OXFORD

Perspectives

A research plan to define Canada's first low-risk gambling guidelines

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Summary

From a public health perspective, gambling shares many of the same characteristics as alcohol. Notably, excessive gambling is associated with many physical and emotional health harms, including depression, suicidal ideation, substance use and addiction and greater utilization of health care resources. Gambling also demonstrates a similar 'dose-response' relationship as alcohol—the more one gambles, the greater the likelihood of harm. Using the same collaborative, evidence-informed approach that produced Canada's Low-Risk Alcohol Drinking and Lower Risk Cannabis Use Guidelines, a research team is leading the development of the first national Low-Risk Gambling Guidelines (LRGGs) that will include quantitative thresholds for safe gambling. This paper describes the research methodology and the decision-making process for the project. The guidelines will be derived through secondary analyses of several large population datasets from Canada and other countries, including both cross-sectional and longitudinal data on over 50 000 adults. A scientific committee will pool the results and put forward recommendations for LRGGs to a nationally representative, multi-agency advisory committee for endorsement. To our knowledge, this is the first systematic attempt to generate a workable set of LRGGs from population data. Once validated, the guidelines inform public health policy and prevention initiatives and will be disseminated to addiction professionals, policy makers, regulators, communication experts and the gambling industry. The availability of the LRGGs will help the general public make well-informed decisions about their gambling activities and reduce the harms associated with gambling.

Key words: risk curves, low-risk gambling limits, problem gambling, total consumption theory, gambling-related harm

INTRODUCTION

Gambling: impact on public health

Commercial gambling has been legal in Canada since 1970 and it continues to expand in all provinces and territories. Other countries have witnessed a similar rate of growth. With increased availability of gambling, some have raised concerns regarding its long-term, health impacts (Korn and Shaffer, 1999). Although gambling disorder (American Psychiatric Association, 2013) impacts a relatively small proportion of the general population—approximately 1% to 3% (Williams *et al.*, 2012)—another 4% to 10% of the population are individuals who frequently gamble (at least twice weekly) or report symptoms of gambling disorder (i.e. gambling-related health harms) that lie beneath the clinical threshold (Welte *et al.*, 2015). These include a number of physical and emotional health harms, including depression, suicidal ideation, anxiety, smoking, substance use and addiction, insomnia, etc. (Petry, 2005; Hodgins *et al.*, 2011) leading to greater help seeking and utilization of health care resources (Ladouceur, 2004; Petry, 2005; el-Guebaly *et al.*, 2006; Afifi *et al.*, 2010; Yau and Potenza, 2015). Most of these consequences are associated with gambling disorder (Petry, 2005; Hodgins *et al.*, 2011), however research shows that heavy gambling leads to harm in individuals who are not necessarily problem gamblers (Afifi *et al.*, 2010; Li *et al.*, 2017).

The theory of total consumption, commonly associated with alcohol control strategies (Skog, 1985; Babor *et al.*, 2010), is relevant to population strategies to reduce gambling-related harms. The theory predicts that the number of people experiencing harm from gambling in a defined population is positively correlated with the average level of gambling participation. Support was found for the total consumption theory in the Norwegian population using frequency (number of days gambled in the past month) as the measure of gambling consumption (Lund, 2008). Within defined populations, a higher mean gambling frequency was positively correlated with a higher proportion of individuals who frequently gamble (at least twice weekly). Markham and colleagues also found empirical support for the theory when specifically applied to electronic gaming machine (EGMs: includes slot machines and video lottery terminals) players in Australia (Markham *et al.*, 2017). After controlling for other variables known to predict harm, each $20 AUD increase in monthly EGM expenditure per adult player was associated with a 1.7% increase in the prevalence of gambling-related harm for a typical venue. A subsequent analysis of Australian data found that an increase in 1% of household disposable income lost on EGMs and casinos was associated with 1.3 times greater problem gambling prevalence (Markham *et al.*, 2017). These findings are consistent with a worldwide comparison of gambling prevalence surveys that show that countries with a high average gambling involvement, particularly with EGMs, have a higher prevalence of gambling–related harms (Orford, 2005; Storer *et al.*, 2009). If the theory of total consumption applies to gambling behaviour as it does for alcohol, a public health approach is needed that should aim to reduce the average level of gambling involvement in the population through stricter control policies and education on safe gambling limits.

