

Gambling, alcohol consumption, cigarette smoking and health:

Findings from the 2007 British Gambling Prevalence Survey

March 2009

Commissioned by the Gambling Commission

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1 Abstract

- 1.1 Previous research has shown a link between gambling, alcohol, and cigarette smoking. Co-occurrence of problem gambling with other behavioural and psychological disorders can exacerbate, or be exacerbated by, problem gambling. Using participant data from the 2007 British Gambling Prevalence Survey (BGPS) (n = 9003 adults aged 16 years and over), secondary analysis was carried out on the relationship between gambling and three particular areas of co-occurrence. These were general health status, cigarette smoking, and alcohol consumption. All analysis was age standardised to allow comparisons between groups after adjusting for the effects of any difference in their age distributions.
- 1.2 Results showed that:
- cigarette smokers were more likely than non-smokers to have gambled in both past week and past year
 - smokers were over three times more likely than non-smokers to be a problem gambler
 - alcohol consumption was significantly associated with having gambled in both past week and past year
 - alcohol consumption as measured by the number of units drank on their heaviest drinking day in the last week was significantly associated with problem gambling
 - health status was not associated with either past week or past year gambling
 - the prevalence rate of problem gambling among those with poor health were over three times as likely to be a problem gambler compared to those with good health. Implications of these results are discussed.

2 Introduction

- 2.1 Gambling has not been traditionally viewed as a public health matter (Korn, 2000; Griffiths, 2004). However, the social and health costs of problem gambling can be large on both individuals and society more generally. Personal costs can include irritability, extreme moodiness, problems with personal relationships (including divorce), absenteeism from work, family neglect, and bankruptcy (Griffiths, 2007). Problem gambling often occurs concurrently with other behavioural and psychological disorders, which can exacerbate, or be exacerbated by, problem gambling (Griffiths, 2007). Adult problem gamblers also have increased rates of attention-deficit hyperactivity disorder (ADHD), substance abuse or dependence, antisocial, narcissistic, and borderline personality disorders (American Psychiatric Association, 1994; Griffiths, 2007). There is also some evidence that cross-addictions may differ among demographic subgroups and gambling types (Griffiths, 1994a). For instance, young male slot machine gamblers are more likely to abuse solvents (Griffiths, 1994b).
- 2.2 Previous research has shown a link between gambling and alcohol, nicotine smoking and/or drug use. For example, alcohol can be used as a way of coping with depression and/or anxiety caused by gambling problems, and, conversely, alcohol may trigger gambling desire (Griffiths, Parke & Wood, 2002). Many studies have reported such links in both adults (eg Ramirez, McCormick, Russo & Taber, 1984; Ciarrocchi & Richardson, 1989; Lesieur, Blume & Zoppa, 1986) and adolescents (eg Griffiths & Sutherland, 1998; Wood, Gupta, Derevensky & Griffiths, 2004). More recently, Petry, Stinson and Grant (2005) reported that just under two-thirds of problem gamblers had a nicotine dependence (60%), approximately three-quarters had an alcohol use disorder (73%), and that just over a third had a drug use disorder (38%) el-Guebaly, Patten, Currie, et al (2006) examined psychiatric co-morbidities associated with problem gambling and reported that those with a substance use disorder were three times more likely to be problem gamblers.

- 2.3** Individuals with other disorders may also be prone to a wide variety of medical consequences including stress-related physical illnesses including insomnia, hypertension, heart disease, stomach problems (eg peptic ulcer disease) and migraine (Daghestani, Elenz & Crayton, 1996; Griffiths, Scarfe & Bellringer, 1999; Griffiths, 2004). Problem gambling may also result in health-related problems from withdrawal effects. For instance, Rosenthal and Lesieur (1992) found that at least 65% of problem gamblers reported at least one physical side-effect during withdrawal including insomnia, headaches, upset stomach, loss of appetite, physical weakness, heart racing, muscle aches, breathing difficulty and/or chills. When comparing the withdrawal effects with a substance-dependent control group, they concluded that problem gamblers experienced more physical withdrawal effects when attempting to stop than the control group.
- 2.4** There were no specific *a priori* hypotheses as secondary analysis was carried out post hoc. However, it was predicted there would be a positive correlation between gambling and alcohol consumption, gambling and cigarette smoking, and gambling and ill health (ie cigarette smokers and alcohol drinkers would be more likely to gamble than non-smokers and non-drinkers, and that those suffering ill health were more likely to gamble than those not in poor health). There were no predictions made about co-occurrence of smoking and drinking behaviours relating to individual forms of gambling.

