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# POPULATION ASSESSMENT OF PROBLEM GAMBLING: Utility and Best Practices

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The present paper has three purposes. First, to outline the value and utility of population prevalence studies of gambling. Second, to review the methodological issues specific to conducting these studies. Third, in light of these methodological issues, to outline Best Practices to be used in population prevalence studies of problem gambling.

## **UTILITY OF ASSESSING THE POPULATION PREVALENCE OF PROBLEM GAMBLING**

Population prevalence studies of problem gambling establish:

1. Past year prevalence of gambling, past year prevalence of each form of gambling, and personal expenditures on each form of gambling.
2. Past year (and/or lifetime) prevalence of problem gambling<sup>1</sup>.

It is very common for these studies to also assess attitudes toward gambling, gambling motivations, and comorbidities associated with problem gambling.

This information, in turn, is very useful in understanding:

1. The overall recreational value of gambling to society.
2. The negative social impacts associated with gambling.
3. The number of problem gamblers who would benefit from treatment.
4. The proportion of gambling revenue derived from problem gamblers.
5. Characteristics that differentiate recreational from problem gamblers in terms of demographic, types of gambling engaged in, attitudes, motivations, and comorbidities.

Changes in the prevalence of problem gambling from one time period to the next, and/or differences between the prevalence in one jurisdiction relative to another, potentially provide important information about:

1. The incidence of problem gambling (i.e., rate of new cases over a certain time period).
2. The potential effectiveness of policies implemented to mitigate gambling's harm.

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<sup>1</sup> Problem gambling is defined as having difficulties limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or for the community. It includes 'pathological gambling' (equivalent to severe problem gambling) that is characterized by severe difficulties in controlling gambling behaviour leading to serious adverse consequences.

## METHODOLOGICAL ISSUES IN ASSESSING THE POPULATION PREVALENCE OF PROBLEM GAMBLING

Survey research is a well established and common method used to ascertain the prevalence and demographic patterns underlying people's attitudes, knowledge and behaviour. Hence, there is extensive academic research in this area and considerable evidence concerning best practices (Fowler et al., 2009). Within the subarea of telephone surveys, there are several well established procedural elements that need to be employed so as to maximize the reliability and validity of the results (see Groves et al., 2001; Volberg, 2007).

Failure to employ these procedures has the potential to compromise the quality of the data and the representativeness of the sample. However, even if these procedures are used, there are several other methodological issues specific to gambling that have created uncertainty about obtained results. These include:

1. Are problem gamblers under-represented in prevalence surveys because they are less likely to be home, less likely to answer the phone, and less likely to have phone access (i.e., incarcerated, serving in the military, hospitalized, or in residential treatment) (Lesieur, 1994)?
2. How reliable and valid are self-reports of gambling behaviour, considering the frequent discrepancy between reported gambling expenditures in surveys and actual jurisdictional revenue? For example, in Australia, reported gambling expenditures in the 1998–1999 Household Expenditure Survey were only 17.3% of actual gambling revenues (Access Economics, 2002). In New Zealand in 1998 people reported spending \$103 per person, compared to \$280 per person in actual revenue (Statistics New Zealand, 1999). In a study of Canadian provinces by Williams & Wood (2004), self-reported expenditures were 2.1 times higher than actual provincial gaming revenues in that time period. In the national U.S. survey, gamblers reported being *ahead* \$3 billion at the casinos in the past year instead of having left more than \$20 billion, the actual total revenues reported by the casino industry. Gamblers also reported being ahead \$2 billion at the racetrack and \$4 billion in private gaming. Only when it came to lotteries did they admit to a loss of \$5 billion (Gerstein *et al.*, 1999).
3. Does describing the survey as a 'gambling' survey (as is typically done) create a sampling bias by causing greater participation by gamblers who are interested in this topic, and greater refusal by non-gamblers who are not interested? Research in other fields has shown that a primary reason for survey nonparticipation is lack of interest in the topic (Groves, Presser & Dipko, 2004; Tourangeau & Yan, 2007).
4. Do different survey administration formats (i.e., telephone vs. face-to-face vs. online vs. mail-in) produce equivalent results?

5. What portion of the sample should be asked questions about problem gambling? The most common procedure has been to ask problem gambling questions of anyone who reports any past year history of gambling (usually 60 – 80% of the sample). However, these questions are not relevant to the large majority of these people, and some individuals become irritated being repeatedly asked questions that do not apply to them. Another issue is that every prevalence survey identifies a small but significant number of people who score in the problem gambling range but report very little actual gambling behaviour. The presumption has been that these are legitimate past year problem gamblers who failed to accurately convey their gambling involvement. However, it is equally likely these are individuals who are not being truthful about their 'gambling problems' and/or individuals who may be speaking to their lifetime rather than past year history of problem gambling. Some clarity about the true status of these types of people is required so as to determine whether a higher gambling behaviour threshold should be used prior to administering questions about problem gambling.
  
