown (41).

Data on inequalities

This review considered data on inequalities where this was available. There was consistent evidence, from both the UK and internationally, that younger adults were more likely to increase gambling or take up new gambling activities during lockdown (26, 30, 36, 37, 39, 42, 45). One of these studies found that both the 18 to 29 and 30 to 39 age groups were 6 times more likely to gamble online during lockdown than those aged 50 or over (39).

Four studies found that males were more likely to increase their gambling during COVID-19 restrictions (28, 33, 37, 39). Males were also more likely to open new gambling accounts in one study (8% of males compared to 5% of females) (42) and another study found that males (OR 1.62, $p < 0.001$) were more likely to gamble online during COVID-19 (24, 25).

A UK study found that psychological distress was higher in gamblers from a BAME background during lockdown, increasing from 57% in October 2019 to 69% in May 2020. This was despite levels of psychological distress remaining consistent in gamblers overall. This was also the case for higher risk alcohol consumption, which increased in younger people with problem gambling and BAME gamblers, but not in gamblers overall (36).

5. Discussion

Most evidence on the impact of the initial COVID-19 lockdown on gambling behaviour showed an overall reduction in gambling in both the general population and some gambling samples, both in the UK and internationally (26 to 28, 30, 33, 34, 36, 40, 41, 43, 45). However, an Australian survey of gamblers found an increase in gambling frequency during COVID-19 restrictions (37). Similarly, PHE data found that people gambling more frequently (fortnightly or more) tended to be gambling the same or more often during lockdown (45).

There were concerns that closing gambling venues would lead to increased online gambling (4). This does not appear to be the case in most of the studies included in this review. Six studies saw an overall reduction in online gambling during the initial lockdown (29, 34, 35, 39 to 41), whereas 2 studies reported an overall increase in online gambling in populations of gamblers (24, 25, 37). This review covers a limited time period and cannot comment on if there has been a longer term shift to online gambling.

Most studies described in this report used self-reported data and relied on participants to recall their gambling before lockdown. This leaves this data open to bias. Two studies used player data obtained from gambling companies (29, 34) and one had baseline data from a previous study in October 2019 (36). This may mean these findings are more reliable. However, it is worth noting that these studies also declared conflicts of interest (29, 34) or were co-funded or indirectly funded by the gambling industry (34, 36). Other data sources that can provide baseline data before COVID-19 restrictions would be useful to corroborate these findings. Banking data has been used before to explore gambling harm (55) and looking at changes in spending during COVID-19 restrictions could provide useful insights into gambling behaviour. Also, longitudinal studies that look at how behaviour has changed over this period would be useful.

Despite an overall reduction in gambling, studies showed that a very small number of people started gambling for the first time during lockdown (26 to 28, 43). Also, some of those who gambled before COVID-19 engaged in new gambling behaviour by opening new accounts and trying new products during lockdown (28, 37, 38, 42, 44).

Twelve studies consistently found a small group who increased their gambling activity during lockdown (26 to 28, 30, 33, 35 to 40, 42 to 44). This increase was found in around 3% to 4% of participants in studies of the general population (26 to 28, 30, 36) and in 11% to 12% of participants in surveys with a gambling sample (40, 43). These people were more likely to be frequent gamblers (18, 29, 37), to have higher PGSI scores (24, 25, 30, 31, 33, 35, 36, 38, 40), to be male (28, 33, 37, 39) and to be younger in age (26, 30, 36, 37, 39, 42, 45).

These findings are based on small numbers of participants, so while these results can give us an indication, they should be interpreted with caution. However, there is little variation in study design between papers which helps with the comparability and consistency of the findings.

Another similarity between studies was that all countries included in this review were subject to some form of restriction on movement due to COVID-19 that affected access to gambling venues.

There was less evidence available on harms associated with gambling during the COVID-19 lockdown and most studies were based outside of the UK. Three studies found an association between gambling during lockdown and experiencing poorer mental health (24, 25, 30, 40), while another found no change in mental health outcomes in gamblers during COVID-19 restrictions compared to baseline (36).

Three studies found an association between gambling during lockdown and higher alcohol use (24, 25, 30, 35). However, 2 studies found no change in drinking or smoking in gamblers during lockdown from pre-lockdown levels (36, 37).

Two studies found that increased gambling during lockdown was related to financial difficulties (24, 25, 40). The evidence found on harms associated with gambling was limited and causality could not be determined due to the studies' cross-sectional design. We cannot draw any conclusions in this area, as any reported estimates would be likely to change in light of new evidence.

6. Limitations

Due to the rapid nature of this work, we did not use a validated tool to assess the quality of studies. Instead, we assessed risk of bias on:

- population or sample
- exposure
- outcome

We describe the approach taken in more detail in the [Methodology](#) section.

We did not have capacity to translate studies so only those published in English were included in this review.

Over half of the studies included in the review were grey literature, meaning that they have not been subject to a peer-review process.

Most studies included relied on self-reported data, which may be open to bias. There is some variation in the gambling landscape and COVID-19 restrictions by country so care should be taken when comparing results to the UK situation. However, there are similarities between countries included and the UK, such as restrictions on the availability of land-based gambling and postponing live sport, which make findings more robust.

This review provides a snapshot, looking at primary studies over a limited period (1 January to 1 October 2020) and more evidence may have been published since this time. Due to the limited period covered, studies included focus on the initial COVID-19 lockdown. There have been several subsequent changes in restrictions and further lockdowns which are not covered here. However, a registered protocol for a systematic review and meta-analysis looking at gambling during the COVID-19 pandemic is due to be completed later this year and is likely to be able to provide further evidence in this area (56).

7. Conclusions

There was consistent evidence from several studies showing a reduction in overall gambling during the initial COVID-19 lockdown. However, we recommend interpreting this with caution as the studies mostly derive their information from self-reported data. Also, this review only covers a limited time.

While concerns were raised about gamblers moving online to riskier forms of gambling (3, 4), most papers in this review found an overall decrease in online gambling. However, 2 studies showed an increase in online gambling, contradicting this. Further evidence is needed to be able to make firmer conclusions in this area.

Evidence was consistent around the motivations to increase gambling, with this most often attributed to boredom and more free time. Also, some studies found that a smaller group of participants gambled more during lockdown, with these individuals being more likely to have higher PGSI scores and to be younger in age.

We found limited evidence on the harms associated with gambling during COVID-19 restrictions. What evidence we did find was inconsistent and apart from one study, all were cross-sectional. So, we cannot make conclusions in this area. Studies that provide evidence on the harm of gambling during COVID-19 restrictions and the impact of COVID-19 on people who are negatively affected by someone else's gambling, would be beneficial for the evidence base.