Other similarities between alcohol consumption and gambling exist, which support a broad health promotion approach that is inclusive of all levels of gambling intensity. Both are regulated by the government, which in turn benefits from the revenue generated. Gambling also has a positive impact on society: governments use the revenue from gambling to fund many public services; the industry provides employment and the introduction of gambling can provide additional leisure options for a community (Williams *et al.*, 2011). Finally, similar to alcohol, there is ample evidence that the majority of the population can gamble without experiencing any apparent harm (Williams *et al.*, 2012; Currie *et al.*, 2017). Hence, an abstinence-only, health promotion message will have little credibility to the average gambling consumer. Public health messaging should therefore provide consumers with direction on how to reduce their overall risk of harm while playing.

Following in the example of the low-risk alcohol drinking guidelines

Canada's Low-Risk Alcohol Drinking Guidelines were released in 2010 and provided the public with direction on how to reduce the risk of alcohol-related harms by staying below specific drink thresholds (Stockwell *et al.*, 2012). The release of the national guidelines was an important step towards standardizing public health messaging concerning alcohol consumption. Their development provides a useful template to follow for many reasons: (i) all the guidelines are based in solid empirical research; (ii) both the research basis and iterative, decision-making process used in finalizing the guidelines were shared publicly; (iii) a diverse, multi-stakeholder committee advised the research team throughout development of the guidelines, and; (iv) specific consideration was given regarding how the guidelines should be adapted for higher risk populations (e.g. pregnant women, those with alcohol use disorder). The evidence used to derive the alcohol drinking guidelines came from

systematic reviews and meta-analyses of the estimated relative risk of death from all causes where potential benefits and risks were balanced (Room *et al.*, 1995, 2005; Di Castelnuovo *et al.*, 2006; Rehm *et al.*, 2003). A similar approach was adopted to produce Canada's first Lower Risk Cannabis Use Guidelines (Fischer *et al.*, 2017). Although the cannabis guidelines do not include consumption thresholds, they do identify subpopulations with a higher risk of harm. Specifically, individuals with a predisposition for psychosis are advised to abstain given the extensive research now amassed that shows a relationship between early use of cannabis and the development of schizophrenia (Fischer *et al.*, 2017).

Prior research on low-risk gambling limits

In contrast to the quantity of published literature on the relationship between alcohol consumption and alcohol-related health harms, the literature on the relationship between gambling patterns and health harms is less extensive. At a population level, there is a direct relationship between the availability of gambling and per capita gambling expenditures (Grun and McKeigue, 2000) and evidence that a large proportion of gambling revenues is supplied by problem gamblers (Williams and Wood, 2004). In the past 10 years, there has been considerable interest among researchers to study the 'dose-response' relationship between gambling intensity and associated harms (Currie *et al.*, 2006; Weinstock *et al.*, 2007; Quilty *et al.*, 2014; Brosowski *et al.*, 2015). This research clearly shows that the more one gambles, the greater the likelihood of harm.

Naturalistic research on individuals who gamble suggests among those actively attempting to control their gambling most do so by setting time and monetary limits (Auer and Griffiths, 2013). In a 2005 Canadian survey, when asked to define 'responsible gambling', the most common responses were not spending more than you can afford, setting a monetary budget and setting a time limit (Turner *et al.*, 2005). When surveyed Australian adults reported that setting a budget target was the most common self-regulation strategy used to control gambling, followed closely by keeping track of money spent and setting a time limit (Moore *et al.*, 2012). These studies suggest that gambling guidelines with actual quantitative thresholds for spending and time would be consistent with the strategies already used by gamblers.