6. Do problem gambling prevalence surveys overestimate the true rate of problem gambling in light of research showing that a significant portion of problem gamblers identified in telephone surveys are consistently not confirmed by subsequent clinical interviews? In New Zealand, Abbott & Volberg (1992) found that only 18/65 people identified as lifetime pathological gamblers by the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987) and only 10/26 SOGS (6 month) pathological gamblers were confirmed as such in a subsequent clinical interview. Only 5/11 people were confirmed as pathological gamblers in a similar study conducted by Abbott in New Zealand in 2001. In Quebec, Ladouceur et al. (2000) found that only 27% of grade 4-6 students, 56% of grade 9 – 11 students, and 77% of adults assessed as problem gamblers by the SOGS or SOGS-Revised for Adolescents were confirmed as problem gamblers in a subsequent clinical interview. In a second study, only 18% of pathological gamblers identified by the SOGS and/or the Canadian Problem Gambling Index (CPGI) (Ferris & Wynne, 2001) were confirmed by clinical interview (Ladouceur et al., 2005). In the development of the CPGI, it was observed that “none of the three measures (SOGS, CPGI, or the Diagnostic and Statistical Manual of Mental Disorders (DSM)) really correlated well with the results of the clinical interviews” (Ferris & Wynne, 2001). Finally, in Murray et al. (2005), 24% of people were identified by a DSM measure of problem gambling as having a more severe problem compared to what was determined in a subsequent clinical interview.

Fortunately, the answers to these questions have now been provided in prior research conducted by the present authors and others:

1. People without residential phone access because of poverty, incarceration, being in the military, or being in residential treatment for psychiatric or substance abuse problems are indeed likely to have significantly higher rates of problem gambling (Crockford & el Guebaly; 1998; Ford, 1998; Pearson et al., 1994; Rönnerberg et al., 1999; Spunt 2002; Williams, Royston, & Hagen, 2005). However, even if one assumes a rate that is 2 to 3 times higher, the very small numbers of people in these groups relative to the general population (in most jurisdictions) means that in most cases only a very small adjustment needs to be made to the population prevalence rate. Thus, in Ontario, the prevalence rate adjustment needed to account for these individuals was only .03% (Williams & Wood, 2007).

There is also some truth to the contention that problem gamblers with residential phone access are somewhat harder to contact. Two large scale prevalence studies (Williams & Wood, 2007,  $N = 6,654$ ; Wood & Williams, 2009,  $N = 8,450$ ) using exhaustive telephone contact attempts (up to 36 in the first study and 48 in the second study) over many months (12 months in the first study and 18 in the second study) found that the average number of telephone calls to establish contact was 5.5 for problem gamblers compared to 4.9 for non-problem gamblers. However, this difference in contactability can be leveled out with sustained attempts. Thus, the above studies also found that with 16 call attempts, 95% of contactable problem gamblers are contacted.

2. With regard to the reliability and validity of self-reported gambling expenditure, research conducted by Wood & Williams (2007) has confirmed that retrospective estimates of gambling expenditure tend to be unreliable and are very much influenced by how the question is worded. A random sample of 2424 Ontario adult gamblers were asked about past month gambling expenditure in one of 12 different ways. The relative validity of each question format was subsequently established by the correspondence of reported gambling expenditures with actual Ontario gambling revenue, as well as with amounts obtained by subsequent prospective diaries. Retrospective estimates were found to have weak correspondence to actual projected revenues and to prospective diaries. Furthermore, slight variations in question wording resulted in significant variation in reported expenditure amounts (by a magnitude of 5). That being said, there were certain question wordings that did produce significantly better correspondence to actual revenue as well as prospective diaries and were recommended for use in all prevalence surveys. The question wording with the best evidence of validity was “Roughly how much money do you spend on [specific gambling activity] in a typical month?” (with the totals from each activity then added together)<sup>2</sup>.
3. Describing the survey as a ‘gambling survey’ to potential participants *does* result in significant over-recruitment of gamblers and under-recruitment of nongamblers, leading to

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<sup>2</sup> This is actually the question wording that has been most often used in gambling prevalence studies.

inflated rates of both gambling and problem gambling (Williams & Volberg, 2009, 2010). Williams & Volberg (2009, 2010) found that the rates of problem gambling are approximately 2.27 times higher in 'gambling' surveys compared to identically administered surveys that do not specify the topic. The magnitude of this effect varies as a function of a) overall response rate and b) whether there is post-hoc weighting to correct for demographic deviations from the known population profile. The above findings were obtained with a response rate of 42%. It is expected that the effect will be lower with higher response rates and higher with lower response rates. Post-hoc demographic weighting reduced the magnitude of this effect to 1.94 times.

4. Survey administration modality also has a significant impact on results. Research in other fields has generally found that **face-to-face** surveys at peoples' residences elicit more candid/honest responding relative to **telephone** interviewing, possibly because face-to-face may foster better rapport (de Leeuw & van der Zouwen, 1988; Holbrook, Green & Krosnick, 2003; Tourangeau & Yan, 2007). Response rates are also higher. Williams, Volberg, & Stevens (2012) found that among the 202 existing problem gambling prevalence studies that have been conducted from 1975 to the present time, the average response rate for face-to-face residential surveys was 77.1% versus 52.5% for telephone surveys.