Studies that use data sources other than self-reporting are needed to triangulate data and provide a clearer picture of the impact of COVID-19 restrictions on gambling. Monitoring changes in behaviour over a longer period of time would also be beneficial to show the full impact of COVID-19 restrictions on gambling behaviour. Researchers in both the UK and Australia have already registered research protocols for studies that take a longitudinal approach (40, 57), which are likely to show the impact of COVID-19 on gambling over a longer time-frame. We describe the initial results of these studies in this review (38, 40).

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Appendix 1. Search strategy

Search strategy used in Ovid Medline medical research platform.

1. gambl*.tw,kw.
2. (lowa adj gambl*).tw,kw.
3. 1 not 2.
4. Gambling/.
5. virtual good*.tw,kw.
6. (lottery or lotteries or lotto).tw,kw.
7. (scratchcard* or scratch card*).tw,kw.
8. in-game purchase*.tw,kw.
9. game credit*.tw,kw.
10. (loot box* or loot crate*).tw,kw.
11. (raffle* or tombola* or sweepstake* or FOBT).tw,kw.
12. (fruit machine* or jackpot machine* or slot machine*).tw,kw.
13. (video lottery or VLT).tw,kw.
14. casino*.tw,kw.
15. amusement arcade*.tw,kw.
16. microtransaction*.tw,kw.
17. (bingo not gene).tw,kw.
18. ((betting or bet or bets).tw,kw.
19. (game or games or gaming or gamer).tw,kw.
20. Video Games/.
21. 19 or 20.
22. (money or monetization or monetisation or monetary or reward* or win or wins or winning* or loss or losses or lose).tw,kw.
23. exp Reward/.
24. 22 or 23.
25. 21 and 24.
26. 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 25.
27. exp coronavirus/.
28. exp Coronavirus Infections/.
29. ((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,kw.
30. (coronavirus* or coronovirus* or coronavirinae* or CoV or HCoV*).ti,ab,kw.
31. (2019-nCoV or 2019nCoV or nCoV2019 or nCoV-2019 or COVID-19 or COVID19 or CORVID-19 or CORVID19 or WN-CoV or WNCov or HCoV-19 or HCoV19 or 2019 novel* or Ncov or n-cov or SARS-CoV-2 or SARSCoV-2 or SARSCoV2 or SARS-CoV2 or SARSCov19 or SARS-Cov19 or SARSCov-19 or SARS-Cov-19 or Ncover or Ncorona* or Ncorono* or NcovWuhan* or NcovHubei* or NcovChina* or NcovChinese* or SARS2 or SARS-2 or SARSCoronavirus2 or SARSCoronavirus-2 or

SARScoronavirus 2 or SARS coronavirus2 or SARScoronavirus2 or SARS-coronavirus-2 or SARScoronavirus 2 or SARS coronavirus2).ti,ab,kw.

32. (respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw.

33. ((seafood market* or food market* or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw.

34. ((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei or China* or Chinese* or Huanan*)).ti,ab,kw.

35. or/25-32.

36. 24 and 33.

37. limit 34 to yr='2020'.

Appendix 2. Summary table of main findings

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
Abacus Data, 2020 (42)	Study type: Online survey	Sample: 1,500 Canadian residents	New online accounts (since COVID-19): <ul style="list-style-type: none"> • 18% of gamblers • 6% of the total sample 	Published as a research briefing	Conflict of interest: Not reported
Grey literature 'Online Gambling/Betting Survey Results'	Aim or objective: Not described Country: Canada	Setting: Random sample of panellists from the Lucid exchange platform Date: 7 to 12 May 2020	Changes in online gambling (whole sample): <ul style="list-style-type: none"> • 76% did not gamble before or since the onset of COVID-19 • 4% more than usual • 3% gambled before COVID-19 but not after • 3% much less than usual • 3% less than usual • 1% much more than usual Changes in online gambling (online gamblers): <ul style="list-style-type: none"> • 47% about the same as usual • 20% more than usual • 14% much less than usual • 13% less than usual • 6% much more than usual 	Sample used weighted data (representative of Canadian population) Relies on self-reported data No defined objective or validated measures used	Funding: Cannot tell

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
Auer and others 2020 (29)	Study type: Timeseries analysis	Sample: 5,396 sports bettors who placed wagers in 5 out of 10 weeks between 1 January to 7 March 2020	Timeseries showed a rapid decline in sports betting after 10th March (number of active players and daily total amount wagered)	Data is from a single gambling operator	Conflict of interest: Declared
Published	Aim or objective: To investigate the behaviour of a sample of online sports bettors before and after COVID19 measures were put in place by European governments	Setting: Behavioural tracking data from a large European gambling operator	Most sports bettors also played online casino games (>70%) prior to 7 March however there was a reduction in those playing casino games after this point	Limited information provided on analysis of data	Funding: Cannot tell
'Gambling Before and During the COVID-19 Pandemic Among European Regular Sports Bettors: An Empirical Study Using Behavioral Tracking Data'	Countries: Sweden, Germany, Finland and Norway	Date: 1 January to 30 April 2020	Reduction in wagering on online casino games was seen in all groups after 7 March, however this reduction was less pronounced in those who gambled more frequently prior to 7 March		
			Less frequent sports bettors were more likely to stop gambling whereas frequent sports bettors maintained their level of online casino gambling		
			Amount spent on sports betting prior to 7 March did not appear to have a relationship with level of online casino gambling after 7 March		