3 Method

- 3.1** Data analysed in this study came from the second British Gambling Prevalence Survey (Wardle, Sproston, Orford, Erens, Griffiths, Constantine & Pigott, 2007), a survey commissioned and funded by the Gambling Commission, the British gambling regulator set up under the 2005 Gambling Act. The study was carried out by the National Centre for Social Research (NatCen) with the first and third authors as advisors. The method was similar to that used in the first national survey carried out in 1999 (Sproston, Erens & Orford, 2000). Using the Postcode Address File as the sampling frame, private addresses were randomly selected within 317 postcode sectors stratified by region, occupational status and proportion of non-white residents.
- 3.2** Fieldwork was carried out between September 2006 and March 2007 by NatCen's field force trained by NatCen researchers at 19 training sessions held across Britain. Following an advance letter, interviewers called at the selected addresses in order to complete a household interview with the 'household reference person' (HRP) or their spouse/partner (to collect socio-economic information about the HRP and demographic information about each person resident in the household) and to assign a copy of the main self-completion questionnaire for each person aged 16 and over living in the household. Completed questionnaires were either collected at the same visit or on a later occasion. An online completion option was made available and was taken up by 7% of respondents. HRP interviews were achieved at 63% of addresses, and questionnaires were completed by 81% of adults at those addresses. The overall response rate was 52% (n = 9,003). Further details are provided in the full report of the survey (Wardle et al, 2007).
- 3.3** From the data collected, secondary analysis was carried out on three particular areas using SPSS. These were general health status, cigarette smoking, and alcohol consumption. Results relating to these variables and problem gambling made use of the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM-IV) criteria for problem gambling (American Psychiatric Association, 1994).

The DSM-IV consists of ten diagnostic criteria, and a diagnosis of pathological gambling is made if a person fulfils at least five of the criteria. In addition, a number of surveys have included a further category of 'problem gambler' for those who fulfil at least three of the DSM-IV criteria. The threshold used to identify 'problem gamblers' in the current survey was the same as that used in the 1999 survey (ie three or more represents a 'problem gambler'). This decision was made for the sake of clarity and simplicity, because the additional distinction was not seen as necessary for the purposes of this study, and because the number of respondents falling into the two categories was too small to analyse separately.

- 3.4** All significance testing on the data to be reported used an adjusted Wald's Test to model the differences taking into account the complex sample design, weighting and clustering. All p values in the next section and tables relate to this particular type of statistical testing. It should also be noted that all analysis was age standardised to allow comparisons between groups after adjusting for the effects of any difference in their age distributions. The data were standardised to the mid-year 2006 population estimates for Great Britain (Office for National Statistics, 2008).

4 Results

- 4.1 Gambling and health:** Poor health was defined by presence of a 'limiting longstanding illness' and/or self-reported poor health (whereas good health was simply self-report of being in good health). Results showed that health status was not significantly associated with past year gambling after age had been taken into account (see Table 1). Approximately two-thirds of those in good health (68%) and poor health (70%) had gambled in the past year. Further analysis was also carried out on health status and each individual gambling activity. As shown in Table 1, those in poor health were significantly more likely in the past year to have engaged in slot machine gambling, playing football pools, playing bingo, playing fixed odds betting terminals (FOBTs)¹, online betting, online gambling and private betting with other people. In relation to overall past week gambling, results showed that health status was not significantly associated with 43% of those in poor health having gambled in the past week compared to 41% of those in good health (see Table 2). Further analysis on individual past week gambling activities showed there were only three activities that were significantly more likely to be played by people with poor health (ie slot machine gambling, horse race gambling, and casino gambling) (see Table 2). Results demonstrated that being in poor health and/or having a limiting longstanding illness was significantly associated with problem gambling. Among those with poor health, the prevalence rate of problem gambling was 1.8% compared to a problem gambling prevalence rate of 0.5% for those who were not in poor health [$F(1, 158) = 15.39$; $p < 0.01$].

¹ Now Category B2 Gaming Machines.

