

**PROBLEM GAMBLING  
PREVALENCE RESEARCH:  
A CRITICAL OVERVIEW**

**A Report to the Canadian Gaming Association**

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### **EXECUTIVE SUMMARY**

What follows is an examination of over 100 problem gambling prevalence studies, spanning more than 20 years of research worldwide.

Observations indicate that the introduction of new forms of gambling result in an initial increase in problem gambling prevalence, followed by a plateau or decline in these rates over time. However, regardless of time, sample size or methodology of measurement, problem gambling prevalence rates consistently hover around one percent.

Stated simply, gambling is a severe problem in approximately 1% of the world's population.

Currently, there remains a significant knowledge gap between the observation that problem gambling rates are stabilizing around the one percent mark, and which factors (if any) are responsible for this stabilization.

More precise exploration, measurement and evaluation, of key variables impacting this complex behaviour is recommended.

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### INTRODUCTION

Beginning around the mid 1980's numerous jurisdictions, primarily located throughout North America, began conducting problem gambling prevalence studies. To date, hundreds of problem gambling prevalence studies have been completed worldwide. As well, numerous districts have conducted multiple prevalence studies to compare and analyze trends over time. By and large, the mass onset of problem gambling prevalence research is in response to the introduction of new forms of gambling activity, most notably casinos and electronic gaming machines in bars, lounges and restaurants.

So what have we learned from these hundreds of problem gambling prevalence studies? This paper takes a look at prevalence findings across the globe in an attempt to identify commonalities and differences, outstanding gaps in knowledge, and priority areas for future research in the problem gambling field.

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## PREVALENCE RATES

This review of problem gambling prevalence rates and trends is based on research conducted world-wide from the early 1990's to the present, separated by Canada, the United States, and outside North America.<sup>1</sup> Just over 100 studies were identified through an extensive search of both published and unpublished sources. The review is restricted to population-based studies of adults, generally defined as 18 years and older, although this range may vary slightly from one study to another.

*Focus on Severe Problem Gambling:* In examining the prevalence of problem gambling among various studies, only the most severe levels are reported. Many studies combine the two highest problem levels (e.g. problem and probable pathological or moderate and severe) to give an overall rate of problem gambling.

*Severe Problem Gambling:* Varied terminology has been used to label the highest levels of problems, including *probable pathological* (SOGS), *pathological* (NODS), *severe problem gambling* (PGSI) and *compulsive* (GA-20).<sup>2</sup> For the purposes of this review, the label *severe problem gambling* will be used to indicate the highest level of gambling problems regardless of the instrument used.

*Focus on Past 12 Months:* Until the mid-1990's, and particularly in the U.S., researchers tended to measure the lifetime occurrence of problems rather than the prevalence of problems in the past 12 months. As Walker and Dickerson (1996) note, lifetime measures are problematic since they incorporate the assumption that the disorder is chronic. Increasingly, there is evidence showing that problem gambling is often transitory, with people moving in and out of problematic gambling patterns (Abbott & Clarke, 2007). As well, Shaffer, LaBrie, LaPlante, Nelson and



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1. Basic information for each study is provided in Appendix A  
2. For a more complete discussion of problem gambling instruments see Abbott & Volberg (2006) and Stinchfield, Govoni & Frisch (2001).

Stanton (2004) point out that affirmative response to lifetime survey questions gives no indication of the time period for which the respondent is referring. The present review is restricted to past year prevalence rates.

It is important to remember that the comparison of prevalence studies is imperfect due to variations in measurement instruments, classification schemes, sampling procedures and response rates. To get an appreciation of the different ways that problem gambling is assessed, Appendix B contains the survey questions for a few of the more common problem gambling instruments, including the South Oaks Gambling Screen Revised (SOGS-R), the Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index (CPGI) and the National Opinion Research Center DSM Screen for Gambling Problems (NODS).



### CANADA

Although within Canada all provinces have completed prevalence studies, with many of the provinces having conducted multiple ones, none of the territorial regions have released any prevalence documents on gambling and problem gambling. Figure 1 displays the severe problem gambling rates by province from the early 1990's to the present. An important note is that the studies conducted in the 1990's used the SOGS-R which incorporates a past 12 months timeframe (Abbott & Volberg, 1996) to assess prevalence, while those in the past decade have used the 9-item Problem Gambling Severity Index (PGSI) from the CPGI (Ferris & Wynne, 2001). Generally speaking, the SOGS-R tends to produce somewhat higher rates than other problem gambling measures (Shaffer, Hall & Vander Bilt, 1997; Volberg, 1998; Wenzel, McMillen, Marshall, & Ahmed, 2004). Abbott (2001) estimates that PGSI severe gambling is approximately half the SOGS-R probable pathological gambling rate.