In a recent empirical investigation of the impact of different survey administration methods, Williams & Volberg (2009, 2010) confirmed that face-to-face surveys elicited more honest responses, as well as higher overall response rates due to increased participation of demographic groups (young people, males) that do not participate in telephone surveys because of a) higher refusal rates and b) greater likelihood of not having a telephone landline. The rates of problem gambling were found to be 2.18 times higher in face-to-face surveys compared to identically administered telephone surveys (without weighting to correct for the true age x gender distributions in the population) and 1.44 times higher after age x gender weighting (Williams & Volberg, 2009, 2010). These findings were obtained with a 49% response rate in the face-to-face survey and 36% in the telephone survey. Here again, it is expected the magnitude of the underestimation of problem gambling prevalence that occurs with telephones will be lower with higher response rates and higher with lower response rates.

In general, it is clear that traditional telephone surveying of residential landlines has a short future. One problem is the continuing drop in telephone survey response rates. Williams, Volberg, & Stevens (2012) found that among the 202 existing problem gambling prevalence studies that have been conducted from 1975 to the present time, the average telephone response rate prior to 1999 was 58.7%, decreasing to 48.5% from 2000 – 2009, and decreasing further to 43.5% for studies conducted from 2010 to 2012. A second problem is the rapid increase in cell-phone-only households (cell phones traditionally being excluded from telephone surveys). In the U.S. in the second half of 2010, 29.7% of households only used cell phones, a dramatic increase from 6% in 2005 (Blumberg & Luke, 2011). The strongest predictor of cell-phone only households is young age, with 49.5% of households with people age 18 – 29 in the United States only using cell phones (Blumberg & Luke,

2011). Because problem gambling is more common in young people (Williams, Volberg, & Stevens, 2012) (as well as substance abuse and many other conditions), traditional landline telephone surveys will underestimate the true rate of these conditions in the population.

Although telephone survey administration is less valid than face-to-face survey administration, it is still superior to surveys using '**online panels**'. Beginning in the late 1990s, market research firms began creating 'online panels' composed of thousands of individuals who have agreed to receive online solicitations to participate in various online surveys in return for compensation (most often, a collection of 'points' that have some cash value) (Görizt, 2007; Görizt et al., 2002). When an individual joins one of these panels, information is collected concerning his/her demographics. Subsequently, when a group is needed for a particular survey (e.g., 'representative sample of Canadian adults'), the survey is only sent out to this selected subsample. Online panels are now commonly used in market research, and are starting to be used in academic studies. The advantages of online panel surveys are that a) the validity of answers to 'sensitive questions' (e.g., gambling) tends to be higher in self-administered formats (Tourangeau & Smith, 1996; van der Heijden et al., 2000); b) everyone has agreed to be and expects to be contacted (unlike telephone surveys); c) the results can be obtained in a much shorter period of time; and d) they are roughly one-third the cost of telephone surveys.

However, online panels have some serious problems. One concern has to do with the data quality of 'professional respondents' who may do dozens of surveys within the span of a few months (Görizt, 2007; Toepoel, Das & van Soest, 2008). Another concern is the nonrepresentative nature of the online panel population. An obvious limitation is that a significant nonrandom minority of people still do not use the Internet, and thus, are not eligible to be part of an online panel. Twenty-one percent of Canadian households did not have Internet access in 2010, with nonusers significantly more likely to be located in rural areas, have lower income, be older, and have a smaller household size (Statistics Canada, 2011). Furthermore, although online panelists are structured to be demographically representative in terms of age, gender, and geographic residence (and sometimes education, income, and other basic demographic variables), other important differences have been found to exist (as might be expected considering that only a very small minority of people invited to be part of an online panel agree to participate (Sparrow, 2006)).

The first author has conducted three research investigations that have shown the non-equivalency of telephone versus online panel samples:

- Williams, Belanger & Arthur (2011) found that an online panel survey of 2,001 Albertans in 2008 produced a past year problem gambling prevalence rate 2.19 times higher (4.6% versus 2.1%) compared to an identically administered telephone survey of 3,001 participants (even with post-hoc weighting to make each sample similar to Alberta census data). In a 2009 retest, the email solicitation to the online panelists changed the description of the study from a 'gambling survey' to a survey about 'recreational activities' (the telephone description continued to describe it as a 'gambling survey'). Nonetheless, the 2009 results still found a rate of problem gambling 1.81 times higher



(5.6% compared to 3.1%) among the Alberta online panelists ( $n = 1,092$ ) compared to the telephone respondents ( $n = 1,004$ ) (Williams, Belanger & Arthur, 2011).

