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TECHNICAL REPORT

Map the Gap

a critical review of the literature
on gambling-related harm

Emma Disley, Alexandra Pollitt,
Deirdre May Culley, Jennifer Rubin

Sponsored by the Responsible Gambling Fund

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Preface

This report, commissioned by the Responsible Gambling Fund (RGF), aims to ‘map the gaps’ in the current evidence base relating to harmful gambling. It sets out findings from a Rapid Evidence Assessment of academic and ‘grey’ literature, describing the quantity and quality of existing research in this field, and highlighting areas in which evidence and knowledge are sparse or lacking.

This report focuses upon eight research issues raised by the RGF. It may also be of interest to academics and researchers working in the field of harmful gambling, to those working in the gambling industries and to those in regulatory bodies, as well as to professionals working in health, criminal justice, social care and other related fields.

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Executive Summary

In order to ‘Map the Gap’ in the available evidence base on problem gambling, the Responsible Gambling Fund (RGF) commissioned a Rapid Evidence Assessment (REA) to explore the following issues relating to problem gambling:

- Prevalence among prisoners, the homeless and members of the armed forces
- The effectiveness of preventative measures, treatment, and other interventions including self-exclusion, self-limitation, and support by those working in the gambling industry or in health professions
- The evidence on situational features (the geographical density, clustering and distribution of gambling venues or machines) and of structural features of electronic gaming machines (such as speed of play, lights and sounds, stop buttons and whether the player can use notes or coins).

Pathological gambling is a recognised psychological disorder. Behaviours indicating problem or pathological gambling include frequent and persistent gambling, being preoccupied with gambling to the detriment of family life and financial situation, and feeling the need to gamble with increasing amounts of money to experience excitement.

Although prevalence rates vary depending on the measurement tool used, and whether prevalence is looked at over the last year or a lifetime, evidence from several countries indicates a prevalence of problem gambling in the general population of around 0.5–2 percent with higher levels amongst younger people, those in lower socio-demographic groups and minorities. There is also evidence that those who have a gambling problem are more likely to suffer a range of other problems, such as substance misuse and depression.

Across the eight issues of interest to the RGF the evidence on problem gambling is limited and patchy. The research has largely been conducted in North America, New Zealand and Australia, and findings from these countries are not necessarily transferable to Britain, given variations in the number and type of gambling opportunities, and difference in the public and cultural acceptability of gambling. Also, much of the empirical research into problem gambling included in this REA suffers from methodological weaknesses, which means findings are inconclusive.

Prevalence in specific demographic groups

The RGF asked for research into problem gambling among prisoners, service and ex-service personnel and the homeless. There is evidence from other countries that prison populations have a higher prevalence of problem gambling than other sections of the

population, and some studies indicate that at least some offences are committed by these individuals to fund a gambling habit. There is no British research into prevalence amongst the armed services, and no studies were found from any jurisdiction about prevalence among the homeless.

Prevention, treatment and other interventions

Prevention programmes have been implemented and evaluated in Canada and the US. Education and prevention initiatives may succeed in increasing knowledge and awareness of problem gambling, but the extent to which they can alter behaviour is yet to be ascertained.

Treatment for problem gambling has received considerable research attention, but this largely focuses on cognitive-behavioural approaches. There is good evidence that such approaches can be effective in reducing problem gambling. Other treatment approaches have not received equal research attention, nor is there sufficient evidence as to which treatments might be best-suited and most effective for different types of problem gamblers – for example, women and young people, or those with comorbid problems such as substance misuse. **Evidence suggests that most people who have a gambling problem do not seek treatment and that there is a high rate of ‘natural recovery’.** Available research indicates that the majority of people who enter treatment demonstrate improvements in gambling (and other) behaviours, but it is not clear whether, or the extent to which, treatment speeds up and improves natural recovery.

Evaluations of self-exclusion programmes show promising results, but do not provide robust evidence of their effectiveness. Most studies do not compare outcomes among self-excluders to a control group and are therefore unable to demonstrate that self-exclusion led to reduced gambling behaviour. It is likely that those who elect to exclude themselves are motivated to reduce their gambling behaviour or have reached a breaking point; the ‘value added’ by the self-exclusion is not known. **There is less evidence of the effectiveness of self-limitation strategies, and indications are that problem gamblers are least likely to impose limits on their playing.** The small number of studies on self-limitation suggests the possibility of unintended consequences: if time is limited, players might compensate by increasing the amount bet, for example.

There is one small study on the willingness of general practitioners in England to identify problem gamblers and signpost them to supports services. A range of professions may come into regular contact with problem gamblers, including drug treatment providers, social workers, General Practitioners and criminal justice professionals. These services could play a role in identifying individuals who have a gambling problem, providing support or referring them to treatment. Further evidence is needed in Britain on whether GPs and other health professionals have the ability or willingness to work with problem gamblers. **Evidence from Canada and Australia suggests that training can be effective in improving casino employees’ knowledge about the nature and signs of problem gambling.** However, the effect of training on employee behaviour (as opposed to knowledge) is not proved. There is little evidence on which to assess the transferability of these findings to the British workforce.

Situational and structural features

Findings relating to the impact of living close to a gambling venue, and/or to several venues are mixed, and can be hard to interpret. Evidence from other countries suggests that living close to a gambling venue increases the chance that an individual will gamble, but a relationship with problem gambling is not consistently found. Individual-level variables are much stronger predictors of problem gambling, and these interact in complex ways with neighbourhood and area-level factors. Available research provides limited evidence regarding these interactions. The possibility that individuals and populations might ‘adapt’ to living in an area where there are many gambling opportunities is a topic in need of further research. **There is no research into situational factors from Britain, and findings from other jurisdictions might not be transferable.** The regulatory structure and the kinds of electronic gaming machines available are just two factors that vary between jurisdiction and which suggest caution about transferring findings from Canada, Australia and the US to Britain.

There is a strong consensus in the literature that that electronic gaming machine use and problem gambling are closely related. However, whether electronic gaming machines contribute to the development and maintenance of problem gambling is not clear. **The available evidence on the impact of structural features is very limited.** There are no studies in Britain, and those conducted in other jurisdictions have limited reliability and validity.

Acknowledgements

We wish to thank Jim Fearnley at the Responsible Gambling Fund for the opportunity to conduct this research and for his collaboration and input throughout the project.

We would also like to thank the Quality Assurance reviewers at RAND who provided constructive and incisive comments on earlier drafts of this report.

1.1 **Background to problem gambling**

1.1.1 **What is problem gambling?**

What we refer to as ‘problem gambling’ in this report is also known as ‘pathological gambling’. Several definitions of pathological gambling exist. The American Psychiatric Association, in its *Diagnostic and Statistical Manual of Mental Disorders, Fourth edition*, (2000), known as the DSM-IV, describes pathological gambling as a ‘persistent and recurrent maladaptive gambling behaviour’. The DSM-IV classifies pathological gambling as an impulse control disorder; ‘the inability to resist a persistent impulse to engage in destructive behaviours’ (Shaffer and LaPlante, 2005, p 278). The DSM-IV lists ten criteria (see Box 1) that can be used by clinicians to assess the presence of ‘pathological gambling’; if five or more criteria are met a positive diagnosis can be made.¹

Box 1: DSM-IV criteria for pathological gambling

A. Persistent and recurrent maladaptive gambling behaviour as indicated by five (or more) of the following:

1. is preoccupied with gambling (e.g. preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble)
2. needs to gamble with increasing amounts of money in order to achieve the desired excitement
3. has repeated unsuccessful efforts to control, cut back, or stop gambling
4. is restless or irritable when attempting to cut down or stop gambling
5. gambles as a way of escaping from problems or of relieving a dysphoric mood (e.g. feelings of helplessness, guilt, anxiety, depression)
6. after losing money gambling, often returns another day to get even (“chasing” one’s losses)
7. lies to family members, therapist, or others to conceal the extent of involvement with gambling
8. has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling
9. has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling
10. relies on others to provide money to relieve a desperate financial situation caused by gambling

B. The gambling behaviour is not better accounted for by a Manic Episode

Source: (American Psychiatric Association, 2000)

Pathological gambling also appears in the World Health Organization International Classification of Diseases (ICD) version 10 (World Health Organisation, 2007). Similarly to the DSM-IV, the ICD-10 classifies pathological gambling as a ‘habit or impulse disorder of adult personality and behaviour’. This description is set out in Box 2.

¹ The DSM-IV is a tool for diagnosis by clinicians, and is not a screening instrument – different screening instruments have been developed based upon the DSM-IV.

Box 2: ICD-10 description of pathological gambling

Habit and impulse disorders: This category includes certain disorders of behaviour that are not classifiable under other categories. They are characterized by repeated acts that have no clear rational motivation, cannot be controlled, and generally harm the patient's own interests and those of other people. The patient reports that the behaviour is associated with impulses to action. The cause of these disorders is not understood and they are grouped together because of broad descriptive similarities, not because they are known to share any other important features.

Pathological gambling: The disorder consists of frequent, repeated episodes of gambling that dominate the patient's life to the detriment of social, occupational, material, and family values and commitments

Source: World Health Organization (2007)

A screening instrument for problem or pathological gambling that is used in many of the studies included in this REA is the South Oaks Gambling Screen (SOGS) (Lesieur and Blume, 1987). This is a sixteen-item test that can be clinician- or self-administered. The SOGS includes questions on the type of gambling (for example, playing cards, betting on horses, slot machines, etc.), the largest amount of money gambled in one day, and whether people have lost work or school time because of gambling. The SOGS score is determined by adding up the number of questions for which an individual gave an 'at risk' answer. For example, answering 'yes' to the question 'did you ever gamble more than you intended' is an at-risk response. The maximum score is sixteen: a SOGS score of three or four suggests a diagnosis of a 'potential pathological gambler or problem gambler' and five or more suggests a 'probable pathological gambler'. The South Oaks Gambling Screen Revised (SOGS-R) added a measure of current problem or pathological gambling – in the last six or twelve months, rather than a lifetime measure (Abbott and Volberg, 2007).

Another scale used in some of the studies included in this review is the Canadian Problem Gambling Index (CPGI). This was launched in 2001 and has been used to measure the prevalence of problem gambling in the general population in Canada (as well as being used in other countries). The CPGI includes indicators of social context and degrees of problem severity.² The questions are set out in Box 3. The maximum score is twenty-seven; a score of eight or more indicates problem gambling.

Box 3: Canadian Problem Gambling Index

In the last 12 months how often have you [or have for item 7]?

1. Bet more than you could really afford to lose?
2. Needed to gamble with larger amounts of money to get the same feeling of excitement?
3. Gone back another day to try and win back the money you lost?
4. Borrowed money or sold anything to get money to gamble?
5. Felt that you might have a problem with gambling?
6. Felt that gambling has caused you health problems, including stress and anxiety?
7. People criticized your betting or told you that you have a gambling problem, whether or not you thought it was true?
8. Felt your gambling has caused financial problems for you or your household?
9. Felt guilty about the way you gamble or what happens when you gamble?

Scoring: 0 = Never, 1 = Sometimes, 2 = Most of the time, 3 = Almost always.

Source: Ferris and Wynne (2001)

² See <http://www.ccsa.ca/eng/priorities/gambling/CPGI/Pages/default.aspx> (as of 8 September 2011).

1.1.2 Theories of pathological and problem gambling

Whilst examining theories of problem gambling is beyond the scope of this REA, some understanding of these is vital to a discussion of each of the eight research issues, since they should provide a reliable or plausible story that links intervention with outcome. In studies included in the REA, discussion of theories of problem gambling is largely absent.

Behavioural models

A behavioural approach is based on the theory that behaviour is initiated, maintained or discontinued on the basis of learning – through observation or schedules of reinforcement.

Behavioural accounts of problem gambling are common in the literature, and look to the reward structure of gambling, which is ‘in essence, a schedule of reinforcement, the periodical allocation of a prize interspersed with losses’ (Faregh and Leth-Steensen, 2009, p 135). A behavioural model posits that a gambler may become addicted because of the rewards or reinforcements that they are given whilst gambling. The rewards might be financial – winning money – but could also be physiological (the thrill of gambling), psychological (such as raising self-esteem) and/or psychosocial (that is, stemming from the social meaning of the activity) (Parke and Griffiths, 2004, p 409).

In his general experiments on behaviourism Skinner (1953) noted that giving rewards irregularly increased reward-seeking. The irregular financial wins that characterise gambling can be seen as analogous to this. According to behavioural theory, the long-term net gain or loss is much less important than the effectiveness of this partial reinforcement schedule (Harrigan and Dixon, 2009).

Cognitive models

A cognitive account of problem gambling focuses on cognitive distortions – such as the illusion of control or misattribution of cause and effect. These distortions may be exaggerated among pathological gamblers and lead to irrational decisions (Faregh and Leth-Steensen, 2009; Harrigan and Dixon, 2009).

A hybrid ‘pathways’ model

Blaszczynski and Nower (2008) argue that no single theoretical model can explain all problem gambling. Rather, the factors that correlate with problem gambling are multiple and differ between individuals, who are influenced by different factors yet display similar behavioural features. ‘Simple consideration of gambling as an addiction or as a compulsive or impulse control disorder is too limiting in scope’ (p. 495) as there are multiple biological, psychological and ecological variables contributing to the development of pathological gambling. Blaszczynski and Nower’s ‘pathways’ model suggests that there are three distinct subgroups of gamblers – behaviourally conditioned problem gamblers; emotionally vulnerable problem gamblers; and antisocial, ‘impulsivist’ problem gamblers – who will all need different forms of intervention (Harrigan and Dixon, 2009).

1.1.3 Problem gambling prevalence in Britain

Findings from the British Gambling Prevalence Survey 2010 (Wardle *et al.*, 2011, pp 89-93), report the following prevalence rates of problem gambling using a screening instrument based upon the DSM-IV criteria:³

- The highest rates of problem gambling in Britain were among those aged 16–24 (2.1 percent) and 25–35 (1.5 percent)
- Problem gambling prevalence was significantly higher among Asian (2.8 percent) and black (1.5 percent) respondents compared to white (0.8 percent)
- There were significantly higher rates of problem gambling among those who were single (1.8 percent) and those who were separated or divorced (1.1 percent) compared to those who were married or living with a partner (0.7 percent)
- For England only, problem gambling was lowest among least deprived individuals and highest among those who are most deprived (1.8 percent for individuals in the Index of Multiple Deprivation⁴ quintile 4)
- Prevalence was 3.3 percent among unemployed respondents compared to 0.9 percent among those who are in paid work
- Prevalence was 6.1 percent among those who reported ‘very severe money problems’ compared to 0.5 percent among those who reported no money problems.

Broadly speaking, these British prevalence rates are in line with prevalence estimates from North America, Australia and New Zealand, and Europe – all of which are around 0.5–2 percent (Griffiths, 2009).⁵ Problem gambling tends to be more prevalent among men, among members of ethnic minorities and individuals with a low socio-economic status (Young *et al.*, 2008, p 78).

This differential prevalence of problem gambling across socio-economic groups raises questions about causation and the kinds of factors included in DSM-IV, the SOGS and ICD-10. People who score highly on deprivation scales are more likely to satisfy some of the criteria in Box 1, Box 2, and Box 3 than those who score low in deprivation scales (for example, they have less disposable income so quickly gamble more than they can afford). The same gambling behaviours may be more likely to be defined as problematic in a low-income individual than in someone with more disposable income. These definitional issues are beyond the scope of this REA, but are borne in mind throughout the study.

1.1.4 Problem gambling and comorbidities

As with theories of problem gambling, examining the comorbidities of problem gambling is beyond the scope of this REA but some coverage is useful in order to frame the discussion of the eight issues raised by the RGF. For example, the presence of comorbid

³ A DSM-IV screening instrument was developed for the British Gambling Prevalence Study. It contains 10 criteria; a score of 3 or more represents a ‘problem gambler’.

⁴ The Index of Multiple Deprivation combines a number of indicators, covering a range of economic, social and housing issues, into a single deprivation score for each small area in England.

⁵ Some countries including Estonia, Finland and Switzerland have reported problem gambling prevalence rates of above 3 percent (Griffiths, 2009, p 4).

disorders might affect the kind of treatments that are appropriate for problem gambling, will interact with situational factors, and could influence the effectiveness of self-exclusion strategies.

To provide background information about common comorbid disorders, findings are drawn from a recent systematic review and meta-analysis of eleven studies, none of which was from Britain (six from the US, one from Korea, two from Canada, two from Switzerland), published between 1998 and 2010 (Lorains *et al.*, 2011).⁶ This review indicated that problem and pathological gamblers had high rates of comorbid disorders. The most common (on average across the studies)⁷ was nicotine dependence (60.1 percent), followed by a ‘substance use disorder’ (57.5 percent). Slightly less prevalent were ‘any type of mood disorder’ (37.9 percent) and lastly ‘any type of anxiety disorder’ (37.4 percent). Precise prevalence rates of comorbidities vary across the studies, in large part because most prevalence studies include only a very small number of problem gamblers, but also because different studies use different methods to estimate prevalence.⁸ The fact that problem and pathological gamblers have high prevalence rates for many comorbid disorders is not, however, in dispute.

Given the high prevalence of comorbid disorders, Shaffer and LaPlante (2005, p 317) highlight one view among those writing about problem gambling that ‘the symptoms associated with pathological gambling reflect a complex syndrome instead of single disorder’. This significance of this for the REA is that problem gambling might be better viewed as just one of a number of symptoms that constitute a wider phenomenon, rather than as a single driver of many of the other problems which appear to be associated with it.

1.2 Background to this report

The Responsible Gambling Fund (RGF) commissioned a critical review to map the quantity and quality of existing evidence relating to problem gambling, and to identify gaps in the knowledge base where future research may be needed to inform policy- and decision-making in Britain. The RGF specified the following eight themes of the focus of the review:

1. A critical analysis of different approaches to treatment (for example, Cognitive-Behavioural Therapy, psychodynamic, person-centred/Rogerian, etc.)
2. The workforce development needs of workers in the health and other support sectors, and the needs of personnel working in the gambling industry itself

⁶ This review only included studies that examined the prevalence of comorbid conditions in problem and/or pathological gamblers in a general population sample, using randomized sampling methods and standardized measurement tools.

⁷ The actual prevalence estimates varied averages across the studies reviewed by Lorains *et al.* (2011), but there was a range of rates reported in individual studies.

⁸ Lorrains *et al.* report the highest mean prevalence was for nicotine dependence (60.1 per cent), followed by a substance use disorder (57.5 per cent), any type of mood disorder (37.9 per cent) and any type of anxiety disorder (37.4 per cent) (p 490).

3. The nature, prevalence, and effectiveness of consumer pre-commitment/self-limitation strategies
4. The nature, prevalence and effectiveness of consumer self-exclusion strategies
5. The impact of situational features on propensity to problem gambling (for example, density and/or location of terrestrial gambling outlets) and the relationship of such features with socio-economic and demographic profiles of localities/regions/jurisdictions
6. Issues regarding gambling-related risk and harm in relation to specific demographic groups, for example, ex-service personnel, homeless people, prisoners
7. The impact of structural features of gambling products, for example, stakes and prizes, speed of play, and so on
8. The effectiveness of prevention/education initiatives, including operators' corporate social responsibility measures.

This report sets out the findings from a review of the existing literature in relation to each of these issues. It complements a second study commissioned by the RGF (Planzer and Wardle, forthcoming) that addresses two further topics:

- The impact of advertising on propensity to problem gambling
- The comparative effectiveness of regulatory approaches across different jurisdictions.

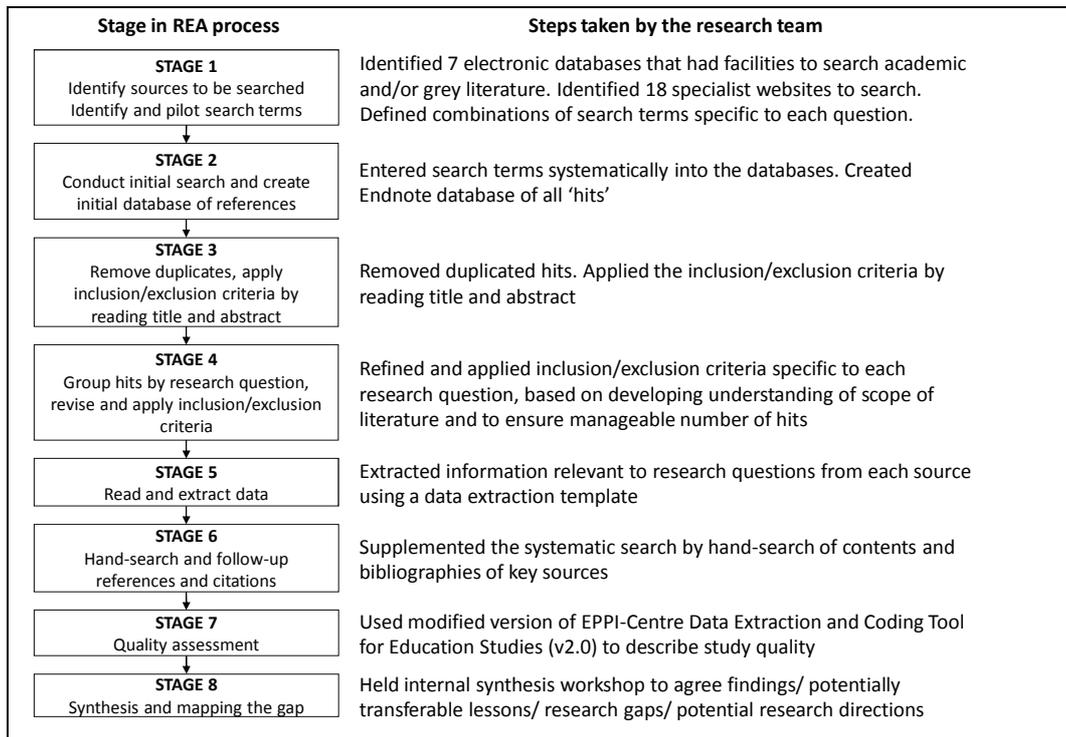
1.2.1 Research approach

A Rapid Evidence Assessment (REA) is conducted within a limited timeframe and involves an overview of existing research on a carefully defined topic. REAs aim to be rigorous and explicit in method and thus systematic, but make concessions to the breadth of the process by limiting particular aspects of the systematic review process (Government Social Research Service, 2009). The search process is summarised in Figure 1; Appendix A sets out a detailed description of the approach taken to the REA; Table 1 provides an overview of the number of studies included in the REA in relation to each issue.

Table 1: Overview of studies included in the REA

Issue	Number of studies included
1. Treatment	12
2. Workforce development	8
3 & 4. Self-exclusion and self-limitation	8
5. Situational factors	14
6. Demographic groups	10
7. Structural features	12
8. Prevention, Education and CSR	6
TOTAL	70

Figure 1: Overview of REA methodology



1.3 Structure of this report

Chapter 2 of this report sets out the key findings from the REA, their implications and the gaps identified. It is intended as an overview of the knowledge base, and is supported by later chapters in which individual research studies are described.

Chapter 3 describes some of the common methodological problems with literature in this area, and is intended as a checklist to be used when reading later chapters of the report.

Chapters 4 to 10 set out the detailed findings of the REA in relation to each of the research issues of interest to the RGF. Each chapter opens by describing how the issue has been defined and interpreted in the REA and gives a summary of the findings. The chapters then take the form of an annotated bibliography – describing each included study and giving a quality assessment.

Appendix A sets out the methodology and approach used for the REA. Appendix B sets out information about all the studies included in the REA.

CHAPTER 2 **Key findings and implications: mapping the gap**

This chapter sets out the key findings from the Rapid Evidence Assessment (REA). It provides an overview of the topics covered in the available literature, maps where there is evidence, and points to where evidence is lacking in relation to the eight issues of interest to the Responsible Gambling Fund (RGF). Chapters 4 to 10 provide a detailed account of the research and a quality assessment of each study.

2.1 **The evidence on problem gambling**

The conclusion from this REA is that the evidence available to policy- and decision-makers in Britain on problem gambling is limited. The available research has been conducted almost exclusively in North America, Australia and New Zealand, and while this can be informative, differences between these countries and Britain in terms of regulation, culture and the mix and availability of gambling opportunities, means that findings are not necessarily transferable.

Some of the topics of interest to the RGF, such as problem gambling amongst homeless people, the effectiveness of corporate social responsibility measures, and the capability and capacity of health professionals to respond to problem gambling, are evidence ‘black holes’, in relation to which this REA found no research since 2004. That is, there are some issues where the problem appears to be a lack of research attention; for example, despite the prevalence of betting shops across Britain, no studies were identified that looked at these. In relation to other issues, such as treatment, the problem of missing evidence appears more related to a lack of provision; for example, person-centred therapy is not practiced very much and thus is not readily available to be evaluated.

The term ‘gambling’ also covers an extremely wide range of activities. The research identified in this REA focuses primarily on the use of electronic gambling machines and gambling in casinos, with some studies also looking at sports betting. There is also little research on transferability of findings from one area of gambling to another, so caution should be exercised in generalising findings from areas in which there is more evidence to areas in which there is little or no evidence.

Furthermore, empirical research into problem gambling commonly suffers from methodological weaknesses, which limit the extent to which policy- and decision-makers

can treat it as a reliable starting point. This issue is discussed in Chapter 3, where a quality checklist is provided to support a critical assessment of studies included in this REA.

2.2 **Evidence of higher prevalence of problem gambling among offenders, but the knowledge base about the homeless and members of the armed services is inconclusive**

The RGF asked for evidence about problem gambling in these specific demographic groups. Only in relation to offenders is there strong evidence that rates of harmful gambling are more prevalent among populations of people who are incarcerated. A small number of studies found that some offending by prisoners was gambling-related, usually to fund their gambling habit (Abbott and McKenna, 2005; Abbott *et al.*, 2005; Turner *et al.*, 2009), but there is no further evidence as to the nature of the relationship between gambling and offending.

Given evidence of higher prevalence of problem gambling amongst young men living in deprived areas, high prevalence rates among prison populations might be expected, because prison populations are commonly drawn from these sections of the community. The same might be said of the homeless and members of the armed forces. However, in relation to the armed services no studies were identified in this REA that could provide reliable evidence regarding the prevalence of problem gambling in these populations. One study from the US showed higher prevalence of problem gambling amongst US air force recruits, but given the specificity of this sample, it is difficult to generalise across to others.

2.3 **The effectiveness of prevention measures is not known; the knowledge base about treatment is somewhat stronger but narrow in scope**

The RGF asked for the identification of research and evidence about ‘demand-side’ measures: preventative programmes for members of the population who might develop a gambling problem; treatment for problem gamblers; and measures that can be applied in gambling venues to reduce problem gambling (self-exclusion programmes, self-limitation programmes, support and signposting to services from those working in the gambling industry, and industry corporate social responsibility measures).