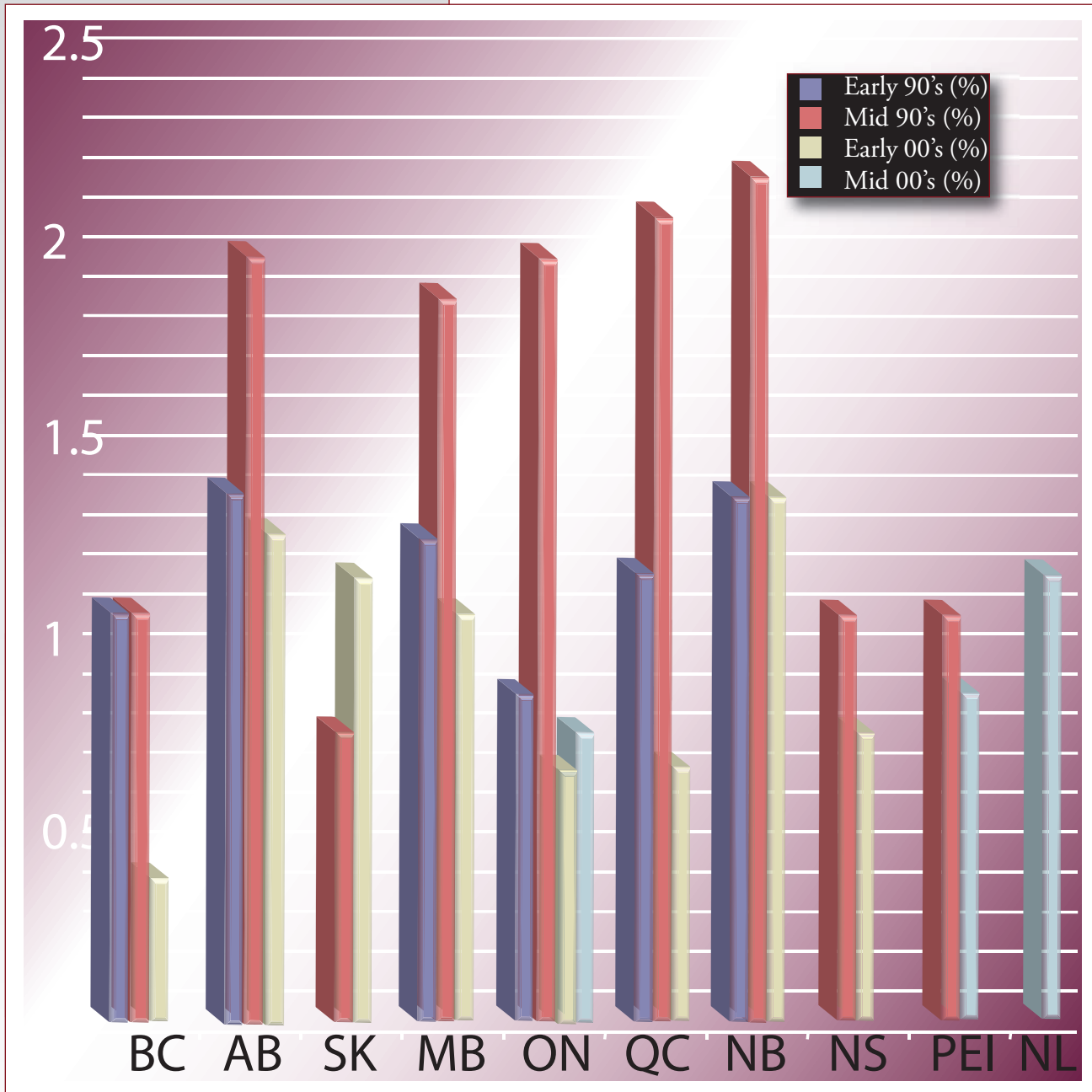


severe problem gambling rates tend to be around 1% with a range from 0.4% to 2.2%

Prevalence Rate (%)

## Prevalence Rates

Canada SOGS-R (1990s), PGSI (00s)



Province

Figure 1: Severe Problem Gambling Prevalence Rates by Canadian Province



The first point worth noting is that regardless of study period and province, severe problem gambling rates tend to be around 1% with a range from 0.4% to 2.2%. The one national study conducted in Canada classified 0.5% of Canadians as having severe gambling problems (Marshall & Wynne, 2003).

Another observation is that rates tended to increase from the early 1990's to the mid-late 90's. This finding is consistent with Ladouceur (1996)'s summary of Canadian problem gambling prevalence studies. In the review, Ladouceur found problem gambling prevalence rates to be highest in provinces where gambling has been available for several years and lower in provinces that have recently introduced new forms of gambling. This is similar to the finding by Volberg (1994b) in the U.S. where prevalence rates tend to be higher in states where gambling has been available longer and where populations are more ethnically diverse and mobile.

However, since the mid to late 1990's, rates appear to have stabilized or declined. For instance, examining the findings from three Alberta prevalence studies conducted in 1994, 1998, and 2001, Smith and Wynne (2002) concluded that "it would appear that the results from this study are in the same range as those from the previous studies; in other words, the prevalence rate has plateaued." (p.62). Commenting on the most recent B.C. problem gambling prevalence study, Volberg (2004) concluded that the incidence of problem gambling in British Columbia is unchanged from previous surveys.

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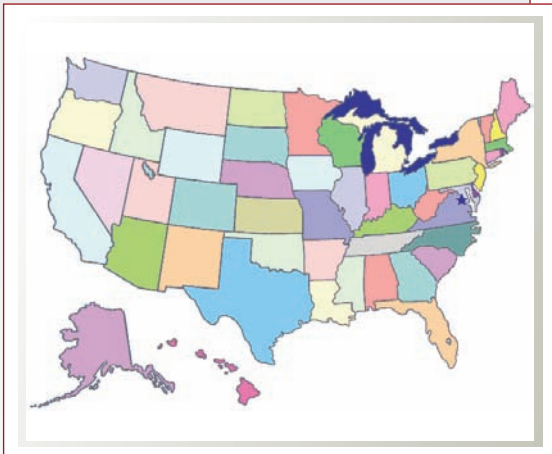
### UNITED STATES

The severe problem gambling rates for several states are provided in Figure 2. The reader is encouraged to consult Appendix A for more detailed information on each study.

Similar to what was observed in Canada, rates tend to cluster around the 1% mark in the U.S. The major outlier is Nevada where the severe problem gambling prevalence rate using the SOGS-R (past year) was 3.5% while the lifetime NODS rate was 2.1% and the past-year NODS rate was 0.3%. As Volberg (2002) notes, problem gambling rates among Nevada adults were highest among residents who had lived in Nevada for 10 years or less and lowest among those born in Nevada or residing in the state for more than 10 years. Collins and Barr (2006) propose an alternative explanation that individuals who are more disposed to problematic levels of gambling are more likely to choose Nevada as a place of residence.

This 1% finding is essentially what Shaffer, Hall and Vander Bilt (1997, 1999) found in their meta-analysis of 120 adult prevalence studies conducted in the U.S. and Canada. In this analysis, Shaffer and colleagues applied their own classification system to allow for comparisons among studies, with Level 3 representing pathological (or severe problem) gambling. The study estimated past year Level 3 prevalence rates among adults in the general population at 1.14%.