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
<p>Brown and Hickman, 2020 (39)</p> <p>Grey literature</p> <p>'Changes in online gambling during the COVID-19 pandemic'</p>	<p>Study type: Omnibus survey (cross-sectional and descriptive analysis)</p> <p>Aim or objective: To investigate changes in the prevalence of online gambling when COVID-19 related social distancing measures were introduced</p> <p>Country: Australia</p>	<p>Sample: 1,000 participants</p> <p>Setting: Online panel from i-Omni service</p> <p>Date: 3 to 6 April 2020</p>	<p>24% of participants had gambled online in the last month</p> <p>11% of participants had increased at least one type of online gambling compared to the first 2 months of the year (45% of past month online gamblers) – most often betting on Australian sports events and online pokies</p> <p>14% of participants had decreased their use of at least one type of online gambling compared to the first 2 months of the year (60% of past month online gamblers)</p> <p>29% of those who had gambled in the past month had increased in one type of online gambling and decreased another</p>	<p>Published in a statistical bulletin</p> <p>Panel survey may not be representative of general population, but sample was broadly representative of Australian population (age, gender and territory)</p> <p>Relies on self-reported data</p>	<p>Conflict of interest: Not reported</p> <p>Funding: Cannot tell</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
<p>Gainsbury and others 2020 (40)</p> <p>Grey literature</p> <p>'The impact of the COVID-19 shutdown on gambling in Australia Preliminary results from Wave 1 cross-sectional survey'</p>	<p>Study type: Cross-sectional online survey with qualitative data</p> <p>Aim or objective: To investigate the impact of the shutdown on the gambling behaviour of a sample of Australian gamblers, particularly in relation to psychological distress, financial stress, and existing gambling problems</p>	<p>Sample: 764 Australian adults (85% male; aged 18 to 82) who had gambled in the past 12 months</p> <p>Setting: Online survey</p> <p>Date: May 2020</p>	<p>All gambling (during lockdown):</p> <ul style="list-style-type: none"> • 64% decreased their gambling • 15% gambling stayed the same • 11% increased gambling • 10% had stopped gambling <p>Significant increase in gambling (N=84):</p> <ul style="list-style-type: none"> • 38% moderate-risk gamblers • 35% moderately distressed • 25% difficulties making ends meet • 17% problem gamblers • 10% severely distressed <p>Online gambling (during lockdown):</p> <ul style="list-style-type: none"> • 42% decreased their online gambling • 29% online gambling stayed the same • 18% increased online gambling • 9% had stopped online gambling • 1% started online gambling for the first time <p>Significant increase in online gambling (n=133):</p> <ul style="list-style-type: none"> • 35% moderate-risk gamblers 	<p>Published as a research briefing</p> <p>Relies on self-reported data</p> <p>Validated tools used to measure gambling severity and psychological distress</p> <p>Sample recruited from a range of organisations, through social media and online advertisement</p>	<p>Conflict of interest: Not reported</p> <p>Funding: Non-industry funded</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
	Country: Australia		<ul style="list-style-type: none"> • 35% moderately distressed • 30% difficulty making ends meet • 24% problem gamblers • 11% severely distressed <p>Gambling spend: Median monthly spend reduced to \$200 AUD during lockdown from \$450 AUD</p> <p>Harmful gambling:</p> <ul style="list-style-type: none"> • 27% of moderate-risk gamblers increased gambling spend • 25% of problem gamblers increased gambling spend <p>Moderate-risk gamblers were most likely to increase gambling frequency</p> <p>Most problem gamblers reported their issues had decreased (60%) or stayed the same (21%)</p> <p>Gambling-related harms: Those reporting higher distress were more likely to increase spending on gambling</p>	Benefits from additional qualitative data	

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			<p>Those reporting COVID-related financial difficulties were more likely to increase spending on gambling</p> <p>Qualitative data: Some reported gambling less due to lack of access to venues and lack of opportunity</p> <p>Some reported gambling more due to boredom</p> <p>Changes in disposable income had affected patterns of gambling for some</p> <p>Lockdown was an opportunity for some to change their gambling</p>		
<p>Gambling Commission, 2020 (26-28)</p> <p>Grey literature</p> <p>'Covid-19 and its impact on gambling –</p>	<p>Study type: Online omnibus survey</p> <p>Aim or objective: To help understand these risks and</p>	<p>Sample: Around 2,000 individuals weekly</p> <p>Setting: Recruited through YouGov COVID</p>	<p>New gambling: Between 0.2% and 0.4% of respondents reported gambling for the first time over the length of the survey</p> <p>31% of past-four-week gamblers have tried one or more new gambling activities; rising to 48% of engaged gamblers (those participating in 3 or more gambling activities in the past-four-weeks)</p>	<p>Published on a webpage with no additional data table</p> <p>Limited information on methods and analysis provided</p>	<p>Conflict of interest: Not reported</p> <p>Funding: Indirect industry funded</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
<p>what we know so far' [updates provided in June and July]</p>	<p>trends, and to inform public knowledge, we are collecting additional data from operators and consumer research – allowing us to build a clearer picture week by week</p> <p>Country: UK</p>	<p>tracker omnibus survey</p> <p>Date: Data collected in March, April and May 2020</p>	<p>1.6% of past-four-week gamblers said they had taken part in activities online which they used to do in person</p> <p>2% of recent gamblers had signed up for new gambling accounts</p> <p>Gambling behaviour: 2.1% reported stopping gambling during COVID-19</p> <p>Over the length of the survey past-four-week gambling remained stable between 28% and 32%</p> <p>There was a recovery of sports betting in May, in line with the return of live sports, while betting on virtual sports has decreased</p> <p>Overall, 8% had reduced or stopped gambling, whereas 3% had increased or started gambling for the first time</p>	<p>Sample not clearly defined</p> <p>Relies on self-reported data</p> <p>Recruited through market research company as part of omnibus survey on wider topics</p> <p>Monitoring rather than defined objective</p>	

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			<p>73% past-four-week gamblers had not increased the time or money spent on gambling</p> <p>Engaged gamblers: Those who participated in 3 or more gambling activities in the past-four-weeks are spending more time or money on one or more gambling activities</p> <p>Advertising: 34% had seen marketing for online gambling during the past four weeks (39% pre-lockdown)</p>		
<p>Gambling Commission, 2020 (43)</p> <p>Grey literature</p> <p>'Market overview for August 2020 - consumer research'</p>	<p>Study type: Online omnibus survey</p> <p>Aim or objective: To explore how people's gambling behaviour (rather than</p>	<p>Sample: 3,389 representative of UK population (Aged 16 and over)</p> <p>Setting: Omnibus survey via Yonder</p>	<p>New gambling (% whole sample): 4.0% began gambling for the first time during lockdown</p> <p>Post-lockdown, 2.6% are not gambling, 0.6% continue to gamble online and 1.1% have started gambling in person</p> <p>2.2% are gamblers who start gambling online during lockdown</p>	<p>Published on a webpage with no additional data table</p> <p>Limited information on methods and analysis provided</p>	<p>Conflict of interest: Not reported</p> <p>Funding: Indirect industry funded</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
	<p>participation) changed as a result of the initial lockdown period, including shifts to online gambling and whether changes have been maintained post-lockdown</p> <p>Country: UK</p>	<p>(previously Populus)</p> <p>Date: 17 to 19 July and 15 to 16 August</p>	<p>Post-lockdown, 0.8% maintain online gambling, 0.4% return to gambling in person and 0.6% keep a mixture</p> <p>5.6% are online gamblers who start gambling on new products during lockdown</p> <p>Post-lockdown, 4.9% stop using new product and 0.7% keep new product</p> <p>Gambling spend (% gamblers): 12% increased gambling spend during lockdown</p> <p>25% decreased gambling spend during lockdown</p> <p>Post-lockdown, 70% report no change in gambling spend compared to pre-lockdown levels</p> <p>Motivations for increase gambling spend: Boredom or needing some excitement</p> <p>More time to spend on leisure activities</p>	<p>Subsamples not well defined</p> <p>Relies on self-reported data</p> <p>Uses market research company to collect data</p> <p>Data reported collected over 3 time periods</p>	