The current initiative – defining Canada's first low-risk gambling guidelines

Using the same collaborative, evidence-informed approach that produced Canada's Low-Risk Alcohol Drinking Guidelines (Stockwell *et al.*, 2012), the Canadian Centre on Substance Use and Addiction (CCSA) is leading the development of national Low-Risk Gambling Guidelines (LRGGs). By drawing on the most rigorous national and international datasets, the project will assess the relationship between gambling patterns (i.e. frequency, duration and expenditure) and risk of developing gambling-related harm. The LRGGs will establish clear quantitative limits on gambling behaviour to help people make informed decisions about their gambling. Presently, responsible gambling guidelines do exist in some countries but these are limited by having little to no empirical basis and failing to set quantitative thresholds of frequency, duration or expenditure that gamblers could follow. For example, Australia, United States, South Africa, United Kingdom and Canada have disseminated to the public advice for gambling in a safe manner (Responsible Gambling Council, 2012; Alberta Gaming & Liquor Commission, 2018; Gambling Help Western Australia, 2018; National Center for Responsible Gaming, 2014; Pennsylvania Gaming Control Board, 2018; Responsible Gambling Trust, 2018; Sun International, 2018). Although there is some common messaging across jurisdictions (e.g. gamble for entertainment and not as a means of earning money; set a limit and stick to it), there is variability in the specificity of these guidelines and how they are promoted within each region.

METHODS

To develop the LRGGs, CCSA began by establishing a scientific working group and an advisory committee.

Low-Risk Gambling Guidelines Scientific Working Group

The Low-Risk Gambling Guidelines Scientific Working Group (LRGG-SWG) was established in July 2016 to provide expert advice, conduct research to support the development of LRGGs and ultimately make recommendations regarding quantitative limits on frequency, duration and expenditure that are associated with a reduced risk of experiencing gambling-related harms (i.e. low-risk gambling limits).

National Low-Risk Gambling Advisory Committee

The National Low-Risk Gambling Advisory Committee was established in November 2016 to provide guidance over the course of the project and help facilitate the uptake of the LRGGs once developed. The committee is

made up of representatives from organizations and sectors that either address or have a vested interest in gambling-related issues, such as prevention, treatment, public health, regulation and finance, as well as the gambling industry.

An appropriate research plan was developed by the LRGG-SWG and approved by the advisory committee. The basic research plan is as follows: (i) review the published literature and adopt working model of gambling-related harm that can be used to relate harm with gambling activity; (ii) summarize the evidence regarding the relationship between gambling activity and harms; (iii) develop an inventory of high-quality, existing datasets that could be used to assess the relationship between gambling activity and gambling-related harm; (iv) assess the feasibility of conducting risk curves with selected datasets to describe the relationship between gambling activity and gambling-related harm; (v) use the results of these analyses to establish quantitative limits on frequency, duration and expenditure that are associated with a lowered risk of harm, and; (vi) validate these limits with individuals who gamble at low or moderate risk and affected others (e.g. spouse or close kin, friends). Similar to the iterative process of decision making that was used with the Low-Risk Alcohol Drinking Guidelines, the approach balances the need for scientific rigour, as well as feasibility and the expectations of stakeholders and the general population for what they consider reasonable limits and an acceptable risk of harm.

Defining gambling related harms

This project is timely with recent conceptual developments in the definition of gambling harms. Gambling harms should be viewed as an outcome of problem gambling rather than problem gambling itself (Langham *et al.*, 2016). A social model of health dictates that the definition of harm includes the consequences to not only the individual but also their family, workplace and broader community. This model was employed by a team of researchers in Australia to develop the most comprehensive and evidence-based description of gambling-related harms to date. *Assessing gambling-related harm in Victoria: A public health perspective*, (Langham *et al.*, 2016), defines gambling-related harm as "any initial or exacerbated adverse consequence due to an engagement with gambling that leads to a decrement to the health or wellbeing of any individual, family unit, community or population." Given its comprehensiveness and the rigour with which it was conducted, the project team decided to adopt the Victorian taxonomy.