In terms of trends, early replication studies in Iowa, New York and Québec were only able to examine changes in lifetime problem gambling prevalence because this was the only measure used in the baseline surveys. Although it might be expected that lifetime measures would be less sensitive to change than current measures, in all three cases there were substantial and statistically significant increases in the prevalence of



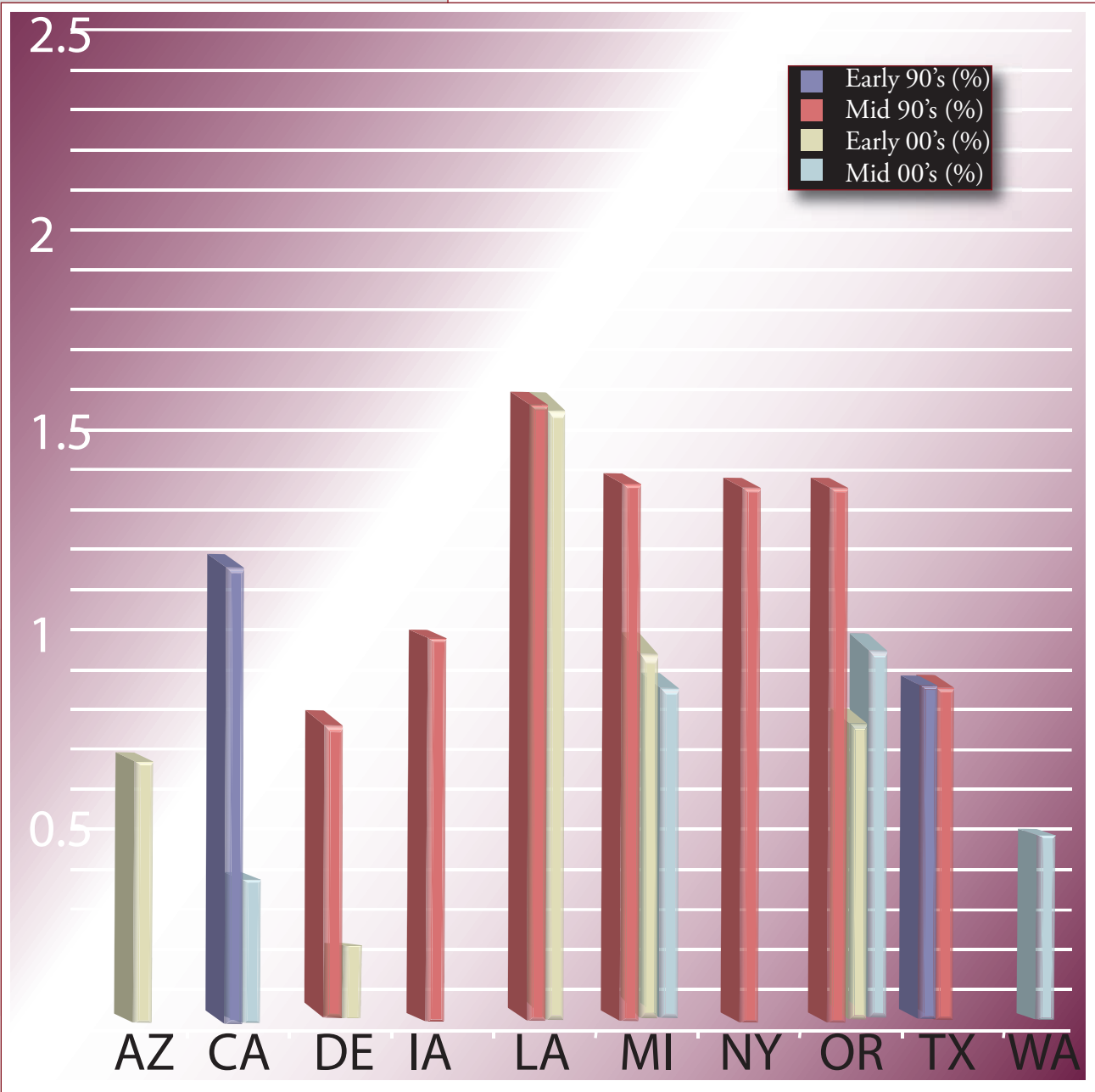


rates tend to cluster around the 1% mark in the U.S.



## Prevalence Rates United States

Prevalence Rate (%)



State

Figure 2: Severe Problem Gambling Prevalence Rates by State

severe problem gambling (Ladouceur, Jacques, Ferland, & Giroux, 1999; Volberg, 1995b, 1996). The time between baseline and replication surveys in these jurisdictions ranged from six to ten years.

Several states observed increases in problem gambling rates over time. For instance, Minnesota went from a past year combined problem gambling rate of 2.4% in 1990 to 4.4% in 1994 (Emerson & Laudergeran, 1996; Laudergeran, Schaefer, Eckhoff & Pirie, 1990). Similarly, Montana's rates increased from 2.2% to 3.6% between 1992 and 1998 (Polzin et al., 1998; Volberg, 1992). New York's lifetime rate increased from 4.2% to 7.3% in the ten year period from 1986 to 1996 (Volberg, 1996; Volberg & Steadman, 1989a). It is worth noting that these increases tended to take place during the 1990's.

In other states, researchers have observed declines or what appears to be the stabilization of problem gambling rates. Michigan experienced a past year combined rate of 3.4% in 1997, 3.2% in 1999, 2.8% in 2001 and 2.0% in 2006 (Gullickson & Hartmann, 1997, 2001; Gullickson, Hartmann, & Wiersma, 1999; Hartmann, 2007). South Dakota experienced a minimal decrease between 1991 and 1993 from a past year combined rate of 1.4% to 1.2% respectively (Volberg & Stuefen, 1991, 1994). Washington obtained combined rates of 2.8% in 1992, 2.3% in 1998 and 1.2% in 2004 (Mancuso, Gilson, & Felver, 2005; Volberg, 1993; Volberg & Moore, 1999;). Although there was a greater decrease in the most current year study, it must be noted that the first two rates were established using the past-year SOGS while the most current rate was calculated using the past-year NODS. Oregon observed problem rates of 1.4% in 1997, 0.9% in 2000 and most recently 1.0% in 2005 (Moore, 2006; Volberg, 1997c, 2001a). Oregon attributed their reduction and stability of problem gambling to the availability of problem gambling treatment and the

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state's "play responsible" media campaign (Moore, 2006).

In Louisiana, there has been virtually no change in the problem gambling rates in three studies that were conducted over a seven year period (Vogel & Ardoin, 2002). In a 1995 Texas prevalence study, despite increases in gambling participation, problem gambling rates remained stable (Wallisch, 1996). This stability in rates was attributed to individuals who gambled on the Texas lottery—the group less likely to experience problems but who accounted for the largest increase in gambling participation.