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			Wanting to bring in money		
Gunstone and others 2020 (36) Grey literature 'The impact of the COVID-19 lockdown on gambling behaviour, harms and demand for treatment and support'	Study type: Follow up online survey with qualitative data Aim or objective: To understand the current level of demand, whether this had changed (given the changes in supply), and whether overall demand had increased or decreased as a result of the Pandemic and lockdown	Sample: 9,067 general population sample (75% response rate from Phase 1 study n=12,161) 1,686 PGSI 1 or above gamblers and affected others sample, including n=1,030 from Phase 2 study (69% response rate) 8 in-depth telephone interviews	Gambling participation (past 12 months): 57% reported any gambling activity (61% in October 2019) Gambling participation (past-four-weeks): 39% took part in any gambling activity (49% in October 2019) Gambling participation (by type): All activities reduced from October 2019 to May 2020 apart from online casino games (2.3% in May 2020 from 1.5% October 2019) Gambling frequency: 52% report gambling the same amount during lockdown, 41% reported gambling less and 4% reported gambling more 37% reported gambling at least once a week (45% in October 2019) 43% reported gambling less than once a month (31% in October 2019)	Published as a report Sample well defined, one of the only studies reporting response rate Has baseline data rather than relying on recall Good response rate from previous studies Uses validated tools to measure gambling severity, alcohol consumption and	Conflict of interest: Not declared Funding: Indirect industry funded

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
	Country: UK	<p>Setting: Completed by YouGov for GambleAware</p> <p>Re-contacted respondents from 2 previous studies and used previous data as baseline</p> <p>Date: May 2020 (baseline data from October 2019)</p>	<p>Gambling spend: 51% reported spending the same amount on gambling during lockdown and 41% report spending less</p> <p>PGSI Score: 12% were PGSI 1 or above gamblers in May 2020 (13% in October 2019)</p> <p>43% were non-gamblers in May 2020 (39% in October 2019)</p> <p>Harmful gambling: 20% problem gamblers (PGSI 8 or above) reported gambling more frequently during lockdown</p> <p>12% of PGSI 1 or above gamblers reported gambling more frequently during lockdown</p> <p>9% PGSI 1 or above gamblers reported spending more on gambling during lockdown</p> <p>The level of PGSI 1 or above gamblers reporting gambling at least once a week</p>	<p>Psychological distress</p> <p>Benefits from additional qualitative data</p> <p>Relies on self-reported data</p>	

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			<p>reduced (46% in May 2020; 60% in October 2019)</p> <p>Problem gamblers (PGSI 8 or above) were more likely to say they gambled less due to bookmakers being closed (13%)</p> <p>Motivations for gambling less (free text):</p> <ul style="list-style-type: none"> • 22% due to live sport being cancelled • 13% due to shopping less • 9% only did lottery or scratch cards occasionally • 8% did not feel the need to gamble • 8% were not going out • 8% being more careful with money <p>Motivations for gambling less (predetermined):</p> <ul style="list-style-type: none"> • 30% did not have the desire to gamble • 28% only gambled on occasion • 28% preferred different types of gambling not available • 11% had less disposable income 		

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			<p>Motivations for gambling more (free text):</p> <ul style="list-style-type: none"> • 36% for fun or to cheer them up • 24% boredom or more free time <p>Motivations for gambling more (predetermined):</p> <ul style="list-style-type: none"> • 52% due to boredom or for something to do • 48% prospect of winning big • 26% more disposable income • 4% for something to do with friends and family <p>Gambling-related harms: 49% of PGSI 1 or more gamblers were drinking at increasing or higher risk levels (consistent from October 2019)</p> <p>Smoking status remained consistent from October 2019</p> <p>Level of psychological distress remained consistent from October 2019, but increased in BAME participants from 57% in October 2019 to 69% in May 2020</p>		

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			<p>Affected others: 6% of respondents reported being affected by someone else’s gambling in May 2020 (7% in October 2019)</p> <p>Qualitative data: For some, lockdown had increased mental health concerns and for a few this had led to increased gambling</p> <p>For a few, seeing an increase in online gambling advertisements during lockdown had prompted them to gamble more often</p> <p>The cancelation of live sport was attributed by male respondents as a reason for reduced gambling</p> <p>Some attributed a decrease in gambling to a decrease in social occasions where they could have gambled (such as at the horse races)</p> <p>Gambling at high levels accompanied psychological issues in a couple of respondents</p>		

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			A couple of respondents mentioned increased gambling while under the influence of alcohol		
Håkansson, 2020 (30) Published 'Changes in Gambling Behavior during the COVID-19 Pandemic—A Web Survey Study in Sweden'	Study type: Cross-sectional online survey Aim or objective: To examine whether self-reported gambling has increased during the pandemic, and to examine potential correlates of such a change Country: Sweden	Sample: 2,016 general population (18 and above) Setting: Web panel of a market research company Date: 24 April to 3 May 2020	Gambling behaviour (during COVID-19): <ul style="list-style-type: none"> • 51% reported no difference in gambling • 38% did not gamble before or since the onset of COVID-19 • 7% reported gambling less • 4% reported gambling more Gambling losses: 9% lost more in the past 30 days compared to a typical 30 day period Correlates of increased gambling (overall): A univariate analysis found that gambling more was significantly associated with: <ul style="list-style-type: none"> • higher PGSI score • history of self-exclusion • younger age • higher alcohol consumption • psychological distress • more time at home 	Recruited through market research company Relies on self-reported data Uses validated measures for gambling severity and psychological distress Uses cross-sectional methodology so can determine association but	Conflict of interest: Declared Funding: Co-funded