Table 1 Participation in gambling activities in the past year by poor and good health

All	Poor health %	Good health %	Total %	F-value	p-value
Gambled in the past year	70	68	68	0.53	0.47
Problem gambling	1.8	0.5	0.9	15.39	0.01
National lottery	57	58	57	0.08	0.78
Other lottery	12	12	12	0.12	0.73
Scratch cards	22	20	20	1.81	0.18
Football pools	5	3	3	4.96	0.03
Bingo	11	7	7	13.80	0.00
Slot machines	18	14	15	5.44	0.02
Horse races	19	17	17	0.91	0.34
Dog races	5	5	5	0.00	0.98
Other betting	7	6	6	0.25	0.62
FOBTs	4	2	3	5.70	0.02
Online bookmakers	6	4	4	4.01	0.05
Online gambling	5	3	3	6.03	0.02
Casino	4	4	4	0.48	0.49
Betting exchange	2	1	1	1.38	0.24
Spread betting	1	1	1	3.87	0.05
Private betting	14	10	11	7.74	0.01
Bases (weighted)	1300	7542	8842		
Bases (unweighted)	1372	7480	8852		

Degrees of freedom: (1,158) for all cases. All data age standardised

Note: Poor health was defined by presence of a 'limiting longstanding illness' and/or self-reported poor health

Table 2 Participation in gambling activities in the past week by poor and good health

All	Poor health %	Good health %	Total %	F-value	p-value
Gambled in the past week	43	41	41	1.70	0.19
National lottery	33	34	33	0.19	0.66
Other lottery	4	3	3	1.09	0.30
Scratch cards	7	6	6	2.80	0.10
Football pools	3	2	2	3.09	0.08
Bingo	4	3	3	3.32	0.07
Slot machines	6	3	4	6.67	0.01
Horse races	4	2	3	6.66	0.01
Dog races	1	1	1	1.70	0.19
Other betting	1	1	1	0.00	0.96
FOBTs	1	1	1	2.24	0.14
Online bookmakers	0	1	1	2.17	0.14
Online gambling	1	1	1	0.07	0.80
Casino	2	0	1	7.81	0.01
Betting exchange	0	0	0	0.31	0.58
Private betting	3	3	3	0.96	0.33
Bases (weighted)	1304	7544	8848		
Bases (unweighted)	1372	7480	8852		

Degrees of freedom: (1,158) for all cases. All data age standardised

Note: Poor health was defined by presence of a 'limiting longstanding illness' and/or self-reported poor health

4.2 Smoking and gambling: Analysis was carried out examining the relationship between those who smoked cigarettes and past year gambling activity. Almost four-fifths of smokers (79%) had gambled in the past year compared to almost two-thirds of non-smokers (65%), a finding that (after controlling for age) was significant (see Table 3). Analysis was also carried out on smoking and individual type of past year gambling. Results showed that in the past year, smokers were significantly more likely to have gambled on the National Lottery, scratchcards, bingo, slot machines, horse races, dog races, other types of betting with bookmakers, FOBTs, online gambling, casinos and private betting (see Table 3).

Table 3 Participation in gambling activities in the past year by cigarette smoking status

All	Current smoker %	Non-smoker %	Total %	F-value	p-value
Gambled in the last year	79	65	68	108.58	0.00
National lottery	67	54	57	80.75	0.00
Other lottery	12	12	12	0.03	0.87
Scratchcards	27	17	20	94.65	0.00
Football pools	4	3	3	1.91	0.17
Bingo	13	6	7	106.72	0.00
Slot machines	20	13	14	69.62	0.00
Horse races	20	16	17	12.49	0.00
Dog races	6	5	5	8.03	0.01
Other betting	8	6	6	11.70	0.00
FOBTs	4	2	3	14.24	0.00
Online bookmakers	5	4	4	2.46	0.12
Online gambling	4	2	2	12.81	0.00
Casino	5	4	4	4.26	0.04
Betting exchange	1	1	1	1.71	0.19
Spread betting	1	1	1	1.40	0.24
Private betting	14	9	10	29.46	0.00
Bases (weighted)	2071	6643	8714		
Bases (unweighted)	2036	6689	8725		

Degrees of freedom: (1,158) for all cases. All data age standardised

4.3 Analysis examining the relationship between cigarette smoking and past week gambling activity showed that just over half the smokers (51%) had gambled in the past week compared to almost two-fifths of non-smokers (38%), a finding that was significant (see Table 4). Results showed that in the past week, smokers were significantly more likely to have gambled on the National Lottery, scratchcards, bingo, slot machines, horse races, dog races, other types of betting with bookmakers, FOBTs, online gambling, casino gambling and private betting (see Table 4). Being a cigarette smoker was also significantly associated with problem gambling. Among smokers, the prevalence rate of problem gambling was 1.1% compared to a problem gambling prevalence rate of 0.4% among non-smokers [F (1, 158) = 11.38; p<0.001].