2.3.1 **Prevention**

This REA included six studies that looked at prevention and education initiatives:

- One of these looked at whether government awareness campaigns about problem gambling in Canada had reached relevant sections of the community (Byrne *et al.*, 2005). This study did not identify the impacts of the campaign.
- A systematic review of health communication media campaigns to assess their applicability to the prevention of problem gambling.
- An evaluation of an ‘awareness centre’ in a casino in Canada (Boutin *et al.*, 2009) that found no impact on gambling from the activities of the centre (and in fact recorded an increase in erroneous beliefs about gambling amongst those who visited the centre).

- Three evaluations of school-based prevention programmes conducted in Canada (Ladouceur, Ferland *et al.*, 2004; Turner *et al.*, 2008; Williams *et al.*, 2010). Results show us that, at least in the short-term, such programmes can improve student's knowledge and understanding of gambling-related issues. However, how quickly this learning is forgotten is not known, nor is the impact on gambling behaviours or the likelihood of developing a gambling problem.

This list illustrates that the evidence on the effectiveness of prevention and education is limited and patchy. Education and prevention initiatives across all categories may succeed in increasing knowledge and awareness of problem gambling, but the extent to which these initiatives can alter behaviour is yet to be ascertained.

It is possible that there are lessons to be learnt from public health campaigns and school-based prevention programmes addressing other behaviours – such as smoking, drinking alcohol or under-aged sex – that could be used in designing gambling prevention programmes. Of course, it is recommended that programmes are subject to robust evaluation, including long-term follow-up and an examination of impacts on gambling behaviour.

2.3.2 Treatment

This REA draws evidence from eleven studies into treatments for problem gambling:

- Two systematic reviews and meta-analyses of the effectiveness of cognitive-behavioural interventions (Gooding and Tarrier, 2009; Pallesen *et al.*, 2005). These provide good evidence that cognitive-behavioural treatments can reduce gambling behaviour over the long-term. Both one-to-one and group approaches appear to be effective for a range of gambling behaviours.
- Three randomised studies on motivational interventions (Diskin and Hodgins, 2009; Grant *et al.*, 2009; Petry *et al.*, 2008), which all showed at least some positive effects from the use of motivational interviewing – either alone or in combination with cognitive-behavioural approaches.
- One evaluation of a pilot intervention providing personalised feedback to problem gamblers, which found that participants were very satisfied with the intervention, but could not show impacts on problem gambling.
- One study that compared, but found no significant differences in the effectiveness of, cognitive-behavioural interventions and '12-step' therapy (Gamblers Anonymous).
- Three evaluations of online forums for problem gamblers (Shandley and Moore, 2008; Wood and Griffiths, 2007; Wood and Wood, 2008), all of which showed satisfaction with the forums, but from which no conclusions can be drawn about impact on gambling behaviour.
- One systematic review of drug therapies for problem gamblers, showing that antidepressants, opiate antagonists and mood stabilisers could be effective as treatments for problem gamblers.

Interpreting the results on treatment

There is evidence of low levels of treatment seeking among those who have gambling problems (Suurvali *et al.*, 2009). This raises the possibility that those who seek treatment are not typical of all problem gamblers – which in turn has implications for an assessment of the potential for treatment effectiveness. If those in treatment are the ‘worst’ problem gamblers, it may be harder to achieve improvements than if those in treatment typically had less-serious problems.

There are also indications of a high level of self-recovery from problem gambling (Slutske, 2006). Empirical studies often detect improvements in *both* problem gamblers receiving treatment and those who are in a control group and not receiving treatment (Diskin and Hodgins, 2009; Petry *et al.*, 2008). This raises a question about the value of treatment – does it improve the speed or long-term effectiveness of recovery and does it add more for some kinds of gamblers than for others? These questions are important for policy- and decision-makers thinking about treatment resource allocation in the current financial climate. The possibility of self-recovery and low levels of treatment seeking heightens the need for evaluations that include control groups and can examine the counterfactual (see Section 3.4).

The available evidence does not speak to the contribution made to treatment effectiveness by contextual factors or other forms of support. For example, should those in treatment be encouraged to engage in self-limitation strategies, or exclude themselves from gambling venues? Would the provision of debt and financial management advice be helpful? Is attendance at Gamblers Anonymous, or the use of drug therapy, a useful addition to treatment? Problem gamblers commonly suffer other problems, such as substance misuse or depression; the available research tells us little about whether treatment works by addressing problem gambling, these comorbid disorders, or some combination of both.

The majority of studies identified in this REA evaluate the effectiveness of cognitive-behavioural treatments. However, the lack of research into other treatment approaches (for example, psychodynamic or person-centred) should not be taken to indicate that they are ineffective. Rather, it is an indication of the relative popularity, availability and use of cognitive-behavioural treatments for problem gamblers, and the interest in that approach among the research community. The term ‘cognitive-behavioural treatments’ includes one-to-one and group approaches, as well as a spectrum of treatments ranging from those that have a cognitive focus, to those that have a behavioural focus. The available evidence provides no indication that any mode of delivery or treatment focus is more effective for any particular kind of problem gambler, and there is scope for further work to shed light on this and thus improve the targeting and dosage of treatment.

Studies reviewed in this REA indicate that there may be an appetite for online support and self-help forums. Future research could investigate whether websites for problem gamblers can reach individuals who would not otherwise volunteer for treatment, and help them to reduce their gambling. Given evidence of an underlying rate of natural recovery, it could be that a website provides a cost-effective way of supporting and encouraging people who want to change their behaviour. Available research, however, only tells us that users of websites who volunteered to participate in research expressed high levels of satisfaction with such websites.

2.3.3 Self-exclusion and self-limitation

This REA included five studies into self-exclusion: one from the US (Nelson *et al.*, 2010); two from Quebec, Canada (Ladouceur *et al.*, 2007; Townshend, 2007; Tremblay *et al.*, 2008); one from New Zealand (Townshend, 2007); and one from Switzerland (Sani *et al.*, 2005). Methodological weaknesses in the design, of these studies, however, means there is no robust evidence that self-exclusion is effective in reducing problem gambling. The most significant weakness of the evidence on self-exclusion stems from the lack of control groups in the available studies. Thus, whilst research finds that self-excluders show long-term reductions in gambling behaviour, it is not possible to say how much of this is due to the self-exclusion programme, and how much is due to natural recovery regardless of the programme.

The theory of change behind self-exclusion programmes is often not articulated in research studies included in this REA. Is self-exclusion a strategy based on deterrence (the threat of being caught, evicted from gambling premises and/or fined), reduction of opportunity (simply meaning someone does not, physically, have the opportunity to gamble), or a public commitment or statement of an individuals' motivation to change? The answers to these questions should influence both the design and the evaluation of self-exclusion programmes.

The REA included three studies from Canada and Australia on self-limitation (Ladouceur and Sévigny, 2009; Nelson *et al.*, 2008; Nower and Blaszczynski, 2010). These all looked at players' perceptions of self-limitation, rather than on the effect of such strategies on gambling behaviours or harms, and thus do not provide robust evidence as to effectiveness.

The effectiveness of self-limitation is, therefore, a considerable research gap. There may be a risk of unintended consequences from self-limitation strategies. For example, providing people with information about their losses may encourage them to try to recover those losses, or limiting play time might increase average bet size. In terms of reducing gambling-related harm a key question is whether self-limitation strategies can reduce harm among *problem* gamblers. If they can be effective, there are then questions about how problem gamblers can be persuaded or compelled to limit their behaviour – should measures be made compulsory?

2.3.4 Capabilities and capacities of staff working in the gambling industry

Those working in gambling venues might be particularly well-placed to identify problem gamblers and indicate where they might seek help and support (notwithstanding the lack of evidence of what treatment works when and for whom). The RGF asked what information was available about the ability of the workforce to do this, whether they already do it, and what, if any, were the training and development needs of the workforce in this respect.

The REA included four studies that evaluated training programmes for those employed in gambling venues (Defabbro *et al.*, 2007; Dufour *et al.*, 2010; Giroux *et al.*, 2008; Ladouceur, Boutin *et al.*, 2004). These studies from Canada and Australia found that training programmes provided to casino employees improved their understanding of problem gambling but did not increase (in the long-term) the chance that they would help potential problem gamblers. No evidence was found from Britain. Whilst there are some professional standards in Britain for those working in the gambling industry (National

Occupational Standards, 2007), they are voluntary, unspecific as to if and when employees should help people with gambling problems, and there are no figures as to compliance. Some of the training programmes evaluated in the available studies were mandatory, which is not the case in Britain. Transferability might also be affected by the nature of the workforce, including the rate of staff turnover, qualifications and education levels. Such factors might affect the uptake and long-term effectiveness of training.

Given the current interest in theories of behaviour change (Institute for Government, 2010) in the policy-making community, there is scope for research into how employees can be incentivised to put their training into action (or conversely, whether there are, in fact, disincentives for doing so).

Finally, a point on which the literature is silent is the potential conflict of interest between the industry's interests in maximising profits, and moves to encourage staff to offer help and support to those who are gambling excessively.

2.3.5 Capabilities and capacities of health and criminal justice professionals

Given the high prevalence of comorbid conditions such as drug misuse and depression, as well as evidence of higher prevalence of problem gambling amongst populations involved in the criminal justice system, it appears there is considerable scope for health and criminal justice professionals to act as a source of information and support. An evidence gap relates to the capacity to do this, whether practitioners have relevant skills and training, and whether they are correctly incentivised to help problem gamblers.

Two studies were included in this REA from the US and Australia that identified concerns about healthcare professionals' ability to identify and help problem gamblers (Engel *et al.*, 2010; Productivity Commission, 2010). These studies have limited applicability to Britain. One study was included that surveyed general practitioners (GPs) who took part in a training session about problem gambling (Corney, 2010). This indicated that GPs would like to provide support to problem gamblers and their family members, including referral to specialist treatment. However, this was a small study and it did not examine the impact of training on GPs ability to help problem gamblers.

There are several models that could be drawn on here. Arrest referral schemes, for example, which make contact with those being held at police stations to offer drug treatment (Edmunds *et al.*, 1998), or moves to encourage General Practitioners to refer victims of domestic violence to specialist support services (Norman *et al.*, 2010).

2.4 The knowledge base about structural features of electronic gaming machines is limited, and the situational effects of the number and location of gambling opportunities are not well understood

The RGF commissioned the research team to look at some supply-side factors: situational features and structural features of gaming machines.

On proximity to a gambling venue, all five studies included in the REA that examined impact on gambling *participation* found a positive relationship (Adams *et al.*, 2007; Marshall *et al.*, 2004; Sévigny *et al.*, 2008; Welte *et al.*, 2004; Wilson *et al.*, 2006). Of five studies that examined impact on *problem gambling*, four found a positive relationship

(Adams *et al.*, 2007; LaBrie *et al.*, 2007; Welte *et al.*, 2004) and one found no relationship (Sévigny *et al.*, 2008).

Five studies that examined whether the density of gambling outlets in a particular area led to higher rates of problem gambling found different results and employed different outcome measures: one found no consistent relationship to expenditure on gambling; two found a positive relationship with problem gambling; and one found a positive relationship with gambling participation (Cox *et al.*, 2005; Marshall, 2005; McMillen and Doran, 2006; Storer *et al.*, 2009; The South Australian Centre for Economic Studies, 2005).

From the available studies it is not possible to conclude whether reducing the number of gambling outlets would reduce problem gambling in an area. It could be that individuals would travel to gamble, so changes to outlets in one community would not change overall problem gambling levels. There are also unanswered questions about the importance of home address; the available research from the US and Canada does not look at opportunities to gamble close to work or along travel routes. It is also not understood whether, and if so how, situational factors interact with individual-level factors. Deprived areas tend to have more gambling outlets, and the people living in such areas have more of the risk factors for problem gambling. Unpicking this relationship is complex. Finally, it is hypothesised that whilst increased access to gambling opportunities could increase the prevalence of gambling and problem gambling, there might also be an ‘adaptation’ effect, in which communities adapt in various ways to the ready access to gambling. For example, the novelty of gambling wears off, informal social pressures are brought to bear, or treatment and support services become more available. The adaptation hypothesis is not proved or disproved by available research, and is an area in which further research is needed.

Therefore, despite identifying a considerable number of studies that look at the impact of situational features, this is an issue on which there is a limited evidence base to inform decisions in Britain.

On structural features, this REA identified a number of studies looking at:

- Speed of play (Blaszczynski *et al.*, 2005; Chóliz, 2010; Ladouceur and Sévigny, 2006; Linnet *et al.*, 2010; Sharpe *et al.*, 2005)
- Stopping devices (Ladouceur and Sévigny, 2005)
- Note acceptors (Blaszczynski *et al.*, 2005; Hansen and Rossow, 2010; Sharpe *et al.*, 2005)
- Bet size (Sharpe *et al.*, 2005)
- Near misses (Dixon and Schreiber, 2004; Ghezzi *et al.*, 2006; MacLin *et al.*, 2007)
- Payback percentage (Brandt and Pietras, 2008)
- Visual complexity (Christopherson and Weatherly, 2006)

However, methodological limitations mean that there is no conclusive evidence as to whether, and if so how, these features are associated with problem gambling.

2.5 **Interpreting and acting upon the findings in this report**

This study has used a Rapid Evidence Assessment methodology (Government Social Research Service, 2009) to identify and evaluate research into problem gambling published since 2004. This report represents an overview of the state of knowledge in relation to the eight issues raised by the RGF, although it necessarily maintains a tight focus on the specific issues of interest to the RGF and is intended to be targeted rather than comprehensive in its coverage of research.

As part of the REA research gaps have been identified in relation to each of the eight research issues. Filling these gaps poses some methodological challenges. For example, evaluating treatments and programmes such as self-exclusion and self-limitation poses challenges in attributing change to these interventions, rather than due to natural recovery or other influences. Furthermore, understanding the impact of and interaction between individual-level, neighbourhood-level and area-level factors (such as the number and density of gambling outlets) requires a research approach that is able to capture data on these factors, and then control for confounding effects.

The next chapter examines some common methodological challenges and limitations in the studies included in the REA, to prepare readers for the critical assessment included in later chapters of the report.

CHAPTER 3 **Quality assessment of research into problem gambling**

This chapter describes some of the common methodological limitations amongst the studies included in this REA. It provides a quick guide, or checklist, of issues and pitfalls to take into account when assessing research in this and related areas. This should allow readers who are not researchers to better understand not only what the studies show, but what significance to place on those findings, how robust the claims emerging from such studies may be, and so forth. As is typical when conducting such evidence reviews, in this REA certain ‘quality assessment’ questions were asked of the research included here by the authors. These questions are set out in detail in Appendix B. This section is intended as a narrative to support the use of those questions, rather than a comprehensive discussion of issues of research methodology, which is beyond the scope of this report.

As noted in the previous chapter, not only are there methodological challenges with existing studies, there is also the important challenge of assessing transferability of findings.

3.1 **Sampling is an important component of good research design**

Key questions about sampling relate to whether the findings can be generalised to the population from which the sample is drawn, or from one population to another. In assessing literature included in this the REA the following questions were asked of each study:

- What method was used to select the sample?
- What was the sample size?
- Did any of the sample drop out over time?
- Were the members of the sample who dropped out different?

Methods used to select the sample

Many of the studies included use a convenience or opportunity sample – researchers approach people who are available at a particular location at a particular time. For example, in some studies researchers approached individuals who were playing machines in a particular casino and asked them to participate in the study (Błaszczynski *et al.*, 2005; Sharpe *et al.*, 2005). Many of the studies also included only those who agreed to participate – and this might affect the representativeness of the sample if those who agree to take part differ systematically from those who do not. Volunteers might have some

existing motivation to address their gambling behaviours, or be different in other ways from the population of problem gamblers.

One issue in problem gambling research is when studies sample from a particular population, such as problem gamblers in treatment or offenders in a federal prison. For example, one study looked at veterans in Australia seeking treatment for Post Traumatic Stress Disorder (Biddle *et al.*, 2005). Findings from such samples can only be generalised with confidence to other members of those specific groups, rather than to, for example, problem gamblers who are not in treatment, or offenders who are on community sentences or in provincial prisons. In particular, findings from a sample of non-problem gamblers might not be generalisable to problem gamblers. Several of the studies investigating structural features of electronic gaming machines used samples of university students who are occasional, non-problem gamblers (Dixon and Schreiber, 2004; MacLin *et al.*, 2007).

Sample size

In describing the studies included in Chapter 4 – 10 the research team often comment on sample size. The appropriate sample depends on the method and approach in a particular study. For example, in-depth case studies have small sample sizes and aim to provide rich and textured information about a small number of cases. In contrast, a survey seeking to estimate national prevalence rates of problem gambling would need a larger, more representative sample. Sample size is also dependent on the total population to which the research seeks to generalise. For example, in studies assessing satisfaction with online support forums (Wood and Griffiths, 2007; Wood and Wood, 2008), a very small proportion of all users of the site took part in the study, which invites caution about the generalisability of findings.

Sample drop-out and response rates

If study participants drop-out or cannot be traced, this may bias the sample and affect the validity of the results. For example, in studies evaluating the effectiveness of treatments for problem gambling those individuals who complete the treatment may have been easier to treat in the first place – indicated by their persistence in treatment. For this reason, those studies that employ an ‘intention to treat’ methodology are generally considered to be of higher quality than those that do not. In an intention to treat approach everyone who begins the treatment is considered to be part of the trial, whether he or she finishes it or not.

3.2 Attention should be paid to the outcomes measured by studies into problem gambling

Many of the studies included in this REA look at the effect of an intervention or measure on problem gambling, but different studies use different measures of problem gambling, ranging from behavioural measures such as including time spent gambling, amount spent gambling or amount lost, to measures of thoughts and attitudes, such as gambling-related cognitive distortions. Studies evaluating the impact of education initiatives looked at misconceptions about gambling. The use of different outcome measures in different studies makes it difficult to compare the efficacy of different treatments (Walker *et al.*, 2006).

In relation to studies that evaluate treatments or interventions, a distinction should be made between gambling behaviour and the problems that follow from excessive gambling behaviour (such as financial and family problems). ‘The effectiveness of an intervention is measured directly by the extent to which problematic gambling behaviour decreases and indirectly by consequent increases in the quality of life as the problems caused by the gambling are resolved’ (Walker *et al.*, 2006, p 505). The more remote the measure from gambling behaviours, the more caution should be exercised in interpreting the study findings. A change in attitudes about gambling might not lead to a change in gambling behaviour, and this might not diminish any of the harmful effects of problem gambling.

3.3 **Data collection methods affect the reliability and validity of data**

In assessing literature included in this the REA the following questions were asked of each study:

- What methods were used to collect the data?
- Who collected the data?
- Where were the data collected?
- Over what period?

Many of the studies included in the REA rely on self-reported gambling behaviours, perceptions and views. For example, the prevalence of problem gambling among prison populations is measured by asking inmates questions about their gambling (Turner *et al.*, 2009). Self-reported measures could be subject to respondents’ recall errors, especially if the research asks about things that have happened in the past. Respondents may deliberately mislead researchers because of embarrassment, or the desire to give a good impression. This might particularly be the case when reporting problem gambling-related behaviours that could be subject to social disapproval.

Also relevant here is the setting in which data are collected. For example, several of the studies that investigate the influence of structural features of electronic gaming machines have been conducted in a laboratory environment (Chóliz, 2010; Ladouceur and Sévigny, 2005). This unnatural setting may make research participants behave differently and thus not be generalisable to a ‘real-life’ situation.

Lastly, the period of follow-up should inform the quality assessment of studies on problem gambling. Studies that only look for effects in the months following an intervention may miss long-term changes or capture effects that are short-term but do not persist.

3.4 **To understand whether treatment, prevention and self-exclusion programmes work it is necessary to consider issues of causation and the counterfactual**

Many of the studies included in this REA can show an association between two variables, but cannot show causation. For example, studies show that prisoners have a higher

prevalence of problem gambling (Williams *et al.*, 2005), but the evidence does not say whether these two features are causally linked.

There are many approaches that studies can use to examine causal relationships, but ‘experimental’ designs are considered best able to do this. The features of an experimental design are (Bachman and Schutt, 2003, p 131):

- Comparison groups – one group that receives the intervention and one that does not
- Randomly assigning people to the comparison groups
- Assessing change in the dependent variable after the experimental condition has been received.

Comparison groups

In an evaluation of the effectiveness of a treatment programme in prison (Walters, 2005), researchers compared inmates participating in the class with inmates who signed up for the class but were transferred prior to participating in the program – who made up a control group. The use of a control group enables researchers to isolate the effect of a programme or treatment from other factors that might have caused a change in the variable of interest. For example, studies that look at the effect of self-exclusion might want to understand whether any reduction in gambling activity was due to the content of an exclusion programme, or whether it was due to unrelated changes within an individual – for example, ‘growing out’ of gambling, support and encouragement from family members, and so on.

In some studies where it is not possible to identify a control group, there are some other methods that can be used to ‘construct’ a control group (such studies would not be considered ‘true’ experiments). Some use statistical control methods. For example, a study into the effect on problem gambling prevalence of living close to a casino used statistical methods to control for individual characteristics (socio-economic status) so the findings of a positive relationship between neighbourhood disadvantage and problem gambling would not be simply an effect of poverty at the individual level (Welte *et al.*, 2004).

Some studies compare the same participants before and after an intervention, but do not use a control group. For example, studies into the effectiveness of self-exclusion look at gambling behaviour amongst self-excluders at the start of the programme, and then at some point in the future, and look for a change in individuals over time. A weakness of this design is that it does not allow the counterfactual to be explored: the outcome that would have occurred if the gamblers had not been on the self-exclusion programme (Bachman and Schutt, 2003). These studies establish an association – reduced gambling after participation in self-exclusion programmes – but cannot determine whether the self-exclusion caused the change in outcomes. As noted elsewhere, there is evidence that many problem gamblers improve over time regardless of any interventions or programmes (Slutske, 2006), so in evaluating self-exclusion strategies it would be best to design an approach to evaluation that isolated the effect of the programme, as compared to natural recovery.

Random assignment

The mere presence of a control group, however, is necessary but not sufficient. In some of the studies included in this REA the control group differed in important ways from the experimental group, or the control group received some form of intervention, thus muddying the waters in establishing causation. One way to minimise the chance that the control and experimental conditions are different is to randomly assign participants to a control and experimental group. It can be assumed that the only difference between the two groups is the treatment or intervention that the experimental group receives, but the control group does not. Randomly assigned groups can provide a good estimate of the counterfactual (Bachman and Schutt, 2003 p 132), but it is still necessary to compare the groups to check they are similar. In one study into treatment for problem gambling, experimental and control groups differed significantly on demographic characteristics despite random assignment (Cunningham *et al.*, 2009).

Some studies included in this review have used ‘natural experiments’ that examine changes in the independent variable which have been made by nature, or by someone other than the researcher. For example, Hansen and Rossow (2010) conducted a study that looked at the effect of a change in the law in Norway on the notes which could be used in electronic gaming machines. In some natural experiments ‘nature’ or a change outside of the control of the researcher assigns individuals to the experimental or control group. An example of this is a study by Cox *et al.* (2005), which compared the prevalence of problem gambling in people living in provinces in Canada that had different numbers of video lottery terminals per 1,000 population.

The time order of the relationship

Well-designed experimental studies measure the dependent variable in both the control and experimental group before the treatment and after the treatment. In a gambling study, an experiment would take measures of gambling expenditure, time spent gambling, etc., before an individual enrolled on a self-limitation programme, and then after some time in the programme.

Few studies included in this REA used prospective designs. A prospective study is a form of cohort study in which the same group of individuals is followed over time in order to determine the effect of a particular intervention or activity. The advantage of this design is that it can help researchers determine the temporal sequence of events, and thus assist in making causal inferences, since to conclude that causation was involved it must be established that the study participants were exposed to the independent variable before variation in the dependent variable – for example, that people enrolled on a self-exclusion programme before they reduced their gambling.

3.5 Understanding the mechanisms of change

In addition to showing that one thing causes another, it can also be very helpful to understand *why* a change occurs. For example, the systematic reviews and meta-analyses of studies into cognitive-behavioural treatments included in this REA provide fairly strong evidence from research using experimental designs that participation in this form of treatment leads to a reduction in symptoms of problem gambling. However, it is not known *how* this effect is achieved or which form of cognitive-behavioural treatment is

most effective. Studies examining situational features are another area in which causal relationships are hard to unpick. Here the problem is that researchers lack the data necessary to control for confounding variables. For example, one study found that problem gambling appeared to be modestly but significantly associated with proximity to casinos. The authors note, however, that the available data severely limit their capacity to ‘tease apart what is undoubtedly a host of individual and community level factors underlying this intra provincial variation’ (Rush *et al.*, 2007, p 206).

3.6 **Conclusion**

This chapter has highlighted some common methodological issues and challenges that arise in research into problem gambling. Awareness of these enables an assessment of the available evidence and aids decisions about how much weight can be assigned to different studies, and thus how useful they are to policy- and decision-makers working in this field. The following chapters – Chapter 4 to Chapter 10 – set out the detailed findings of this REA. Each study is described, along with its methodological strengths and weaknesses. It will be seen that many of the studies included in this REA do not utilise experimental designs.

CHAPTER 4 **Problem gambling among offenders and members of the armed services**

4.1 **Interpretation of the issue and overview of findings**

The RGF asked about ‘issues regarding gambling-related risk and harm in relation to specific demographic groups, for example ex-service personnel, homeless people and prisoners’.

In interpreting this issue the research team sought to look beyond the information available in general prevalence surveys about differential levels of gambling and harmful gambling among population groups such as women vs men, younger people vs older people, ethnic minorities vs majority ethnic groups. This decision about scope was in line with both the specific issue of interest to the RGF and a Rapid Evidence Assessment methodology. The groups on which literature was identified were:

- Itinerant groups
- Offenders/prisoners
- Veterans.

No literature was identified on homeless people. Although gender, race and age are not included in the REA the prevalence of problem gambling among such groups is mentioned at Section 1.1.3.

4.2 **Itinerant groups**

Doran and Young (2010) conducted a study of three itinerant groups on the ‘Sunshine Coast’ of Australia. The groups were: ‘grey nomads’ – itinerant elderly tourists who were permanently mobile and did not have a home base (n=64); southerners – temporary residents who visited for several months to escape the southern winter (n=28); and construction workers (n=68). From interviews with members of these groups, Doran and Young reported significant differences in the venues visited by members of the three groups, their gambling behaviour and their risk of problem gambling risk. The group with the least discretionary mobility, the construction workers, were most heavily dependent on gambling venues for economic and social relationships. This translated into higher levels of problem gambling risk, which was further mediated by the inter-personal connectedness of individuals. ‘These results suggest that mobility per se does not directly result in higher risk

of problem gambling but combines with social isolation to place individuals at risk' (Doran and Young, 2010, p 629).