- An even more dramatic difference was recently obtained in Williams, Lee & Back (submitted for publication) in South Korea, where an online panel survey of 4,000 South Koreans in 2011 produced a past year problem gambling prevalence rate 11.4 times higher (11.4% versus 1.0%) compared to an identical cell phone administered prevalence study of 4,000 people.
- Noticing that online panelists tended to have much higher rates of ‘pathology’ in all areas (i.e., substance use, mental health problems, etc.), a final manipulation by Williams & Volberg (in preparation) for a prevalence study of gambling in Ontario, required that the sample of online panelists have an equivalent rate of *tobacco use* compared to the Ontario population. This was in addition to their usual stratification based on age, gender, education, and not indicating the nature of the survey in the email solicitation. Nonetheless, the prevalence of past year problem gambling was still found to be considerably higher in the online panel sample compared to the identical telephone survey (that also included cell phones) (8.3% versus 1.0%).

**Mail-in surveys** have some of the same advantages and disadvantages of online panels. The advantage concerns the greater validity of answers to ‘sensitive questions’ (e.g., gambling) that usually occurs in self-administered formats (Tourangeau & Smith, 1996; van der Heijden et al., 2000). The main disadvantage concerns the significantly lower response rate (and therefore, potential for nonrepresentativeness) that typically occurs in mail-in surveys compared to all other survey modalities.<sup>3</sup> In jurisdictions where researchers have access to a national registry that links telephone numbers to addresses (i.e., Nordic countries), mail-in surveys can serve as a useful supplement so as to collect data from people who could not be contacted by phone.<sup>4</sup>

5. A common threshold for administering questions about problem gambling (i.e., any past year gambling) produces too many false positives on problem gambling assessment instruments, particularly when used in combination with a low problem gambling threshold (e.g., CPGI 3+; Williams & Volberg, 2009, 2010). These false positives can be significantly reduced by a) requiring a minimal frequency of gambling in the past year (i.e., at least 10 times on some format) before administering problem gambling screens; b) automatically

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<sup>3</sup> This is not always the case. Rönnerberg et al., (1999) conducted a pilot study of ~3,000 randomly selected Swedish respondents, with half interviewed by telephone and half completing a self-administered postal questionnaire. Response rates to both the phone and mail-in surveys were quite high (80% and 70% respectively), and there was also no significant difference in the problem gambling prevalence rate between the two samples.

<sup>4</sup> For example, this was done in the Rönnerberg et al. (1999) main Swedish study, as well in a Norwegian prevalence study (Lund & Nordlund, 2003). In both cases the response rates to the mail-in survey were significantly lower than the telephone survey. There were also significant differences in the demographics of mail-in respondents, with the Swedish mail-in sample having a greater tendency to be young, unmarried, lower income, less education, immigrant, and urban; and the Norwegian sample having a greater tendency to be young, female, and lower income. Of final note, the rate of problem gambling was significantly higher in both the Swedish and Norwegian mail-in samples compared to the telephone sample (1.6% vs 0.5% in Sweden; 0.9% vs 0.5% in Norway).

asking people to explain the discrepancy between their problem gambling classification in the absence of significant gambling behaviour, or intensive gambling involvement in the absence of reports of problems (Williams & Volberg, 2009, 2010). Note that requiring a minimal amount of gambling *expenditure* is not advisable because a significant percentage of problem gamblers report winning or being ahead 'in a typical month' (Williams & Volberg, 2009, 2010). Note also that in order to capture binge gamblers, this minimal frequency of gambling should not have to occur throughout the year.

6. A large scale clinical validation study showed that the ability of the NODS<sup>5</sup>, SOGS, and CPGI to distinguish clinically assessed problem from non-problem gamblers was better than had been suggested in prior research, but that overall accuracy was still modest (Williams & Volberg, 2010). By contrast, a new instrument, the Problem and Pathological Gambling Measure (Appendix A), had excellent classification accuracy across both data sets with sensitivity, specificity, positive predictive power, and negative predictive power all above 90% (Williams & Volberg, 2010). In general, all instruments correctly classified most non-problem gamblers. Because non-problem gamblers constitute the large majority in most general population prevalence surveys, this also means that these instruments all have good overall diagnostic efficiency and level of agreement (kappa). However, a significant problem with the CPGI and SOGS is that roughly half of the people labeled as problem gamblers by these instruments (using a 3+ criterion) are not confirmed as such by clinical assessment, resulting in prevalence rates that are too high (1.85 times higher than the actual rate with the CPGI 3+ and 1.52 times higher with the SOGS 3+). (Note: an 8+ criterion for the CPGI produces a rate that is only 49% of the actual rate and a 5+ criterion for the SOGS produces a rate that is 69% of the true rate). The main problem with the NODS concerns the fact that it only correctly identifies 68.5% of the genuine problem gamblers, and, even with this lower rate of over-identification, its positive predictive power is still only 76.8%. On the other hand, relative to the SOGS and CPGI, the NODS has higher specificity, higher positive predictive power, better overall diagnostic efficiency, and it produces a problem gambling prevalence rate closest to the true rate.