Table 4 Participation in gambling activities in the past week by cigarette smoking status

All	Current smoker %	Non-smoker %	Total %	F- value	p-value
Gambled in the past week	51	38	41	117.76	0.00
National lottery	40	32	34	50.71	0.00
Other lottery	3	3	3	0.29	0.59
Scratchcards	10	5	6	64.32	0.00
Football pools	2	2	2	1.63	0.20
Bingo	6	2	3	69.85	0.00
Slot machines	6	3	4	63.47	0.00
Horse races	4	2	3	19.65	0.00
Dog races	1	1	1	5.11	0.03
Other betting	2	1	1	13.38	0.00
FOBTs	1	1	1	9.83	0.00
Online bookmakers	1	1	1	0.63	0.43
Online gambling	2	1	1	19.84	0.00
Casino	1	0	1	6.68	0.01
Betting exchange	0	0	0	0.41	0.52
Spread betting	0	0	0	2.39	0.12
Private betting	4	2	3	23.29	0.00
Bases (weighted)	2071	6649	8720		
Bases (unweighted)	2035	6695	8730		

Degrees of freedom: (1,158) for all cases. All data age standardised

4.4 Alcohol consumption and gambling: After controlling for age, alcohol consumption was significantly associated with having gambled in the past year. The prevalence of gambling in the past year was highest among those who drank more than four times the recommended daily intake² of alcohol on their heaviest drinking day (see Table 5). Further analysis showed that drinking four times the daily recommended intake of alcohol on their heaviest drinking day was significantly associated with past year gambling on the football pools, slot machines, horse races, dog races, other types of betting with bookmakers, FOBTs, online bookmakers, online gambling, casino gambling, betting exchanges and private betting (see Table 5).

² The maximum recommended daily limit for alcohol is four units for men and three units for women.

Table 5 Participation in gambling activities in the past year by alcohol consumption on heaviest drinking day in the past seven days

All current consumers of alcohol	Does drink alcohol - but did not drink in last 7 days %	Drank 6 or less units (women) or 8 or less units (men) %	Drank 6 - 12 units (women) or 8 - 16 units (men) %	Drank more than 12 units (women) or more than 16 units (men) %	Total	F-value	p-value
Gambled in the past year	70	70	75	81	72	3.34	0.02
National lottery	59	58	63	64	60	1.45	0.23
Other lottery	14	12	14	14	13	1.08	0.36
Scratchcards	21	19	22	24	20	2.56	0.06
Football pools	4	3	4	7	3	3.31	0.02
Bingo	8	7	10	9	8	1.61	0.19
Slot machines	17	15	19	22	16	5.98	0.00
Horse races	17	18	24	33	20	12.38	0.00
Dog races	5	5	8	10	6	9.08	0.00
Other betting	6	6	9	12	7	9.58	0.00
FOBTs	2	2	3	7	3	11.12	0.00
Online bookmakers	5	3	5	9	4	9.86	0.00
Online gambling	3	2	4	6	3	6.13	0.00
Casino	3	4	5	9	4	7.63	0.00
Betting exchange	1	1	1	2	1	2.65	0.05
Spread betting	1	1	1	1	1	0.96	0.41
Private betting	8	10	16	21	12	13.31	0.00
Bases (weighted)	694	3913	1266	458	6331		
Bases (unweighted)	705	4020	1233	420	6378		

Degrees of freedom: (3,158) for all cases

4.5 Alcohol consumption was also associated with having gambled in the past week. Those who drank more than four times the daily recommended intake of alcohol on their heaviest drinking day were significantly more likely to have gambled in the past week (see Table 6). In relation to individual gambling activities, drinking four times the daily recommended intake of alcohol on their heaviest drinking day was significantly associated with past week gambling on football pools, slot machines, horse races, dog races, other types of betting with bookmakers, online bookmakers, online gambling and private betting. Alcohol consumption as measured by the number of units drunk on their heaviest drinking day in the last week was significantly associated with problem gambling. Results showed that the prevalence rate for problem gambling was 0.2% for people who drank six or less units (women) and eight or less units (men) on their heaviest drinking day; 0.6% for people who drank 6-12 units (women) and 8-16 units (men) on their heaviest drinking day; and 2.3% for those people who drank more than 12 units (women) and more than 16 units (men) on their heaviest drinking day ($F[2,157] = 12.3$; $p < 0.001$).