4.3 **Members of the armed services and veterans**

One study was found on problem gambling among members of the armed forces in the US and one on veterans in Australia.⁹

Steenbergh *et al.* (2008, p 453) analyse self-completed survey data from 31,104 active duty US Air Force recruits completing basic military training. Three questions in the survey asked about gambling:

- Frequency was assessed by asking respondents, 'In the past twelve months before Basic Military Training, how often did you: play cards for money, bet money on sports, buy lottery tickets/scratch off cards, or gamble at a casino?'
- To assess level two gambling, respondents were asked, 'In the twelve months before Basic Military Training, did you ever feel bad about the amount you bet or the consequences of betting, or what happened when you bet money?'
- Finally, participants were asked, 'In the twelve months before Basic Military Training, did you ever feel that you would like to stop betting money, but didn't think you could?' Those who responded 'yes' to this question were identified as level two gamblers.

According to this measure, problem gambling prevalence in their sample was 1.9 percent. The authors of the study conclude that 'a significant number of Air Force recruits entered the military with gambling-related problems' (p. 457). However (and as the study authors acknowledge) using a single question to identify problem gamblers has some limitations, and caution should be exercised in using this result as evidence of a higher prevalence of problem gambling in this population.

Biddle *et al.*, (2005) explored gambling among 153 Australian veterans entering post-traumatic stress treatment programs, through asking participants to complete a survey. The participants in this study were a convenience sample of 153 people (drawn from 194 people who were approached and asked to participate). They found that the prevalence of gambling among this treatment-seeking group was much higher than in the general Australian community; 29 percent of study participants were classified as probable problem gamblers according to the SOGS (lifetime measure) and 17 percent according to the DSM-IV. The key predictors of problem gambling in this population were gambling on electronic gaming machines weekly or more often, gambling at casino tables, and living alone. Although no support for a relationship between post-traumatic stress disorder, anxiety, depression or alcohol use was observed, this may be due both to the fact that all study participants were diagnosed with post-traumatic stress disorder and because the sample had multiple psychiatric symptoms.

⁹ One study was identified in searches but excluded from the REA because it described, rather than evaluated, a treatment programme for soldiers (Kennedy *et al.*, 2005).

4.4 Offenders

Engaging in criminal activities to finance gambling is one of the DSM-IV diagnostic criteria for pathological gambling. Its inclusion is justified by findings of high rates of self-reported gambling-related offending among serious problem gamblers surveyed in treatment and self-help group settings (Abbott *et al.*, 2005, p 538). The inclusion of illegal behaviour in the diagnostic criteria for pathological gambling suggests that such behaviour is not merely a result of the disorder but might be considered, at least in some individuals, an intrinsic aspect of it (Grant and Potenza, 2007, p 302).

While pathological gamblers seem to have high rates of gambling-related arrest, and gambling-related illegal behaviour appears to be common among inmates, not all pathological gamblers commit illegal acts related to gambling (Ledgerwood *et al.*, 2007, p 295).

In looking at the relationship between offending and problematic gambling, it should be remembered that prisons include disproportionate numbers of people likely to be at risk of problem gambling, including young adults (especially men), unemployed people, those of low socio-economic status, ethnic minorities, those with substance abuse disorders, and so on (Piquero *et al.*, 2007). These confounding variables mean that it is difficult to explore the causality of any relationship between offending and problematic gambling (Abbott *et al.*, 2005, p 539).

In a systematic review that includes twenty-seven papers (three from the UK; five from Australia; three from New Zealand and sixteen from the US) dating between 1990 and 2002, Williams *et al.* (2005) find that around one third of criminal offenders meet criteria for problem or pathological gambling, which, if correct, would be a very high prevalence rate. On the basis of their review they conclude that 'a significant percentage of problem/pathological gamblers commit crimes to support their gambling, resulting in a natural link between gambling and inmates' (p. 680). Amongst studies included in the review the percentage of gambling-related crimes committed by inmates who were either problem or pathological gamblers ranged between 11 percent and 100 percent, with an average of 50 percent (across the studies reviewed).

Turner *et al.* (2009) examined the prevalence of moderate and severe problem gambling in a sample of 254 incarcerated Canadian male federal offenders. The rate of moderate and severe problem gamblers in the offender sample was much higher than is found in the general population, and there was a statistically significant correlation between the severity of problem gambling and committing 'income-producing' crimes (but no link with violent crimes). Some 65 percent of the severe problem gamblers in the offender sample (but only 20 percent of the moderate problem gamblers) reported engaging in criminal activity because of their gambling problems (for example, to pay off debts). Based on these findings there appears to be a need to offer problem gambling treatment services to offenders in order to help them break the cycle of gambling, debt and crime. Severe problem gamblers in the sample had more previous offences, which suggested to the authors of the study that prison does not end the cycle of gambling, debt and crime.

This study sampled from a federal assessment centre – so more serious offenders are likely to be included. There was also some selection effect: 651 offenders were asked if they

would be interested in volunteering for the study, and 254 agreed (a completion rate of about 40 percent). The study also relies on self-reported levels of gambling.

Abbott *et al.* (2005) looked at gambling participation prior to and whilst in prison among 357 recently sentenced inmates in four New Zealand male prisons. Some 19 percent said they had been in prison for a gambling-related offence, most of which were property-related and non-violent. The sample was representative of the rest of the New Zealand prison population, there was a response rate of about 87 percent (those approached were randomly selected), and in terms of age, ethnicity and offence type, those who did not respond were the same as those who did. In line with Turner *et al.* (2009), this study found very high problem gambling prevalence rates compared to the general population, and that this sample had more severe and chronic gambling problems.¹⁰ The large majority of gambling-related offending was reported by problem gamblers, the majority of gambling-related crimes reported were non-violent, and those with more severe problems offended more often than those with less serious problems. Only 5 percent of problem gamblers said their early offending was gambling-related.

Abbot and McKenna (2005) undertook a similar study of 94 recently sentenced female inmates from New Zealand's three women's prisons. 151 inmates were eligible and were approached, and 62 percent agreed to participate. The sample was representative of the New Zealand female prison population and the study authors report that the respondents did not differ significantly from those who declined to participate. The majority of the respondents were Maori and all were in the first twelve months of their sentence. Mirroring findings of their study on male inmates, Abbot and McKenna found that lifetime and six-month probable pathological gambling prevalence rates were many times higher than in the general adult female population. The researchers report a 'high degree of gambling-related offending on the part of women prisoners' (p. 578), most of which was by problem gamblers and tended to be non-violent. However, half of the lifetime problem gamblers did not report gambling-related offending, and the authors conclude, as with the men, that the 'large majority of problem gamblers in the present study were criminals first and problem gamblers second' (p. 579).

In both the male and female studies, the researchers suggest that the identification and effective treatment of prisoners could have an impact on recidivism and gambling-related offending.

A study included in this REA by Walters (2005) examined inmates in the US completing a twenty-week psycho-educational class on the gambling lifestyle (this could be classified as a cognitive intervention). Inmates participating in the class (n=203) were compared to inmates who signed up for the class but were transferred prior to participating in the program (n=124). The outcome measure was prison disciplinary infractions and specifically gambling-related infractions. There was some evidence that participants had fewer disciplinary reports after the treatment, but there was no effect on gambling-related reports. This study has some important limitations – the control and experimental groups

¹⁰ In comparison to problem gamblers in the general population, prisoners' mean SOGS-R scores were higher; there was less difference between offenders' lifetime and 'current' gambling.

were not equivalent, only individuals who completed the programme were included in the analysis and the outcome measure is not a good proxy for gambling.

Tangentially relevant to this question, Ledgerwood *et al.* (2007) compared treatment outcomes between pathological gamblers who did and did not commit gambling-related illegal acts in the year before treatment. Participants reporting recent illegal behaviour (n=63) had more severe lifetime and past-year gambling disorder symptoms (measured using the SOGS) and higher gambling-related debt than did gamblers who denied illegal behaviour (n=168). Those who reported illegal behaviour also maintained a significantly higher severity of gambling disorder throughout treatment, although both groups experienced similar improvements in gambling symptoms over time. Limitations of this study are that it only included treatment-seeking problem gamblers, and had to rely on self-reports of gambling-related illegal behaviour. However, Ledgerwood *et al.* suggest that more intensive treatment may be warranted for individuals reporting gambling-related illegal behaviour, as they demonstrated greater gambling severity throughout treatment and follow-up.

Lahn (2005) outlines findings from a survey of 102 people (97 men and 5 women) in correctional centres in Canberra, Australia. Participants were either on remand, community service orders, periodic detention, or probation and parole – they were not full-time prisoners. Some 34 percent of participant offenders had some form of gambling problem. Lahn reports that this figure is eighteen times higher than that found in the general population in the same location. Many problem gamblers identified in the survey had not sought help for gambling and felt they did not have a problem or were in control of their gambling. In addition, many survey participants said that their gambling was not problematic despite some admissions that they had committed gambling-related crimes. Participation in the survey was voluntary, although Lahn says that the survey respondents were representative of those populations.

4.5 Chapter summary and conclusions

This REA included one study on the gambling activities of itinerant groups. Although the findings from this research may not be generalised to mobile populations in other countries (or even other parts of Australia) the study highlights the interaction of gambling risk and harm with daily routines and social networks.

The RGF asked for the REA to include studies on problem gambling prevalence among members and ex-members of the armed services. Only two studies were identified. One looked at the US Air Force and found some evidence that recruits had a higher prevalence of problem gambling than the general population, but this finding was based upon responses to a single survey question, and must therefore be treated with caution. However, given that those recruits are likely to have been drawn from sections of society who are at most risk of problem gambling, higher prevalence rates seem a reasonable hypothesis, albeit one which has not been proved. The other study, of Australian veterans, looked only at a treatment population, who are perhaps not a representative sample of all veterans. Further research would be needed to establish whether these findings were true of similar populations in Britain.

Four studies included in the REA that estimate gambling prevalence in offender populations all found higher prevalence among this population – in Australia, Canada and New Zealand – and a systematic review confirmed this finding. As with the air force recruits, the elements of the population at risk of offending and incarceration are also at risk of problem gambling. There is considerable research into the characteristics of offender populations, indicating that they are broadly similar (at least in Western Europe and North America). This suggests that findings might be transferable to Britain, where we could expect to find a similarly high prevalence of gambling problems in the offender population.

Findings about armed forces and offenders both have implications for treatment services. For example, there are many points in the criminal justice system in England and Wales at which offenders are offered (or compelled to undertake) treatment for drug and alcohol misuse. If problem gambling is also prevalent, and part of the multiple problems suggested by offenders, there could be a case for similarly enhancing access to treatment.

CHAPTER 5 Prevention, education and corporate social responsibility

5.1 Interpretation of the issue

The RGF asked for evidence regarding ‘the effectiveness of prevention/education initiatives, including operators’ corporate social responsibility measures’.

In interpreting this issue the research team took into account two ways in which prevention activities might be classified. Firstly, into primary, secondary or tertiary prevention activities (see Box 4), and secondly, the categorisation used by Williams *et al.* (2007) in their (non-systematic) review of prevention programmes (see Box 5). The focus of this chapter is upon programmes and interventions that, broadly, fall within ‘primary’ prevention activities, rather than secondary or tertiary. Within the classification system of Williams *et al.* this is equivalent to ‘Educational Initiatives to Prevent Problem Gambling’.

This focus is in recognition that tertiary intervention (i.e. treatment for problem gamblers), is covered separately in this report in Chapter 6; secondary interventions or what Williams *et al.* refer to as ‘Restrictions or Alterations on How Gambling is Provided’ are, at least in part, covered in Chapter 7 on self-exclusion and self-limitation and in Chapter 8 on workforce development. Similarly, ‘Policy Initiatives to Prevent Problem Gambling’ are in part discussed in Chapter 9, which looks at situational features.

Box 4: Categorisation of primary, secondary and tertiary prevention activities

Primary interventions seek to prevent or postpone initiation into problematic behaviour, e.g. initial substance use or first bet. These interventions can include empowering a targeted population with the necessary knowledge and skills to make informed choices about gambling, therefore preventing participants from becoming problem gamblers (Williams, 2007). Primary prevention initiatives focus on educating and raising awareness of potential risks and consequences of gambling, or developing skills to help identify and cope with problematic gambling behaviours.

Secondary interventions emphasise protection and aim to discourage risky behaviours, as well as the reduction of the incidence, prevalence and negative consequence of problem gambling. These types of interventions include both voluntary and mandatory restrictions and modification on gambling products or services, and target the full spectrum of gambling severity behaviours.

Tertiary interventions aim to treat or potentially reverse the problems occurring in existing problem gamblers.

Source: Dickson-Gillespie *et al.* (2008) and Williams *et al.* (2007)

Box 5: Categorisation of prevention activities by Williams *et al.***Educational Initiatives to Prevent Problem Gambling**

1. Upstream Interventions (interventions to strengthen families and create effective parenting practices)
2. Information/Awareness Campaigns
3. More Sustained and Directed Educational Initiatives
 - Statistical Instruction
 - Comprehensive Programs
4. On-Site Information/Counselling Centres

Policy Initiatives to Prevent Problem Gambling

1. Restrictions on the General Availability of Gambling
 - Restricting the Number of Gambling Venues
 - Restricting More Harmful Types of Gambling
 - Limiting Gambling Opportunities to Gambling Venues
 - Restricting the Location of Gambling Venues
 - Limiting Gambling Venue Hours of Operation
2. Restrictions on Who can Gamble
 - Prohibition of Youth Gambling
 - Restricting Venue Entry to Non-Residents
 - Restricting Venue Entry to Higher Socio-economic Classes
 - Casino Self-Exclusion

Restrictions or Alterations on How Gambling is Provided

1. On-Site Intervention with At-Risk Gamblers
 - Employee Problem Gambling Awareness Training
 - Automated Intervention for At-Risk gamblers
2. Modifying EGM Parameters
3. Maximum Loss Limits
4. Restricting Access to Money
5. Restrictions on Concurrent use of Alcohol and Tobacco
6. Restricting Advertising and Promotional Activities
7. Gambling Venue Design
8. Increasing the Cost of Gambling
9. Independence Between Gambling Regulator and Provider

Source: Williams *et al.* (2007)

In relation to corporate social responsibility measures, the research team looked for any sources that described such measures and included some form of evaluation of their effectiveness in preventing problem gambling. No studies were identified. There are, however, some overlaps with studies on self-exclusion and self-limitation – which could be considered a form of corporate social responsibility. Similarly, training of the workforce in identifying problem gambling could be seen as an element of corporate social responsibility.

5.2 Evidence on primary prevention programmes

The REA identified sources that described and evaluated the following forms of primary prevention:

- Media and awareness campaigns
- On-site information centres
- Pre-gambling youth educational initiatives
- Corporate social responsibility.

Although primary initiatives can be targeted upon individuals of any age, the majority of studies included in the REA evaluate school-based education interventions. However, the REA found little robust evidence as to the effectiveness of such programmes in altering

behaviour. Furthermore, the REA did not find any studies comparing the effectiveness of different primary programs.

5.2.1 Media and awareness campaigns

Media and awareness campaigns are used as a prevention tool for a range of behaviours, including tobacco, alcohol and drug use, and are a relatively inexpensive way of delivering preventive health messages to large sections of the population (Williams *et al.*, 2007). Some researchers suggest that they could be particularly effective in reaching young people who watch more television and are exposed to other forms of media. Problem gambling has only recently been identified as a public health risk as compared to tobacco, alcohol and drugs (Byrne *et al.*, 2005). As a result, there have been comparatively few media awareness campaigns, and little research has been conducted on their impacts (Williams *et al.*, 2007).

Byrne *et al.* (2005) conducted a systematic review of health communication media campaigns to assess their applicability to the prevention of problem gambling amongst young people. The review looked at fifty-three studies describing twenty-five health campaigns (twelve on tobacco, seven on alcohol, and six on drugs), the majority of which were devised and disseminated in the USA. Most involved media interventions in conjunction with campaign activities such as school-based programs, contests, websites, toll-free help lines, and community events designed to raise awareness about key issues.

The programmes included in the review had a range of aims and outcome measures:

- Eight campaigns were found to have favourable effects on attitudes toward substance use.
- Two campaigns were associated with unfavourable changes in attitude.
- Ten campaigns were associated with changes in substance use knowledge (of increased awareness of risk / social norms surrounding substance use).
- Four alcohol use prevention campaigns, two drug use prevention campaigns and four tobacco use prevention campaigns were associated with changes in knowledge regarding drinking, drug use and smoking.
- Thirteen campaigns were associated with changes in substance use behaviour.

The author identified a range of characteristics that contributed to successful campaigns. In terms of message content they highlight the following as being effective:

- ‘Denormalization’ messages – in order to modify social norms surrounding gambling.
- Health effects messages – highlighting the risks associated with gambling.
- Industry manipulation messages –highlighting that in order to make profits the industry must produce games designed to make individuals repeatedly lose money.
- Personal stories – describing family members’ suffering due to addiction.

They also recommend on the basis of their review that messages should be targeted at specific groups – including by age, gender and culture – and that messages should be targeted at an individual’s specific level of engagement in gambling (whether they have little experience gambling or are already regularly engaging in gambling activities). They conclude that the media remains largely unexploited as a youth gambling prevention tool and this, based on the evaluation of other health campaigns, presents a promising avenue for gambling prevention.

A large-scale survey of the general public (n=2,500) in Ontario, Canada conducted by Turner *et al.* (2005) included a question about media awareness campaigns. A minority (34 percent) of respondents reported that they were aware of initiatives to reduce problem gambling by government, social agencies or other organisations, with the age groups 18–24 and 50–64 being the least likely to demonstrate awareness. The study also found that respondents were most likely to report hearing about gambling problems from the television. The study did not seek to evaluate the impact of media awareness campaigns on behaviour.

5.2.2 On-site information centres

‘Responsible Gambling Information Centres’ (RGICs) are located within gambling venues. They aim to provide, on request, information and education about the risks of gambling (for example, information about the odds of winning and losing, and demonstrations of how slot machines work and how they generate random numbers). RGICs also aim to identify, support and refer people who are experiencing problems with gambling, to provide information, and to support venue employees and assist them with customer interactions. RGICs are also referred to as ‘On-site Casino Information Centres’ (OCICs) or ‘Gaming Information Centres’ (GICs).

Boutin *et al.* (2009) carried out an assessment of an RGIC called ‘Au Centre du Hasard’, located in a casino in Montreal. The study evaluated the impact of a visit to an RGIC on visitors’ perceptions about randomness and their gambling behaviours.

The study included 141 participants – 67 in an experimental group and 74 in a control group. Data were collected from both groups through pre and post questionnaires as well as a three-month telephone follow-up. After completing the first questionnaire, participants from the experimental group were invited to visit the RGIC where they met an ‘ambassador’ and received information about gambling. Both groups then completed a second questionnaire after the intervention and a third questionnaire via telephone three months later. Analysis revealed no significant changes in gambling activities or gambling strategies for those who visited the RGIC. Contrary to what was expected, visitors did not use more responsible gambling strategies to control their gambling habits. However, those who visited the RGIC reduced erroneous beliefs more than those who did not visit the RGIC.

5.2.3 Pre-gambling youth educational initiatives

Ladouceur *et al.* (2004) evaluated an educational intervention in a school setting in Quebec and New Brunswick, Canada. The premise of the study was that through providing youths with a more realistic view of gambling than that given by the media, it may be possible to limit their interest and restrict their participation in this activity. The

intervention consisted of a twenty-minute video to inform youths about gambling and to correct misconceptions regarding the extent to which the game can be controlled.

The sample consisted of schoolchildren aged 12–15. The intervention group (n=204) was shown the video, and the control group (n=167) was not. Both groups filled out a questionnaire at the start of the study, and one week later. It was found that those in the intervention group had improved knowledge and significantly decreased misconceptions about gambling as compared to the control group. The authors note that the experiment did not evaluate the impact of the video on gambling habits, or on populations with more significant differences.

Williams *et al.* (2010) undertook a large-scale experiment that aimed to ascertain the extent to which a classroom educational programme, ‘Stacked deck’, could change knowledge, attitudes and behaviour toward gambling. The programme consisted of a set of five or six interactive lessons about:

- The history of gambling
- True odds and ‘house edge’
- Gambling fallacies
- Signs, risk factors, and causes of problem gambling
- Skills for good decision-making and problem solving.

A total of 1,253 students in ten schools (in grades nine to twelve) in Alberta received the training. They were compared to a control group (n=433) from other schools who did not receive the training. Schools were originally randomly assigned to the conditions, but subsequently two schools asked to change (one asked to change to the experimental group, and one asked to change to the control group). The researchers also changed the assignment of two other schools to ensure that control schools provided comparability to the intervention schools in terms of urban/rural split, school enrolment numbers, and student demographics.

The students in both conditions completed questionnaires at the baseline and at between three and seven months. Four months after receiving the program, students in the intervention group had significantly more negative attitudes toward gambling, improved knowledge about gambling and problem gambling, improved resistance to gambling fallacies, improved decision-making and problem solving, decreased gambling frequency, and decreased rates of problem gambling. There was, however, no change in involvement in high-risk activities or money lost gambling. Despite similarity between the control and experimental groups in some characteristics, the authors note that ‘students within the same school may be more similar to each other in some attributes relative to students from other schools’, which could increase the chances of a ‘false positive’ error.

Turner *et al.* (2008) report on the development and piloting of a school-based problem gambling prevention curriculum. The programme focused on three elements: knowledge about random events and chance; skills that may help prevent or mitigate problem gambling, such as self-monitoring and coping skills; and avoiding problematic behaviour and undue risk through self-awareness and self-monitoring. The rationale was to highlight

the interrelationship between emotional and cognitive aspects of problem gambling in the hopes of promoting greater reasoned action. Exercises were devised to help the students understand how emotional experiences such as wins can override reasoning.

The programme was piloted on 100 Ontario students aged 15–18. They were compared to a control group of 101 students. The experimental group filled out a pre and post instruction questionnaire. The control group filled out these same questionnaires ten to twelve weeks apart. Results indicated that the curriculum successfully educated students about the nature of random events and their connection to problem gambling. The programme succeeded in reaching those who needed it the most, i.e. those who showed signs of potentially problem gambling behaviour.

5.3 **Chapter conclusion and summary**

This chapter has focused on the effectiveness of prevention/education initiatives, and has examined evidence as to the effectiveness of primary interventions, including media awareness campaigns, on-site information centres, and pre-gambling youth educational initiatives. The REA found no evidence on the effectiveness of corporate social responsibility gambling prevention/education initiatives.

The majority of primary intervention evaluations focus on classroom education initiatives. The REA found few empirical studies that assessed on-site information centres and media campaigns. One of the reasons attributed to this gap is the relatively recent classification of problem gambling as a public health concern. In view of the type of methodologies required to investigate the effectiveness of education/prevention initiatives, longitudinal studies over greater periods of time provide the most robust evidence.

The evidence that has been presented above indicates that education/prevention initiatives across all categories succeed in increasing knowledge and awareness of problem gambling. However, the extent to which these initiatives can alter behaviour is yet to be ascertained.

6.1 **Interpretation of the issue and overview of findings**

The RGF is interested in ‘a critical analysis of different approaches to treatment’. In interpreting this, the research team looked for evidence as to the efficacy and effectiveness of different treatment approaches in reducing harmful gambling and for literature that made direct empirical comparisons between different approaches. ‘Critical analysis’ was interpreted as comparing the relative effectiveness of different approaches, or the same approach with different patient populations.

A large number of ‘hits’ were returned in relation to cognitive-behavioural approaches, which appear to have been the focus for most research into treatment, rather than some of the other treatment methods highlighted by the RGF. While there were many studies on individual approaches to the treatment of problem gambling, the REA found little research that compares different treatments. Nor did the REA identify any research studies that made robust empirical comparisons between populations receiving different kinds of treatment.

The task of comparing different treatment is also made difficult due to the use of different outcome measures in different studies.

6.2 **Approaches to treatment for problem gambling**

The approaches to treatment for problem gambling identified in the literature are explained in detail below and summarised in Table 2. Each of these approaches is premised on a slightly different understanding of the nature and causes of problem gambling. It is noted that few of the studies and evaluations included in this REA explicitly articulate a ‘theory of change’ behind their intervention. There is perhaps an opportunity (beyond the scope of this REA) to connect the available evaluation evidence on treatment for problem gambling to theoretical models of behaviour change that are currently being explored in other public health and public policy fields (Conner and Norman, 2005; Institute for Government, 2010), in order to support understandings of why certain treatments or interventions do (or do not) work.

Table 2: Summary of approaches to treatment of problem gambling

Approach	Brief description
Cognitive	Therapist and patient identify the patient's cognitive distortions about the patient's gambling
Behavioural	Based on learning theory and applying classical and operant conditioning techniques in order to reduce the arousal and excitement associated with gambling
Cognitive-behavioural	Behavioural components added to cognitive therapies to reinforce non-gambling behaviours
Motivational	Focus on exploring and resolving ambivalence and on motivational processes within the individual that facilitate change. Commonly employed as part of cognitive-behavioural therapy
Psychodynamic	Focus on identifying and resolving unconscious psychic conflicts
Pharmacological	Treatments using drugs
Self-help	Used by an individual, independent of a clinician – for example, through a work book
Gamblers Anonymous	12-step, peer-support approach. Could be considered a form of self-help

6.2.1 Cognitive and cognitive-behavioural approaches

In cognitive approaches, the therapist and patient identify the patient's cognitive distortions about gambling (such as the illusion of control over gambling or biased memories about past wins and losses), and work together to modify these thoughts.

Behavioural approaches to the treatment of pathological gambling look at conditioned responses to gambling (Dowling *et al.*, 2008). Behavioural components may be added to cognitive therapies to reinforce non-gambling behaviours, encourage problem solving, improve social skills, and prevent relapse (Ledgerwood and Petry, 2005).

One such technique is activity scheduling. This aims to identify alternative leisure activities (suitable for a particular individual) to replace gambling behaviour. Activity scheduling is usually employed as a supplemental technique in cognitive-behavioural interventions (Dowling *et al.*, 2008). Other methods, desensitisation and exposure techniques, aim to modify the conditioned response of arousal or excitement by pairing the stimulus cues for gambling with no gambling or a competing response such as boredom or relaxation. When used in the treatment of pathological gambling, desensitisation often involves 'imaginal' procedures (imagined cues for gambling), 'in-vivo' procedures (real cues for gambling), and combined, gradual procedures involving both imaginal and in-vivo gambling-related cues (Dowling *et al.*, 2008).

6.2.2 Motivational approaches

Diskin and Hodgins (2009) describe motivational interviewing as a 'client centred, directive approach in which reflective listening, summarization, and values exploration are used to help the individual consider his or her behaviour in a non judgemental context' (p. 382). Motivational approaches such as explaining the relationship between thoughts and feelings, or disputing maladaptive cognitions, are commonly combined with cognitive and cognitive-behavioural interventions.

6.2.3 Personalised feedback

This broadly involves providing information to gamblers to put their behaviour into context – for example, comparing their gambling expenditure with that of others. Personalised feedback could be seen as a form of cognitive-behavioural intervention, since the information provided to problem gamblers challenges their thought processes and thinking.