Significant improvements to the classification accuracy of the CPGI occurs when a 5+ cut-off is used for the designation of problem gambling, and when a 4+ cut-off is used with the SOGS. The current 3+ cut-off continues to be optimal for the NODS. No improvements were needed in the PPGM. The use of these new thresholds would allow all of these instruments to produce fairly accurate prevalence rates of problem gambling when used in population surveys. These higher cut-offs also decrease the impact of methodological variations on obtained rates (i.e., survey description, administration format) (Williams & Volberg, 2010).

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<sup>5</sup> National Opinion Research Centre's operationalization of the DSM diagnostic criteria for pathological gambling for survey administration (Gerstein et al., 1999).

## BEST PRACTICES IN THE POPULATION ASSESSMENT OF PROBLEM GAMBLING

The following is a summary of current best practices in the population assessment of problem gambling that derives from survey research generally (Fowler et al., 2009; Groves et al., 2001; Volberg, 2007), as well as research specific to gambling.

1. Employ a survey company with the greatest potential to achieve a high response rate. The highest rate will typically be obtained by the federal agency that conducts the national census (although there are often constraints in working with such agencies). Respondents are also more likely to agree to participate in surveys conducted by university affiliated survey companies compared to private commercial firms.
2. Conduct a training session with survey firm management and their interviewers to provide an overview of the purpose of the survey, how each of the survey questions should be answered and scored, and the need to maintain verbatim wording for standardized instruments/scales.
3. Pilot test the questionnaire to ensure it is properly programmed and all questions are clear.
4. Keep the questionnaire short to increase the chances of participation (under 15 minutes being optimal).
5. When possible, provide pre-notification of the impending survey so as to increase response rates (de Leeuw et al., 2005).
6. Use computer assisted interviewing methods (CATI, CAPI or CASI)<sup>6</sup> to standardize survey administration.
7. Random sampling from a comprehensive listing of the population is the best way to ensure representative sampling. However, centralized population registries are only common in Europe (particularly the Nordic countries). Furthermore, the less centralized population databases kept by other countries are often not accessible by researchers.<sup>7</sup> In lieu of a population database, random sampling of observable residences can potentially be used. The difficulty with this approach is ensuring equal access to all residences, particularly

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<sup>6</sup> CATI: Computer assisted telephone interview; CAPI: computer assisted personal interview; CASI: computer assisted self interview.

<sup>7</sup> Governments in most countries keep population databases for the purposes of taxation, eligibility for voting, military service, health care, social services, pensions, and education. This information is also used for program planning, budgeting, and generating statistical profiles of the population. These databases typically contain information about each person's birth date, age, sex, marital status, place of birth, current address, citizenship, and language. These databases/registries are maintained by different departments depending on the country (e.g., tax departments, health departments, national electoral agencies).

multi-dwelling complexes (apartment buildings, condominiums) and residences in remote locations. Another strategy is “random digit dialing” so as to capture all possible listed and unlisted telephone numbers.<sup>8</sup> If using this approach it is essential that a) cell phones are included in the pool of eligible numbers;<sup>9</sup> and b) it is supplemented by face-to-face and/or mail-in surveys when a large percentage of the population of interest does not have cell phones or landlines (e.g., First Nation reserves).<sup>10</sup> When researchers have access to a population database, then response rates can be improved by sending questionnaires to the addresses of people who could not be contacted.

8. Face-to-face residential interviewing is the method best able to achieve representative and valid results. However, sensitive parts of the questionnaire (e.g., problem gambling) are best self-administered. Telephone interviews (using landlines + cell phones) are currently the next best method of survey administration, but the representativeness of this approach is increasingly limited due to declining response rates and the increasing market share of Internet phones (Voice over Internet Protocol; VoIP) whose numbers are usually inaccessible to survey companies. The future of survey research probably lies with online panels. However, the online panels that currently exist are not truly representative of the population and should not currently be used to establish prevalence rates.
9. When employing telephone or face-to-face residential surveys, randomly select the adult to be interviewed within the household to compensate for the tendency of females to answer the phone or door. Alternatively, attempt to interview *all adults* within the household. Research by Williams & Volberg (in preparation) has found that interviewing everyone within the household produces results that are very close to results obtained with the traditional method of selecting a single person per household.<sup>11</sup> In addition, this approach achieves somewhat higher overall response rates and is more cost efficient. However, there is also a very slight trend for reported rates to be lower for ‘sensitive’ questions, probably because of the decreased anonymity of this approach.
10. Have minimum age x gender cell quotas that are at least 50% of the true prevalence of these cells in the population (as established by the most recent population census) so as to

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<sup>8</sup> This approach tends to be inefficient because of the many nonexistent or noneligible numbers (e.g., businesses, fax numbers, etc.), however, is often more cost effective than face-to-face residential interviews.

<sup>9</sup> Although cell phone response rates are even lower than landline response rates, they capture a demographic group that would not be adequately captured otherwise (Williams & Volberg, in preparation).