The classification scheme, shown in Table 1, categorizes harms into seven dimensions: financial (e.g. erosion of savings, bankruptcy); relationship disruption, conflict or breakdown (e.g. neglect of relationship, social isolation); emotional or psychological distress (e.g. distorted cognition, suicidal behaviours); physical health harms (e.g. reduced levels of self-care, drinking, smoking, illegal substances); cultural harm (e.g. reduced engagement in the community, not meeting social expectations); reduced performance at work or study (e.g. reduced performance, job loss); and criminal activity (e.g. child neglect, conviction). The evidence used to develop the taxonomy was primarily drawn from large population self-report surveys of individuals who gamble or affected others (spouse, child or friend). In subsequent research, the Australian team established important psychometric properties of 73 self-reported gambling harms (Li *et al.*, 2017). Using item response theory modelling, the severity and discrimination properties of each harm was tested. The results identified items more likely to appear at severe levels of gambling problems (e.g. bankruptcy, suicide ideation). These findings were consistent with earlier work by Miller and colleagues on the harms defined by the Problem Gambling Severity Index (PGSI) (Miller *et al.*, 2013). This latter finding suggests the PGSI, although having a limited number of items, may function as a reliable, broad-based measure of gambling harms.

The relationship between gambling activity and harms

The scientific working group reviewed the most relevant literature on quantitative studies examining the dose-response relationship between gambling intensity (frequency, expenditure and duration) and harm. The most relevant studies are listed in Table 2. It was evident from the literature review that risk curves for gambling were indeed feasible, and that both safe and harmful levels of gambling could be defined. The link between gambling intensity and associated harm had been established by independent research teams using data from general population surveys, problem gamblers in treatment, psychiatric outpatients and Internet gamblers. Self-reported, gambling-related harm can be reliably predicted from self-report measures of gambling frequency, expenditure and duration even when other known risk factors were controlled. While the literature indicated clearly that there was a relationship between gambling activity and the onset of gambling-related harms, it was clear that additional risk curve studies would be needed to develop low-risk gambling limits.

Table 1: Taxonomy of gambling related harms proposed by Browne *et al.* (2016)

Family and relationships	Financial/legal	Emotional/psychological
Criticized by others (belittled) [M]	Financial problems [H]	Suicide thoughts [H]
Relationship problems/conflict [M]	Bankruptcy [H]	Feelings of failure, worthlessness, escaping, extreme distress and vulnerability [H]
Lost a relationship [M]	Needing to borrow money to gamble [H] Cash withdrawal from credit cards [M]	Loneliness/increased isolation [M]
Gambling affected reputation [M]	Selling items to gamble [M]	Mental health problems [M]
Careless of family welfare [M]	Bet more than could afford to lose [L]	Decrease in ambition/efficiency [M]
Neglect of responsibilities [L]	Harder to make money last from pay day to pay day [L]	Felt guilty about gambling [L]
	Using household money to gamble/reduced spending on other things [L]	

Work and school	Physical health	Criminal Acts
Losing a job [H]	Attempted suicide [H]	Committed illegal activities to fund gambling [M]
Negatively affects job/school performance [M]	Self-harm [H]	Child neglect [H]
Work absences, being late [L]	Health problems [H]	Petty theft [M]
	Impact someone else's health [M]	
	Difficulty sleeping [L]	
	Cultural	
	Reduced engagement in cultural rituals [M]	
	Shame [H]	
	Reduced contribution to community [M]	

Note: Coding for severity of harms: H = High severity; M = Mid-level severity; L = Low severity. Severity based on studies by Li *et al.* (2017) and Miller *et al.* (2013) which employed item response theory (IRT) analysis.