6.2.4 Psychodynamic approaches

Psychodynamic approaches place emphasis on the therapeutic relationship, the meaning of the patient's self-destructive behaviours, and on obstacles to forgiveness (Rosenthal, 2008). Psychodynamic psychotherapy is described as 'akin to detective work; it seeks out motives and tries to read between the lines of human behaviour. It looks for repetitive patterns; uses present relationships to shed light on the past; pays attention to the irrational and unspoken' (Rosenthal, 2008, p 42). It aims to help gamblers gain insight into the emotional basis and meaning of their gambling behaviour. Psychodynamic therapy is usually lengthy, but has been used in brief treatments (Shaffer and LaPlante, 2005, p 284). Shaffer and LaPlante (2005) report that psychodynamic psychotherapy and counselling were applied widely to people with gambling problems prior to the emergence of cognitive-behavioural therapies.

6.2.5 Pharmacological (drug) treatments

The pharmacological approach to treating gambling problems is relatively new and includes three main classes of drugs: opiate antagonists (naltrexone and nalmefene), antidepressants and mood stabilizers (Productivity Commission, 2010, p 7.33).

6.2.6 Self-help, including Gamblers Anonymous

Self-help approaches are those used by an individual, independent of a clinician. Self-help can take a variety of forms but it is often 'media-based', in that individuals use self-help books, treatment manuals, audiotapes, videotapes, and computer-based tools and guidance. Many self-help methods use cognitive-behavioural approaches (Raylu *et al.*, 2008, p 1373).

Gamblers Anonymous is a 12-step, peer-support approach to gambling abstinence, modelled on Alcoholics Anonymous. Gamblers Anonymous is based on a medical model of addiction that emphasises a person's powerlessness over his or her gambling. Gamblers Anonymous sees gambling as a chronic disease for which abstinence is the only solution (and, therefore, the only aim of the intervention) (Shaffer and LaPlante, 2005, p 278). Shaffer and LaPlante (p. 292) argue that Gamblers Anonymous is best seen as a self-help programme, not a formal treatment, as change comes through fellowship with other gamblers (Ledgerwood and Petry, 2005) and there is no fee or professional facilitation. However, the exact parameters of activities and programmes that can be classified as 'treatment' are by no means clear.

6.3 Extent of treatment seeking and barriers to treatment

Although not directly related to a 'critical analysis of different forms of treatment', the REA included one study on the barriers to treatment, since understanding these might help inform decisions as to which kind of treatment is most likely to be taken up by different kinds of problem gamblers.

The study is a systematic literature review by Suurvali *et al.* (2009), and aims to summarise empirical research on factors preventing problem gamblers from seeking treatment. The only methodological requirement for inclusion in the review was that a study asked gamblers about reasons for not seeking help. The review included nineteen studies, none of which was from Britain (nine from Canada, five from Australia, one from New Zealand, one from the United States, one from Brazil and one from Switzerland; one further study

drew its participants from players on a gambling website). All these studies reported similar obstacles to treatment. Most common were:

- An expressed intention to handle gambling problems by themselves
- Shame, embarrassment or stigma
- Non-acknowledgment or minimization of problems.

Next most common were:

- Concerns about treatment content and quality
- Lack of knowledge about treatment availability
- Practical issues around attending treatment.

The authors of the review are careful to highlight the methodological limitations of the included studies – many had small sample sizes and relied on volunteers (who might not be representative of all those seeking treatment, or those who do not seek treatment). Also, there are limitations to relying only on self-reported (and often retrospective) reporting of barriers to treatment seeking. Nonetheless, the fact that the same types of barriers were repeatedly identified in different studies suggests that these factors are likely to have at least some impact on treatment seeking.

6.4 Evidence of the effectiveness of cognitive-behavioural approaches

As explained above, in assessing the evidence base on the effectiveness of cognitive and cognitive-behavioural treatments, this REA draws on two recent systematic reviews.¹¹

Gooding and Tarrier (2009) conducted a systematic review which includes twenty-five studies (nine from the US, eight from Canada, three from Spain and five from Australia) which evaluate cognitive-behavioural therapies (or a treatment programme that contains cognitive-behavioural methods as a substantial part of that treatment) aiming to reduce gambling (p. 593). Each of the studies included in the systematic review evaluated different kinds of interventions¹² and modes of delivery (that is, some were delivered one-to-one and some in a group scenario). The studies included also used a range of outcome measures including hours gambled, gambling attitudes and beliefs, gambling frequency, days gambled, cognitive distortions related to gambling, and score on the SOGS.¹³

From their review, Gooding and Tarrier draw the following key conclusions:

¹¹ It is noted that there is an ongoing Cochrane systematic review of 'Psychological interventions for the treatment of pathological and problem gambling' (Anderson *et al.*, 2011).

¹² Including imaginal desensitisation, cognitive restructuring, problem solving, motivational interviewing and node-link mapping.

¹³ Studies included had attrition rates from the study generally of a range from 0–45.7 percent, with a mean of 15 percent.

- There was good evidence that the cognitive-behavioural interventions included in the review reduced gambling behaviours in the three months after the intervention – regardless of the type of gambling behaviour.
- The studies also showed ongoing positive effects of cognitive-behavioural interventions at six, twelve and twenty-four months after treatment ended. The longer-term effects are treated more cautiously than those in the short term because effect sizes from the studies were smaller at later follow-up periods and because fewer studies followed-up this far.
- Both individual and group therapies appear to be equally as effective in the three-month time point, although at the six-month follow-up only group therapy appeared to be effective (although Gooding and Tarrrier note the need for more studies on this).
- The review suggests that gambling behaviours are not, themselves, directly affected by cognitive-behavioural treatments; rather, that comorbid conditions such as depression and anxiety are ameliorated and gambling behaviours improve as a consequence.

Overall, cognitive-behavioural interventions seemed to be effective, at least at the three-month follow-up, despite variability in the included studies in terms of:

- The populations being treated
- The methods of recruitment
- The severity of the gambling behaviours
- The type and mode of treatments delivered
- The outcome measures used and
- The design of the studies (e.g. the type and use of control groups).

To further understand the possible drivers of effectiveness in the included studies, Gooding and Tarrrier conducted analysis of the effect of: the outcome variable used in the studies; the mode of therapy; and the type of therapy. Their findings are discussed below.

Outcome variable

Their analysis revealed that studies measuring *frequency of gambling behaviour* as the outcome variable appeared to have the most significant effects at three months. However, amongst the studies that followed participants to six months after treatment, only ‘the three studies which used *desire to gamble* as an outcome variable had a significant overall effect size’ (p. 604, italics added). In other words, studies that used frequency of gambling behaviour as the outcome measure did not show an effect six months after treatment. One possible implication of this, raised by the authors of the systematic review, is that some outcome measures are more ‘sensitive’ than others.

Mode of therapy

The studies included in the systematic review did not provide enough information from which to draw firm conclusions on the relative effectiveness of different modes of therapy (individual one-to-one sessions, group work only, and self-directed/workbook only). All of

these modes produced significant positive effects at three months; however the studies were not designed to provide comparisons between modes.

Type of therapy

The authors divided included studies into three groups depending on the type of intervention: generic CBT; motivational interviewing, or a mixture of motivational interviewing and CBT; and imaginal desensitisation.¹⁴ They conducted an analysis to see whether any particular type was more effective. Few studies included in the systematic review directly compared different types of interventions. All three types of therapy were significant at the three-month follow-up. At the six-month follow-up just over three quarters (10/13) of the included studies used a form of cognitive therapy, and the effect size was, again, highly statistically significant. This finding is treated cautiously by Gooding and Tarrier: ‘although this result lends support to the use of cognitive-behaviour therapies to address gambling it does not mean that other types of therapy will be ineffective’ (p. 605).

The second source relied on in this REA relating to cognitive-behavioural therapy is a systematic review and meta-analysis conducted by Pallesen *et al.* (2005). This included some older studies that were not included in Gooding and Tarrier’s review. The focus was on ‘psychological’ interventions for problem gambling – including treatments such as:

- Eclectic therapy
- Cognitive-behavioural treatments
- Motivational interviewing
- Aversive therapy
- Imaginal relaxation/ imaginal desensitisation.

Some of these modes of therapy overlap with those examined by Gooding and Tarrier, although eclectic therapy can include psychotherapeutic elements. Findings from Pallesen *et al.*’s systematic review were that psychological treatments had a positive effect immediately after treatment and at follow-up (averaging seventeen months following termination of treatment). However, it appears from the meta-analysis that factors other than treatment, not measured in the studies, at least partly accounted for the outcomes.

6.5 Motivational interventions

As with the literature on cognitive-behavioural approaches, only studies with a randomised design were included in this REA. Motivational interviewing was also included in the systematic reviews discussed above (Gooding and Tarrier, 2009; Pallesen *et al.*, 2005).

Diskin and Hodgins (2009) conducted a randomised clinical trial in Canada to test the efficacy of a single face-to-face motivational intervention compared with a control

¹⁴ Described in Section 6.2.1. In this instance the imaginal desensitisation involved clients creating and taping three scenarios that stimulated gambling urges. They then used relaxation training and cognitive skills to cope with the urges that the scenarios elicited. The treatment involved six sessions each lasting one hour over an eight-week period.

interview (CI) for reducing gambling behaviours in eighty-one individuals who expressed concerns about their gambling. They interviewed participants in the intervention (by telephone) at one month, three months, six months, and twelve months after the intervention.

The results of this study indicate that a brief motivational intervention was helpful in reducing gambling behaviours amongst the treatment group. Twelve months after receiving a motivational interview, participants reported that they spent less money and fewer days gambling per month than those assigned to the control interview condition.

The study has some limitations. The participants were all volunteers who responded to an advertisement asking if they had concerns about their gambling. Secondly, a number of participants dropped out of the study during the follow-up stages and those who were not followed-up had different characteristics to those who stayed in treatment (they were higher frequency gamblers and had more substance abuse and alcohol problems). Thirdly, there is a question about how much of the change was due to natural recovery. Overall, participants in both the control group and experimental groups reported reductions in problem gambling symptoms, based on their reduced scores on the SOGS and CPGL. Lastly, although this was a controlled study, the control condition differed from the experimental condition in ways other than the just the motivational interviewing element (the motivational interview was longer than the control interview, for example).

Grant *et al.* (2009) conducted a study in the US to evaluate the effectiveness of an intervention that combined motivational interviewing and imaginal desensitisation. Sixty-eight men and women who were pathological gamblers and who had gambled at least once a week for the past two months were recruited into the study (the recruitment method is not described) and randomised into either the experimental condition (imaginal desensitisation plus motivational interviewing) or the control condition (referral to Gamblers Anonymous).

The main outcome measure used in this study was the Yale-Brown Obsessive Compulsive Scale Modified for Pathological Gambling.¹⁵ After the eight-week treatment period the experimental group had improved scores on this measure more than the control group – an indication that the treatment reduced gambling urges and behaviours. Twenty-one out of thirty-three members of the treatment group reported being abstinent from all gambling for at least one month, compared to only six out of thirty-five in the control group. Members of the control group were later given the treatment, and those participants showed a statistically greater reduction in gambling symptoms after the treatment. However, Gamblers Anonymous was also beneficial in a minority of cases in the short term.

A limitation of this study was the low rates of attendance at Gamblers Anonymous meetings by the control group (this might have been effective with more regular attendance). Grant *et al.* also note that the study did not allow them to identify the number of motivational interviewing sessions or the length of treatment that might be most effective.

¹⁵ This is described as a 10-point scale indicating an urge/thought subscale and a behaviour subscale.

Petry *et al.* (2008) conducted a study in the US to evaluate the effectiveness of brief, 'motivational enhancement' interventions. Participants (n=180) were recruited using advertisements posted at medical clinics and were eligible for the study if they scored three or above on the SOGS (and thus were classified as probable pathological gamblers) and had bet at least \$100 on at least four occasions within the past two months. Participants were randomly assigned to one of four treatment groups:

1. Assessment only control group.
2. Brief advice group, consisting of a 10-minute meeting with a therapist to discuss gambling problems, risks, and concrete steps for reducing gambling.
3. Motivational enhancement therapy, involving a 50-minute therapy session in which therapists provided personalised feedback about participants' gambling, explored positive and negative consequences of gambling, discussed how gambling fitted within participants' goals and values, and concluded with participants completing a change plan worksheet.
4. Motivational enhancement therapy plus cognitive-behavioural therapy sessions, which was the same as above but with the addition of three sessions of cognitive-behavioural therapy where therapists determined gambling triggers and strategies for coping with triggers.

At baseline, six weeks, and nine months, participants reported past-month gambling expenditures and were assessed using the SOGS. Two important points can be drawn from overall findings. Firstly, all groups, including the control group, experienced decreases in gambling. Secondly, the results suggest that brief motivational interventions may be effective in reducing gambling when combined with cognitive-behavioural therapy.

In more detail the results showed that, six weeks after treatment:

- Participants in group two (10-minute brief advice) significantly decreased gambling relative to the control condition. At nine months, however, no further changes in gambling were noted in group two members, although patients continued gambling at significantly lower rates than pre-treatment.
- Participants in group four (motivational enhancement therapy plus cognitive-behavioural therapy) did not reduce gambling more than those in the control condition during the first six weeks of treatment, but benefits of this intervention were apparent on *some* outcome measures at the nine-month follow-up (they reported less gambling severity than control group participants but no change on clinical gambling scales).
- Participants in group three (motivational enhancement therapy only) evidenced no significant differences from the control condition.

6.6 Personalised feedback

As with motivational interventions, only randomised studies on personalised feedback were included in the REA. One such study was identified.

Cunningham *et al.* (2009)¹⁶ conducted what they describe as a pilot study of a personalised feedback intervention for problem gamblers in Ontario. They describe the theory behind personalised feedback as correcting normative fallacies that other people gamble as much as they do. Sixty-one respondents were recruited from an ongoing gambling research project (via a random-digit-dialling telephone screener of the Ontario population)¹⁷ and were randomly assigned to the experimental condition or control condition. In the experimental condition participants received personalised feedback comparing them to the Canadian population. The content of the feedback is set out in Box 6. The control group were placed on a waiting list, were sent a list of possible self-help intervention techniques, and were asked to consider the effectiveness of each technique.

Box 6: Content of personalised feedback in study by Cunningham *et al.*

Participants received a summary of their different types of gambling activities and a report that compared them to other Canadians of the same sex. This included graphs as a visual demonstration of their gambling in comparison with other Canadians. The feedback included a summary of participants' Canadian Problem Gambling Index score, a description of their gambling cognitions and a measure of their cognitive distortions. The materials concluded with a list of techniques that might lower the risk associated with their gambling.

Source: Cunningham *et al.* (2009)¹⁸

At a three-month follow-up (with about an 80 percent follow-up rate), after controlling for baseline demographic characteristics and gambling severity, respondents in the experimental condition reported spending less money on gambling than those in the control condition, but there did not appear to be any significant impact on the frequency of different gambling behaviours. Respondents' ratings of the usefulness of the feedback were positive and most recipients (96 percent) recommended that feedback be made available to other gamblers interested in evaluating or modifying their gambling.

Limitations of this study stem from the unusual composition of the sample, which comprised of a group of heavy gamblers who had already agreed to participate in a study on gambling typologies. Additionally, the sample was small and the experimental groups differed significantly on some demographic characteristics despite random assignment to groups (these differences were controlled for in the analytic methods employed, but caution should still be applied in interpreting the results).

6.7 Gamblers Anonymous

Few studies were found that directly evaluated Gamblers Anonymous. One was the intervention for the control group in the study conducted by Grant *et al.* (2009). Additionally, the REA identified one study by Toneatto and Dragonetti (2008) that compared CBT to 12-step therapy, based on the Gamblers Anonymous model.

¹⁶ Abstract only available to the REA team.

¹⁷ Respondents who were identified as problem gamblers and who indicated an interest in receiving, at some time in the future, a free computerised summary comparing their gambling to that of other Canadians, were asked if they would take part in a study.

¹⁸ Abstract only available to the REA team.

Participants were recruited through newspaper advertisements and through local addiction and mental health agencies in two geographically separate communities in the US (locations were not specified). They were included in the study if they self-reported a problem with gambling and were interested in outpatient treatment. Individuals were excluded if they showed evidence of severe mental illness. Participants received one of two interventions: cognitive-behavioural therapy (n=65) or a 12-step therapy (n=61) based on the Gamblers Anonymous model. The content of the control and experimental interventions is described in Box 7. Assignment to the treatment groups was not randomised.

Box 7: Conditions in study comparing CBT and 12-step therapy

In the CBT condition participants met with therapists in eight separate group sessions. The sessions emphasized: 1) a functional analysis of gambling behaviour 2) problem solving 3) stimulus control and 4) cognitive restructuring of gambling-related maladaptive beliefs. Treatment goals related to gambling behaviours (i.e. if/when to abstain) and were individually negotiated.

In the '12-step' condition participants met with therapists in eight separate group sessions. The sessions (modelled on Gamblers Anonymous) emphasized: 1) admitting powerlessness over gambling 2) believing that a greater power could restore a normal way of thinking and living 3) deciding to turn their will and lives to the care of the greater power 4) making a moral and financial inventory of themselves and 5) admitting to themselves and another human beings the exact nature of their wrongs. Participants were encouraged to abstain from gambling throughout treatment.

Source: Toneatto and Dragonetti (2008)

Importantly, this study only looked at participants who completed the baseline assessment, attended (at least some) treatment, and were available at the one-year follow-up (rather than looking at all those who started the treatment). The authors of the study considered this to be the most appropriate design to address the issue of comparative treatment effectiveness, and report that those who were lost to follow-up did not differ significantly from the completers on demographic and gambling-related variables. The study found that both treatments reduced the frequency and amount of money wagered over the follow-up period, with approximately half of the sample abstaining from gambling at the twelve-month follow-up. There was no difference between the two groups on gambling variables (frequency, abstinence rates and money wagered). Participants who attended more sessions and chose a goal of being abstinent appeared to achieve better outcomes.

The authors point out some limitations to their study: the effectiveness of the therapists was not examined; participants were not randomly assigned to treatment groups; there was no control group; and not all participants attended the full eight sessions (those receiving cognitive-behavioural therapy attended an average of 3.7 sessions and those receiving the 12-step programme attended an average of 5.5 sessions).

Although beyond the scope of this REA, it is worth noting that the 12-step model has been tested with other addictions, and an example of a study of effectiveness in treating drug interventions is outlined in Box 8.

Box 8: Evaluation of a 12-step programme for drug and alcohol use

Fiorentine (1999) conducted a study to assess the effectiveness of 12-step programs as an aftercare resource for illicit drug and alcohol users, using data from an aftercare study. The study was conducted in Los Angeles, California, and was part of a larger research project funded by the Centre for Substance Abuse Treatment to evaluate the effectiveness of the Los Angeles site of the Target Cities Treatment Enhancement Project.

The methodology involved administering in-treatment and two post-treatment interviews (6 and 24 month follow-up), as well as urinalysis, to a sample of 262 individuals from outpatient drug treatment programs who had been in treatment for at least 8 weeks. Of the sample, nearly 49 percent attended a 12-step meeting in the 6 months prior to the 24-month follow-up (this attendance was voluntary). These were compared to individuals who did not attend the 12-step meetings. The outcome measured was levels of alcohol and illicit drugs use.

Study participants had similar characteristic to individuals participating in publicly funded outpatient drug treatment programs in the same geographic area, with one exception, Latinos were found to be less likely than non-Latinos to attend 12-step meetings.

The study's findings suggest that weekly or more frequent 12-step participation may be an effective step in maintaining relatively long-term drug and alcohol abstinence. Less-than-weekly participation did not seem to be any more effective than non-participation. Weekly or more frequent 12-step participation was equally effective in maintaining abstinence from illicit drug and alcohol use.

Source: Fiorentine (1999)

6.8 Online forums for gamblers

Wood and Wood (2008) conducted an evaluation of two online forums, based in the UK, designed to support people with gambling problems or people who are affected by problem gambling. The study aimed to understand the experience and motivations of people using the forums, and did not look at effects on gambling behaviours.

Interviews were conducted over the forum with users (nineteen people in total; seventeen with gambling problems and two who were married to a person with gambling problem). An online survey of 121 forum users was also conducted. The findings from this study should be treated carefully because the study only included volunteers, and they were a small proportion of all forum users (one of the forums had 1,783 registered members and the other had 2,295 registered members). It is not known how they differed from other forum users or whether their experiences were typical.

With these limitations in mind, the study found that the forums provided useful support for the people who used them, whether they were personally experiencing gambling problems, getting over gambling problems, or seeking help or coping with others with gambling problems. The forums provided a means of 'mutual peer-based support that allowed the members to feel less alone with their problems' (Wood and Wood, 2008, p 23). Interviewees reported that by reading other members' posts and by exchanging messages, they gained a 'better insight and understanding of gambling problems... [the] mutual peer support that the forums offered helped members to consider how they might take steps towards confronting their problems' (p. 23).

Interviewees (the study does not say how many) reported that the anonymity of the forums allowed them to express themselves openly. Half of the survey respondents said that it would be 'fairly or extremely difficult' to get help other than through the forum, (although a third responded that it would be 'fairly easy', and just over half of survey respondents had contacted another treatment service in the past). Reasons why the forum was reported to be convenient included participants' geographical location, lack of transport, time

constraints or childcare considerations. Wood and Wood speculate that some participants would not consider other help services because they did not want a face-to-face encounter or to speak over the telephone.

Shandley and Moore (2008) report on an evaluation of the Gambler's Helpline in Victoria, Australia. Callers to the helpline were asked to participate in an immediate post-call telephone interview (n=90, a 35 percent response rate) and one-month follow-up interview (n=65). This study examined three outcomes from the helpline:

- Callers' satisfaction with the counselling intervention
- How many callers actually accessed referrals¹⁹ to other services suggested by the counsellor
- Whether gambling callers who did access referrals showed greater improvement (assessed using the Life Assessment Scale – not a measure of problem gambling).

On satisfaction, the service provided by helpline counsellors was rated highly, and interview responses suggest callers wanted a mix of emotional and practical support. On accessing referrals, of those callers who were followed-up (forty-two gamblers and fourteen non-gamblers), three-quarters (thirty-four gamblers, eight non-gamblers) had received a referral from the helpline when they originally called, and twenty-eight participants followed-through with the referral by, at a minimum, making an appointment for an upcoming date. The most common reason for not accessing a referral was the desire to deal with the problem alone or being too busy.

On improvements following referral, all of the twenty-three gambling callers who accessed at least one referral in the follow-up period improved their outcomes according to the Life Assessment Scale. Of the nineteen gambling callers who did not access a referral about 63 percent demonstrated improvement according to the Life Assessment Scale, which was statistically significant.

The findings of this evaluation should be viewed in light of some serious methodological limitations. Firstly, there was no control group of problem gamblers who did not access the helpline, which may have allowed the study to separate self-induced improvement from improvement due to the helpline. Secondly, a follow-up period of one month may have been too short, as some callers had not yet attended the service to which they had been referred (although a longer follow-up could have jeopardised response rates). Thirdly, the sample used in the study was self-selected, and some individuals dropped-out over the follow-up period. Callers who were not satisfied with the service or who had not improved may be less likely to participate in a follow-up interview. Those who sought referral may have been more motivated to change.

Wood and Griffiths (2007) conducted research into 'GamAid', an online advisory, guidance and signposting service that provides links to information and allows users to 'talk' to an online advisor (during the available hours of service). Again, this study did not look at impacts on problem gambling. Wood and Griffiths conducted an online survey with eighty respondents (one quarter of whom were not from the UK), who volunteered

¹⁹ Referrals were to services such as Gamblers Anonymous, financial counselling and self-exclusion.

after taking part in an online counselling session (about 20 percent of users of the site participated, and women were more likely to participate than men). The majority of those who responded to the online survey agreed that GamAid helped them to consider their options, made them more confident in seeking help, helped them to decide what to do next, made them feel more positive about the future and provided useful information about local help. Of course, the limitations of the study mean that these findings should be treated as promising, rather than conclusive; the study included a small, non-representative sample and did not look at whether visiting the site improved outcomes.

6.9 Drug treatments for problem gambling

The REA identified a large number of studies into the effectiveness of drug treatments for gambling problems. Therefore, as with cognitive-behavioural interventions, the inclusion and exclusion criteria were modified to include only systematic reviews on this topic. One such source was identified.

The review by Pallesen *et al.* (2007) included studies conducted between 1966 and 2006, on populations of pathological gamblers, and which reported outcomes particularly pertaining to gambling. Sixteen studies met the inclusion criteria (the countries in which these studies were conducted is not indicated). A total of 597 subjects were included in the outcome analyses of these studies. Three classes of drug interventions were examined: antidepressants, opiate antagonists and mood stabilisers.

At post-treatment stage, the analysis showed that the pharmacological interventions were more effective than no treatment or a placebo, thus the overall conclusion of the meta-review is that pharmacological interventions may be an adequate treatment for pathological gambling. There were no differences between the different classes of drugs. Analysis showed that studies that used a placebo-control design showed smaller effect sizes of drug treatments than studies that used a 'before and after' design without any control condition. Also, studies that included more men generally showed smaller effect sizes, suggesting that of pathological gamblers, women may respond to drug treatment more than men.

6.10 Chapter summary and conclusions

This chapter has examined evidence of the effectiveness of six types and modes of treatment: cognitive-behavioural treatment; motivational interventions; personalised feedback; Gamblers Anonymous; online forums; and drug treatments.

Overall, the evidence suggests that individuals who seek treatment of any kind for problem gambling (defined broadly to include treatment provided by a trained psychologist or counsellor as well as self-help and peer-based approaches) show some signs of improvement. However, it appears that most people who have gambling problems do not seek any treatment and that there is a high rate of 'natural recovery' from problem gambling.

Treatments that can be classified cognitive-behavioural have both the strongest evidence of effectiveness and the most coverage in the research literature. Of course, these two factors – research coverage and strength of evidence of effectiveness – could be mutually reinforcing

– with more research funding attracted to this area because of the high publication rate. There is evidence that motivational interventions might be effective when combined with cognitive-behavioural treatments. Pharmacological interventions have also received research attention and the research that exists suggests that they appear to be modestly effective.

Evaluations of Gamblers Anonymous are few in number and face methodological difficulties because of irregular attendance by participants. Existing studies suggest that individuals who attend more sessions have improved outcomes; however, this could be due to individual motivations rather than the effect of the programme (something that could be true of all treatment modalities).

For some individuals who have a gambling problem, online forums might be a source of support and information about treatment services. Given evidence of low levels of treatment seeking, online forums might provide a cost-effective intervention for some individuals who would otherwise not access any support. The effect of these forums on gambling behaviours is not, however, established in the available evidence base.

There are several research gaps: the factors that drive treatment success or failure are not well understood (for example, the role of social support); the relative or comparative effectiveness of different treatments is not established; there is little research on matching particular individuals to different treatments (including different cultural groups); many authors note a need for evidence-based treatments for individuals with co-occurring gambling and other psychiatric disorders (Barry *et al.*, 2011, p 76); and while cognitive-behavioural therapy has the most empirical support, no one style of intervention is necessarily best practice (Ladouceur and Shaffer, 2005), and there are evidence gaps as to the effective dosage and format of delivery.