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			<p>Higher gambling severity and increased alcohol consumption remained significant in the logistic regression analysis</p> <p>Changes in gambling due to cancellation of sports: 69% no change as they do not usually bet on sports (associated with lower PGSI score, female gender, older age and not spending more time at home)</p> <p>19% reported gambling less (associated with younger age and male gender)</p> <p>6% reported more horse betting (associated with older age and higher PGSI score)</p> <p>5% gambling more on other games (associated with male gender and higher PGSI score)</p> <p>4% reported gambling more on online casino games (associated with higher PGSI score)</p> <p>2% reported gambling more on other sports (associated with higher PGSI score)</p>	<p>not direction of these</p>	

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
<p>Håkansson and others 2020 (32)</p> <p>Published</p> <p>'Gambling during the COVID-19 crisis - A cause for concern?'</p>	<p>Study type: Telephone survey</p> <p>Aim or objective: To monitor the impact of the initial 4 weeks of COVID-19-related confinement</p> <p>Country: Spain</p>	<p>Sample: 26 patients attending treatment (22 male)</p> <p>Setting: Telephone interviews with patients from Gambling Disorder and other Behavioral Addictions Unit, University Hospital of Bellvitge</p> <p>Date: Not described</p>	<p>After 2 weeks in confinement:</p> <ul style="list-style-type: none"> • 46% reported symptoms of anxiety • 27% reported symptoms of depression • 19% were abstinent from gambling • 12% reported a worsening of gambling 	<p>Small sample</p> <p>Relies on self-reported data</p> <p>No measures described</p> <p>No date of data collection given</p> <p>No response rate</p>	<p>Conflict of interest: Not declared</p> <p>Funding: Cannot tell</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
<p>Håkansson, 2020 (31)</p> <p>Published</p> <p>'Impact of COVID-19 on Online Gambling – A General Population Survey During the Pandemic'</p>	<p>Study type: Cross-sectional online survey</p> <p>Aim or objective: Focuses on past-30-day and past-year gambling patterns in Swedish online gamblers, in order to highlight the online gambling situation during the ongoing COVID-19 crisis</p> <p>Country: Sweden</p>	<p>Sample: 997 past-year online gamblers (75% male)</p> <p>Setting: Web panel used through market research company (Ipsos)</p> <p>Date: 5 to 12 May 2020</p>	<p>Percentage of past-year gamblers who gambled in the past 30 days (by gambling type):</p> <ul style="list-style-type: none"> • 90% online horse betting • 86% gambling within video games • 81% online casino games • 74% online poker • 72% online bingo • 56% live sports betting • 56% non-live sports betting • 46% electronic gambling machines • 42% land-based horse betting • 26% land-based casino games <p>Harmful gambling: Moderate-risk and problem gamblers were more likely to have recently gambled in sports betting, land-based casinos and electronic gambling machine, but not online horse betting</p> <p>Gambling harms: Past 30-day sports bettors had higher levels of gambling problems and were more likely to have a history of indebtedness</p>	<p>Project not specifically designed to measure impact of COVID-19 on gambling but undertaken during COVID-19</p> <p>Only explores online gambling</p> <p>Relies on self-reported data methodology so can determine association but not direction of these</p>	<p>Conflict of interest: Declared</p> <p>Funding: Co-funded</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
<p>Håkansson and others 2020 (33)</p> <p>Published</p> <p>'Psychological Distress and Problem Gambling in Elite Athletes during COVID-19 Restrictions—A Web Survey in Top Leagues of Three Sports during the Pandemic'</p>	<p>Study type: Cross-sectional online survey</p> <p>Aim or objective: To study current perceived psychological influence from COVID-19 and symptoms of depression, anxiety and changes in alcohol drinking, gambling behaviour and problem gambling in the midst of the COVID-19 lockdown in elite athletes</p>	<p>Sample: 327 elite athletes in soccer, ice hockey and handball (62% Male; 15 and above)</p> <p>Response rates: 58% for soccer, 26% for ice hockey and 16% for handball</p> <p>Setting: Sent to union members of the highest male and female leagues in soccer, ice hockey and handball</p> <p>Date: 20 May to 10 June 2020</p>	<p>Gambling during COVID-19:</p> <ul style="list-style-type: none"> • 48% did not gamble (now or before COVID-19) • 33% reported their gambling the same amount • 12% were gambling less • 7% were gambling more <p>Changes in gambling due to cancellation of sports (n= 274):</p> <ul style="list-style-type: none"> • 73% did not normally gamble on sports so were not affected • 18% reported gambling less • 7% reported increased horse betting • 1% (4) reported increased online casino gambling • 1% (4) reported increased gambling on other games • 1% (2) reported gambling on other types of sports <p>Associations with increased gambling during COVID-19: Strongly associated with higher PGSI score</p>	<p>Validated tools used to measure gambling severity</p> <p>Used brief instruments to measure anxiety and depression</p> <p>Relies on self-reported data</p> <p>Low response rates</p>	<p>Conflict of interest: Declared</p> <p>Funding: Co-funded</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
	Country: Sweden		No association with depression or anxiety No association with increased alcohol consumption		
Hunt and others 2020 (38) Grey literature 'Gambling during Covid-19: Insights from the Betting and Gambling Covid-19 Impact Study, Briefing Paper 1'	Study type: Online survey Aim or objective: To present emerging findings from the first wave of a longitudinal study of sports bettors, set up to monitor behaviour change over the next year Country: UK	Sample: 3,866 regular sports bettors (aged 18 and above) Setting: Existing sample of regular sports bettors on YouGov (market research company) Date: Not reported	Gambling behaviour: The majority of sports bettors stopped gambling during the initial UK lockdown Harmful gambling: 50.2% of problem gamblers (PGSI 8 or more) started gambling on new activities during lockdown (compared to 11.2% of non-problem gamblers; 21.4% of low-risk gamblers and 31.1% of moderate risk gamblers) 18.2% of problem gamblers (PGSI 8 or more) started gambling on risky activities (online casino or slots) compared to 1.8% of non-problem gamblers In sports bettors who gambled on more risky activities, 48.1% were moderate-risk or problem gamblers	Published on Centre for Open Science (OSF) as research briefing Date of data collection not reported Relies on self-reported data Sample recruited from a market research company	Conflict of interest: Not reported Funding: Non-industry funded