An inventory of high-quality, existing datasets

Several large population surveys on gambling behaviour have emerged in the past 5 years, including two population-based longitudinal studies conducted within Canada (el-Guebaly *et al.*, 2015; Williams *et al.*, 2015). Moreover, other countries have conducted large, nationally representative surveys assessing gambling behaviour and associated harms (Billi *et al.*, 2014; Froberg *et al.*, 2015; Volberg *et al.*, 2015). Fortunately, many of these studies have used the same or very similar measures of gambling activity and harms as the Canadian surveys. The LRGG-SWG conducted an exhaustive review of potential population datasets to include in the analysis. To minimize the potential bias of including only datasets that have produced peer-reviewed journal publications, we included grey literature (e.g. government reports of gambling surveys) in the search. This revealed several datasets that were the product of population health surveillance activities rather than academic research. Identified datasets were assessed on the following criteria to determine suitability:

1. Comparability of the instruments (e.g. PGSI) was used to assess harm.
2. Similarity in the questions used to assess gambling frequency, expenditure and duration.
3. Method of participant recruitment (random, targeted, oversampling of high-risk gamblers).

Assessing the feasibility of conducting the desired analyses

This inventory yielded 29 possible datasets. After assessing the characteristics of each dataset, the LRGG-SWG determined that some would be unsuitable for the project. The most common reasons for exclusion of a dataset were: the questions used to assess gambling activity were atypical or lacked sufficient precision in the data produced (e.g. use of a categorical rather than a continuous scale for expenditure); overall sample size was too small to produce robust risk curves, and; the sampling of gamblers was non-random. A final set of 13 datasets were selected to conduct feasibility assessments to determine whether it was possible to conduct the desired risk curves on each dataset.

Conducting analyses using the selected datasets

Analyses will be conducted to determine the relationship between gambling activity and onset of gambling related harms. Because there is no consensus on an aggregate threshold of harm, it was determined that risk curves should be constructed for individually defined harms.

Table 2: Studies that have documented the dose-response relationship in gambling

Study - year	Region	Sample	Gambling behaviour	Harm definition
Currie et al. (2006)	Canada	General population (N = 19.012)	Frequency, total expenses, percent of income spent on gambling	≥2 consequences[a]
Weinstock et al. (2007)	US	Problem gamblers in treatment (N = 178)	Frequency, percent of income spent, duration per session	≥1 symptoms of problem gambling[b]
Weinstock et al. (2008)	US	College students (N = 159)	Frequency, percent of income spent, duration per session	Yes/no met criteria for pathological gambling[c]
Currie et al. (2008)	Canada	General population (N = 7, 675)	Frequency, total expenses, percent of income spent on gambling, duration per session	≥2 consequences[a]
Dragicevic et al. (2011)	Europe	Online casino gamblers from several European countries (N = 546)	Frequency and size of bets	Total losses
McCormack et al. (2013)	UK, US, Canada, and Australia	Online gamblers (n = 975)	Duration of session, years gambling online	Yes/no met criteria for problem gambling[a]
Quilty et al. (2014)	Canada	Psychiatric outpatients (N = 275) and general population (N = 228)	Frequency, total expenses, duration per session	≥2 consequences[a]
Brosowski et al. (2015)	Germany	General population (N = 15 023)	Frequency, total losses, number of game types played	≥1 to ≥4 symptoms of gambling disorder[d]
Markham et al. (2014)	Australia	EGM players in the general population (N = 7049)	Expenditure on EGMs	≥2 consequences[a]

[a]PGSI defined.
[b]South Oaks Gambling Screen defined symptoms.
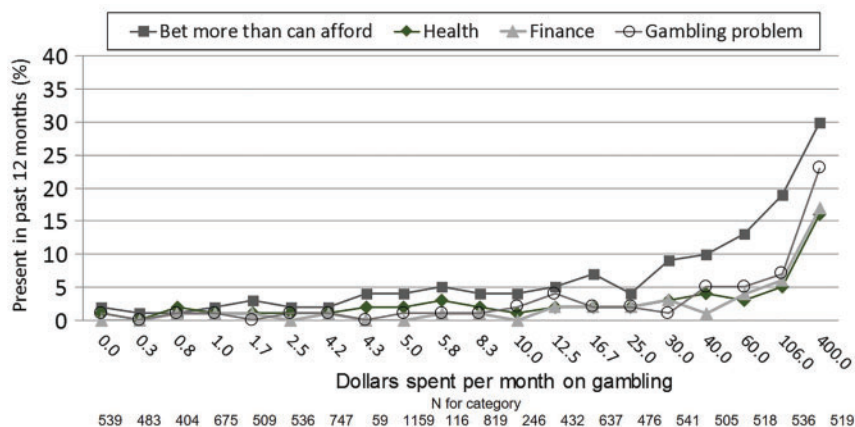[c]DSM-IV symptoms.
[d]DSM 5 symptoms.