Some of the findings of the REA relating to treatment for problem gambling also have implications for workforce development needs, discussed in Chapter 4; for example, findings from Shandley and Moore's (2008) study indicated that a mix of emotional and practical support was important.

7.1 **Interpretation of the issue**

The RGF asked about ‘the nature, prevalence and effectiveness of consumer pre-commitment/self-limitation strategies, and the nature, prevalence and effectiveness of consumer self-exclusion strategies’.

Self-exclusion programs allow patrons to ban themselves from casinos or gambling venues, and to request that these casinos do not allow them on the premises or accept their money and, in some cases, that their trespass results in criminal prosecution (Nelson *et al.*, (2008, p 464-5). Self-exclusion can take a number of forms and the requirements, procedures, processes and penalties that underlie self-exclusion programmes are different across jurisdictions (Blaszczynski *et al.*, 2007, p 60). Some of the variations include:

- Whether self-exclusion is enforced by law or regulation²⁰
- The consequences of breach of a self-exclusion
- Who bears consequences for a breach (the gambler or the venue)
- Whether self-exclusion is supported by a treatment programme.

Blaszczynski *et al.* (2007) report that the first self-exclusion programme was initiated by a casino in Manitoba, Canada, in 1989 concurrent with the opening of Canada’s first permanent casino. Similar programmes were introduced between 1993 and 2000 in all Canadian provinces with casinos: British Columbia, Alberta, Saskatchewan, Manitoba, Quebec and Nova Scotia. In 1996 the Missouri Gaming Commission implemented the first such programme in the USA, followed by Illinois, Louisiana, Michigan, Mississippi, Missouri and New Jersey. Currently, such programmes operate in many casinos and gaming jurisdictions worldwide including South Africa, Poland, France, Switzerland, the Netherlands and Australia.

In statistics compiled by the Gambling Commission, in England, Wales and Scotland in 2009/10 6,204 self-exclusions were reported by operators of casinos, and 2,586 were reported by operators of arcades (Gambling Commission, 2010). The number of people

²⁰ Faregh and Leth-Steensen (2009) report on a class-action lawsuit brought by thousands of Ontario gamblers against the Ontario Lottery and Gaming Corporation. The case was brought in relation to instances where gaming venues had failed to enforce self-exclusion contracts and gamblers continued to gamble at these establishments.

who self-excluded is not known, since the same individual may have self-excluded from more than one venue.

Self-limitation programmes (also called pre-commitment strategies) allow patrons to impose limits on certain gambling-related activities. Pre-commitment has expanded beyond simply limiting amounts of money, and might also include:

- **Play Activity Report:** A historical record of the amount of time and/or money the player has spent within a given time period
- **Current Session Feedback:** A running total of time and/or money spent during an active session
- **Limit Setting:** The opportunity to set time and/or money limits prior to participation in gambling
- **Timeouts:** The ability for players to ban themselves from gambling for a certain period of time
- **Risk Assessment:** An assessment of a gambler's risk level based on play patterns or a self-administered test (Responsible Gambling Council Centre for the Advancement of Best Practices, 2009, pp 4-5).

These kinds of features can be monitored through 'play and information management systems'; some examples of these are set out in Box 9. These are defined as 'features or tools that can be incorporated into electronic gaming machines and, potentially, other forms of gaming, to enable players to more easily keep track of their play and manage their gambling decisions' (Responsible Gambling Council Centre for the Advancement of Best Practices, 2009, p 4).

Box 9: Play management/self-limitation systems in Nova Scotia, Sweden and Norway

Nova Scotia: has a province-wide player card system for its video lottery network, called the Informed Player Choice System (IPCS). The Nova Scotia Gambling Council is implementing the IPCS with a voluntary enrolment model, where players can choose to register in the system or continue to play without using a card.

Sweden: launched a player card, Spelkortet ('player card'), for its online poker website, lottery tickets and bingo. Card use is mandatory for online gaming but optional for lottery tickets and bingo. The play information and management features offered through the card are money and time limit setting, timeouts and risk assessment. It is mandatory that players set money and time limits while playing on Svenska Spel's poker website. Players can, however, set whatever money or time limits they please. So, for instance, they can choose to set a limit so high that it effectively disables the limit-setting feature.

Norway: a player card is mandatory for video lottery terminals and online games, and optional for lottery tickets. The card offers the following features: play summaries, money and time limit setting, timeouts and risk assessment (although play summaries and timeouts are not available for online games and lottery tickets). All cards have a universal money spending limit, but players are able to set lower limits. (There is an evaluation of this, but not available in English.)

Source: Responsible Gambling Council Centre for the Advancement of Best Practices (2009)

There is a risk that measures introduced to encourage self-limiting behaviour might have unintended consequences or perverse effects. For example, play activity reports may prompt some players to attempt to recover losses (Responsible Gambling Council Centre for the Advancement of Best Practices, 2009, p 19), or to try to determine which machines pay out more often.

7.2 Contextualising the findings: the counterfactual and who self-excludes?

In order to make an assessment of the effectiveness of self-exclusion and self-limitation it is necessary to ask what would have happened to individuals if they had not self-excluded (the counterfactual). This is important in seeking to establish some kind of causal link between self-exclusion or limitation and improved outcomes.

As discussed below, most evaluations do not compare self-excluders to a control group, which is one form of assessing the counterfactual. Most studies look at the outcomes of a group of self-excluders over time to see if outcomes improve. This establishes an association, but cannot, on its own, determine whether the self-exclusion caused the change in outcomes. As noted elsewhere, there is evidence that many problem gamblers improve over time regardless of any interventions or programmes – so in evaluating self-exclusion strategies it would be best to isolate the effect of the programme, as compared to natural recovery.

An important consideration when evaluating self-exclusion programmes is to ask who self-excludes, and how they might differ from individuals who do not self-exclude. Self-exclusion is, by definition, a voluntary action, and perhaps a sign that an individual is more motivated to change their gambling behaviour than others. It might be that more serious gamblers are *least likely* to self-exclude. There is limited empirical evidence as to the nature of self-excluding populations – this REA did not find any studies that made direct comparisons between self-excluders and other gamblers. However, two studies (Ladouceur *et al.*, 2007; Nower and Blaszczynski, 2006) describe populations of self-excluders,²¹ and we can compare this to what we know about problem gambling prevalence generally (Wardle *et al.*, 2011).

Overall, self-excluders in these studies were more likely to be women and were older (having long gambling careers) than the typical population of problem gamblers. In the study by Ladouceur *et al.* about 89 percent of the sample were classified as a pathological gamblers under the SOGS, about 7 percent were considered at-risk gamblers and 4 percent had no gambling problems at all (p. 89).

Of course, the data presented by both Nower and Blaszczynski and Ladouceur *et al.* relate to the specific population of self-excluders studied, and it is not known whether they are typical of self-excluders from other times and locations. However, the data do suggest the possibility that the population of self-excluders is different from the population of problem gamblers – perhaps in ways that make them more likely to change their behaviour. This should be borne in mind when interpreting studies of the effectiveness of self-exclusion.

²¹ Nower and Blaszczynski (2006) looked at the characteristics of 2,670 individuals participating in the Missouri casino self-exclusion program between 2001 and 2003. Ladouceur *et al.* (2007) studied 161 people participating in self-exclusion programmes offered by casinos in Quebec. In a separate publication Nower and Blaszczynski (2008) compare the demographic and gambling characteristics of younger, middle-aged and older-adult self-excluders from Missouri casinos from 2001 to 2003. Older adult self-excluders typically began gambling in midlife, experienced gambling problems around age 60, reported preferences for non-strategic forms of gambling, and identified fear of suicide as the primary reason for self-excluding.

7.3 Evidence on the effectiveness of self-exclusion

In this section we describe five studies into self-exclusion: one from the US, two from Quebec, Canada, one from New Zealand, and one from Switzerland. These are summarised in Table 3.

Nelson *et al.* (2010) conducted a ten-year study that looked at the experiences of 113 self-excluders who enrolled in the Missouri Voluntary Exclusion Program (MVEP) (described in Box 10). Overall most self-excluders reported positive experiences with the MVEP. About 92 percent of the sample complied with the self-exclusion (84 percent who did not try to enter a casino and 8 percent who did try to enter but were not successful).

In terms of effects on gambling behaviour, about one in eight self-excluders had not gambled at all since enrolling in the MVEP. The majority (81 percent) of self-excluders who continued to gamble regularly after enrolling in the MVEP reported gambling less than before, (no participant reported gambling more than before). According to participants' retrospective reporting of symptoms, the prevalence of *probable* pathological gambling among self-excluders declined from 79 percent at enrolment to 15 percent at follow-up.

In terms of compliance, 50 percent of self-excluders who attempted to enter casinos were able to do so (this finding, however, was based on only eighteen self-excluders who attempted to enter a casino, nine being successful). Some 74 percent of self-excluders in the sample went to casinos in other jurisdictions. This could be taken as an indication that the threat of arrest and prosecution was taken seriously, but that actual enforcement was limited. Self-excluders who engaged in complementary treatment or self-help groups had more positive outcomes than those who did not.

This study looked at 113 self-excluders who agreed to take part in the research, out of a total of 5,127 who enrolled in the MVEP over a five-year period. Although the researchers had a representative sampling strategy, not all those approached agreed to take part (only 27 percent of self-excluders contacted were interviewed). Whilst those who did not take part were not significantly different in terms of demographic characteristics to those who did, there is the possibility of other, unmeasured differences (for example, motivation to change) that could have influenced outcomes. The study relied on self-reported measures that could have introduced recall errors because the researchers were asking participants to remember things from the past. The absence of a comparison group means we cannot be sure that changes were due to the MVEP.

Box 10: The Missouri Voluntary Exclusion Program (MVEP)

In 1996 the Missouri Gaming Commission created the first state-wide SEP in the United States. Applicants who enrol in the MVEP add themselves to the List of Dissociated Persons for life and assume responsibility for not entering any Missouri casino. The Missouri Gaming Commission removes the applicants' names from all marketing lists, prohibits the applicants from cashing checks on the premises, and requires the presentation of appropriate identification before compensating any jackpot winner of \$1,200 or more. If an enrolled person returns to a casino, he or she can be arrested and charged with trespassing.

Source: Nelson *et al.* (2010)

Tremblay *et al.* (2008) looked at a self-exclusion programme operating in Montreal. As part of this study an 'improved' or enhanced version of the standard self-exclusion

programme was offered – which involved a meeting with a counsellor and the provision of additional support (see Box 11). Out of about 1,140 self-exclusions, 857 people selected the improved version. Of these, 116 enrolled within the study timeframe and agreed to participate in the research. The majority of participants were satisfied with the improved self-exclusion service and perceived it as useful. Major improvements were observed between the final and the initial evaluation on time and money spent on gambling, there were also reductions in the reported effects of gambling on family life, work, mood and financial situation.

The weaknesses of this study include the absence of a control group, the inclusion of only those who agreed to participate (who might be more likely to have been successful), the reliance on self-reported data, and that the study does not control for other, potentially confounding factors.

Box 11: Montreal self-exclusion program – the ‘improved’ version

The gambler has the opportunity to meet a self-exclusion counsellor at the beginning of his self-exclusion period. This counsellor is a psychologist, independent from the casino, and located outside the casino's walls. During this meeting, the self-excluder receives detailed feedback of his gambling activities, as well as some referrals to additional resources (e.g. gambling hotlines, treatment centres, Gamblers Anonymous groups, financial counsellors). The gambler can also benefit from monthly telephone support from his counsellor for the entire duration of his agreement. This phone support, lasting for about 15 minutes, does not have a therapeutic purpose, but acts as a continual gateway toward resources to help the self-excluder respect his engagement. The Montreal self-exclusion program includes a mandatory meeting at the end of the period mentioned in the agreement. This mandatory meeting included an evaluation of the gambling situation, an information session about chance and responsible gambling and referrals to additional resources, if needed. The self-excluder must attend this evaluation and information session if he wants his self exclusion to end. Failing to do so, the self-exclusion continues until the self-excluder does attend.

Source: Tremblay *et al.* (2008)

Ladouceur *et al.* (2007) studied 161 people who participated in self-exclusion programmes offered by casinos in Quebec, Canada. They conducted telephone interviews 6, 12, 18 and 24 months after enrolment (follow-ups had 117, 83, 60 and 53 participants respectively). Positive improvements were made on several variables measured in the study including the urge to gamble, perceived control over gambling, and intensity of the negative consequences of gambling on daily activities, social life, work and mood. SOGS scores and DSM-IV scores were also reduced. Most of these improvements occurred during the first six months following self-exclusion.

In terms of compliance, by the six-month follow-up interview more than half of the participants for whom the self-exclusion program was still in effect had returned to a casino or breached their contracts. The authors of this study suggest that detection procedures in casinos could be improved, but they also question whether self-excluders have clear expectations as to whether they are responsible for enforcing the exclusion, or whether enforcement is led by the casino (Ladouceur *et al.*, 2007, p 92).

The design of this study does not allow us to determine whether these effects were due to the programme, or due to other factors (including natural recovery). We are also not able to say whether those who dropped out of the study, or who refused to participate in the first place, were the same as those who did participate.

Townshend (2007) looked at thirty-two clients of a New Zealand treatment service who had used the self-exclusion option between July 2004 (when self-exclusion regulations

came into effect) and July 2006. Improved outcomes were noted in terms of: greater control over gambling (self-reported), more abstinence from gambling, lower self-reported losses from gambling, and improvements on problem gambling scales. However, there are several limitations of this study. The small sample was also receiving cognitive-behavioural treatment, so the study is not able to isolate the effectiveness of self-exclusion alone. There was no control group, just an examination over time. Another potential problem is that data were collected by treatment service staff, who may not have been impartial. Lastly, all the study participants were volunteers.

In Switzerland, Sani *et al.* (2005) conducted a small, preliminary study in one casino to measure the impact of an information session on the gambling habits of at-risk gamblers before signing a self-exclusion agreement. Twelve gamblers showing signs of problem gambling were randomly assigned to an experimental group (n=6) or to a control group (n=6). The counselling session (the experimental condition), focused on informing patrons about the risks of problem gambling and the help available to them both within and outside the casino. This information was provided before self-exclusion took place. Participants in the experimental group were given information on the amount of time played, money spent, and number of visits, whereas participants in the control group did not receive any information.

Researchers measured monthly average time spent gambling, number of visits to the casino, amount of money lost and the amount of money gambled. On each of these measures those in the experimental group who had received the information reported greater improvements (less gambling) compared to those who had not received the information. However, the small numbers of study participants means that these results are not able to be subjected to statistical analysis and are not statistically significant. The study authors argue that these results provide 'indications about interesting avenues to pursue in order to increase the efficacy of self-exclusion programs' (p. 8), thus suggesting areas for further, larger-scale research studies.

7.4 Self-limitation

This REA includes three studies that examined self-limitation, one from Australia, one from Canada, and one that looked at self-limitation on a gambling website. These are summarised in Table 4.

Nower and Blaszczynski (2010) compared motivations for gambling and pre-limiting behaviours in non-problem, low-risk, moderate-risk and problem gamblers. Overall, they found that 'those most in need of limit-setting, problem gamblers, are the least likely to adopt the use of smart cards and other pre-commitment technologies and the most likely to find ways around' (p. 370). Problem gamblers were the least likely group to endorse any form of pre-commitment or limit-setting before playing, although they indicated they lost track of money while gambling and were rarely aware of whether they were winning or losing during play.

Participants in this study were 127 electronic gaming machine players at four venues in Queensland, Australia, who agreed to take the survey before commencing play. The findings, therefore, may not be generalisable to players in other venues and locations.

Participants may have incorrectly recalled their behaviour, and those who volunteered for the study may have been different from those who did not. Thus the study found a relationship, but does not explore causal factors. From this research it is not known whether pre-commitment strategies would help problem gamblers reduce their gambling.

Ladouceur and Sévigny (2009) conducted a study in two bars with video lottery terminals in Quebec City to test the effect of three self-limiting features of electronic gambling machines – a clock, a cash display, and pre-commitment on gambling time – on gambling behaviour. This was a small study, involving thirty-eight adults who consented to participate. The sample included (using the SOGS) twenty-four non-problem gamblers, seven at-risk gamblers and seven probable pathological gamblers. The findings should be interpreted in light of this small, convenience sample (not randomly selected) and the fact that there was a small number of pathological gamblers in the study.

Using behavioural and self-reported measures, the study found that a majority of players reported the cash display as being a helpful feature for controlling gambling activities, but neither the clock nor the pre-commitment on gambling time device as being helpful.

Nelson *et al.* (2008) conducted a study of Internet gamblers who imposed limits on the amount they were allowed to deposit to a betting site. The study analysed the betting transactions of all the individuals who subscribed to an online betting site, comparing 567 people who used the site's self-limit feature with 46,567 other subscribers to the same site who did not self-limit.

Looking back at the behaviour before imposing a limit, self-limiting gamblers played a wider variety of games, placed more bets per day and bet on more days than non-self-limiters. After imposing limits, around 10 percent of self-limiters ceased all betting. Those who continued to bet after setting limits significantly reduced bets per day and total wagered, but did not reduce the amount they wagered per bet.

Nelson *et al.* conclude that this suggests that time spent gambling, not just money spent, appears to be an important indicator of gambling problems, and that self-limit programs appear to be 'promising options' for at-risk Internet gamblers. The findings are limited by the fact that the study only focused on sports betting and only looked at one website – users who reduced gambling on this site might have been gambling on other sites.

7.5 Chapter summary and conclusions

This chapter has reviewed evidence on the effectiveness of self-exclusion and self-limitation strategies. The findings are summarised in Table 3 and Table 4.

The five studies that evaluated the effectiveness of self-exclusion strategies all found improvements among self-excluders on a range of measures – including gambling behaviours and problem gambling. Whilst this is promising, these studies have methodological limitations: the absence of a control group and the self-selecting samples mean that the studies cannot show that the self-exclusion caused the reported improvements. As discussed in Section 7.2, those who volunteer for self-exclusion might be different to the larger population of problem gamblers, and may have improved regardless of the self-exclusion.

The finding by Nelson *et al.* (2010) that greater improvements were seen among individuals who were also in treatment may warrant follow-up. Again, it could be that individuals who decided to enter treatment were more ready or motivated to change than other self-excluders (and without a control group or other way of looking at the counterfactual, this cannot be determined).

Because policies differ between jurisdictions it is not straightforward to make comparisons and generalisations or to develop evidence-based practice.

Alongside evidence gaps as to whether self-exclusion leads to reductions in problem gambling, there is also room for information about how self-exclusion might work: is it the threat of arrest or a fine? Is it the provision of support or signposting to treatment that some programmes include? This relates back to the theory or understanding of problem gambling, and the theory of change behind self-exclusion programmes.

In relation to self-limitation this REA identified fewer studies. That problem gamblers are least likely to self-limit makes sense. What is not clear from Nower and Blaszczynski's study (2010) is whether introducing limits or encouraging limits will reduce gambling and problem gambling. Ladouceur and Sévigny (2009) report on perceived helpfulness, rather than impact on behaviour. Research into limit-setting on gambling websites (Nelson *et al.*, 2008) is promising, but might be specific to online betting and highlights a complex relationship – where imposing a limit on one aspect of gambling (for example, time) is counterbalanced by other non-limited features (for example, total wagered per bet).

Table 3: Summary of studies on self-exclusion

Study	Country	Independent variable	Dependent variables	Findings
Nelson <i>et al.</i> (2010)	US	Before and after self-exclusion	- Compliance	92 percent compliance
			- Gambling frequency	Reduction in frequency in majority who continued to gamble
			- Problem gambling	Declined
Tremblay <i>et al.</i> (2008)	Canada	Before and after self-exclusion	- Time and money spent on gambling, - Effect of gambling on family life, work, mood, financial Situation	All saw positive improvements
Ladouceur <i>et al.</i> (2007)	Canada	Before and after self-exclusion	- Urge to gamble, - Perception of control - Intensity of the negative consequences of gambling on daily activities, social life, work and mood - SOGS	All saw positive improvements
Townshend (2007)	New Zealand	Before and after self-exclusion	- Greater control over gambling (self-reported) - Abstinence from gambling - Losses from gambling, problem gambling scores	All saw positive improvements
Sani <i>et al.</i> (2005)	Switzerland	Before and after self-exclusion	- Monthly average time spent gambling - Number of visits to the casino - Amount of money gambled - Money lost	All reported positive improvements BUT no statistically significant effect (small sample size)

Table 4: Summary of studies on self-limitation

Study	Country	Independent variable	Dependent variable	Findings
Nower and Blaszczyński (2010)	Australia	Problem gamblers Low risk gamblers Non-problem gamblers	Whether they set limits	Problem gamblers were less likely than all other groups to endorse any form of pre commitment or limit-setting prior to play
			Attitudes to use of smart cards	Problem gamblers expressed more reluctance about using smart cards
			Whether they lost track of money when gambling	Problem gamblers were more likely than all other groups to indicate they lost track of money while gambling
Ladouceur and Sévigny (2009)	Canada	Clock Cash display Pre-commitment on gambling time	Considered helpful	The cash display reported to be helpful feature for controlling gambling activities, but neither the clock nor the pre-commitment on gambling time device as being helpful
Nelson <i>et al.</i> (2008)	Betting website	Before and after setting a limit	Number of bets per day	10 percent of self-limiters ceased all betting and those who continued to bet significantly reduced bets per day
			Total wagered	Those who continued to bet significantly reduced total wagered
			Total wagered per bet	Did not change

8.1 **Interpretation of the issue**

The RGF's specification requests a review of the literature on 'the workforce development needs of workers in the health and other support sectors, and the needs of personnel working in the gambling industry itself'.

The REA sought to identify research into the skills, training needs and capabilities (or lack thereof) of those working in the gambling industry, as well as professionals who might come into contact with problem gamblers (psychologists, health professionals, etc.).

This was the issue on which the least information was identified. The topics covered in literature identified as part of this REA are:

- The effect of providing training for casino staff in identifying individuals with gambling problems and signposting them into treatment and support services.
- The training and skills needed by health professionals to ensure they are able to identify and appropriately help problem gamblers.
- A study of the visibility of warnings on online gambling websites.

8.2 **Training for employees in the gambling industry**

The REA included four studies that either evaluated training programmes for those employed in gambling venues or looked at training needs. Three of these studies were from Canada and one from Australia, raising questions about whether findings are applicable to Britain. The training described in these studies commonly included improving knowledge about problem gambling, how to identify a problem gambler, and how to help them.

These studies indicate that employees were satisfied with the training they received, and there is evidence that training improves employees' knowledge about problem gambling. However, these effects of training appear to wear-off – so training has to be frequently repeated. Furthermore, the effect of training on employee *behaviour* (as opposed to knowledge) is not demonstrated by the studies.

Dufour *et al.*, (2010) evaluated a training session ("Taking Risks is No Game-2") in Quebec, Canada, to inform video lottery terminal (VLT) employees about problem gamblers. This study looked at 826 employees who received the training, 456 of whom were followed-up eight months after the training. The results showed that the session improved employees' attitudes regarding problem gamblers. More of the employees who

had completed the training knew how to provide problem gamblers with information about treatment services.

To measure the effects of the training on employee's behaviour a 'pseudo patron' visited eighty-two video lottery terminal venues pre and post the training, and sixty-three venues at the eight-month follow-up, and made observations. The behaviour measured was whether employees gave the pseudo patron a pamphlet. This is a very narrow definition, and there could have been other forms of helping that were not captured by the study. The results showed behavioural changes after the training, but these were not fully maintained at follow-up.

Giroux *et al.* (2008) evaluated a mandatory awareness training session (a workshop called *Des gens qui font la difference* – People Making a Difference) for casino employees (n=2,432) in Quebec, Canada. Employees reported that they were satisfied with the training and thought it was pertinent to their job. Before and after comparisons showed that the session allowed employees to improve their attitudes regarding gamblers and increase their knowledge about gambling in general. At follow-up (n=789), the improved attitudes and knowledge were partly maintained, although some notions about problem gambling and the procedure to be used to help gamblers in crisis seemed to have been forgotten. Giroux *et al.* suggest that because some important elements of the session (such as the established procedure to help gamblers) were not well-retained, there needs to be additional information made available through refresher courses, posters, brochures or videos (2008, p 594). This study did not use a control group and did not look for changes in employees' behaviour. One factor reported by Giroux *et al.* that might have affected whether employees put the training into practice was that the employees had been told to contact casino security if they identified a problem gambler – a course of action with which some employees may not have agreed.

As part of research for Gambling Research Australia on the identification of problem gamblers in gambling venues, Defabbro *et al.* (2007) conducted a survey of 125 gambling venue staff (managers and gaming floor workers) across Australia. This indicated that:

- Most venue staff had received responsible gambling training and that this included some component relating to the identification of problem gamblers.
- Most staff members felt confident in being able to identify problem gamblers within venues and reported encountering problem gamblers very frequently during the course of their work.

The survey indicated that the most significant barrier to identifying problem gamblers was not staff turnover, the length of shifts, or even the size of venues, but the lack of staff training relating to direct interventions with gamblers on the gaming floor. Most staff did not feel confident about how patrons would respond if they were approached. For this reason, there was strong support for the introduction of further training to assist this process.

Lastly, Ladouceur *et al.* (2004) evaluated the impact of the first gambling awareness programme for video lottery terminal retailers in Quebec, Canada – the 'as luck would have it' awareness program. The results showed that, after the session, retailers (n=707) displayed a better understanding of randomness and problem gambling, and that they

could more effectively choose the right moment to suggest seeking help to a gambler. At the six-month follow-up, the trained retailers (n= 496) reported having approached a problem gambler more often than the retailers who had not yet received training (n=504). The study only included a control group at the six-month follow-up.

8.3 Training and skills of health professionals

Corney (2010) conducted a study of four training sessions about problem gambling which were delivered to 145 general practitioners (GPs) working in four locations in southeast of England. The session provided information about the prevalence and signs of problem gambling screening tools, and information about those groups most at risk. It also covered the impact of gambling, the difficulties in giving up, treatment issues, and a description of treatment services. Ninety-five session participants completed a survey before the session, and ninety completed the same survey after the session.

Both the training session and completion of the questionnaire were voluntary, and this should be taken into account in interpreting the results. Further, as the researchers noted, this small study did not examine the impact of the training on the behaviour of GPs. The study focused upon whether GPs encountered patients with problem gambling, and if they did whether, and if so how, they would respond.

In the pre-session survey, over half of the GPs who completed the survey said that none of their patients had explicitly disclosed a gambling problem to them. However, about 45 percent said that they suspected that one or more of their patients might have a problem, and 35 percent said they were not sure. Twenty-nine respondents (31 percent) said that they had previously provided treatment for a patient with a gambling problem. Of those eleven (38 percent) said they had prescribed medication for an associated health problems, seventeen (59 percent) said they had ‘talked through issues’ with patients and the same number said they had made a referral to a counsellor or mental health professional. Eighteen respondents (62 percent) said they had ‘suggested’ gamblers anonymous. Only two respondents had referred to a specialist agency.