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			In sports bettors who took up a new gambling activity, 33.2% were moderate-risk or problem gamblers		
Jenkinson and others 2020 (37) Grey literature 'Gambling in Australia during COVID'	Study type: Online survey with qualitative data (telephone and video interviews) Aim or objective: To learn more about the types of products people gambled on before and during COVID-19 (for example sports, racing, pokies), and how people's gambling	Sample: 2,019 individuals who had gambled in the past 12 months (73% male) 10 telephone interviews with experts Setting: Recruited via social media advertisements, e-news alerts and word of mouth Date: Online survey: 10 June to 31 July 2020	Gambling behaviour: 3.6% reported they did not gamble before COVID-19, rising to 7.9% during COVID-19 Individuals reported gambling on an average of 3 products before COVID-19 and 2 products during COVID-19 Gambling frequency: The number of individuals who participated in gambling at least once a week rose from 79% to 83% during COVID-19 The number who participated in gambling over 4 times a week rose from 23% to 32% during COVID-19 Gambling spend: Median monthly spend decreased from \$500 AUD to \$460 AUD, but this was not statistically significant Online gambling:	Published as a report Relies on self-reported data Sample recruited from a wide range of sources Benefits from additional qualitative data	Conflict of interest: Not reported Funding: Cannot tell

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
	<p>participation, alcohol consumption and health and wellbeing were affected</p> <p>Country: Australia</p>	<p>Telephone interviews: July and August 2020</p>	<p>Before COVID-19 62% reported gambling online, which increased to 78% during COVID-19</p> <p>Harms: Drinking and smoking prevalence was stable from before and during COVID-19</p> <p>Qualitative data (participants): Some discussed how they had adapted to the changes in availability of gambling in Australia by changing gambling type or betting on virtual sports or weather markets</p> <p>Some discussed taking a break from gambling during COVID-19</p> <p>Some described gambling due to boredom and to socialise with friends</p> <p>Qualitative data (experts): There were reports that online gambling companies were offering generous offers to attract new customers</p>		

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			<p>Some had seen improvements in their clients who had used COVID-19 as an opportunity to take a break from gambling</p> <p>Some experts felt that clients were drinking more to cope with stress of COVID-19, but others thought that the relationship between alcohol, gambling and COVID-19 was too complicated to make any direct links</p>		
<p>Lindner and others 2020 (34)</p> <p>Published</p> <p>'Transitioning Between Online Gambling Modalities and Decrease in Total Gambling Activity, but No Indication of Increase in</p>	<p>Study type: Timeseries analysis</p> <p>Aim or objective: To examine whether the first phase of the COVID-19 outbreak in Sweden was associated with an increase in overall gambling activity on a</p>	<p>Sample: Swedish Gambling Authority provided data on number of gambling sessions initiated per day</p> <p>Dataset from the same period from one of the largest licenced gambling</p>	<p>There was a decrease of 13.29% in gambling compared to forecast for the period 12 May 2020 and 8 April 2020</p> <p>Online gambling activity increased by 3.7% from forecast, but this was not significant</p> <p>There was a significant decrease in online sports betting (by 74.8%) and a smaller but significant increase in online casino gambling (by 8.63%) which began in late February</p> <p>Low-intensity online gambling was no different than forecast</p> <p>High-intensity online gambling decreased by 8.3% compared to forecast</p>	<p>Looks at single-metric (that is the amount spent or number of sessions initiated)</p> <p>Threshold for high-intensity gambling was high</p> <p>Swedish Gambling Authority has reported</p>	<p>Conflict of interest: Declared</p> <p>Funding: Co-funded</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
Problematic Online Gambling Intensity During the First Phase of the COVID-19 Outbreak in Sweden: A Time Series Forecast Study'	population level, whether high-intensity online gamblers were particularly affected, and whether online gamblers transitioned between gambling modalities Country: Sweden	providers in Sweden Date: 1 January 2019 to 8 April 2020		concerns around look-up queries (number of sessions imitated) as this is higher than expected	
Price, 2020 (24) Published 'Online Gambling in the Midst of COVID-19: A Nexus of	Study type: Cross-sectional online survey Aim or objective: This study examined the emerging impact of	Sample: 2,005 gamblers with a subsample of 1,081 online gamblers (aged 18 and above) Setting: Recruited by Delvinia (an	Online gambling: 54% of participants had gambled during emergency measures (this was typically: 76.7% land-based only, 13.6% land-based and online, 9.7% online only) Online gambling by type (over 6 weeks following the declaration of provincial emergency measures): <ul style="list-style-type: none"> 84.6% lottery or raffle play 	Study is published as a report and in a peer-reviewed journal Uses appropriate validate tools	Conflict of interest: Declared Funding: Non-industry funded

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
<p>Mental Health Concerns, Substance Use and Financial Stress'</p> <p>Responsible Gambling Council (RGC), 2020 (25)</p> <p>Grey Literature</p> <p>'The Emerging Impact of COVID-19 on Gambling in Ontario'</p>	<p>COVID-19 on gambling during the first 6 weeks of emergency measures in Ontario, Canada</p> <p>Country: Canada</p>	<p>online survey vendor)</p> <p>Date: 21 to 28 April 2020</p>	<ul style="list-style-type: none"> • 39.4% instant lottery • 21.3% electronic gambling machines • 15.7% casino table games • 10.8% sports betting • 6.8% novelty betting (such as politics, reality tv) • 6.3% virtual sports betting • 6% horse racing <p>Gambling motivations: Around a third said their online gambling had been influenced by COVID-19 and isolation this had caused</p> <p>Harmful gambling: High-risk gamblers were most likely to gamble online during emergency measures</p> <p>High-risk gambling was associated with increased alcohol use during emergency measures</p> <p>High-risk gamblers were more likely to experience negative financial impacts due to</p>	<p>Relies on self-reported data</p> <p>Recruited through market research company</p> <p>Questions on COVID have not previously been tested</p> <p>Cross-sectional methods show association but causality between variables cannot be determined</p>	

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			<p>COVID-19 (such as losing employment or having working hours reduced)</p> <p>High-risk gamblers were more likely to report that COVID-19 had influenced their decision to gamble online</p> <p>Gambling harms: Those with moderate anxiety (OR = 1.33), moderately severe depression (OR = 1.69) and severe depression (OR = 2.52) were more likely to gamble during emergency measures</p> <p>Those who reported increased alcohol intake during emergency measures were more likely to gamble online</p> <p>Those who reported negative financial impact due to COVID-19 were more likely to gamble online</p> <p>Gambling under the influence of alcohol or cannabis was correlated with moderate and high risk gambling, anxiety and depression</p>		