<sup>10</sup> Households without residential telephone service historically have had significantly higher rates of poverty, unemployment, health problems, and substance use (Ford, 1998; Pearson et al., 1994). However, because only about 0.5%-2% of the population in most western jurisdictions do not have residential phone service (at least between the period ~1960 to ~2000), the failure to include these individuals in jurisdiction-wide prevalence studies usually did not have a marked effect.

<sup>11</sup> This procedure has been used in gambling prevalence surveys in Great Britain (Wardle et al., 2011) and Nova Scotia (Focal Research, 2004, 2008).

minimize the amount of data weighting that has to be done after data collection. If possible, strive for quotas that are even closer to the true prevalence and use additional quotas for other important demographic attributes (e.g., ethnocultural group).

11. Use sustained efforts to contact the randomly selected individual or household to ensure that the obtained sample does not consist only of easily contactable people. This is accomplished by making multiple contact attempts during different times of the day and different days of the week (although most attempts should be in the evening and on weekends) over at least a one month period (even longer is better). Sixteen contact attempts is usually sufficient to contact 95% of contactable problem gamblers so as to level out differences in the contactability between problem and non-problem gamblers.
12. Recontact 'soft refusals' at a later point to see if they would be willing to participate ('refusal conversion').
13. For quality assurance, have a supervisor conduct periodic visual and audio evaluation of the interviewers' work.
14. Have the ability to conduct the interview in different languages, depending on the language abilities of the population being surveyed.
15. Knowing the survey topic in advance produces a bias in the people who choose to participate and not participate. Thus, the description of the survey to prospective participants needs to be somewhat ambiguous (e.g., 'health and recreation survey', 'recreational activities'). Alternatively, the gambling survey should be inserted as an additional module in a larger multi-topic study. (Note, however, that if the primary goal is just to establish changes since the last prevalence survey, then the procedures of the previous study should be replicated as closely as possible.)
16. Use question wordings about gambling frequency and expenditure that are documented to have the best reliability and validity (see Wood & Williams, 2007).
17. For improved efficiency and to minimize false positives, do not ask problem gambling questions unless the person indicates they have gambled at least once a month on some form of gambling in the past year.
18. Use a problem gambling assessment instrument with good established correspondence between gambling classifications obtained in population prevalence surveys and clinical assessment of these categorizations. The Problem and Pathological Gambling Measure is the best instrument for this purpose. Alternatively the NODS is adequate, as is the CPGI with a 5+ cut-off for problem gambling or the SOGS using a 4+ cut-off.

19. Conduct post-hoc weighting of the obtained sample to compensate for:
  - i. Oversampling of single person households and undersampling of individuals from large households. This does not need to be done if the sampling approach attempts to interview everyone within the household.
  - ii. Oversampling of people with multiple means of potential contact (e.g., people with a landline as well as a cell phone).
  - iii. Sampling deviations from the known demographic profile of the population (typically age x gender distributions, but could include other relevant attributes).
  
20. Ensure the final report provides documentation concerning the name of the survey firm, whether interviewer training occurred, average survey length, whether participants received survey pre-notification, the eligibility criteria for participants (i.e., age, language, mental and physical capacity, age x gender quotas, etc.), administration format, the telephone sampling procedure (i.e., inclusion of cell phones, random digit dialing), whether computer assisted methods were used for survey administration, the method used for participant selection within a household, the length of time and number of attempts made to contact each person, whether refusal conversion was used, whether supervisors monitored interviewers' work, whether multilingual interviewers were employed, the criterion used to administer the problem gambling assessment instrument, the nature of the post-hoc weighting, the response rate, and an appendix with the actual survey.

Response rates should be calculated using the procedures recommended by the Council of American Survey Research Organizations (CASRO, 1982) and the American Association for Public Opinion Research (AAPOR) (2011). Essentially, response rate is the number of completed interviews divided by the estimated number of eligible respondents. For telephone surveys the following chart can be used:

	Number
Not in Service	
Fax/Modem	
Business Number	
Bad Line/Inaudible/Disconnected	
Participant Language Difficulties	
Participant Physically or Mentally Incapable	
Participant does not meet eligibility criteria and/or is in demographic group whose quota is filled	
<b>INELIGIBLE TOTAL</b>	
Always Busy/Never Answered/Answering Machine	
Household Refusal	
<b>ELIGIBILITY NOT DETERMINED (ND) TOTAL</b>	
Respondent Refusal	
Eligible Respondent Not Available	
Incomplete Interviews	
COMPLETED INTERVIEWS	
<b>ELIGIBLE TOTAL</b>	
<b>ELIGIBILITY RATE</b>	
ELIGIBLE TOTAL _____ ÷ (ELIGIBLE TOTAL _____ + INELIGIBLE TOTAL _____)	
<b>ESTIMATED # OF ELIGIBLES</b>	
ELIGIBLE TOTAL _____ + (ELIGIBILITY ND TOTAL _____ x ELIGIBILITY RATE _____)	
<b>RESPONSE RATE</b>	
COMPLETED INTERVIEWS _____ ÷ ESTIMATED # OF ELIGIBLES _____	