Similar to what Ladouceur observed in his 1996 review of Canadian prevalence studies, Volberg (1994b) ascribed fluctuations in problem gambling rates to how long gambling had been legalized in each state. In her analysis, less than 0.5% of the adult population tended to be classified as probable pathological in states where legal gambling had been available for less than 10 years. This rate increased to 1.5% among states where gambling had been available for more than 20 years.

### OUTSIDE NORTH AMERICA

The majority of research on problem gambling prevalence rates has come from Canada and the United States. However, in the past ten years, there has been an increase of research coming from countries outside North America. Although several studies have been conducted, it remains difficult to make comparisons because of the different measurement tools utilized to derive problem gambling prevalence rates. Figure 3 provides severe problem gambling rates for various countries outside of North America using a variety of measurement instruments.

On average, severe problem gambling rates tend to be around 1%. In a recent analysis, Shaffer et al. (2004) applied his meta-analysis classification scheme to problem gambling rates in countries outside of North America. He observed slightly lower prevalence rates in European countries compared to the U.S. However, he also noted that the rates “are remarkably similar given the range of methods and measures” (p.509).

The severe problem rates observed in Hong Kong, Macao and Singapore at nearly or over 2% are notable. Factors associated with these higher rates likely include increased expansion and accessibility, diversification of games, cultural factors regarding the meaning of gambling, and availability of prevention and treatment services.

Similar to trends in Canada and the U.S., other countries have observed problem gambling rates stabilizing over time. Between the 1991 and 1999 New Zealand studies, the prevalence of severe problem gambling decreased from 1.2% to 0.5% (Abbott & Volberg, 2000). In South Australia, the combined problem gambling rate was 1.9% in 2001 using the SOGS-R and 1.6% in 2005 using the PGSI (Government of South Australia, 2006). Using the GA-



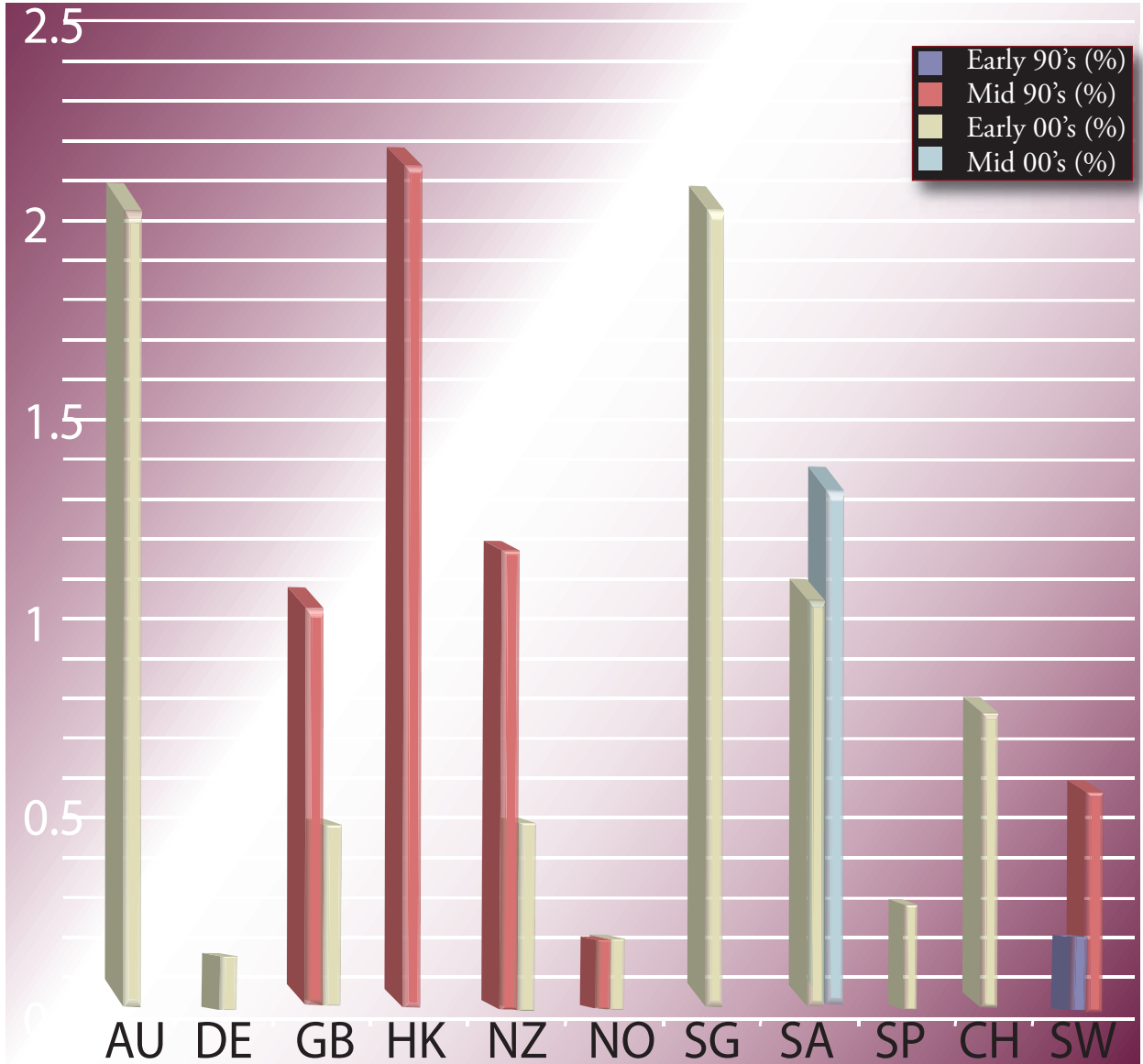


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Prevalence Rate (%)

## Prevalence Rates Worldwide



Country

Figure 3: Severe Problem Gambling Prevalence Rates outside North America

20, South Africa has conducted prevalence studies in 2001, 2003 and 2005. The results from the most recent study in South Africa show that the proportion of problem gambling among gamblers (not the total sample) has fluctuated from 4.2% in 2001 to 6.8% in 2003 to 4.8% in 2005 (Collins & Barr, 2001, 2003, 2006). South Africa's gambling environment is similar to many jurisdictions where the number of legalized gambling formats has increased over the years (Collins & Barr, 2006).