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
Public Health England, 2020 (45) Grey literature 'Wider Impacts of COVID-19 on Health (WICH) monitoring tool'	Study type: Online survey Aim or objective: To observe and monitor how the gambling behaviour of people across different groups has changed during lockdown Country: England	Sample: Selected from over 1 million British adults on YouGov panels (aged 18 and above) Setting: Pooled survey data collected by YouGov Date: 13 May to 10 August 2020 (release 16)	Impact of COVID-19 on gambling activity: Before Lockdown: 38.7% engaged in gambling and 61.3% did not engage in gambling During Lockdown: 33.8% engaged in gambling and 66.2% did not engage in gambling Impact of COVID-19 on gambling activity (by type): Lottery products: 33.8% before lockdown and 30.3% during lockdown Any gambling (excluding lotteries): 21.0% before lockdown and 15.9% during lockdown Betting activities: 7.7% before lockdown and 4.3% during lockdown Gambling machines and games: 4.3% before lockdown and 3.3% during lockdown Gambling frequency: Everyday or 6 to 7 days a week: 2.6% before lockdown and 2.6% during lockdown	Published on a webpage, with detailed data tables Sample not clearly defined Uses weighted data to be representative of UK population Relies on self-reported data Collected by market research company	Conflict of interest: Not declared Funding: Non-industry funded

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
			<p>4 to 5 days a week: 3.6% before lockdown and 4.2% during lockdown</p> <p>2 to 3 days a week: 16.1% before lockdown and 16.8% during lockdown</p> <p>About once a week: 36.7% before lockdown and 38.4% during lockdown</p> <p>About once a fortnight: 13.5% before lockdown and 16.9% during lockdown</p> <p>About once a month: 27.6% before lockdown and 21.1% during lockdown</p>		
<p>Survation, 2020 (44)</p> <p>Grey literature</p> <p>'COVID-19: Survation survey for Clean Up Gambling campaign</p>	<p>Study type: Online survey</p> <p>Aim or objective: Not described</p> <p>Country: UK</p>	<p>Sample: 1,010 total respondents with a subsample of 537 who participate in online gambling (aged 18 and above)</p>	<p>New online gambling accounts (since COVID-19 outbreak started):</p> <ul style="list-style-type: none"> • 26% of all online gamblers • 41% of regular online gamblers (gambles at least once a week) • 16% of casual online gamblers (gambles at least once a month, but less than once a week) • 9% of infrequent online gamblers (gambles less than once a month) 	<p>Recruited from online panel</p> <p>Relies on self-reported data</p> <p>No objective defined and limited data provided on methodology</p>	<p>Conflict of interest: Not reported</p> <p>Funding: Cannot tell</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
points to addiction concerns during Coronavirus lockdown'		Setting: Online panel prepared for Clean Up Gambling (advocacy group) Date: 21 to 22 April 2020	Online gambling in all online gamblers (since COVID-19 outbreak started): <ul style="list-style-type: none"> • 37% were gambling less • 32% were gambling the same • 30% were gambling more Online gambling in regular online gamblers (since COVID-19 outbreak started): <ul style="list-style-type: none"> • 39% were gambling more • 34% were gambling less • 25% gambling the same 	Data weighted to be representative of UK population Published on a webpage, however data table provided	
Te Hiringa Hauora/Health Promotion Agency, 2020 (41) Grey literature 'Post-lockdown survey- the impact on health risk behaviours'	Study type: Online survey Aim or objective: This survey looks at changes in health risk behaviours post-lockdown Country: New Zealand	Sample: 925 (over-representation of Māori and Pasifika respondents) Setting: Sourced from Nielsen panel partners, supplement with database to boost Māori	Gambling behaviour: Fewer participants had gambled in the last two weeks compared to pre-lockdown Online gamblers use of some online gambling sites has increased since the end of lockdown Gambling activity (by type): Online: 39% pre-lockdown and 34% post-lockdown Casino: 21% pre-lockdown and 16% post-lockdown	Published as brief report or research briefing Sample weighted to be representative of New Zealand adult population (aged 18 and above)	Conflict of interest: Not reported Funding: Cannot tell

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
		<p>and Pasifika respondents</p> <p>Date: 10 to 19 June 2020</p>	<p>Pokie machine: 32% pre-lockdown and 22% post-lockdown</p> <p>Lotto products: 70% pre-lockdown and 50% post-lockdown</p> <p>NZ TAB betting: 30% pre-lockdown and 19% post-lockdown</p> <p>Affected others: 9% reported being affected by someone in their households gambling (consistent with pre-lockdown levels)</p>	Relies on self-reported data	
<p>Xuereb and others 2021 (35)</p> <p>Published</p> <p>'Substitution behaviors among casino gamblers during COVID-19 precipitated</p>	<p>Study type: Cross-sectional online survey</p> <p>Aim or objective: To examine how Americans who gamble responded to the COVID-19 lockdown, including</p>	<p>Sample: 424 Americans who had gambled at a casino in the last 3 months (aged 18 and above)</p> <p>Setting: Amazon's Mechanical Turk (MTurk)</p>	<p>Gambling intensity: In those who gambled online, there was a significant decrease in online gambling since the closure of casinos</p> <p>Gambling-related harm: Increased online gambling was associated with higher PGSI score, alcohol use and tobacco use</p> <p>Gambling motivations (gambling more):</p> <ul style="list-style-type: none"> • 56.9% due to boredom or an increase in free time 	<p>Recruited through an online survey panel</p> <p>Relies on self-reported data</p> <p>High number of problem gamblers in sample,</p>	<p>Conflict of interest: Declared</p> <p>Funding: Cannot tell</p>

Reference	Study design	Methods	Summary of main findings	Risk of bias	Declaration of interest
casino closures'	migration to online gambling, and changes in substance use and use of other technologies Country: USA	Date: 9 April 2020	<ul style="list-style-type: none"> • 11.2% due to increased stress or anxiety • 1.2% to fill the void left by the closure of land-based gambling <p>Grouped characteristics (previous online gamblers (n=186), migrators to online gambling (n=34) and never gambled online (n=203):</p> <p>Those who never gambled online had a lower PGSI score than previous online gamblers and migrators to online gambling</p> <p>Migrators to online gambling earned significantly less than those who never gambled online</p> <p>Those who never gambled online were older than previous online gamblers</p> <p>No significant differences between groups in terms of alcohol, tobacco or cannabis use</p>	possible selection bias Uses cross-sectional methods so can determine associations but not causality	