Fig. 1: Risk curve showing the relationship between typical monthly expenditure on all forms of gambling and self-reported harms. Group categories of approximately equal size were created for the x-axis (sample size for each category is shown below the axis). The spending midpoint (Canadian dollars) are the labels on the x-axis. Harms derived from the Problem Gambling Severity Index. Total N = 7675.

Furthermore, the work of Li, et al. (2017) and Miller et al. (2013) indicates that not all gambling-related harms have the same impact on quality of life. Therefore, it is possible that the optimal low-risk limits depend on the specific harms being assessed.

Statistical methods will be adapted from previous studies on the gambling dose-response relationship (Currie et al., 2008). Aggregate measures of gambling frequency, expenditure and duration will be created from the detailed information collected on individual playing habits for specific game formats (e.g. EGMs, Bingo, etc.). Risk curves will then be calculated separately for the principal dimensions of gambling intensity: frequency of any gambling (days) in a typical month; typical expenditure (net loss) on all forms of gambling in a month, percent of gross monthly income spent on all forms of gambling in a month, and; duration of a typical session (minutes). Figure 1 display an application of this approach using Canadian cross-sectional data. The dataset used in this analysis (Currie et al., 2008) consists of gambling prevalence surveys pooled from individual provincial studies conducted between 2001 and 2006. Working with a combined sample of over 7 600 adults individual risk curves show the dose-response relationship between gambling expenditure per month on all forms of gambling and four types of consequences: betting more than one can afford, health problems, financial problems and perception of having a gambling problem. All harms were measured using individual items from the Problem Gambling Severity Index (Currie et al., 2013). The point on the curve where the relative risk of harm sharply changes—in this case

around $70 to $80 per month—is approximately the same for all measures of harm.

Risk curves are largely a qualitative method to visualize the dose-response relationship. Risk curves themselves are not used to set a cut-off. Quantitative methods, beginning with receiver operating characteristic (ROC) analysis, will be used to pinpoint an optimal threshold for discerning low and high-risk levels of gambling involvement. With this approach, the performance of various cut-off levels over the complete range of non-zero scores can be tested. The nominal area under the curve (AUC) is a general index of the accuracy of prediction [values above 0.7 are desired (Swets et al., 2000)]. Only curves with an AUC of 0.70 or higher will be accepted as evidence of a gambling activity-harm relationship. A cut-off is normally chosen based on optimizing sensitivity and specificity (Ruopp et al., 2008). Because low specificity values increase the proportion of false positives, a variation will be used to ensure specificity is maintained at 0.70 or higher (Currie et al., 2017). As a final step, logistic regression model will be used to estimate the odds of experiencing future harm if an individual who gambles exceeds each threshold. A relative risk approach will be taken whereby the probability of experiencing harm is estimated in gamblers who exceed the low-risk thresholds compared to gamblers who remain below the thresholds.

These analyses will be conducted across multiple datasets from several countries. If optimal thresholds for each measure of gambling activity are consistent across harms assessed as well as datasets examined, then such a threshold will be considered as highly reliable and will

be adopted as part of the LRGGs. Both Li *et al.* (2017) and Miller *et al.* (2013) found that not all gambling-related harms have the same impact on quality of life. Therefore, if results indicate that different optimal thresholds are associated with different gambling-related harms we will assess whether some harms should be considered more than others when determining over-all low-risk limits. With input from the external experts who conducted the targeted analyses a final synthesis of the relative risk assessments and proposed low-risk limits will be put forward to the Low-Risk Gambling Advisory Committee for endorsement.