## PROBLEM GAMBLING PREVALENCE & GAMBLING EXPANSION

It is widely believed that increased gambling exposure leads to increased problem gambling rates. Hundreds of articles in the gambling literature assert the existence of a link between gambling availability and problems. Major reviews (e.g. Abbott & Volberg, 2000; Shaffer et al., 1997; Wildman, 1998) have, with varying degrees of qualification, concluded that research findings are generally consistent with the view that increased availability leads to more gambling and problem gambling. National official review bodies in Australia, Great Britain and the United States have reached the same conclusion (Gambling Review Body, 2001; Productivity Commission, 1999).

This association is often attributed to certain forms of gambling, particularly casinos and Electronic Gaming Machines (EGM) (Abbott, 2001; Polzin et al., 1998; Productivity Commission, 1999). As Collins and Barr (2006) acknowledge, “it seems obvious that if you make more gambling more easily available you are going to find more people succumbing to the temptation to gamble in excess” (p.5). Upon further analysis, however, the relationship between gambling expansion and problem gambling rates may not be as straightforward as one would think.

As shown in the previous discussion, during the early years of gambling expansion, a number of jurisdictions experienced increases in problem gambling prevalence rates, followed by a leveling off and in some instances a decline. Similarly, Volberg (2004) observed a correlation between availability and problem gambling rates, but also found that rates in a number of jurisdictions were stabilizing or declining in the face of gambling

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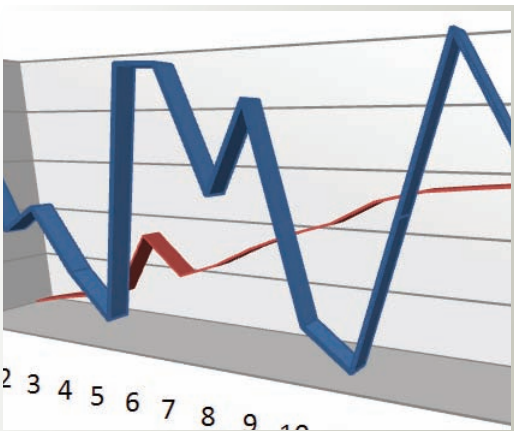
expansion. Abbott (2006) points out that despite significant increases in EGM availability and expenditure in New Zealand and Australia, problem gambling rates 15 years later are between one-third to one-half of what they were in the early 1990's.

While many studies have corroborated this “availability” or “exposure” theory of problem gambling, others have failed to demonstrate the predicted relationship and the validity of the theory is becoming a focus of international debate (as illustrated by a commentary series in the September 2005 edition of the journal *Addiction*). Application of the alternative “adaptation” theory to gambling is relatively new. While relevant research is in its infancy, findings from a number of studies are consistent with the view that adaptation takes place at individual and societal levels.

Stated tentatively, it appears that the introduction and expansion of new forms of gambling, most especially electronic gaming machines, initially result in increased levels of problem gambling with particular population sectors, including males and youth, most affected. Over time and in some jurisdictions, problems extend to groups that previously had low levels of participation and gambling problems, such as women and older adults. In other jurisdictions that have experienced prolonged increased availability, prevalence rates have remained constant or declined. The reasons for such reductions have yet to be clearly delineated and the extent to which these changes are related to inherent properties of different forms of gambling, rather than factors associated with the individuals and groups who develop problems, remains to be determined (Abbott, 2006; Abbott, Volberg, Bellringer & Reith, 2004). Based on his analysis, Abbott (2006) concludes that “exposure to the agent gambling is multidimensional and that the effects of exposure are complex” (p.1).

The stability of problem gambling rates supports the

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adaptation model of the impact of gambling exposure on problem gambling rates (Abbott, 2006; Shaffer et al., 2004). The adaptation model predicts a gradual plateau in problem gambling prevalence rates, followed by a decrease in gambling problems over time. The factors that account for problem gambling stabilization are not well understood, but may include a novelty factor where regular gamblers decrease their level of play over time as their interest in newly available gambling activities is satisfied, greater awareness of the risks associated with gambling, and increased availability of problem gambling services (Volberg, 2004). While there is still much to learn about the relationship between gambling exposure and problem gambling rates, Collins and Barr (2006) succinctly summarize the current state of understanding as follows:

If a jurisdiction introduces new forms of gambling and does nothing else, it will most likely experience an increase in the incidence of problem gambling. However, if the jurisdiction combines the introduction of new forms of gambling especially with an effective public awareness campaign about the dangers of gambling and how to avoid them, it is likely to experience a decrease in problem gambling numbers and even in the numbers of people who gamble regularly as well. (p.6).

## PROBLEM GAMBLING CLASSIFICATION

From the earlier review of prevalence studies world-wide, it can generally be said that the prevalence of pathological gambling is approximately 1% regardless of when or where the study was conducted. But what does it mean to say that 1% of a population has severe gambling problems? Unfortunately, the answer to this question is hindered by a number of methodological issues associated with problem gambling prevalence research.

*Content:* Generally, severe problem gambling rates are used to provide an indication of the proportion of the population who are impaired by their gambling, and thereby likely require treatment. Collins and Barr (2006) argue that existing problem gambling instruments are too “blunt” to give an accurate understanding of the extent of the problem. There are over 20 instruments for assessing the various dimensions of problem gambling, and the aspects of this phenomenon deemed to be important indices of problem gambling vary by measure (Shaffer et al., 2004). As well, different instruments tend to identify different people as having a gambling problem (Shaffer et al., 2004). Essentially, prevalence studies measure how many people answered how many questions affirmatively (Collins & Barr, 2006).

*Scoring:* With most problem gambling instruments, scored items are added to make a summary score and established cut-off scores are applied to place individuals along a continuum that ranges from non-problem to severe problem gambling. This method of scoring assumes that problem gambling is uni-dimensional and that all dimensions contribute in the same way to the overall score and have equal importance. Recent work on the factor structure of several problem gambling



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screens, including the SOGS, the NODS and the PGSI, suggest that a weighting procedure that assigns greater significance to certain features of problem gambling may be required (Maitland & Adams, 2005, 2007; Wiebe, Cox & Mehmel, 2004).

*Clinical Significance:* Concerns have been raised regarding the seemingly arbitrary cut-off scores used to determine problem gambling levels (Collins & Barr, 2006; Gambino, 2006; Shaffer et al., 2004), and the failure to examine clinical and policy implications of such cut-offs (Gambino, 2006). In an examination of the results from 22 gambling prevalence studies, it was found that 39% of those people who have ever had a gambling problem reported no problems in the past year (Hodgins, Wynne, & Makarchuk, 1999). Additionally, “it appears that recovery from gambling problems is common, and it is likely that many of those who recover make these changes without treatment” (Hodgins & El-Guebaly, 2000, p.778). However, prevalence rates do not distinguish between those who need treatment, those who want treatment, and those most likely to experience future gambling problems (Gambino, 2006).