Appendix 3. Excluded studies

Reference	Reason for exclusion
Adfam, 2020. Families in Lockdown: The effects of the COVID-19 lockdown on the family and friends of someone with an alcohol, drug or gambling problem	Cannot separate out gambling data
Adhanom and others 2020. Addressing mental health needs: an integral part of COVID-19 response	Wrong publication type
Addiction and the Family International Network, 2020. How AFINet members think affected family members are being impacted by the ongoing corona virus crisis	Wrong publication type
Advisory Board on Safer Gambling, 2020. More action needed in this time of COVID crisis	Wrong publication type
Advisory Board on Safer Gambling, 2020. Progress Report on the National Strategy to Reduce Gambling Harms	Wrong publication type
Amin and others 2020. Online Gaming During the COVID-19 Pandemic in India: Strategies for Work-Life Balance	Wrong outcome and population
Balhara and others 2020. Impact of lockdown following COVID-19 on the gaming behavior of college students	Wrong outcome
Blaschke, 2020. Australian study shows decrease in gambling frequency and spend during COVID-19 lockdown	Wrong publication type
Children’s Commissioner, 2020. Putting children first in future lockdowns	Wrong publication type
Columb and others 2020. Addiction psychiatry and COVID-19: impact on patients and service provision	Wrong publication type
Concordia University, 2020. COVID-19 and Gambling: Impacts, transformations and reflections	Not original research
Coward-Gibbs, 2020. Why Don’t We Play Pandemic? Analog Gaming Communities in Lockdown	Wrong outcome and population
Czegledy, 2020. Canadian land based gambling in the time of COVID-19	Not primary research
Erikson, 2020. Betting on Pandemic	Wrong outcome and publication type
Espiner and others 2020. Beyond COVID-19: five actions which would improve the health of all New Zealanders	Wrong publication type

Reference	Reason for exclusion
Espiner and Houia-Ashwell, 2020. COVID-19 and the disproportionate harms of gambling, alcohol and the obesogenic environment in Māori	Not primary research
GambleAware, 2020. GambleAware urges greater awareness of the risks related to gambling during the COVID-19 pandemic	Wrong publication type
GambleAware, 2020. Submission for the Digital, Culture, Media and Sport Select Committee Inquiry into the impact of COVID-19 on DCMS sectors	No original research
GamCare, 2020. Understanding Gambling Related Harm and the Impact of COVID-19	Wrong publication type
GamCare, 2020. GamCare Lockdown Report Finds Fewer Gamblers Seeking Support	Wrong publication type
GamCare, 2020. The National Gambling Helpline During Lockdown	No methods, just chosen statistics
Gambling Commission, 2020. Gambling business data on gambling during Covid-19	No methods, not primary research
Gambling Commission, 2020. Gambling Commission directs £9m to boost resilience of gambling harm treatment services during Covid-19	Wrong publication type
Gambling Commission, 2020. Risks arising from Covid-19 and our response	Wrong publication type
Gambling Commission, 2020. Survey data on gambling participation - July 2020	Covered in August update (included in review)
Glowacki and others 2020. Identifying #addiction concerns on twitter during the COVID-19 pandemic: A text mining analysis	Wrong outcome
GREGO, 2020. Resources for Safer Gambling During COVID-19	Wrong publication type
GREGO, 2020. COVID-19 News and Emerging Research	Wrong publication type
Griffiths and others 2020. Pandemics and epidemics: public health and gambling harms	Wrong publication type
Hayer and others 2020. Recommendation on Gambling Advertising during the Corona Pandemic	Not available in English

Reference	Reason for exclusion
Higuchi and others 2020. Prolonged use of Internet and gaming among treatment seekers arising out of social restrictions related to COVID-19 pandemic	Wrong outcome and population
iCAAD, 2020. What impact is Coronavirus having on Gambling?	Wrong publication type
iGaming Business, 2020. Sweden: Covid-19 impact on problem gambling yet to be felt	Wrong publication type
Inside Asian Gaming, 2020. Studies show dramatic rise in online gambling during COVID-19 lockdowns	Wrong publication type
Keller and Sims, 2020. Gambling and Gaming During COVID-19: Prevalence, Implications and Strategies to Stay Safe	Wrong publication type
King and others 2020. Problematic online gaming and the COVID-19 pandemic	Wrong publication type
Kiraly and others 2020. Preventing problematic internet use during the COVID-19 pandemic: Consensus guidance	Wrong outcome
Ko and others 2020. Impact of COVID-19 on gaming disorder: Monitoring and prevention	Wrong outcome and study design
Kriz, 2020. Gaming in the Time of COVID-19	Wrong outcome and publication type
Lally, 2020. Mental health and well-being during the COVID-19 outbreak	Wrong publication type
Marsden and others 2020. Mitigating and learning from the impact of COVID-19 infection on addictive disorders	Wrong publication type
National Youth Agency, 2020. Inside out: young people's health and wellbeing: a response to Covid-19	Wrong outcome and population
Nature Immunology, 2003. Betting on our future	Wrong year
Odone and others 2020. Covid-19 lockdown impact on lifestyle habits of Italian adults	Wrong outcome
Royal College of Psychiatrists, 2020. Responding to COVID-19	Wrong publication type
Sanders, 2020. Covid-19, low incomes and poverty	Wrong outcome
Sharman, 2020. Gambling in football: How much is too much?	Wrong outcome and publication type

Reference	Reason for exclusion
Stevens, 2020. The Impact of Covid-19 on Gambling Availability in Canada	Wrong publication type
Synergy Blue, 2020. The Path Forward for Casinos in a Post-COVID World: How Younger Gamblers, Experiences, and Safety Concerns Will Influence Industry Recovery	Wrong outcome
The Commission on Alcohol Harm, n.d. 'It's everywhere': alcohol's public face and private harm: the report of the Commission on Alcohol Harm	Wrong outcome and publication type
TIPi Group, 2020. A Shifting Landscape: The gambling industry during and after COVID-19	Not original research
Turner, 2020. Covid-19 and Gambling in Ontario	Wrong publication type
University of Manchester, n.d. National academic response to COVID-19-related suicide prevention	Wrong publication type
University of Stirling, 2020. Major study to investigate COVID-19 impact on gamblers	Wrong publication type
WHO Regional Office for Europe, 2020. COVID-19 and social protection in Europe and Central Asia : A moment of opportunity to expand and strengthen social protection mechanisms to safeguard health, well-being and livelihoods, leaving no one behind	Wrong outcome and publication type
Yahya and Khawaja, 2020. Problem Gambling During the COVID-19 Pandemic	Wrong publication type

Appendix 4. Interests and acknowledgements

Competing interests

The authors declare that they have no competing interests.

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About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-leading science, research, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide government, local government, the NHS, Parliament, industry and the public with evidence-based professional, scientific and delivery expertise and support.

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