Validating the limits

Once the recommended LRGGs have been developed, they must be validated, via qualitative methods (i.e. focus groups and structured interviews), among individuals who gamble at low or moderate risk and affected others (e.g. spouse or close kin, friends). It will be important to assess participants' opinions and understanding of the LRGGs and how they might be applicable to different gambling activities and contexts (e.g. consuming alcohol or other substances while gambling, online gambling). The feedback from end users will ultimately improve the recommendations and optimize knowledge translation efforts when they are released.

Adaptation to special populations

There is an abundance of evidence that vulnerability to the harms of gambling may vary across subpopulations. Several literature reviews identify the demographic groups with the highest risk of developing gambling problems such as male, younger adults, persons with comorbidities including substance use disorders, persons with a low income and non-Caucasians (Raylu and Oei, 2002; Johansson *et al.*, 2009). Because conclusions about high-risk subpopulations have relied heavily on cross-sectional and correlational study designs, the LRGG project team intends to expand the previous literature to incorporate more recent findings from longitudinal designs and emerging international studies. The intent is to identify the most robust and reproducible predictors of gambling disorder that define player populations in need of special consideration in safer play messaging. This information will assist in tailoring the LRGGs for these populations—groups for which more conservative limits or even abstinence may be recommended because they are more vulnerable to the harms from excess gambling—in the same way that the Low-Risk Alcohol Drinking Guidelines and Lower-Risk Cannabis Use Guidelines identify high risk populations.

DISCUSSION

Using similar collaborative, evidence-informed approach that produced the national alcohol drinking guidelines, Canada is leading the development of the first national low-risk gambling guidelines. The project also represents an international collaboration with risk curves being derived through secondary analyses of large population datasets held by several nations. The custodians of databases from seven countries (USA, Sweden, Finland, Iceland, New Zealand, Australia and Canada) that met our criteria for inclusion in the analysis have been approached to collaborate on this project. These datasets contain information on gambling behaviour and harms for over 50 000 individuals. A special meeting of the researchers engaged for this work was held in early 2017 to consolidate the analytic approach for further risk curve development. The ability to replicate dose-response relationship across international datasets will increase the external validity of any resulting LRGGs. There are also statistical power advantages to pooling the results from several large samples particularly in the upper range of gambling intensity where the confidence intervals for estimates can be quite large.

Over the next 2 years, the scientific working group will be pooling the results, validating the recommendations through qualitative methods and producing a technical report with recommendations for LRGGs. The draft LRGGs will include safe gambling thresholds (along the dimensions of frequency, expenditure and duration of a gambling session), limitations on their applicability and considerations for special populations (e.g. persons with mental illness, substance use disorders, prior gambling disorder) or gambling environments (e.g. Internet gambling) as the evidence dictates. The final LRGGs will be disseminated to addiction professionals, policy makers, regulators, communication experts and the gambling industry. The aim is to have these guidelines used in communication products that educate the public about low-risk gambling in general and in specific, hazardous situations such as in the context of alcohol or substance use.

Gambling is legal in all provinces and territories of Canada and continues to expand. In 2015 (the last year for which complete data for all provinces is available) Canada had 76 permanent casinos, 217 race tracks and over 98000 EGMs (Canadian Partnership for Responsible Gambling, 2018). Four out of 10 provinces have legalized Internet gambling. About 80% of Canadians have engaged in some form of gambling in the past year. About 2% of government revenue now comes from gambling. The weight of evidence to date

shows that problem gambling is associated with several physical, social and emotional consequences. As the average level of gambling participation increases in the population so does the proportion of individuals who gamble frequently or heavily. In many countries, governments act as both the regulator and the provider of gambling opportunities. Because governments profit directly from the gambling venues, they have a responsibility to monitor and limit the harm associated with excess gambling. The endorsement and promotion of evidence-informed LRGGs would be an important way to meet this responsibility.

Acknowledgements

Funding

Ethics information

The method described in the paper relies on secondary analyses of existing datasets. The project will only use population surveys that were approved by the researcher's local research ethics board for secondary analysis.

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