*Transitions:* As noted by Shaffer et al. (2004), “aggregate prevalence estimates obscure individual disorder trajectories” (p.512). There are only a handful of studies that have examined change in gambling patterns over time, and even fewer that have specifically focused on the development of problems among the general population (Abbott, Williams & Volberg, 1999; Shaffer & Hall, 2002; Slutske, Jackson, & Sher, 2003; Wiebe, Single, & Falkowski-Ham, 2003). Of the research conducted, the results suggest that rather than being a stable state, problem gambling is more episodic and transitory at the individual level than has been previously supposed.

- Prevalence and incidence of problem gambling were reported in an 11-year, four-wave longitudinal study (Slutske et al., 2003). Participant retention was high at the 3 data points following baseline: 97%, 94% and 84%, respectively. Whereas prevalence rates were stable at the aggregate level, results showed that individual level problem gambling was transitory and episodic. The authors concluded “the results are consistent with a continuum model of gambling pathology in which sub-clinical levels of gambling problems are not necessarily a stage that precedes the development of a full-blown gambling disorder but also represent a less severe final outcome in themselves” (p.271).
- In 1998, Abbott et al. (1999) followed up 217 participants from the original sample of 4,053 people who participated in New Zealand’s 1991 prevalence study. The results provide valuable insight into changes in gambling patterns over a 7-year period. The results showed that over three-quarters (77%) of those who were current problem gamblers at time 1 shifted into non-problem gambling at time 2, and 45% of current probable pathological gamblers at time 1 shifted to non-problem gambling. It is worth noting that there was a small group of respondents in this study whose gambling problems became worse, indicating the dynamic nature of problem gambling over time.
- The recent Ontario prevalence study noted movement within a one-year period (Wiebe, Mun, & Kauffman, 2006). The nine PGSI items used to assess problem gambling levels are typically framed in the past 12 months. For the purposes of this study, these items were also framed in the past 6 months and past one month. For approximately 50% of the individuals with moderate to severe gambling



problems in the past year, these levels persisted at one month prior to the survey. The remaining 50% endorsed fewer items at the one-month timeframe.

*Future Research Priorities:* The discussion of methodological limitations does not mean that prevalence research has been of no value. Rather, it is through prevalence research that important patterns have been observed and priority research areas defined.

As Gambino (2006) points out, by focusing strictly on the presence of symptoms, it has not been possible to accurately separate individuals along the gambling continuum of non-problem gambling to severe gambling problems. In turn, we have little understanding of treatment need, self-recovery, and risks for future gambling problems. The question of how to accurately make these classifications is not clear, but one starting point is the use of longitudinal designs to examine the risk and protective factors associated with transitions in symptom severity.

Numerous calls have been made over a period of nearly two decades for the use of longitudinal research to gain a more precise definition and understanding of the development of problem gambling (Petry & Armentano, 1999; Shaffer et al., 2004; Volberg & Banks, 1990; Walker and Dickerson, 1996). To this end, Shaffer et al. (2004) recommends focusing on factors associated with the initiation of gambling, persistence of gambling despite negative consequences, alleviation of gambling in the face of negative consequences, and the return to problematic gambling levels after a period of remission. A better understanding of the factors affecting these varied gambling patterns would provide clear direction for the development of targeted and effective treatment and prevention initiatives.

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## CONCLUSION

Over the past three decades, gambling research has consisted for the most part of studies of the prevalence of problem gambling, with hundreds of such studies conducted worldwide. Despite variations in methodology, time that the study was conducted and geographical location, estimates of severe problem gambling tend to be around 1%. Although there has been some instability (both increases and decreases) in problem gambling rates over time, these changes have been attributed to gambling expansion (particularly casino and EGMs), a saturated market, novelty factor (resulting in a time-limited increase in the rates), increased awareness of the risk associated with gambling and increased accessibility to problem gambling treatment. It should be noted that the precise impact that each of these factors has on problem gambling rates is not understood.

As the problem gambling field progresses, the questions of importance continue to evolve. The field is at a point where greater precision in measurement and understanding of this complex behaviour is required. In order to contribute to the understanding of this complex behaviour, future research should be directed at the exploration of risk and protective variables associated with problem gambling through the use of longitudinal designs. There is little understanding of the nature of non-problem and problem gambling in terms of stability and transitions between gambling states (non-problem, at-risk, severe problem), the factors associated with stability and transition, and the best way to reach individuals across the continuum of gambling problems with effective prevention and intervention strategies.

**future research should be directed at the exploration of risk and protective variables associated with problem gambling through the use of longitudinal designs**





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# Problem Gambling Prevalence Research

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## APPENDIX A: Problem Gambling Prevalence Research

### Canada

Location	Year of Study	Author	Sample Size	Instrument	PG Rate*
National	2002	Marshall & Wynne	18,887	PGSI	0.50%
Alberta	2001	Smith & Wynne	1,804	PGSI	1.30%
Alberta	1998	Wynne	1,821	SOGS-R	2.00%
Alberta	1993	Wynne et al	1,804	SOGS-R	1.40%
British Columbia	2002	Ipsos-Reid & Gemini Research	2,500	PGSI	0.40%
				SOGS-R	1.1% (gamblers)
British Columbia	1996	Angus Reid Group	810	SOGS-R	1.1% (gamblers)
British Columbia	1994	Angus Reid Group & Gemini Research	1,200	SOGS-R	1.1% (gamblers)
Manitoba	2001	Patton et al.	3,119	PGSI	1.10%
Manitoba	1995	Criterion Research	1,207	SOGS-R	1.90%
Manitoba	1993	Criterion Research	1,212	SOGS-R	1.30%
New Brunswick	2001	Focal Research	800	PGSI	1.40%
New Brunswick	1996	Baseline	800	SOGS-R	2.20%
New Brunswick	1992	Baseline	800	SOGS-R	1.40%
Newfoundland & Labrador	2005	MarketQuest	2,596	PGSI	1.20%
Nova Scotia	2003	Focal Research	2,800	PGSI	0.80%
Nova Scotia	1996	Baseline	801	SOGS-R	1.10%
Nova Scotia	1993	Omnifacts	810	SOGS-R	1.7% (lifetime)
Ontario	2005	Wiebe et al	3,604	PGSI	0.80%
Ontario	2001	Wiebe et al	5,011	PGSI	0.70%
Ontario	1995	Ferris & Stirpe	1,030	SOGS-R	2.00%
Ontario	1993	Insight Canada	1,200	SOGS-R	0.90%
Prince Edward Island	2005	Doiron	1,000	PGSI	0.90%
Prince Edward Island	1999	Doiron & Nicki	809	SOGS-R	1.10%
Quebec	2002	Ladouceur et al.	4,225	PGSI	0.70%
Quebec	1996	Ladouceur	1,257	SOGS-R	2.10%
Quebec	1989	Ladouceur	1,002	SOGS-R	1.20%
Saskatchewan	2001	Wynne	1,848	PGSI	1.20%
Saskatchewan	1994	Volberg	1,000	SOGS-R	0.8% (gamblers)