Table 6 Participation in gambling activities in the past week, by alcohol consumption on heaviest drinking day in the past seven days

All current consumers of alcohol	Does drink alcohol - but did not drink in last 7 days %	Drank 6 or less units (women) or 8 or less units (men) %	Drank 6 - 12 units (women) or 8 -16 units (men) %	Drank more than 12 units (women) or more than 16 units (men) %	Total	F-value	p-value
Gambled in the past week	42	40	45	51	42	4.55	0.00
National lottery	34	33	37	37	35	1.47	0.22
Other lottery	4	3	4	3	3	0.39	0.76
Scratchcards	6	5	7	7	6	2.00	0.12
Football pools	2	2	3	5	2	2.77	0.04
Bingo	3	3	4	4	3	1.15	0.33
Slot machines	3	3	6	7	4	10.72	0.00
Horse races	3	2	3	6	3	8.50	0.00
Dog races	1	0	1	2	1	4.22	0.01
Other betting	1	1	2	2	1	4.36	0.01
FOBTs	1	1	1	2	1	1.28	0.28
Online bookmakers	1	1	2	1	1	3.27	0.02
Online gambling	1	1	1	3	1	4.22	0.01
Casino	0	0	1	1	0	1.27	0.29
Betting exchange	1	-	1	0	0	n/a	n/a
Spread betting	-	0	-	-	0	n/a	n/a
Private betting	2	2	4	6	3	5.38	0.00
Bases (weighted)	695	3915	1266	458	6334		
Bases (unweighted)	706	4022	1233	420	6381		

Degrees of freedom: (3,158) for all cases

5 Discussion

5.1 Findings of this study were broadly in line with the hypotheses made and supported previous research in the area that gambling (and more specifically problem gambling), cigarette smoking and alcohol consumption are co-occurring behaviours (eg Lesieur et al, 1986; Griffiths & Sutherland, 1998; el-Guebaly et al, 2006). More specifically, this study demonstrated that smokers were more likely to gamble in the past year and past week, a finding reported in other studies (eg Griffiths & Sutherland, 1998; Petry et al, 2005). It was also found that smokers were more likely to gamble on most forms of gambling in both the past year and past week. Given that there was an overall relationship between smokers and the amount of general gambling, it was perhaps unsurprising that smokers were more likely than non-smokers to gamble on most individual forms of gambling.