In the post-session survey, all but one survey respondent reported that problem gambling was a ‘very relevant’ or ‘relevant’ subject for GPs, and around 80 percent agreed that their role with problem gamblers should include treating associated health problems, supporting patients who were family members of a problem gambler and making appropriate referrals. Corney describes these as ‘positive’ findings, given competing demands on GPs’ time.

Corney also reports on issues discussed in the training session. These reports should not be overly relied upon, since no quotations are provided in evidence, nor are any data provided as to the number of participants agreeing or disagreeing with the views put forward. With these caveats in mind, the study reported:

- Family members of a problem gambler were more likely to disclose a problem to a GP than the problem gambler themselves, so more information to provide to family members would be useful.
- GPs rarely asked questions about problem gamblers, which meant that some patients who did have a problem would not be identified.

- GPs reported having a poor awareness of treatment provision in their area.

Another relevant study identified in this REA is by Engel *et al.* (2010) who report on findings from a survey of 137 executive directors of a range of mental health, family counselling, drug and alcohol service organisations in Allegheny County, Pittsburgh, US. The survey asked about readiness to deal with problems potentially arising from a new casino that was about to open. Analyses of survey responses 'revealed a lack of human service response to the impending start of casino gambling' (p. 611); more than three-quarters of respondents to the survey had not sent staff for training in screening or treating gambling disorders, did not screen clients for problem gambling, did not treat problem gambling, and did not refer clients to other agencies for treatment of gambling-related problems. The most common reason offered for not engaging in prevention and treatment activities was that problem gambling is not considered an issue for the agency.

In evidence to the Australian Productivity Commission enquiry (Productivity Commission, 2010, p 7.35) experts raised concerns about the qualifications of problem gambling counsellors in Australia and variability among counsellors in their knowledge about the nature of gambling activities and technologies. No similar evidence was identified about Britain.

8.4 Chapter conclusion and summary

The REA identified no evidence regarding the workforce development needs of employees in the gambling industry in Britain, but has found studies about the effect of training from Canada and Australia. The REA identified one recent and relevant study into British GPs, although this was a small study which did not measure the impact of the provision of information about problem gambling on doctors' behaviour.

Available evidence suggests that training for employees working in the gambling industry can be effective at increasing knowledge of the nature of problem gambling and how to help by signposting to treatment, provided the training is regularly updated. However, the link between training and behavioural change is not tested and thus is not clear. Further, the effectiveness of a training strategy may depend upon the characteristics of the workforce, such as average length of service in the industry, educational qualifications, pay and conditions, and these might affect transferability of the findings. No such comparative information has been identified in this REA to inform assessments of transferability.

As for the development needs of those working in medical and other professionals, evidence from the US and Australia suggests that knowledge and training in problem gambling is not common. Findings from the single study of GPs in Britain provides an indication of a similar situation here; however, further research is needed in this area.

9.1 **Interpretation of the issue**

The RGF asked about the impact of situational features on propensity to problem gambling (for example, density and/or location of terrestrial gambling outlets) and the relationship of such features with socio-economic and demographic profiles of localities/regions/jurisdictions.

Situational features refer to the geographical density, clustering and distribution of gambling venues or machines, and their impact upon harmful gambling. Understanding these relationships can usefully inform decisions about regulating the location of casinos and the allocation of treatment resources, and can help identify previously unknown risk factors (Rush *et al.*, 2007).

In this chapter we discuss studies that have looked at three (sometimes overlapping) features:

- The number of venues in an area
- The proximity to venues
- The number of venues per capita (density - per 1,000 population).

Findings are summarised in Table 5.

9.2 **The number of venues**

Bondolfi *et al.* (2008) undertook a study to investigate whether an increase in the numbers of casinos in Switzerland had any measurable effect on the prevalence of problem and pathological gambling in the general population. The research team conducted two sets of telephone interviews, one in 1998 and one in 2005. Both used the SOGS to identify potential and probable pathological gamblers. In the 1998 survey 2,526 telephone interviews were completed, a response rate of 59 percent (Bondolfi *et al.*, 2000). In the 2005 survey 2,803 interviews were conducted, a response rate of 47 percent. Both samples were representative of the general population.

The researchers report that the lifetime and past-year prevalence estimates of probable problem gambling (a score of three or four on the SOGS) remained stable at about 2.2 percent and 0.8 percent respectively, despite an increase in the number of casinos between 1998 and 2005.

However, there are several limitations to this study. The results of the 1998 and 2005 surveys are presented across two different papers, which makes it hard to undertake an assessment of the results (the researchers do not use tables or graphs comparing the findings from the two surveys, which impedes assessments of the validity of the statistical analysis). Another important limitation stems from the cross-sectional design, which does not allow a specific sample of disordered gamblers to be looked at over time. New casinos could have lead people to become problem gamblers, but at the same time some existing problem gamblers ‘aged out’ of their gambling habits – thus giving the impression of no overall effect. Furthermore, the researchers note that one explanation for the stability of problem gambling over time could lie in the effect of other measures introduced at the same time: preventative programmes were introduced requiring the training of casino staff in the early detection of problem gamblers; information about assistance for problem gamblers (self-evaluation questionnaires, addresses of clinics and support groups) was made available within casinos; and a system of voluntary or imposed exclusion was set up. Lastly, whilst the number of casinos increased between 1998 and 2005, the number of electronic gaming machines diminished – this could have had an important impact that the study was not able to explore.

Overall, therefore, this study provides limited insight into the relationship between the number of gambling opportunities and the prevalence of problem gambling.

9.3 Proximity to venues

Séigny *et al.* (2008) examined the relationship between proximity to a casino and rates of probable pathological and problem gambling in Quebec, Canada, in two linked studies.²² In the first, 8,842 participants were categorised into groups depending on the driving distances from their home to the nearest casino in the province of Quebec (0–100 km, 100–200 km, 200–300 km or 300 km and over). Analysis of these data found a positive link between casino proximity and gambling participation, but no link with the current prevalence rate of probable pathological or problem gambling.

The second study focused on participants who lived within a 100 km driving distance from the Montreal casino (n=5,158). They were again classified into driving distances. The findings here were, again, that individuals who lived closest to the Montreal casino tended to gamble more frequently. The prevalence of probable pathological and problem gambling was found to be higher in those individuals who lived *furthest away* from the Montreal casino – a counter-intuitive finding. One possible explanation for this offered by the study authors is that people who live in the vicinity of a casino may adapt their behaviours in reaction to exposure (p. 299). There was no relationship between proximity to the casino and gambling expenditures.

The authors concluded that, in a setting in which many types of gambling activities are available, casino proximity in itself does not appear to explain the rate of gambling-related problems.

²² Only the summary was available for this source.

The New Zealand Ministry of Health (Ministry of Health, 2008) conducted a sophisticated study to investigate the association between individual-level gambling behaviour and neighbourhood access to gambling venues. This study used data from national health surveys, the New Zealand Census, and information about the location of three types of gambling venues: non-casino gaming machine venues, Totalisator Agency Board (TAB) venues (broadly equivalent to the Tote in Britain), and casinos. Gambling accessibility was measured, firstly, as the distance to the nearest gambling venue via the road network, and secondly as the density of outlets in a particular area.

The study used multilevel modelling to control for both individual-level and area-level variables, thus isolating the effect of proximity. This study found that gambling behaviour in New Zealand was significantly associated with accessibility of gambling venues. Key findings were:

- Living in a neighbourhood closer to a gambling venue significantly increased the odds of a person gambling at all, and of being a problem gambler.
- The more gambling venues there were within 5 km of a person's neighbourhood, the more likely it was that the person had gambled at a gambling venue in the last year. However, this did not increase the chances of being a problem gambler. Thus, gambling behaviour was more strongly associated with the distance to the nearest gambling venue, than with the number of gambling venues within walking distance.
- Findings were specific to the type of venues studied. Living close to a non-casino gaming machine venue or Totalisator Agency Board (TAB) venue was associated with an increased likelihood of participating in that specific type of gambling, rather than increasing the chances of engaging in other types of gambling (for example, playing the lottery).

The analysis suggested that accessibility to gambling venues was a risk factor for problem gambling, even when neighbourhood socio-economic deprivation and urban/rural status is controlled for. Interestingly, controlling for area-level socio-economic deprivation did not appear to change the strength of the relationships, but when urban/rural status was taken into account this increased the explanatory power of the analysis – suggesting that urban status may be an important possible confounding factor.

Rush *et al.* (2007) mapped the location of casinos and slot machines at race tracks in Ontario using Geographic Information Systems (GIS) techniques, and combined this with information about the prevalence of problem gambling from the Canadian Community Health Survey (which covers a representative sample of the population). They found that there was regional variation in the prevalence of problem gambling in Ontario, and that problem gambling appeared to be modestly but significantly associated with proximity to casinos and racetracks with slot facilities. However, the variation was more strongly associated with demographic characteristics, as well as mental disorders, co-occurring substance abuse problems and physical health status. The authors note that the available data severely limit their capacity to 'tease apart what is undoubtedly a host of individual and community level factors underlying this intra provincial variation' (Rush *et al.*, 2007, p 206). Thus, whilst this study provides modest evidence that some of the variation is

associated with availability of gambling venues, there are a number of potentially important neighbourhood-level factors (such as unemployment) that were not controlled for.

Adams *et al.* (2007) looked at the gambling behaviour and problem gambling of college students (n=1,579) attending universities in Ontario, Canada. Casino slot machines and table games were played more frequently among students attending a university near a casino, and students categorised as pathological were more likely to be enrolled in universities near to (80 percent) than far from a casino (20 percent) (these were statistically significant findings). This study collected data about gambling through questionnaires administered on campus. However, an important limitation of this study was the small proportion of the sample classified as pathological gamblers (using the SOGS only fifteen students – 0.9 percent of the sample – were pathological gamblers). They conclude that ‘attending a university close to a major casino, or possibly other gambling venues, appears to create an ecological condition in which the location of school and casino merge to create a setting that encourages gambling behaviour and possibly problem gambling’ (p. 14).

LaBrie *et al.* (2007) sought to measure the effect of exposure to casinos on the prevalence of problem gambling in Missouri, using the number of people who had self-excluded from casinos as a proxy for the prevalence of problem gambling in a particular area.²³ The results did suggest a relationship between gambling proximity, gambling availability, and self-exclusion rates, which persisted after taking into account the underlying regional vulnerability to disordered behaviours (which was measured by the need for treatment of alcohol use disorders). However, the proxy measure (self-exclusion) used in this study could be unreliable, which suggests caution should be exercised in interpreting these findings.

Wilson *et al.* (2006) found that video lottery terminal gambling opportunities were more prevalent near schools located in socio-economically deprived neighbourhoods in Montreal, compared with schools located in more affluent neighbourhoods,²⁴ which meant that students attending schools in the inner city or economically disadvantaged neighbourhoods were more likely to encounter video lottery terminals in their daily routine. The odds of video lottery terminal use were 40 percent greater for students attending schools in neighbourhoods with high video lottery terminal access. Wilson *et al.* suggest that this density of video lottery terminals interacts with individual risk factors (in this sample population the risk factors for video lottery terminal gambling were being male, having smoked or having drunk alcohol, having friends who played video lottery terminals, and not going straight home after school). This study used GIS mapping combined with a survey of gambling behaviours in high school students in Montreal (which had a high response rate – 97 percent). This study does not look at problem gambling, just gambling prevalence (whether students had played video lottery terminal in the last twelve months).

²³ There are reasons to question whether this is a good proxy for problem gambling, see discussion in Section 7.2.

²⁴ Wilson *et al.* developed a map of youth gambling prevalence and the number of video lottery terminals accessible to students via a short walk (500 m) from their school.

Welte *et al.* (2004) examined the effect of neighbourhood disadvantage and gambling availability on gambling participation and pathology. They conducted 2,638 telephone interviews with a representative sample of US residents aged 18 or older, asking questions about problem gambling and gambling frequency (using DSM-IV). The results showed that the neighbourhood disadvantage (estimated from census data) was positively related to frequency of gambling and problem/pathological gambling. Furthermore, the presence of a casino within 10 miles of the respondent's home was positively related to problem gambling (those who live within 10 miles of a casino have twice the rate of pathological or problem gambling as those who do not).

One possible explanation for the relationship between proximity and problem gambling, as discussed by the authors of the study, is that the availability of gambling opportunities led to gambling problems in some people who would not otherwise develop them. Another could be that problem gamblers chose to live closer to casinos. The study was able to eliminate some possible explanations: for example, they controlled for urban place of residence, so the geographic effects of gambling were not just because both problem gamblers and casinos tend to be located in cities. Welte *et al.* also controlled for individual respondents' socio-economic status, so the findings of a positive relationship between neighbourhood disadvantage and problem gambling are not simply an effect of poverty at the individual level.

There are possible confounding neighbourhood and environmental variables that were not measured in this study, but the relationship detected was sufficiently large that it seems likely that there are some environmental influences in disadvantaged neighbourhoods that encourage gambling. Welte *et al.* stress that individual traits (such as alcohol abuse) have a stronger relationship to gambling pathology than geographic factors.

Marshall *et al.* (2004) conducted a door-to-door survey with adults (n=2,447) in Canberra, Australia, to examine whether geographical proximity to a casino was a significant factor influencing gambling-related activity. Distance to casino was the strongest explanatory variable for the number of times individuals played on electronic gaming machines per annum. Persons living within four kilometres of their regular casino had more frequent electronic gaming machine sessions than those living further away. Marshall *et al.* also found that gaming venues close to places of community congregation, or close to residential areas of relative socio-economic disadvantage, were factors influencing gambler behaviour. The interactions between age, gender, income and marital status in relation to distance from a regular club suggest that the social dimension of accessibility is an important consideration. In other words, gambling is a social activity like any other.

Although this study did not directly examine the relationship between proximity and problem gambling, it does suggest that the close proximity of electronic gaming machine venues increases opportunity to gamble and, therefore, the risk of excessive gambling.

9.4 **Density**

This section describes findings from four studies all looking at the density of electronic gaming machines. The term electronic gaming machines is used to refer to a range of types

machines, which have a range of stakes and prizes. Therefore we must be cautious in assuming the findings from these studies are transferable to Britain.

McMillen and Doran (2006) looked at the relationship between electronic gaming machine expenditure²⁵ and the geographic density (how close venues containing machines were to each other) of electronic gaming machines in three locations in Victoria, Australia, using data over a four-year period (2001–2005). Findings from the analysis were inconclusive: there was no direct or uniform relationship between electronic gaming machine expenditure patterns, measures of disadvantage, and density of gaming machines across the three areas. The pattern of relationships between these variables in the three study localities varied widely. McMillen and Doran concluded that ‘localised factors may have affected patterns of expenditure in particular and different ways’ and data on these neighbourhood-level factors were not available. Advising the Victoria provincial government about a caps policy (and the data needed to inform this policy) they recommended that attention should be at the very local level: ‘evidence from this study indicates that a more detailed, localised methodology is required’ (p. 24). They also stress that it cannot be assumed that venues attract patronage and expenditure only from residents in the local area.

In their study of problem gambling across the ten Canadian provinces (using data from a nationally representative survey of almost 35,000 residents) Cox *et al.* (2005) found that those provinces with the highest density of video lottery terminals (per 1,000 population) and a permanent casino had the highest rates of self-identified problem gamblers (using the CPGI). More detailed findings were as follows:

- Four of the five provinces that had both video lottery terminals and casinos produced the four highest prevalence figures for gambling problems in the country.
- The two provinces with permanent casinos but no video lottery terminals in the community (Ontario and British Columbia) ranked fifth and eighth out of ten (where a rank of ten indicates greatest prevalence), respectively, on prevalence of gambling problems.
- Quebec had both video lottery terminals and casinos and yet was associated with a low rate of gambling problems. However, the authors note that, of the provinces that allow video lottery terminals, Quebec also had the smallest concentration per 1,000 population.
- One province (Newfoundland) had a high concentration of video lottery terminals compared with other provinces, yet only ranked sixth (tied) out of ten on prevalence of gambling problems. This may be related to the fact that Newfoundland does not have permanent casinos in addition to video lottery terminals, as do some other provinces.

It does not appear that this study controlled for or looked at other variables that could have accounted for the positive relationship between density and problem gambling. This study merely shows a correlation between these two variables, rather than causation.

²⁵ The authors note that this is not the same thing as problem gambling.

Marshall (2005) explored the association between electronic gaming machine density and gambling participation in one area of New South Wales, Australia. Data on gambling behaviour were obtained from 1,018 persons in seven residential centres of the area. The study suggested a positive relationship between electronic gaming machines per capita and electronic gaming machine participation rates. In total, 395 of the sample population reported using the machines in the previous six months, and amongst those individuals the study suggested that median annual expenditure tended to be higher in the areas which had a higher saturation of machines. People living in more saturated areas gambled more frequently, and spent more money. The limitations of this study are that it relied on self-reported data (subject to recall error) and did not look at relationships between density and problem gambling per se.

The South Australian Centre for Economic Studies (2005) compared five regions in Victoria, Australia, where the number of electronic gaming machines is capped with five regions in which there is no cap (control regions).²⁶ Results showed that the capping of electronic gaming machines in these areas was not associated with a reduction in gaming revenue. Additionally, there was no evidence that problem gambling behaviours (as measured by problem gambling counselling rates and other forms of help seeking behaviour) were at all affected by the electronic gaming machine caps.

Storer *et al.* (2009) conducted a meta-analysis of studies which examined the effect of the density of gambling venues on the prevalence of problem gambling. Thirty-five studies from Australia and New Zealand conducted between 1991 and 2007 were included. The researchers extracted and analysed data from these studies. Their findings 'strongly indicate that the prevalence of problem gambling increases with increasing density of EGMs at a rate of around 0.8 problem gamblers for each additional EGM' (p. 240). They also found that problem gambling prevalence kept rising, and did not plateau or level off as the density of EGMs increased. Both these findings support the hypothesis that increasing access to gambling opportunities increases the changes of gambling problems.

However, their analysis also showed that the prevalence of problem gambling decreased over time in an area. This finding, the study authors suggest, provides some evidence for what is called 'adaptation'. That is, that populations are at particularly high risk of developing gambling problems when exposed to new forms of gambling, but that problem gambling prevalence decreases with time as people adapt. The picture, however, is complicated, since adaptation did not appear to lead to a plateau in the prevalence of problem gambling in the studies included in Storer *et al.*'s review. The researchers call for further work to better understand the phenomenon of adaptation.

9.5 Chapter summary and conclusions

This chapter has reviewed thirteen studies on the impact of situational features on propensity to problem gambling. These are summarised in Table 5.

²⁶ Selection of control areas: the researchers identified critical factors correlated with regional average per capita gaming expenditure and selected five matching regions; econometric analysis was conducted to select control groups or matching regions whose gambling behaviours were as close as possible to the cap regions.

One study that looked at the **overall number of gaming venues** found no relationship between the number in a country or region and the prevalence of problem gambling or revenues.

On **proximity to a gambling venue**, all six studies that examined impact on gambling *participation* found a positive relationship.²⁷ Of six studies that examined impact on *problem gambling*, five found a positive relationship,²⁸ and one found no relationship.²⁹

The five studies on **density** found different results: one found no consistent relationship to expenditure on gambling; two found a positive relationship with problem gambling; two found a positive relationship with gambling participation.

One study provides some indication that populations might adapt or become used to the availability of gambling. The possibility of adaptation is an area for further research to explore how it interacts in particular areas with the influence of access to gambling opportunities.

In interpreting these results it should be remembered that problem gambling is more strongly predicted by individual risk factors than area-level factors. Poorer areas, in which individuals at risk of problem gambling are more likely to live, tend to have more gambling opportunities.

However, some of the studies included in the REA reveal an area-level effect once individual risk factors are controlled for (Ministry of Health, 2008). A research gap, however, relates to the reason for the positive relationship between place and gambling. Many of the studies noted the absence of neighbourhood-level data (for example, unemployment rates in an area) that might enhance the understanding of the effect of situational features. The strength of the relationship might also be 'susceptible to contextual variations' such as mobility and travel to gambling venues (Doran and Young, 2010, p 270), and in turn means we cannot be sure that findings are transferable to a British environment.

²⁷ Adams *et al.* (2007), Marshall *et al.* (2004), Ministry of Health (2008), Sévigny *et al.* (2008), Welte *et al.* (2004), Wilson *et al.* (2006).

²⁸ Adams *et al.* (2007), LaBrie *et al.* (2007), Ministry of Health (2008), Rush *et al.* (2007), Welte *et al.* (2004).

²⁹ Sévigny *et al.* (2008).

Table 5: Summary of studies on situational factors

Study	Country	Dependent variable	Independent variable	Finding
Number of venues				
Bondolfi <i>et al.</i> (2008)	Switzerland	Increase in the number of casinos in the country	Prevalence of problem and pathological gambling	No relationship
Proximity to venues				
Adams <i>et al.</i> (2007)	Canada	Distance to casino from college	Participation	Positive relationship
			Problem gambling	Positive relationship
LaBrie <i>et al.</i> (2007)	US	Distance between self-excluders' home and the nearest casino	Self-exclusions (as a proxy for problem gambling)	Positive relationship
		Number of casinos clustered with the closest casino		Positive relationship
Marshall <i>et al.</i> (2004)	Australia	Distance to club	Electronic gaming machine frequency (number of times played per annum) (participation)	Positive relationship
			Annual expenditure on electronic gaming machines	Positive relationship
Ministry of Health (2008)	New Zealand	Distance to gambling venues	Participation	Positive relationship
			Prevalence of problem gambling	Positive relationship
Rush <i>et al.</i> (2007)	Canada	Proximity to casino/ racetrack with a video lottery terminal	Problem gambling	Modestly but significant positive relationship
Sévigney <i>et al.</i> (2008)	Canada	Distance from casino	Participation	Positive relationship
Welte <i>et al.</i> (2004)	US	Casino within 10 miles of the respondent's home	Problem gambling	No relationships
			Participation	Positive relationship
			Neighbourhood disadvantage	Positive relationship
Wilson <i>et al.</i> (2006)	Canada	Number of casinos within 50 m of schools	Participation	No relationship
			Problem gambling	Positive relationship
			Socio-economic characteristics of area	Positive relationship
			Prevalence of playing on video lottery terminal (participation)	Positive relationship
Density				
Cox <i>et al.</i> (2005)	Canada	Density of video lottery terminals per 1,000 population AND permanent casino	Problem gambling	Positive relationship
Marshall (2005)	Australia	Electronic gaming machine density	Gambling participation	Positive relationship
			Numbers of gamblers in counselling	No relationship
McMillen and Doran (2006)	Australia	How close electronic gaming machines are to each other	Gambling expenditure	No consistent relationships
Ministry of Health (2008)	New Zealand	Number of gambling outlets within 5 km of a person's neighbourhood	Participation	Positive relationship
			Prevalence of problem gambling	Positive, but not statistically significant relationship
The South Australian Centre for Economic Studies (2005)	Australia	Number of electronic gaming machines in region	Gaming revenue	No relationships
			Gaming machine expenditure	No relationship
			Numbers of gamblers in counselling	No relationship
Storer <i>et al.</i> (2009)	Australia and New Zealand	Electronic gaming machines per capita	Prevalence of problem gambling	Positive relationship

10.1 **Interpretation of the issue and overview of findings**

The RGF asked about ‘the impact of structural features of gambling products, for example, stakes and prizes, speed of play, etc.’.

The focus of the REA is on electronic gaming machines and slot machines. A general description of these is set out in Box 12. It is important to note, however, that the term ‘electronic gaming machine’ covers a number of different types of machine. Therefore in reviewing research in this area it is important to remember that the transferability of findings might be effected by the kind of machine in question.

Box 12: Electronic gaming machines

Video lottery terminals (VLTs) and slot machines are forms of electronic gaming machines (EGM). They are known as fruit machines in Britain, pokies in Australia and New Zealand, video poker or slots in America, and video lottery terminals or slot machines in Canada.

Common features include

- randomly generated outcomes and prizes are won when a certain pattern or configuration of images is produced;
- player participation involves activating the machine by inserting money and responding to commands and options flashed on the screen;
- although gamblers are theoretically free to play at their own pace, the machines are designed to encourage a rhythm of repetitive continuous play; and
- they are normally located in adult-only environments such as private clubs and/or liquor-licensed premises. However in Britain they are also found in non-age-restricted locations such as cafés and sports centres. In Nevada, US, they are also in grocery and convenience stores and airports

Source: Smith and Campbell (2007)

The issue of interest to the RGF looks at the ‘structural features’ of these machines. These are things such as the speed of play, lights and sounds, stop buttons and whether the player can use notes or coins. For example, Harrigan and Dixon (2009) suggest that sensory cues such as the flashing lights and sounds that often happen when a slot machine pays out might confuse the player by emphasising the win on this spin rather than the overall loss of money during the whole playing period. Further, there are often points during slot machine play when then players can make choices (for example, pressing the stop button to speed-up game play). These actions do not influence the outcome of the game (which is random), but they do provide the player with an illusion of control. In an opinion piece (which was therefore excluded from the REA), Parke and Griffiths (2006) argue that there have been changes to the structural features of fruit machines in Britain, in particular that the number of features have increased – there are more buttons and options available. They

suggest that this could increase the perception that player skill has a greater role in the outcome, and thus increase the illusion of control over the outcome.

Over the past three decades there has been considerable research interest in structural features of electronic gaming machines and their role in the acquisition, development and maintenance of gambling behaviour (Parke and Griffiths, 2006). The hypothesis is that is that slot machines encourage behaviours that obey principles of classical and operant conditioning. Studies included in the REA cover the following structural features:

- Event frequency/speed of play
- Stop buttons
- Note and bill acceptors
- Bet size
- Near misses
- Payback percentages.

In looking at the available research and evidence, it is important to bear in mind that structural characteristics interact with contextual factors – mood, atmosphere and other forms of reinforcement.

10.2 Event frequency and speed of play

Speed of play refers to the time interval between successive plays on a machine. The shorter the time interval, the more frequently events (bets) can occur. Electronic gaming machines usually have an event every few seconds, compared to playing the lottery, for example, which occurs once or twice per week. Speed of play on electronic gaming machines is often measured by reel spin speed (the length of time measured in seconds for a slot machine's reels to complete a round of spinning). It reflects the time between the onset of a bet and its final outcome on a single round of play. It has been hypothesised that the faster the event frequency, the more likely it is that a gambling activity will lead to problems.

Linnet *et al.* (2010) conducted a laboratory experiment in Denmark to examine the effect of event frequency on behaviours of problem gamblers (n=15) and non-problem gamblers (n=15). In the control condition an electronic gaming machine had a two-second event frequency and in the experimental condition the machine had a three-second event frequency. All participants were volunteers; the problem gamblers were recruited from a treatment centre and the non-problem gamblers through a newspaper advertisement. Linnet *et al.* measured the time spent gambling, and (in interviews) measured excitement levels and desire to play again.

As might be expected, pathological gamblers had significantly higher excitement level, desire to play again, and spent significantly more time gambling compared with non-problem gamblers. Pathological gamblers significantly decreased their desire to play again in the three-second condition, but the decrease in excitement failed to reach a significant level. Non-problem gamblers showed no differences in level of excitement or desire to play again across conditions.