### United States

Location	Year of Study	Author	Sample Size	Instrument	PG Rate*
National	2001/02	Petry et al.	43,093	NIAAA DSM-IV Interview Schedule	0.42% (lifetime)
National	2000	Welte et al.	2,638	SOGS-R	1.90%
National	1999	Gerstein et al.	2,947	NODS	0.60%
National	1997	Shaffer et al.	Metanalysis (34 North American States)	New Classification scheme	1.10%
Arizona	2002	Volberg	2,750	SOGS-R	0.70%
				NODS	0.30%
California	2005/06	Volberg et al.	7,121	NODS	0.40%
California	1990	Volberg	1,250	SOGS	1.2% (lifetime)
Colorado	1997	Volberg	1,810	SOGS-R	0.70%
				DSM-IV	0.50%
Connecticut	1996	WEFA Group	994	SOGS-R	0.60%
Delaware	2002	University of Delaware	2,638	DSM-IV	0.30%
Delaware	1998	Mateja et al.	3,395	SOGS-R	1.10%
Florida	2001	Shapira et al.	1,504	SOGS-R	0.60%
Georgia	1995	Volberg	1,550	SOGS-R	0.80%
Indiana	1998	Gambling Studies Unit	2,927	SOGS	0.8% (lifetime)
Iowa	1995	Volberg	1,500	SOGS-R	1.00%
Iowa	1989	Volberg & Steadman	750	SOGS	0.1% (Lifetime)
Kentucky	2003	Kentucky Legislative	1,253	DSM-IV	0.50%
Louisiana	2002	Vogel & Ardoin	1,353	SOGS-R	1.60%
Louisiana	1999	Volberg & Moore (as cited in Ryan & Speyer, 1999)	1,800	SOGS-R	1.60%
				DSM-IV	0.90%
Louisiana	1995	Volberg	1,819	SOGS-R	1.40%
Maryland	1988	Volberg & Steadman	750	SOGS	1.5% (lifetime)
Massachusetts	1989	Volberg	750	SOGS	2.3% (lifetime)
Michigan	2006	Hartmann	957	SOGS-R	0.90%
Michigan	2001	Gullickson & Hamman	1,211	SOGS-R	1.00%
Michigan	1999	Gullickson et al.	1,717	SOGS-R	1.20%
Michigan	1997	Gullickson & Hamman	3,942	SOGS-R	1.30%
Minnesota	1994	Emerson & Lundgren	1,028	SOGS-R	1.20%
Minnesota	1990	Laundergan et al.	1,251	MOGS	1%
Mississippi	1996	Volberg	1,014	SOGS-R	2.10%
Montana	1998	Polzin et al.	1,227	SOGS-R	1.60%
				DSM-IV	1.00%
Montana	1992	Volberg	1,020	SOGS-R	0.70%
Nevada	2002	Volberg	2,200	SOGS-R	3.50%
				NODS	0.30%
New Jersey	1990	Reilly & Guida	858	DSM	1.20%
New Jersey	1988	Volberg & Steadman	1,000	SOGS-R	1.4% (lifetime)
New Mexico	2005/06	Volberg & Bernhard	2,860	NODS	0.60%
New York	1996	Volberg	1,829	SOGS-R	1.40%
				DSM-IV	0.90%
North Dakota	2000	Volberg	5,002	SOGS-R	1.40%
				NODS	0.7%?
North Dakota	1992	Volberg & Silver	1,517	SOGS-R	0.70%
Oregon	2005	Moore	1,554	SOGS-R	1.00%
Oregon	2000	Volberg	1,500	SOGS-R	0.90%
				NODS	0.20%
Oregon	1997	Volberg	1,502	SOGS-R	1.40%
South Dakota	1993	Volberg & Stuefen	1,767	SOGS-R	0.50%
South Dakota	1991	Volberg & Stuefen	1,560	SOGS-R	0.60%
Texas	1995	Wallisch	7,015	SOGS-R	0.80%
Texas	1992	Wallisch	6,308	SOGS-R	0.80%
Washington	2003/04	Mancuso et al.	6,713	NODS	0.50%
Washington	1998	Volberg & Moore	1,501	SOGS-R	0.50%
Washington	1992	Volberg	1,502	SOGS-R	0.90%