- 5.2** Excluding the activities that had a very low player base (eg spread betting, betting exchanges), the activities that showed no relationship with smoking tended to be the more discontinuous gambling activities such as playing on the football pools, playing other lotteries and using betting exchanges. Given that smoking cigarettes tends to be a somewhat habitual behaviour and classically conditioned (eg the smoking of a cigarette after eating, having a cigarette as soon as the person gets up in the morning), it may be that those gambling activities where there was no significant relationship were activities that occurred too infrequently for habitual or conditioned responses to be formed. Given the positive association between cigarette smoking and gambling, it was unsurprising that current smokers (1.4%) were over three times more likely than non-smokers (0.4%) to be a problem gambler, and again supports previous research (eg Petry et al, 2005).
- 5.3** As with cigarette use, alcohol consumption was also significantly associated with having gambled in the past week and past year. The prevalence of gambling in the past year was highest among those who drank more than four times the recommended daily intake of alcohol on their heaviest drinking day and also supports previous research showing such a link (eg Ramirez et al, 1984; Ciarrocchi & Richardson, 1989; Lesieur et al, 1986; Griffiths & Sutherland, 1998; Wood et al, 2004). Unlike cigarette use, the activities that alcohol consumption was not associated with (past week or year) were a disparate group including the National Lottery, bingo, scratchcards, casino gambling, betting exchanges and spread betting. There appears to be little in common with these very different types of gambling and there does not appear to be an obvious reason as to why there was no association with alcohol consumption. Almost identically to cigarette use, alcohol consumption (as measured by the number of units drunk on their heaviest drinking day in the last week) was significantly associated with problem gambling.
- 5.4** High levels of legal substance use, abuse and addiction among problem gamblers found in many other studies highlight the importance of screening for gambling problems among participants in alcohol (and other drug) treatment facilities, mental health centres and outpatient clinics, as well as probation services and prisons. Unfortunately, beyond programmes that provide specialised problem gambling services, few counselling professionals screen for gambling problems among their clients although there have been reports in the empirical literature where such screening has taken place in alcohol and drug treatment facilities (Griffiths 1994b; Orford, Boulay, Copello, Graves, Purser & Day, 2003). Even when a gambling problem is identified, non-specialist professionals are often uncertain about the appropriate referrals to make or what treatments to recommend (Abbott et al, 2004). There is clearly a need for education and training in the diagnosis, appropriate referral and effective treatment of gambling problems amongst the health professions more generally. The need for education and training in the diagnosis, appropriate referral and effective treatment of gambling problems must be addressed within general practitioner training (Griffiths, 2007).
- 5.5** Using the age standardised data, results showed that health status was not associated with either past year or past week gambling. However, there was a significant association between health and problem gamblers with the problem gambling rate being over three times higher among those in poor health compared to those in good health. This meant that the predicted hypothesis was only partially supported. Data by individual gambling activity over the past year showed some activities were significantly more likely to be played by those in poor health (ie football pools, online gambling, online betting, private betting, slot machines and bingo). Apart from slot machines and bingo, all the other gambling activities positively associated with poor health are ones that can be done from a person's home.

This makes intuitive sense as those with poor health are more likely than those in good health to spend more time in their home. Only three activities were significantly associated with poor health and past week gambling (ie slot machines, horse racing, casinos). These three activities all have the potential to be high event frequency activities that allow the person to engage in continuous gambling and the capacity to escape and/or dissociate (Griffiths, Wood, Parke & Parke, 2006; Wood & Griffiths, 2007). To a person in poor health, such activities may be cognitively distracting enough to alleviate pain and provide a reason for engaging in the behaviour. However, it should also be noted that prevalence rates for past week gambling on some activities were very low making any significant differences somewhat meaningless.

- 5.6** As already noted, among those with poor health, the prevalence rate of problem gambling was 1.8% compared to a problem gambling prevalence rate of 0.5% for those who were not in poor health. Such a finding is broadly in line with other studies that have found higher levels of problem gambling among those with a variety of health problems and/or psychiatric disorders (eg Kim, Grant, Eckert, et al, 2006; Zimmerman, Chelminski & Young, 2006; McIntyre, McElroy, Pope, et al, 2007; Kennedy, McIntyre, O'Donovan, et al, 2008). The question of whether these individuals are in poor health as a consequence of problem gambling, engage in gambling as a way of coping with poor health, or a combination of both, cannot be answered from the cross-sectional data presented in this study (Griffiths, 2004).
- 5.7** There are, despite the large sample size and good representation of the British population, a number of limitations of the data presented here. Perhaps, most importantly, is the self-report nature of the data. No validated measures (such as the General Health Questionnaire) were used to assess health, and all data relating to cigarette use and alcohol consumption were also self-report. Future studies may benefit from more accurate measures of health-related behaviour and/or corroboration from third party sources.
- 5.8** The introduction of the smoking bans may help decrease problem gambling given the co-relationship between the two behaviours although further research is needed to assess whether this will lead to any displacement effects, such as an increase in online gambling where smokers can gamble from the comfort of their own home.
- 5.9** To conclude, there is clear evidence from this and other studies that gambling is a potential health issue. It could therefore be argued that in the medical and health professions there needs to be a raised awareness about gambling-related problems and to develop effective strategies to prevent and treat problem gambling and co-occurring behaviours (Griffiths, 2007). The relatively rapid expansion of gambling opportunities over the last decade represents a potential public health concern, and medical/health practitioners also need to research the impact of gambling on vulnerable, at risk, and special populations (including those that use and misuse alcohol and nicotine).

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Gambling Commission March 2009

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INFO 08/37