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## Appendix A: Problem and Pathological Gambling Measure

The PPGM is a 14 item assessment instrument with questions organized into three sections: Problems (7 questions), Impaired Control (4 questions), and Other Issues (3 questions). Similar to the CPGI, it uses a 12 month time frame, recognizes there to be a continuum of gambling with 4 categories (Recreational Gambler, At-Risk Gambler, Problem Gambler, Pathological Gambler), and has been field tested and refined over several years with both clinical *and* general population samples (unpublished work). However, it diverges from other instruments in several important respects:

1. *All* potential harms of problem gambling are addressed (financial, mental health, health, relationship, work/school, legal) with these questions ordered from least commonly to most commonly endorsed. This is in contrast to traditional instruments (i.e., DSM, CPGI, SOGS) where not all the possible harms of problem gambling are covered. For example, mental health problems are not asked about in the DSM and only indirectly in the SOGS (i.e., presence of guilt). Physical health problems are not addressed in either the DSM or SOGS. School and work problems are not covered in the CPGI. Engagement in illegal activities to support gambling is not addressed in the CPGI and only partially addressed in the SOGS (i.e., passing bad cheques). Financial problems are not well addressed in the DSM (i.e., relies on others to provide money). The failure to provide comprehensive coverage of the potential harms of problem gambling means that a small number of people reporting certain valid signs/symptoms of problem gambling may not be correctly identified.
2. To better capture problem gamblers in denial or who lack insight, PPGM harm questions allow for either direct admission of a problem/harm, or endorsement of something that indicates harm is occurring regardless of whether the person is willing to call it a problem.
3. All harm questions are phrased to inquire whether the person's gambling has created difficulties either for the individual himself/herself "or someone close to you". This is in contrast to traditional instruments where almost all the harm questions refer to problems experienced by the gambler, rather than harms that he/she may be causing in his/her immediate social network.
4. To provide better face and construct validity, to be classified as a '**Problem Gambler**' the person is normally required to endorse 1 or more items from the Problems section and 1 or more items from the Impaired Control section. Endorsement of several problems and indices of impaired control will typically lead to the person being classified as a '**Pathological Gambler**'. Endorsement of a problem or impaired control, but not both, typically leads to classification as an '**At Risk**' Gambler. Gamblers who do not meet the criteria for Problem, Pathological, and At Risk, are deemed to be '**Recreational**' Gamblers.

This approach contrasts with traditional instruments where all items have an equal weighting so that any pattern of item endorsement that meets the necessary quantitative threshold is sufficient for designation of problem/pathological gambling (i.e., despite the fact that some items are more serious and/or diagnostic than others). Consequently, it is possible to be classified as a problem/pathological gambler without actually endorsing any significant problems or harm deriving from one's gambling. Similarly, it is possible to indicate the presence of significant problems deriving from one's gambling without being classified as a problem gambler. Most people would agree that for someone to be a problem gambler there *needs* to be evidence of a) significant negative consequences, and b) impaired control (Neal, Delfabbro, & O'Neil, 2005).

5. To minimize false positives, to be labeled as either a Problem or Pathological gambler the person also has to report gambling at least once a month on some form of gambling in the past year. None of the traditional instruments require the person to report corroborating gambling behaviour to support their report of problem gambling symptomatology. All population surveys contain a small but significant portion of people who score in the problem gambling range but report very little past year history of gambling behaviour. Research by Williams & Volberg (2009, 2010) shows that a significant portion of these individuals are not really problem gamblers. Requiring a minimal amount of gambling frequency (e.g., gambling once a month or more) before being designated as a problem gambler effectively excludes these false positives without excluding any genuine problem gamblers (Williams & Volberg, 2009, 2010).
6. To minimize false negatives (i.e., to better capture problem gamblers in denial), a person can be classified as a Problem Gambler if:
  - He/she indicates a) there are *other* people who would say he/she has significant problem(s) deriving from his/her gambling and b) there are *other* people who would say he/she has significant difficulty controlling his/her gambling.
  - OR
  - He/she endorses 3 or more items from any of the 3 categories as long as their frequency of gambling and gambling losses are *equal to or greater than the median for unambiguously identified Problem and Pathological Gamblers*.
  - Similarly, an individual can be designated as an At Risk gambler without endorsement of any problem gambling questions if his/her frequency of gambling and gambling losses are equal to or greater than the median for unambiguously identified Problem and Pathological Gamblers.

### Problem and Pathological Gambling Measure (PPGM)

1a. Has your involvement in gambling caused you either to borrow a significant<sup>12</sup> amount of money or sell some of your possessions in the past 12 months? (Yes/No).

1b. Has your involvement in gambling caused significant **financial concerns** for you or someone close to you in the past 12 months? (Yes/No). (Note: do not score 1 for 1b if 1 has already been scored for 1a).