Significantly more pathological gamblers than non-problem gamblers continued gambling until stopped in the two-second condition, but there were no significant differences in the

three-second condition (in other words, in the slower condition the non-problem and problem gamblers behaved more similarly). It could be that pathological gamblers are just used to the commercially available two-second condition so prefer that. Further, the limitations of this study are the inability of the researchers to control payback percentage and reward frequency – although this was recorded. Furthermore, the limited gambling time (60 minutes) and the laboratory condition could have affected the results.

Chóliz (2010) used a slightly different laboratory experiment, this time in Spain, to investigate event frequency. Ten problem gamblers were recruited from a treatment service, and asked to play a slot machine computer simulation program. One condition involved an electronic gaming machine with a two-second play speed, the other was machine that had a ten-second play speed. The study found that when the result appeared immediately (after two seconds), more games were played than when the result was delayed by ten seconds – regardless of the results obtained. Clearly, with such a small sample, and in laboratory conditions, we must be cautious in relying on this result. There is also the possibility that fewer games were played simply because each game took longer and participants had a limited amount of time to take part in the experiment.

Ladouceur and Sévigny (2006) describe another laboratory experiment in Quebec, Canada, designed to test the impact of the speed of play on concentration, motivation to play, loss of control, and number of games played. Participants were forty-three people from the general population who responded to a newspaper advertisement. They were randomly assigned to either a high-speed (five-second) or a low-speed (fifteen-second) condition on a slot machine. Gamblers in the high-speed condition played more games and underestimated the number of games played more than did participants in the low-speed condition. However, speed did not influence concentration, motivation,³⁰ or loss of control over time or money. The authors of the study concluded that speed of play does not seem to have an impact on occasional video lottery terminal gamblers. There are important limitations on the generalisability of the findings from this study: it was conducted in a laboratory setting and might not apply to actual gambling venues. The absence of problem gamblers in the study mean that the findings cannot be used to predict what impact speed of play may have on actual problem gamblers' behaviour.

Sharpe *et al.* (2005) (this study is described below in Section 10.4) concluded that there was no evidence from their study that reducing the speed of the wager cycles on electronic gaming machines would be an effective harm minimisation strategy. The proportion of probable problem gamblers who played in cycles faster than five seconds was no different to the proportion of non-problem gamblers. However, it is not possible to tell from this study whether reductions in speed of play would be differentially effective for problem gamblers as compared to non-problem gamblers, as there were insufficient numbers of problem gamblers included in the study.

Blaszczynski *et al.* (2005) similarly concluded that, although slower machines were rated as less satisfying to play (by both recreational and problem gamblers) the effects were small

³⁰ It is perhaps useful to note that 'concentration' was operationalised as whether participants heard a phone ringing. Loss of control referred to whether participants stuck to limits they set at the start, although many participants did not set any limits.

and did not appear to influence players' behaviours. This study was conducted in a casino setting in Sydney, Australia. As well as looking at the effect of changing the speed of play (by changing the reel spin speed) they also looked at the impact on player satisfaction of removing high denomination bill acceptors and imposing a maximum bet of \$1.00 (the findings in relation to these features are described in Sections 10.4 and 10.5). Some 363 people attending clubs and hotels agreed to participate in the study, and the sample included problem and gamblers (the representativeness of the sample is not known). The study measured effects on satisfaction, which cannot be interpreted as a proxy for gambling problems.³¹

10.3 Stopping devices

Stop buttons allow gamblers to terminate the spinning of the machines' reels rather than wait until they have run their full course, thus controlling the machine's speed of play, and allowing the player to complete more games in a given period of time. While a stop button allows players to have some influence on the length of playing time, some players may mistakenly believe that the stop button influences their chances of winning (White *et al.*, 2006).

Ladouceur and Sévigny (2005) report on two studies conducted in Quebec City, Canada, that investigated the effects of a video lottery terminal stopping device on gamblers' thoughts and behaviour. The study, conducted in a laboratory and involving forty-eight participants (who were mostly university students and occasional, non-problem video lottery gamblers) found that the stopping device contributed to the development of an illusion of control and to the acquisition of erroneous thoughts that could possibly influence gambling habits: 87 percent of participants believed that stopping the reels would bring different symbols on the screen, 57 percent believed that they could control a game's outcome, and 26 percent believed that they could enhance their probability of winning when using the device. Those who played on a machine without a stop feature did not develop the illusion of control to the same extent. They also played significantly fewer games.

The laboratory conditions, self-selected sample, the focus on occasional, non-problem gamblers, and the fact that the study did not look at the effect on amount of money bet per session, impose some limitations on the findings. However, the researchers did control for potentially confounding factors such as the amount participants had played in the last month and the payback they received during the experiment.

10.4 Note acceptors

Many electronic gaming machines are equipped with bill or note acceptors that allow players to use notes as well as coins or tokens.

³¹ Interestingly, Blaszczynski *et al.* found large and significant differences in enjoyment ratings of problem vs. social gamblers. Those scoring above 5 on the SOGS consistently reported enjoying the machines less than recreational players.

Hansen and Rossow (2010) report on research that examined the effect of a ban on note acceptors on gambling behaviour and gambling problems among Norwegian adolescents. Two school surveys were conducted prior to the removal of note acceptors and one school survey was conducted approximately four months after the removal of note acceptors. Findings from these surveys were that gambling frequency, gambling expenditures and problem gambling among young people (aged 13–19) decreased significantly in the time period after the removal of note acceptors. No transition to other forms of gambling was observed after the ban. The decrease in problem gambling was obvious both for ‘at-risk gamblers’ and ‘problem gamblers’. The proportion of those who gambled more than 63 Euros per week on slot machines was reduced by one third from 2005–2006. The decrease was generally of the same magnitude for both boys and girls and in various age groups.

Thus, changes in the outcome variables from 2005–2006 could indicate the possible impact of the ban. Of course, the authors of the study stress that other changes over the same period could have affected gambling behaviours (for example, changes in the social acceptability of gambling). However, they did not identify any alternative explanations for the decrease, there had been considerable stability in observed gambling behaviour in the two years prior to the intervention, and there were no other significant changes in the gambling market during the observation period. All these things suggest that it is reasonable to attribute these findings to the removal of the note acceptors on slot machines. The study also had a large sample and a high response rate at all three points of time of the data collection.

Sharpe *et al.* (2005) conducted a study in a naturalistic setting in a casino in New South Wales, Australia. A gaming machine manufacturer provided and modified fourteen machines, one modification was changing the maximum note that could be accepted (the others were changing the speed of play – results on this are reported in Section 10.2 – and changing the maximum bet size – reported in Section 10.5). There were 779 voluntary participants, made up of people attending casinos in hotels and clubs. The study authors note the following sample limitations: there were many people approached who did not agree to take part; the representativeness of the sample of all casino attendees is not known; problem gambling scores were obtained for only 634 members of the sample; between-machine comparison data were collected for 210 participants who played at least two of the experimental machines; 20 percent of the participants were problem gamblers.

Probable problem gamblers used higher denomination note acceptors more frequently than non-problem gamblers, but reconfiguring machines to accept only lower denominations notes did not influence their patterns of play.³² The use of high denomination bill acceptors was not found to be independently associated with problem gambling status, severity of problem gambling, amount of money lost, or persistence of play when taking into account other factors such as age, gender, credits wagered per bet and play rate.

The casino study by Blaszczynski *et al.* (2005) (described in Section 10.2) found little effect on players’ satisfaction or enjoyment when bill acceptors were limited. They did not

³² As Sharpe *et al.* note, this was not surprising given that all venues had facilities to change larger denomination notes.

look at whether this change minimised harm, but suggest that ‘if these modifications were proven to be effective in minimising the harm associated with gambling, then there would be little detrimental effect to the enjoyment of players’ (p. 197).

10.5 **Bet size**

Bet size is determined by a number of factors, including the denomination of the machines (the value of each credit), the number of lines one can bet on, and the number of credits played.

Sharpe *et al.* (2005) found that participants with SOGS scores greater than five were more likely to bet amounts greater than one dollar per wager and were more likely to use higher denomination bills than those with scores of less than five. Machines modified to accept the one dollar maximum bets were played for less time and were associated with smaller losses, fewer individual wagers and lower levels of alcohol consumption and smoking.

10.6 **Near misses**

A near miss is a failure that appears to the player to be close to a win. The term near miss is usually used to refer to a feature of slot-machine play where the player can see three symbols in each slot-machine window – the middle row of symbols determines the win or loss (the ‘payline’) but symbols in the top and bottom rows can also be seen.

The REA includes three studies on near misses: these are all lab-based experiments that involved small samples of non-problem gamblers. Also, there are questions about the dependent variables selected in each study (that is, they did not all look at effects on gambling behaviours, but on perceptions).

MacLin *et al.* (2007) conducted a laboratory experiment to test the effect of near misses on the ‘preferences’³³ of gamblers. This was a small study – the participants were eighteen US college students (psychology undergraduates) who played a computer-simulated slot machine (although they were able to keep their winnings). The study had two phases. In the first phase participants played 100 times on three machines that all paid out 20 percent of the time (on average every fifth spin). The three machines differed only in the percentage of losses that were near misses: 15, 30, or 45 percent. In the second phase participants played as many times as they wanted, the machines never ‘paid out’ (participants never won), but the distribution of near-misses continued as before. Participants saw all three ‘versions’ of the slot machine on their screen, and could select which to play.

The findings were that, both in phase one and phase two, there was a slight, but not statistically significant, preference for the version of the machine that had a 45 percent near win percentage. However, the authors suggest that the fact that participants did not play all three games equally suggests that further research into near win effects is warranted.

³³ In the opinion of the research team, MacLin *et al.* do not adequately describe this concept – their dependent variable. The research team believe that ‘preferences’ was operationalised as which computer simulation the participants chose to play on.

Another small study conducted by Dixon and Schreiber (2004) involved twelve participants, all US psychology undergraduates who were non-problem gamblers. All twelve participants estimated near misses as being closer to a win than total losses. There was also a trend for participants to estimate closer to a win when the same symbols were adjacent, rather than split.

Ghezzi *et al.* (2006) outline three experiments that looked at the effects of near misses. These were lab experiments conducted on university students. They did not find statistically significant relationships between the number of near misses and either the magnitude of payout or the order in which the near misses appeared. However, as noted by Ghezzi *et al.* their experiments had several design features that may have affected the outcome: participants played for points rather than for money, and in two of the experiments the participants won 40 percent of the time, which is much higher than the percentage of wins on a slot machine.

10.7 **Payback percentage or payout rate**

Payback refers to the amount won compared to the total amount bet, or in other words the average rate of return. For example, if the payout rate is 85 percent, gamblers would receive back 85 percent of the amount of money inserted into an electronic gaming machine. However, this is a long-run expected return rate that is unlikely to be relevant for a given gambling session, and therefore not relevant to a given gambler.

Brant and Pietras (2008) ran two laboratory experiments³⁴ to investigate the impact of payback percentage on gambling behaviour. It is important to note the extremely small sample sizes in this study (n=5 in experiment one and n=3 in experiment two), and to note that the participants were US college students, not problem gamblers, and had volunteered. Although they were able to keep their winnings, the experiments were conducted in a laboratory, rather than a naturalistic setting. With these caveats in mind, findings from this study were that, at least across the range of payback percentage and win probability and size values studied, gambling in most participants was insensitive to payback percentage. This is not necessarily intuitive, as Brant and Pietras point out: 'percentage payback is equivalent to net reinforcement [so] it seems likely that gambling would be sensitive to variations in percentage-payback values' (Brandt and Pietras, 2008, p 406). These counter-intuitive findings, as well as the methodological limitations, suggest a need for further studies.

10.8 **Visual complexity and sound**

Visual and sensory effects on electronic gaming machines can include flashing lights, primary colours and iconology (White *et al.*, 2006). Christopherson and Weatherly (2006) conducted a study to look at the effect of visual complexity – which in their study they operationalised as the number of symbols appearing on the screen. Their experiment

³⁴ Experiment one was designed to investigate the effects of payback percentage on gambling, whereas experiment two was designed to investigate the effects of win probability and size on gambling as payback percentage was held constant.

concluded that gambling behaviour (the number of trials played) was not sensitive to the number of symbols that appeared in their simulation. Again, the study participants were US college students (n=30). They were assigned to three treatment groups each of ten people; these differed only in how many different symbols were visible on the slot-machine simulation during the session. Participants in the first group saw three symbols (bars, cherries and blanks), those in the second group saw five symbols (bars, cherries, blanks, bells and plums), and those in the third group saw seven symbols (bars, cherries, blanks, bells, plums, balloons and 1,000s). There are several limitations to this study: the small sample size may have prevented significant effects from being detected and the results may not be generalisable to problem gamblers or to real casino settings.

This REA did not identify any studies that looked at the effects of sounds – which could act as reinforcers, for example, by making antagonistic noises after a player has lost, or loud ‘celebratory’ tunes on a win (Parke and Griffiths, 2006, p 171).

10.9 Chapter summary and conclusions

This chapter has examined empirical studies conducted since 2004 into seven structural features of electronic gaming machines. The findings from these are summarised in

Table 6.

Of five studies that looked at the effect of **speed of play**, only one (Sharpe *et al.*, 2005) found no effect at all from quicker speed of play. The other four studies found that faster play was associated with some changes, but outcome variables differed across the studies – desire to play, satisfaction with play, length of play and number of games played – and none of the studies was able to examine relationships between speed of play and problem gambling.

One study found that the use of **stopping devices** increased players’ perceptions that they had control over the game, but the link between this perception and problem gambling was not tested.

Three studies on **note acceptors** produced conflicting findings. In Norway, the removal of note acceptors was significantly correlated with reductions in gambling behaviour and problem gambling prevalence amongst young people. But in two studies conducted in casinos in Australia, although problem gamblers used note acceptors more, there was no association between the presence of note acceptors and gambling-related behaviours or satisfaction.

Limiting the maximum **bet size** was found to be associated with a reduction in gambling behaviours in the one study that examined this feature.

Near misses were not found to be associated with gambling behaviour in two studies; another study found that participants reported near misses to be closer to wins. None of these three studies looked at associations with gambling risks and harms and all were conducted on samples of college students.

Gambling behaviours were found to be insensitive to **payback percentage** and to **visual complexity**.

Overall, the evidence base for the impact of structural features of gambling products is very limited. The majority of studies are lab based, use small sample sizes, involve participants who are irregular and non-problem gamblers, and do not seek to look directly at the association between these features and the development and maintenance of problem gambling. There have been no studies conducted in Britain. One avenue to explore in future research is that electronic gaming machines are not inherently ‘addictive’ in their own right, but there are some interactions between individuals and machines that contribute to differences in play between recreational and problem gamblers (Nower and Blaszczynski, 2010, p 362).

Table 6: Summary of studies on structural characteristics

Study	Setting	Country	Dependent variable(s)	Independent variable(s)	Findings
Speed of play					
Linnet <i>et al.</i> (2010)	Lab	Denmark	<ul style="list-style-type: none"> - Time spent gambling - Excitement - Desire to play again 	<ul style="list-style-type: none"> - 2-second reel-spin - 3-second reel spin 	<p>Non-problem gamblers did not differ in level of excitement or desire to play again in the two conditions</p> <p>Problem gamblers significantly decreased their desired to play again in the 3-second condition</p> <p>Significantly more pathological gamblers than non-problem gamblers continued gambling until stopped in the two-second condition, there were no significant differences in the three-second condition</p>
Chóliz (2010)	Lab	Spain	Number of games played	<ul style="list-style-type: none"> - 2-second - 10-second 	More games played in 2-second condition
Ladouceur and Sévigny (2006)	Lab	Canada	<ul style="list-style-type: none"> - Concentration - Motivation to play - Loss of control - Number of games played 	<ul style="list-style-type: none"> - 5-second - 15-second 	<p>Gamblers in the high-speed condition played more games and underestimated the number of games played more than did participants in the low-speed condition</p> <p>Speed did not influence concentration, motivation, or loss of control over time or money</p>
Sharpe <i>et al.</i> (2005)	Casino	Australia	<ul style="list-style-type: none"> - Time spent on machines - Number of bets placed - Amount lost - Proportion of problem gamblers vs non-problem gamblers playing 	<ul style="list-style-type: none"> - 3.5-second - 5 second 	<p>No difference detected</p> <p>Rapid speed of play did not have any positive or negative impact on any of the parameters of play (i.e., time spent playing, number of bets, net loss), nor was it found to be related to problem gambling status, the severity of problems, or the amount of money spent</p>

Study	Setting	Country	Dependent variable(s)	Independent variable(s)	Findings
Blaszczynski <i>et al.</i> (2005)	Casino	Australia	Satisfaction/enjoyment	<ul style="list-style-type: none"> - 3.5 second - 5 second 	Slower machines were rated as less satisfying to play, but effects were small and did not appear to influence player's behaviours
Stopping device					
Ladouceur and Sévigny (2005)	Lab	Canada	Perceptions of control over the game	Presence of a stopping device	Stopping device contributed to the development of an illusion of control
Note acceptors					
Hansen and Rossow (2010)	Population survey	Norway	<ul style="list-style-type: none"> - Gambling frequency - Gambling expenditure - Problem gambling prevalence 	Whether machines had note acceptors or not	Gambling frequency, gambling expenditures and problem gambling among young people (aged 13–19) decreased significantly in the time period after the removal of note acceptors
Sharpe <i>et al.</i> (2005).	Casino	Australia	<ul style="list-style-type: none"> - Time spent playing - Number of bets - Amount lost - Proportion of problem gamblers vs non-problem gamblers playing 	<ul style="list-style-type: none"> - \$20 maximum note accepted - All denomination notes accepted 	<p>22 percent of probable problem as compared to 10 percent of non-problem participants inserting notes with denominations greater than \$20</p> <p>No other effect detected</p>
Blaszczynski <i>et al.</i> (2005)	Casino	Australia	<ul style="list-style-type: none"> - Satisfaction/enjoyment 	<ul style="list-style-type: none"> - Accepts \$50 and \$100 notes - Accepts up to \$20 notes 	No effect detected
Near wins/misses					
MacLin <i>et al.</i> (2007)	Lab	US	<ul style="list-style-type: none"> - Preferences for machines 	<ul style="list-style-type: none"> - Percentage of losses that were near misses (15, 30, or 45 percent) 	No statistically significant relationship
Dixon and Schreiber (2004)	Lab	US	<ul style="list-style-type: none"> - Estimate of how close to a win 	<ul style="list-style-type: none"> - Win, loss or near win 	Participants estimated near misses as being closer to a win than total losses
Ghezzi <i>et al.</i> (2006)	Lab	Unknown	<ul style="list-style-type: none"> - Number of times participants chose to play on a machine 	<ul style="list-style-type: none"> - Percentage of losses that were near misses (0, 33, 66 or 100 percent) 	No statistically significant relationship
Payback percentage					
Brant and Pietras (2008)	Lab	US	<ul style="list-style-type: none"> - Number of trials - Amount bet 	<ul style="list-style-type: none"> - Payback percentage 	No statistically significant relationship
Visual complexity					
Christopherson and Weatherly (2006)	Lab	US	<ul style="list-style-type: none"> - Number of trials completed 	<ul style="list-style-type: none"> - Number of symbols visible on the slot machine 	No relationship

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APPENDICES

Appendix A Methodology of the Rapid Evidence Assessment

Stage 1: Identify sources to be searched and identify and pilot search terms

Three databases were searched.

1. *EBSCOhost*

We used this data base to search the following;

EconLit, the American Economic Association's electronic database. Covers virtually every area related to economics.

PsycARTICLES, from the American Psychological Association (APA). Full-text, peer-reviewed scholarly and scientific articles in psychology.

PsycINFO database, American Psychological Association's (APA) resource for abstracts of scholarly journal articles, book chapters, books, and dissertations.

Social Sciences Abstracts contains indexing for 620 publications on a wide range of interdisciplinary fields such as addiction studies, anthropology, corrections, economics, gender studies, gerontology, minority studies, political sciences, psychology, sociology, and more.

National Criminal Justice Reference Service Abstracts provides information covering the fields of law enforcement and criminal justice.

2. *Pub Med*

PubMed comprises more than 20 million citations for biomedical literature from MEDLINE, life science journals, and online books.

3. *Cochrane Library*

The Cochrane Library is a collection of six databases that contain different types of high-quality, independent evidence to inform healthcare decision-making, and a seventh database that provides information about groups in The Cochrane Collaboration.

- Cochrane Database of Systematic Reviews
- Cochrane Central Register of Controlled Trials
- Cochrane Methodology Register
- Database of Abstracts of Reviews of Effects
- Health Technology Assessment Database
- NHS Economic Evaluation Database

In addition, eighteen specialist websites outlined in Table 7 were searched by hand

Table 7: Specialist websites searched by hand

	Name	URL
1.	Alberta Alcohol and Drug Abuse Commission (part of Alberta Health Services)	http://www.albertahealthservices.ca
2.	Alberta Gaming Research Institute	http://www.abgaminginstitute.ualberta.ca/
3.	Gemini Research	http://www.geminiresearch.com/
4.	Institute for Research on Gambling Disorders	http://www.gamblingdisorders.org/
5.	McGill University International Centre for Youth Gambling Problems and High Risk Behaviors	http://www.youthgambling.com/
6.	New Zealand Ministry of Health	http://www.moh.govt.nz/moh.nsf/pagesmh/1543
7.	Ontario Problem Gambling Research Centre	http://www.gamblingresearch.org/
8.	Problem Gambling Institute of Ontario	http://www.problemgambling.ca/
9.	Oregon Council on Problem Gambling	http://www.oregoncpg.com/?page_id=74
10.	Canadian Responsible Gambling Council:	http://www.responsiblegambling.org/
11.	Addictive Behaviours Laboratory at the University of Calgary	http://www.addiction.ucalgary.ca/
12.	University of Nevada Las Vegas, Center for Gaming Research	http://gaming.unlv.edu/
13.	Responsible Gambling Fund	http://www.rgfund.org.uk/
14.	The National Bureau of Economic Research	http://www.nber.org/
15.	North American Association of State and Provincial Lotteries	http://www.naspl.org/
16.	Australian Productivity Commission	http://www.pc.gov.au
17.	Massachusetts Council on Compulsive Gambling	http://www.masscompulsivegambling.org/
18.	UCLA Gambling Studies Programme	www.uclagamblingprogram.org/

Search terms were developed, in consultation with the RGF, and piloted. The search terms used are outlined in Table 8 and Table 9.

Table 8: Search terms used in EBSCOhost

	Questions posed by RGF	Search terms
1	A critical analysis of different approaches to treatment	(gambl* OR gaming) AND (treat* OR Interven* OR therapy OR support OR help)
2	The workforce development needs of workers in the health and other support sectors, and the needs of personnel working in the gambling industry itself	(gambl* OR gaming) AND (employee* OR host OR clinical)
3	The nature, prevalence, and effectiveness of consumer pre-commitment/self-limitation strategies	(gambl* OR gaming) AND self limit* (gambl* OR gaming) AND pre#commitment (gambl* OR gaming) AND "self restrict**"
4	The nature, prevalence and effectiveness of consumer self-exclusion strategies	(gambl* OR gaming) AND "consumer protection" (gambl* OR gaming) AND "corporate social responsibility" (gambl* OR gaming) AND "self excl**"
5	The impact of situational features on propensity to problem gambling (for example, density and/or location of terrestrial gambling outlets) and the relationship of such features with socio-economic and demographic profiles of localities/regions/jurisdictions	(gambl* OR gaming) AND (harm OR problem*) AND region* (gambl* OR gaming) AND (harm OR problem*) AND jurisdiction* (gambl* OR gaming) AND (harm OR problem*) AND loca* (gambl* OR gaming) AND (harm OR problem*) AND distribution (gambl* OR gaming) AND (harm OR problem*) AND allocation (gambl* OR gaming) AND (harm OR problem*) AND clustering (gambl* OR gaming) AND (harm OR problem*) AND density
6	Issues regarding gambling-related risk and harm in relation to specific demographic groups, for example, ex-service personnel, homeless people, prisoners	(gambl* OR gam*) AND (harm OR problem*) AND demograph* (gambl* OR gam*) AND (harm OR problem*) AND (prison* OR offend* OR probation*) (gambl* OR gam*) AND (harm OR problem*) AND homeless (gambl* OR gam*) AND (harm OR problem*) AND "armed forces" (gambl* OR gam*) AND (harm OR problem*) AND "service personnel" (gambl* OR gam*) AND (harm OR problem*) AND (children OR "young people") (gambl* OR gam*) AND (harm OR problem*) AND ("mental health" OR psychiatric disorder*) (gambl* OR gam*) AND (harm OR problem*) AND (alcohol or drug) (gambl* OR gam*) AND (harm OR problem*) AND (co#morbid*)

	Questions posed by RGF	Search terms
7	The impact of structural features of gambling products, for example, stakes and prizes, speed of play, etc	(gamb* OR gaming) AND (structur* OR Prize OR speed) (gamb* OR gaming) AND visual (gamb* OR gaming) AND aural (gamb* OR gaming) AND odds (gamb* OR gaming) AND "dual meters" (gamb* OR gaming) AND "note acceptors" (gamb* OR gaming) AND "video lottery terminal" (gamb* OR gaming) AND random (gamb* OR gaming)AND compensated (gamb* OR gaming) AND intervals (gamb* OR gaming) AND ("payout interval") (gamb* OR gaming) AND("payout ratio" OR "payout frequency") (gamb* OR gaming)AND "near miss" (gamb* OR gaming) AND "repeat chance**" (gamb* OR gaming) AND "event frequency" (gamb* OR gaming) AND familiarity (gamb* OR gaming) AND probability (gamb* OR gaming) AND predictab* (gamb* OR gaming) AND reward
8	The effectiveness of prevention/education initiatives; including operators' corporate social responsibility measures	(gamb* OR gaming) AND (harm OR problem*) AND (education OR prevention) (gamb* OR gaming) AND "social responsibility"

Table 9: Search terms used in PubMed and Cochrane

PubMed	Cochrane
problem gambling	gambl*

Stage 2: Conduct initial search and create initial database of references

Search terms were entered into each of the identified databases. The research team kept detailed notes of how the search terms were entered into the databases to ensure transparency, and to ensure that the approach could be replicated. The approach taken to searching each of the sources is set out in Tables 10 and 11.

The research team used the reference management software Endnote to keep a record of the references identified. Each relevant ‘hit’ was downloaded or entered manually into Endnote. The following information was recorded for each article or reference:

- Type of work – book, report, journal article, etc
- Author
- Title
- Year of publication
- Where published and publisher, or journal title and volume number
- Search terms that generated the hit
- Database through which it was found, or book in which it was cited
- Abstract (if available).