### Outside North America

Location	Year of Study	Author	Sample Size	Instrument	PG Rate*
Australia	1999	Productivity Commission	10,525	SOGS-R	2.10%
Australia- SA	2005	Government of South Australia	17,745	PGSI	0.40%
Australia- NT	2005	Charles Darwin University	1,873	SOGS-R	1.10%
				PGSI	0.60%
Australia- ACT	2001	McMillen et al.	5,445	SOGS-R	1.90%
Denmark	2005	Bonke & Borregaard	8,153	NODS	0.10%
Finland	2003	Ilkas & Turja	2,485	SOGS-R	1.5% (lifetime)
Great Britain	1999	National Centre for Social Research	7,770	SOGS-R	1.10%
				DSM	0.80%
Great Britain	2007	Wardle et al.	9003	PGSI	0.50%
				DSM	0.60%
Hong Kong	2005	University of Hong Kong	2,093	DSM	2.20%
Hong Kong	2001	Wong & So	2,004	DSM	1.80%
Iceland	2005	Olason et al. (as cited in Jonsson, 2006)	4,808	PGSI	0.50%
Iceland	2000	Gallup (as cited in Jonsson, 2006)	1,500	NODS	0.6% (lifetime)
Macao	2003	Fong ka Chio & Orozio	1,121	DSM	1.80%
New Zealand	1999	Abbott & Volberg	6,452	SOGS-R	0.5% (past 6 months)
New Zealand	1991	Abbott & Volberg	4,053	SOGS-R	1.20%
Norway	2006	Kavli & Berntsen	3,135	PGSI	1.90%
Norway	2003	Lund & Nordlund (as cited in Jonsson, 2006)	5,235	SOGS-R	0.20%
				NODS	0.30%
Norway	1997	Gotestam & Johansson	2,014	DSM	0.20%
Singapore	2004/05	Ministry of Community Development	2,004	DSM	2.10%
South Africa	2005	National Centre for the Study of Gambling	3,003	GA-20	1.40%
South Africa	2003	National Centre for the Study of Gambling	5,816	GA-20	1.30%
South Africa	2001	National Centre for the Study of Gambling	5,800	GA-20	1.10%
Spain	2002	Becona	1,624	NODS	0.30%
Sweden	1999	Volberg et al.	7,139	SOGS-R	0.60%
Sweden	1990	Kuhlhorn et al. (as cited in Jonsson, 2006)	5,042	Economic Criteria	0.20%
Switzerland	2000	Bondolfi et al.	2,526	SOGS-R	0.80%

## APPENDIX B

### Sample Problem Gambling Measurement Instruments

#### A. The Problem Gambling Severity Index (Ferris & Wynne, 2001)

1. Have you bet more than you could really afford to lose?
2. Still thinking about the last 12 months, have you needed to gamble with larger amounts of money to get the same feeling of excitement?
3. When you gambled, did you go back another day to try to win back the money you lost?
4. Have you borrowed money or sold anything to get money to gamble?
5. Have you felt that you might have a problem with gambling?
6. Has gambling caused you any health problems, including stress or anxiety?
7. Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?
8. Has your gambling caused any financial problems for you or your household?
9. Have you felt guilty about the way you gamble or what happens when you gamble?

#### B. The National Opinion Research Center DSM-IV Screen (NODS) for Gambling Problems (Gerstein et al., 1999).

The NODS is composed of 17 lifetime items and 17 corresponding past-year times.

1. Have there ever been periods lasting 2 weeks or longer when you spent a lot of time thinking about your gambling experiences or planning out future gambling ventures or bets? OR
2. Have there ever been periods lasting 2 weeks

- or longer when you spent a lot of time thinking about when you spent a lot of time thinking about ways of getting money to gambling with?
3. Have there ever been periods when you needed to gamble with increasing amounts of money or with larger bets than before in order to get the same feeling of excitement?
  4. Have you ever tried to stop, cut down, or control your gambling?
  5. On one or more of the times when you tried to stop, cut down, or control your gambling, were you restless or irritable?
  6. Have you ever tried but not succeeded in stopping, cutting down, or controlling your gambling?
  7. If so, has this happened three or more times?
  8. Have you ever gambled as a way to escape from personal problems? OR
  9. Have you ever gambled to relieve uncomfortable feelings such as guilt, anxiety, helplessness, or depression?
  10. Has there ever been a period when, if you lost money gambling one day, you would return another day to get even?
  11. Have you ever lied to family members, friends, or others about how much you gamble or how much money you lost on gambling?
  12. If so, has this happened three or more times?
  13. Have you ever written a bad check or taken money that didn't belong to you from family members or anyone else in order to pay for your gambling?
  14. Has your gambling ever caused serious or repeated problems in your relationships with any of your family members or friends? OR
  15. ASK ONLY IF IN SCHOOL Has your gambling caused you any problems in school, such as missing classes or days of school or your grades dropping? OR
  16. Has your gambling ever caused you to lose

a job, have trouble with your job, or miss out on an important job or career opportunity?

17. Have you ever needed to ask family members or anyone else to loan you money or otherwise bail you out of a desperate money situation that was largely caused by your gambling?

**C. South Oaks Gambling Screen-Revised (Lesieur & Blume, 1987; Abbott & Volberg, 1996).**

1. In the past 12 months how often have you gone back another day to win back money you lost?

2. In the past 12 months, have you ever claimed to be winning money from these activities when in fact you lost?

3. In the past 12 months, have you spent more time or money gambling than you intended?

4. In the past 12 months, have people ever criticized your gambling?

5. In the past 12 months, have you ever felt guilty about the way you gamble or about what happens when you gamble?

6. In the past 12 months, have you ever felt that you would like to stop gambling, but didn't think that you could?

7. In the past 12 months, have you ever hidden betting slips, lottery tickets, gambling money or other signs of gambling from your spouse or partner, children, or other important people in your life?

In the past 12 months, have you ever argued with people you live with over how you handle money?

8. Have these money arguments ever centred on your gambling?

9. Have you ever missed time from work due to gambling?

10. In the past 12 months have you ever borrowed money from someone and not paid

them back as a result of your gambling?

I am going to read a list of ways in which some people get money for gambling. Can you tell me which of these, if any, you have used to get money for gambling or to pay gambling debts.

11. In the past 12 months have you ever borrowed from household money to gamble or to pay gambling debts?

12. In the past 12 months have you ever borrowed money from your spouse or partner to gamble or to pay gambling debts?

13. In the past 12 months have you ever borrowed money from other relatives or in-laws to gamble or pay gambling debts?

14. In the past 12 months, have you ever gotten loans from banks, loan companies or credit unions for gambling or to pay gambling debts?

15. In the past 12 months, have you ever made cash withdrawals on credit cards such as VISA or MasterCard to get money to gamble or to pay gambling debts? (DOES NOT INCLUDE ATM OR INSTANT CASH CARDS)

16. In the past 12 months have you ever gotten loans from loan sharks to gamble or to pay gambling debts?

17. In the past 12 months, have you cashed in stocks, bonds or other securities to gamble or pay gambling debts?

18. In the past 12 months have you ever sold personal or family property to gamble or to pay gambling debts?

19. In the past 12 months have you ever borrowed money from your chequing account by writing cheques that bounced to get money for gambling or to pay gambling debts?

20. In the past 12 months have you felt you had a problem with betting money or gambling?