2. Has your involvement in gambling caused significant **mental stress** in the form of guilt, anxiety, or depression for you or someone close to you in the past 12 months? (Yes/No).

3a. Has your involvement in gambling caused serious problems<sup>13</sup> in your **relationship with your spouse/partner, or important friends or family** in the past 12 months? (Note: Family is whomever the person themselves defines as “family”)(Yes/No).

3b. Has your involvement in gambling caused you to repeatedly neglect your children or family in the past 12 months? (Yes/No). (Note: do not score 1 for 3b if 1 has already been scored for 3a).

4. Has your involvement in gambling resulted in significant **health problems** or injury for you or someone close to you in the past 12 months? (Yes/No).

5a. Has your involvement in gambling caused significant **work or school problems** for you or someone close to you in the past 12 months? (Yes/No).

5b. Has your involvement in gambling caused you to miss a significant amount of time off work or school in the past 12 months? (Yes/No). (Note: do not score 1 for 5b if 1 has already been scored for 5a).

6. Has your involvement in gambling caused you or someone close to you to write bad cheques, take money that didn't belong to you or commit other **illegal acts** to support your gambling in the past 12 months? (Yes/No).

7. Is there anyone else who would say that your involvement in gambling in the past 12 months has caused any significant problems regardless of whether you agree with them or not? (Yes/No).

<b>PROBLEMS SCORE</b>	<b>/7</b>
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<sup>12</sup> If people ask what 'significant' means, say 'significant means something that either you or someone else would say is considerable, important, or major', either because of its frequency or seriousness.

<sup>13</sup> If people ask what 'problem' means say 'a difficulty that needs to be fixed'.

8. In the past 12 months, have you often gambled longer, with more money or more frequently than you intended to? (Yes/No).

9. In the past 12 months, have you often gone back to try and win back the money you lost? (Yes/No).

10a. In the past 12 months, have you made any attempts to either cut down, control or stop your gambling? (Yes/No). (go to 11 if 'no') (this item not scored)

10b. Were you successful in these attempts? (Yes/No). (score '1' for no and '0' for yes)

11. In the past 12 months, is there anyone else who would say that you have had difficulty controlling your gambling, regardless of whether you agreed with them or not? (Yes/No).

<b>IMPAIRED CONTROL SCORE</b> /4
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12. In the past 12 months, would you say you have been preoccupied with gambling? (Yes/No).

13. In the past 12 months, when you were not gambling did you often experience irritability, restlessness or strong cravings for it? (Yes/No).

14. In the past 12 months, did you find you needed to gamble with larger and larger amounts of money to achieve the same level of excitement? (Yes/No).

<b>OTHER ISSUES SCORE</b> /3
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<b>TOTAL SCORE</b> /14
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## PPGM Scoring and Classification

### **PATHOLOGICAL GAMBLER (4)**

1. Problems Score of 1 or higher, plus
2. Impaired Control Score of 1 or higher, plus
3. Total Score of 5 or higher, plus
4. Reported gambling frequency of at least once a month on some form of gambling.

### **PROBLEM GAMBLER (3)**

1. Problems Score of 1 or higher, plus
2. Impaired Control Score of 1 or higher, plus
3. Total Score of 2 to 4, plus
4. Reported gambling frequency of at least once a month on some form of gambling.

OR

1. Total Score of 3 or higher, plus
2. Frequency of gambling<sup>14</sup> AND average reported gambling loss (not net loss)<sup>15</sup>  $\geq$  median for unambiguously identified Problem and Pathological Gamblers in the population (i.e., as established by the most recent population prevalence survey).

### **AT RISK GAMBLER (2)** (this category also includes people who may be problem gamblers in denial)

1. Does not meet criteria for Problem or Pathological gambling, plus
2. Total Score of 1 or higher

OR

1. Frequency of gambling<sup>1</sup> AND average reported gambling loss (not net loss)<sup>2</sup>  $\geq$  median for unambiguously identified Problem and Pathological Gamblers in the population (i.e., as established by the most recent population prevalence survey).

### **RECREATIONAL GAMBLER (1)**

- Gambler who does not meet criteria for Pathological, Problem or At-Risk gambler.

### **NON-GAMBLER (0)**

- No reported gambling on any form in past year.

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<sup>14</sup> Simplest way of establishing this is using the highest frequency of gambling reported for any individual form in the past year.

<sup>15</sup> Reported gambling losses tend to be a more accurate estimate of true losses compared to net loss, especially in problem gamblers (i.e., problem gamblers often report winning as much or more than they lose and thus may not report any net loss) (Wood, R.T. & Williams, R.J. (2007b). How much money do you spend on gambling? The comparative validity of question wordings used to assess gambling expenditure. *International Journal of Social Research Methodology: Theory & Practice*, 10 (1), 63-77. <http://hdl.handle.net/10133/752>. Note: The person's income and net worth/debt can be taken into account when deciding whether the gambling loss criterion should apply.