Table 10: Methods of searching databases

Database	Details of search
EBSCOhost	Advanced search Selected to search in 'subject terms' Selected 'phrase searching' Limited publication date between January 2004 and March 2011
Cochrane	Advanced search Searched in 'title, abstract or keywords' Entered terms connected with AND in different search boxes
PubMed	Searched using Endnote search function Limited publication date from 2004 Looked in title only

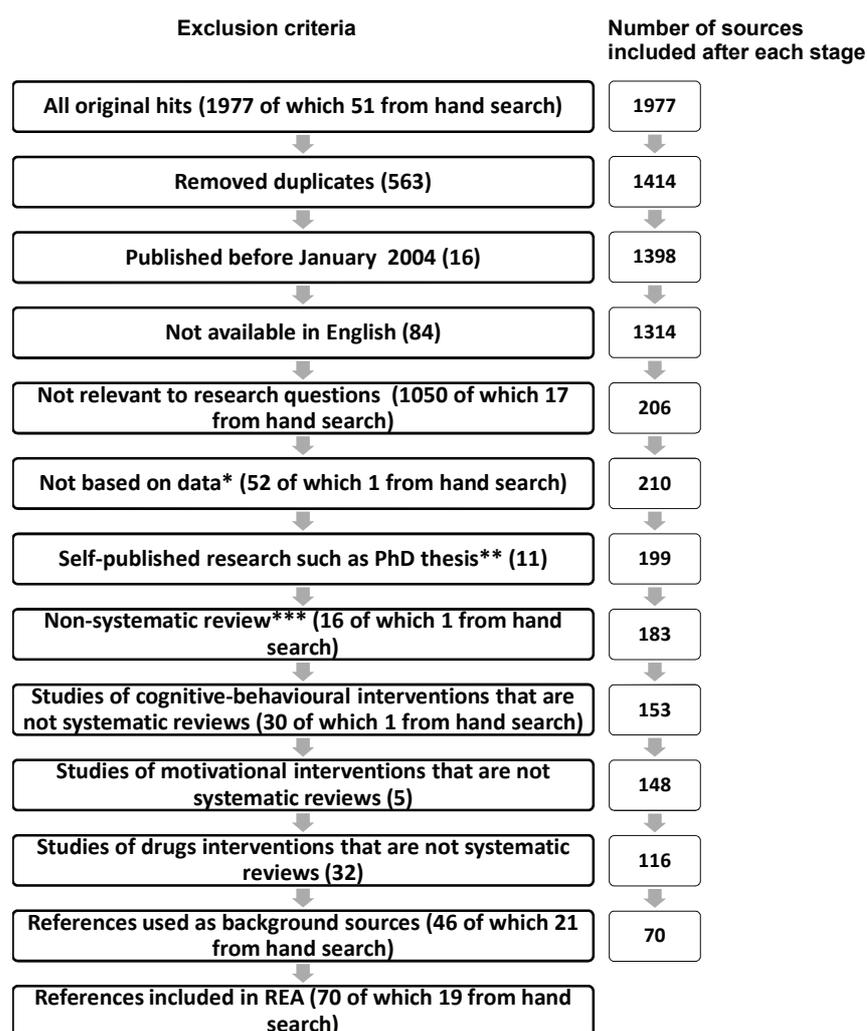
Table 11: Description of how specialist websites were searched

albertahealthservices.ca/	Started search by checking the 'Information for researchers tab', which did not yield any results. Searched the 'Publications' section which yielded no results. Input key term 'gambling' into search field and sorted through results (28 pages)
abgaminginstitute.ualberta.ca/	Started searching in the 'research' tab in home menu. The research figuring on the website is divided per year, sorted through all research projects 2004 to date
geminiresearch.com/	Started by searching in the 'reports' section of the home menu. Also searched the bibliography section for relevant articles: http://geminiresearch.com/bibliography , no results were yielded from the bibliography
gamblingdisorders.org/	Searched all tabs of the website for reports and publications
youthgambling.com/	Searched the reports/publications section (bottom right corner)
moh.govt.nz/	Searched the problem gambling 'publications' section of the website
gamblingresearch.org/	Searched the 'research findings' section of website, including both 'MOHLTC directed research' and 'OPGRC funded research'. Scanned for completed projects with final reports
problemgambling.ca/	Searched 'Research - Published Research', under clinical research; epidemiological; psychosocial; special populations
oregoncpg.com/	Reviewed 'studies' section
responsiblegambling.org/	Under 'research & information' tab - reviewed 'RGC research' and 'latest documents'. Then searched online library in following categories: ethno-cultural; internet/online gambling; self-exclusion; treatment; video lottery terminals and slot machines
addiction.ucalgary.ca/	Reviewed all tabs of the website for relevant publications
gaming.unlv.edu/	Reviewed 'papers' and 'reports'. Under reports tab, searched 'problem gambling' in 'articles' section
rgfund.org.uk/	Reviewed all tabs of the website for relevant publications
nber.org/	Conducted full text search of publications using key search terms 'problem gambling' and 'pathological gambling'
naspl.org/	Reviewed tabs on the website: gambling studies
pc.gov.au	Conducted a search of website using 'gambling' as a search term
masscompulsivegambling.org/	Reviewed all tabs for publications and searched for 'publications' in the search tab. This yielded a bibliography (which was downloaded) and a link to BASIS
uclagamblingprogram.org/	Reviewed all tabs

Stage 3: Remove duplicates, apply inclusion/exclusion criteria by reading title and abstract

Duplicates were removed by employing the 'remove duplicates' function on Endnote. Further duplicated references were then removed by hand when encountered.

A member of the research team then screened all references by title and abstract, applying the initial inclusion and exclusion criteria – as set out in Figure 2.



* qualitative/quantitative data included. Primary research/secondary analysis included. Opinion/journalism excluded

** will include other grey literature

*** will include systematic descriptive/narrative (non-quantitative) reviews

Figure 2: Inclusion and exclusion criteria

Stage 4: Group hits by research question, revise and apply inclusion/exclusion criteria

Once the initial inclusion and exclusion criteria were applied, the hits were categorised according to the research question to which they related. This allowed the researchers to identify those research questions that had a large number of hits.

The topics on which the number of hits was judged unmanageable were treatments. Thus for this research question the research team applied a revised inclusion/exclusion criteria.

Stage 5: Read and extract data

Research team members read each of the references that met the inclusion criteria. On reading some sources, it became clear they did not meet the inclusion criteria after all, and such references were excluded at this stage.

Information was extracted from each source using the data extraction template shown in Table 12 – this template allowed researcher to both describe studies and extract the information needed to make a quality assessment. Each source was read for data extraction by one member of the research team.

Stage 6: Hand-search and follow-up references and citations

The systematic search of databases and specialist websites was supplemented by hand-searching the contents and bibliographies of relevant texts and articles. Doing this provides the research team with confidence that the key texts and studies in a particular field have been included (or at least considered and excluded if they did not meet the inclusion criteria).

Stage 7: Quality assessment, reporting and synthesis

The data extracted from the studies were used to write the report. In the write-up researchers describe in detail the strengths and limitations of the studies. The team held an internal synthesis workshop to explore the similarities and differences across the literatures.

Rather than assigning a grade or score to each study, as is often done in a REA, the research team considered it was more helpful to describe the different strengths and weaknesses of each study, since this provides a more comprehensive and nuanced way of communicating the quality of the evidence and its usefulness to the RGF.

Table 12: Data extraction template – to describe studies and assess quality

1	Study aim	
1.1	Aim of the study/ research questions	Write in authors' description if there is one. Elaborate if necessary, but indicate which aspects are reviewers' interpretations. Other, more specific questions about the research questions and hypotheses are asked later
1.2	Purpose of the study	(1) DESCRIPTION: studies in which the aim is to produce a description of a state of affairs or a particular phenomenon, and/or to document its characteristics. In these types of studies there is no attempt to evaluate a particular intervention programme (according to either the processes involved in its implementation or its effects on outcomes), or to examine the associations between one or more variables. (2) EXPLORATION OF RELATIONSHIPS: a study of statistical associations between variables in order to build theories and develop hypotheses. These studies may describe a process or processes (what goes on) in order to explore how a particular state of affairs might be produced, maintained and changed. These relationships may be discovered using qualitative techniques, and/or statistical analyses. These studies often consider variables such as social class and gender that are not interventions, although these studies may aid understanding, and may suggest possible interventions, as well as ways in which a programme design and implementation could be improved. These studies do not directly evaluate the effects of policies and practices. (3) WHAT WORKS: A study will only fall within this category if it measures effectiveness - i.e. the impact of a specific intervention or programme on a defined sample of recipients or subjects of the programme or intervention. (4) REVIEWING/ SYNTHESISING RESEARCH: Studies that summarise and synthesise primary research studies
2	Study focus	
2.1	Type of gambling	Note if the focus is on a particular type of gambling, for example, electronic gaming machines
3	Sample	
3.1	Who or what is/ are the sample in the study?	Number of participants, in different conditions of the study, whether they are general population/ gamblers/ problem gamblers/ gambling industry staff
3.2	Countries of the participants?	
3.3	Any other useful information about study participants, for example limited to one age/sex/ethnicity/ socio-demographic status	
4	Programme or intervention description	
4.1	Name of treatment/ programme/ intervention being studied	State if NA - no intervention etc
4.2	Content of the intervention/ treatment	Describe the intervention in detail, whenever possible copying the authors' description from the report word for word. If specified in the report, also describe in detail what the control/ comparison group(s) were exposed to
4.3	Aim of the intervention	Not stated; not explicitly stated [if not stated, use reviewer's wording/ interpretation], stated [author's own words]
4.4	Year in which the intervention took place	
4.5	Duration of the intervention	
4.6	Anything of note about person providing the intervention/ their training	(Often not available)
5	Results and conclusions	
5.1	What are the results of the study, as described by the authors	Cut and paste from abstract/conclusions

5.2	Study timing	(1) CROSS SECTIONAL: study examines one or more samples but each at only one point in time (2) RETROSPECTIVE: examines same samples as they change over time, starting at one time point and looking back (3) PROSPECTIVE: examines the same samples as they have changed over time and if data are collected forward over time
6	Context of study	
6.1	Location of study	For example, if it's on an Indian reserve/ rural or urban setting/ in a particular state or town
6.2	Country of study	
6.3	Regulatory factors mentioned	
6.3	Other context/ cultural/ regulatory factors that might be relevant	
7	Research gaps and topics for further work	
7.1	Any current research gaps noted by authors/ or noted by reviewed	Record whether author or reviewer has identified a gap
8	Study methods	
8.1	For 'WHAT WORKS' studies – when were variables measured	(1) NA (2) before and after (3) after only (4) other (5) not stated
8.2	Method of study	(1) Randomised experiment (2) non-randomised experiment (3) one group pre and post test (4) one group post-test only (5) cohort study (6) secondary data analysis (7) case study (8) document study (9) systematic review (10) ethnography (11) statistical survey
9	Methods – sampling strategy	
9.1	Method used to select the sample	
9.2	Planned sample size	
9.3	How representative was the sample	
9.4	Did any of the sample drop out over time	Include here level of non-response to surveys
9.5	Were the members of the sample who dropped out different?	
10	Recruitment and consent	
10.1	What methods were used to recruit people into the study	For example, advertisements, door-to-door survey, random digit dialling
10.2	Were any incentives provided	
11	Methods – data collection	
11.1	Which variables/ concepts does the study aim to measure/ examine?	Independent variable/ dependent variable
11.2	Methods used to collect data	(1) Interviews (2) observations (3) self-completed questionnaire (4) psychological tests (5) secondary data (publicly available stats).
11.3	Data collection tools/ who collected the data	Explicitly stated/ implicitly stated/ not stated
11.5	Do the authors describe any ways in which they have addressed validity of tools	Piloting, etc.
12	Methods – data analysis	
12.1	Which methods were used to analyse qualitative data	
12.2	Which methods were used to analyse quantitative data	
12.3	Do the authors describe strategies used in analysis to control for bias from confounding variables	
12.4	For WHAT WORKS studies: was data analysis carried out for all starters, or only programme completers	Intention to treat approach
12.5	Do the authors describe any ways they have addressed the repeatability or reliability of data analysis?	For example, using more than one researcher to analyse data, looking for negative cases

12.7	If the study uses qualitative methods, how well has the detail, depth and complexity (i.e. the richness) of the data been conveyed? Has analysis been conducted such that context is preserved?	
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Source: developed from EPPI Centre (2007)

Appendix B List of included sources and quality assessment

This appendix sets out the list of sources included in relation to each of the questions posed by the RGF. As explained in Appendix A, rather than assigning the sources a grade or score for quality, the research team highlights particular strengths and weaknesses of each.

Table 13: Sources included for question 1 – treatment

	Author and year	Country	Question	Description	Comments on strengths and weaknesses
1.	Cunningham <i>et al.</i> (2009)	Canada	Treatment – personalised feedback	RCT	+ Controlled for baseline characteristics - Participants were heavy gamblers who had already signed up to another study - Small sample size - Control and experimental groups differed
2.	Diskin and Hodgins (2009)	Canada	Treatment – face-to-face motivational intervention	RCT	+ Clear description of training of treatment practitioner + Intent to treat methodology - Participants who did not complete the study differed from those who did - Experimental intervention longer than control - Participants were volunteers who had concerns about their gambling
3.	Gooding and Tarrier (2009)	US, 9; Canada, 8; Spain, 3; Australia, 5	Treatment – cognitive-behavioural approaches	Systematic review and meta-analysis	+ Clear description of search strategy and quality assessment
4.	Grant <i>et al.</i> (2009)	US	Treatment – motivational interviewing & imaginal desensitisation compared to Gamblers' Anonymous (GA)	RCT	+ Randomised design - Low rates of attendance at GA by control group - Participants were volunteers - Recruitment method not described
5.	Pallesen <i>et al.</i> (2005)	15 studies included – countries not given	Treatment – psychological approaches	Systematic review and meta-analysis	+ Clear description of search strategy and quality assessment

	Author and year	Country	Question	Description	Comments on strengths and weaknesses
6.	Pallesen <i>et al.</i> (2007)	16 studies included – countries not given	Treatment – drugs	Systematic review and meta-analysis	+ Clear description of search strategy and quality assessment
7.	Petry <i>et al.</i> (2008)	US	Treatment – brief, 'motivational enhancement' interventions	RCT	+ Large sample size + High follow-up rates + Intent-to-treat approach + Population were not already seeking treatment – Interventions differed in content – Relatively short follow-up period – Recruitment through medical clinics
8.	Shandley and Moore (2008)	Australia	Treatment – online forum	Longitudinal (interviews with website users at time of use and followed-up same group one month after)	+ Qualitative data provide insight into experiences and motivations of participants – No control group – Short follow-up period – Self-selected sample – Did not look at gambling behaviours
9.	Toneatto and Dragonetti (2008)	US	Treatment – GA compared to cognitive-behavioural therapy	Non-randomised experiment	+ Looked at gambling behaviours + Twelve-month follow-up period – Analysis only included participants who were contactable at follow-up – No control group – Inconsistent attendance by participants – Participants were volunteers
10.	Wood and Griffiths (2007)	UK (although users were international)	Treatment – online forum	Cross sectional survey of website users	+ Qualitative data provide insight into experiences and motivations of participants – Did not look at gambling behaviours – Small sample size – Participants were volunteers
11.	Wood and Wood (2008)	UK (although users were international)	Treatment – online forum	Cross sectional survey and interviews of website users	+ Qualitative data provide insight into experiences and motivations of participants – Did not look at gambling behaviours – Small proportion of all forum users included in the study – Survey respondents volunteered to participate
12.	Suurvali <i>et al.</i> (2009)	Canada, 9; Australia, 5; New Zealand, 1; US, 1; Brazil, 1; Switzerland, 1; gambling website, 1.	Treatment – reasons for not seeking treatment	Systematic literature review	+ Systematic search and data extraction approach – Broad inclusion and exclusion criteria

Table 14: Sources included for question 2 – workforce development

	Author and year	Country	Question	Description	Comments on strengths and weaknesses
1.	Corney (2010)	England	Workforce development – provision of information to GPs	Before and after survey on GP's experience of problem gambling and their impressions of it	<ul style="list-style-type: none"> + Qualitative data provides information about GP's attitudes to helping patients with gambling problems - Small, self-selecting sample - No measurement of effect on behaviour
2.	Defabro <i>et al.</i> (2007)	Australia	Workforce development – staff training and confidence in identifying problem gamblers	Cross sectional survey and consultation with industry staff, gamblers. Observational work within venues	<ul style="list-style-type: none"> + Data obtained from several states - Survey respondents volunteered - Convenience sampling
3.	Dufour <i>et al.</i> (2010)	Canada	Workforce development – employee training programme	Pre-post experimental design with control group with eight-month follow-up	<ul style="list-style-type: none"> + Use of pseudo-patron to measure behavioural effects
4.	Engel <i>et al.</i> (2010)	US	Workforce development – readiness of human services response	Cross sectional survey of heads of services	<ul style="list-style-type: none"> - One state in the US
5.	Giroux <i>et al.</i> (2008)	Canada	Workforce development – employee training programme	Pre-post experimental design with no control group with six-month follow up	<ul style="list-style-type: none"> - No control group - Did not look for behaviour change
6.	Ladouceur <i>et al.</i> (2004)	Canada	Workforce development – employee training programme	Pre-post experimental design with six-month follow-up. Control group at follow-up only	<ul style="list-style-type: none"> + Control group at follow up + Looked at effect on behaviour - Self-reported behaviour
7.	Productivity Commission (2010)	Australia	Workforce development – skills of counsellors	Expert views	<ul style="list-style-type: none"> - Expert views only
8.	Wells <i>et al.</i> (2006)	US	Workforce development – training of counsellors in internet problems	Cross sectional survey of mental health and social work professionals	

Table 15: Sources included for questions 3 and 4 – self-limitation and self-exclusion strategies

	Author and year	Country	Question	Description	Comments on strengths and weaknesses
1.	Ladouceur and Sévigny, (2009)	Canada	Self-limitation	Cross sectional survey of players	- Small, convenience sample
2.	Ladouceur <i>et al.</i> (2007)	Canada	Self-exclusion	Post only experimental design with two-year follow-up and no control group	- Small proportion of all self-excluders participated - No control group - Voluntary participation
3.	Nelson <i>et al.</i> (2008)	Online	Self-limitation	Secondary data analysis. Constructed two groups and pre and post measures	- Looked at only one website
4.	Nelson <i>et al.</i> (2010)	US	Self-exclusion	Post only experimental design with ten-year follow-up and no control group	+ Length of follow up - Small proportion of all self-excluders participated - Voluntary participation - No control group - Retrospective self-reported measures of gambling
5.	Nower and Blaszczyński (2010)	Australia	Self-limitation	Cross sectional survey of players	- Not all players approached agreed to take the survey - Self-reported measures - Did not look at gambling behaviour
6.	Sani <i>et al.</i> (2005)	Switzerland	Self-exclusion	RCT	- Small sample size
7.	Townshend (2007)	New Zealand	Self-exclusion	Pre and post experimental design with no control group	- Participants also receiving CBT - No control group - Data collected by treatment service staff - Voluntary participation
8.	Tremblay <i>et al.</i> (2008)	Canada	Self-exclusion	Pre and post experimental design with no control group	- Small proportion of all self-excluders participated - No control group - Voluntary participation - Self-reported gambling data

Table 16: Sources included for question 5 – situational features

	Author and year	Country	Question	Description	Comments on strengths and weaknesses
1.	Adams <i>et al.</i> (2007)	Canada	Proximity to venues	Cross sectional survey of students. Secondary data on distance to gambling venue	<ul style="list-style-type: none"> - Small proportion of the sample were problem gamblers - Can only show correlation
2.	Bondolfi <i>et al.</i> (2008)	Switzerland	Situational features – number of venues	Cross sectional telephone survey before and after change	<ul style="list-style-type: none"> - Cannot demonstrate causal relationships
3.	Cox <i>et al.</i> (2005)	Canada	Density	Secondary data analysis: Density and problem gambling	<ul style="list-style-type: none"> - Looked for correlation between density variables, but did not control for other potentially confounding variables
4.	LaBrie <i>et al.</i> (2007)	US	Proximity to venues	Secondary data analysis: self-exclusions and proximity to gambling venue	<ul style="list-style-type: none"> - Number of self-excluders used as a proxy for problem gambling prevalence
5.	Marshall (2005)	Australia	Density	Cross sectional survey combined with data on number of gaming machines	<ul style="list-style-type: none"> - Door-to-door survey methodology may discourage honest responses
6.	Marshall <i>et al.</i> (2004)	Australia	Proximity to venues	Cross sectional survey. Secondary data on disadvantage and machine location	<ul style="list-style-type: none"> - Door-to-door survey methodology may discourage honest responses
7.	McMillen and Doran (2006)	Australia	Density	Secondary data analysis: expenditure and density	<ul style="list-style-type: none"> - Quality of local data means other potential explanatory variables could not be taken into account - No information about whether people travelled to gambling venues
8.	Ministry of Health (2008)	New Zealand	Density and proximity	Secondary data analysis of census, health survey and venue location data	<ul style="list-style-type: none"> + Sophisticated statistical techniques control for area socio-demographic status

	Author and year	Country	Question	Description	Comments on strengths and weaknesses
9.	Rush <i>et al.</i> (2007)	Canada	Proximity to venues	Cross sectional survey of local population. Secondary data on distance to gambling venue	- Limited data available on neighbourhood level factors
10.	Séigny <i>et al.</i> (2008)	Canada	Proximity to venues	Cross sectional survey of local population. Linked to secondary data on distance to gambling venue	- Can only show correlation
11.	The South Australian Centre for Economic Studies (2005)	Australia	Situational features – number of venues	Secondary data analysis; comparison between areas with cap and areas without	- Measured counselling rates, rather than gambling behaviours
12.	Storer <i>et al.</i> (2009)	Australia and New Zealand	Situational features – density of electronic gaming machines	Meta-analysis	+ Employed statistical methods to control for differences - Combined data from different countries and different studies
13.	Welte <i>et al.</i> (2004)	US	Proximity to venues	Cross sectional survey. Secondary data from census and distance to gambling venue	+ Controlled for individual-level factors + Nationally-representative survey - Can only show correlation - Potentially confounding neighbourhood-level factors not controlled for
14.	Wilson <i>et al.</i> (2006)	Canada	Proximity to venues	Cross sectional survey of school children. Secondary data on distance to gambling venue	- Can only show correlation

Table 17: Sources included for question 6 – risk and harm in specific demographic groups

	Author and year	Country	Question	Description	Comments on strengths and weaknesses
1.	Abbott <i>et al.</i> (2005)	New Zealand	Demographic groups – offenders	Cross sectional survey	+ High response rate + Representative of all New Zealand prison population
2.	Abbott and McKenna (2005)	New Zealand	Demographic groups – offenders	Cross sectional survey	+ Representative sample of New Zealand prison population
3.	Biddle <i>et al.</i> (2005)	Australia	Demographic groups – veterans with PTSD	Cross sectional survey	- Study population had high incidence of mental health conditions – findings may be highly specific to that group
4.	Doran and Young (2010)	Australia	Demographic groups – itinerant populations	In-depth qualitative interviews	+ qualitative approach provides rich description of meaning of gambling to members - Findings cannot be transferred to other jurisdictions or groups
5.	Lahn (2005)	Australia	Demographic groups – offenders	Cross sectional survey of offenders	- Voluntary participation in survey
6.	Ledgerwood <i>et al.</i> (2007)	US	Demographic groups – offenders	Longitudinal survey. Constructed two groups and took pre and post measures	- Sample was treatment-seeking problem gamblers - Reliance on self-reported data
7.	Steenbergh <i>et al.</i> (2008)	US	Demographic groups – US Air Force recruits	Cross sectional survey	- Self-reported gambling behaviour
8.	Turner <i>et al.</i> (2009)	Canada	Demographic groups – offenders	Cross sectional survey	- Low response rate - Specific to federal prison population
9.	Walters (2005)	US	Demographic groups – offenders	Experimental design with control group, post intervention measurement only	- Not randomised - Prison disciplinary infractions might not be a good proxy measure
10.	Williams <i>et al.</i> (2005)	UK, 3; Australia, 5; New Zealand, 3; US, 16	Demographic groups – offenders	Systematic literature review	

Table 18: List of sources included for question 7 – structural features

	Author and year	Setting	Country	Question	Description	Comments on strengths and weaknesses
1.	Linnert <i>et al.</i> (2010)	Lab	Denmark	Structural features – speed of play	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Small sample size - Lab setting - Could not control payback percentage
2.	Chóliz (2010)	Lab	Spain	Structural features – speed of play	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Small sample size - Lab setting
3.	Ladouceur and Sévigny (2006)	Lab	Canada	Structural features - speed of play	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Lab setting - No problem gamblers included
4.	Sharpe <i>et al.</i> (2005)	Casino	Australia	Structural features – speed of play AND note acceptors AND bet size	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Large sample size - Naturalistic setting - Low response rate - Not able to say whether sample was representative - Self-selected sample
5.	Blaszczynski <i>et al.</i> (2005)	Casino	Australia	Structural features – speed of play AND note acceptors	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Sample included some problem gamblers and recreational gamblers - Naturalistic setting - Satisfaction measures, rather than problem gambling - Self-selected sample
6.	Ladouceur and Sévigny (2005)	Lab	Canada	Structural features – stopping device	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Focus on occasional, non-problem gamblers - Self-selected sample/ volunteers
7.	Hansen and Rossow (2010)	Population survey	Norway	Structural features – note acceptors	Longitudinal survey of school children. Secondary data on number of note acceptors	<ul style="list-style-type: none"> - Large sample size - Correlation measured, not causation
8.	MacLin <i>et al.</i> (2007)	Lab	US	Near wins/misses	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Participants were all college students - Small sample size - Lab setting

9.	Dixon and Schreiber (2004)	Lab	US	Near wins/misses	?	<ul style="list-style-type: none"> - Participants were all college students - Small sample size - Lab setting
10.	Ghezzi <i>et al.</i> (2006)	Lab	?	Near wins/misses	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Lab setting - Participants were all college students
11.	Brant and Pietras (2008)	Lab	US	Payback percentage	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Very small sample size - Participants were all college students, non-problem gamblers and had volunteered
12.	Christopherson and Weatherly (2006)	Lab	US	Visual complexity	Experimental design where participants played under different conditions	<ul style="list-style-type: none"> - Operationalising visual complexity as number of symbols might have been restrictive - Participants were all college students - Lab setting

Table 19: List of sources included for question 8 – prevention, education and CSR

	Author and year	Country	Question	Description	Comments on strengths and weaknesses
1.	Byrne <i>et al.</i> (2007)	Mainly US	Prevention and education	Systematic literature review	
2.	Turner <i>et al.</i> (2008)	Canada	Prevention and education	Experimental design with control group	
3.	Williams <i>et al.</i> (2010)	Canada	Prevention and education	Experimental design with control group	
4.	Ladouceur <i>et al.</i> (2004)	Canada	Prevention and education	Experimental design with control group	<ul style="list-style-type: none"> - Looked at beliefs, rather than behaviours
5.	Boutin <i>et al.</i> (2009)	Canada	Prevention and education	Experimental design with control group	
6.	Turner <i>et al.</i> (2005)	Canada	Prevention and education	Cross sectional population survey	