LRGG
Lower-Risk
Gambling Guidelines

Developing Lower-Risk Gambling Guidelines

Canadian Centre
on Substance Use
and Addiction

Evidence. Engagement. Impact.

Developing Lower-Risk Gambling Guidelines

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This document can also be downloaded as a PDF at www.ccsa.ca and www.gamblingguidelines.ca

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Conflict of Interest

In December 2020, Marie-Claire Flores-Pajot left CCSA and in May 2021 accepted a position at the Massachusetts Gaming Commission and ceased working on this project. Other members of the Lower-Risk Gambling Guidelines Scientific Working Group have no financial or non-financial potential conflicts of interest to declare.

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Lower-Risk Gambling Guidelines

These guidelines were developed using the most current and highest quality scientific evidence available.

To reduce your risk of experiencing harms from gambling, follow all three of these guidelines:

1 HOW MUCH

Gamble no more than **1%** of household income before tax per month

Yearly household income	Maximum monthly amount
$10,000	**$8**
$30,000	**$25**
$50,000	**$42**
$70,000	**$58**
$90,000	**$75**
$110,000	**$92**
$130,000	**$108**
$150,000	**$125**

and

4 HOW OFTEN

Gamble no more than **4 days** per month

WHAT YOU PLAY MATTERS

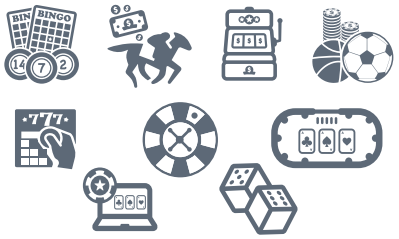
- Fast-paced games that involve quick and repeated betting can more quickly and easily lead to problems.
- For example, with many forms of online gambling, slot machines, electronic gaming machines and poker, people can spend large amounts of money in a short time.

and

2 HOW MANY

Avoid regularly gambling at more than **2 types** of games

GAMBLING TYPES INCLUDE THE FOLLOWING:



HOWEVER, these limits may not be suitable for you. You should consider gambling less than these guidelines recommend or not at all if you ...

- Experience problems from **alcohol**, **cannabis** or **other drug use**
- Experience problems with **anxiety** or **depression**
- Have a **personal** or **family history** of problems with gambling

SAFER GAMBLING TIPS

- Try to **limit your consumption of alcohol**, cannabis and other drugs while gambling. This will make it easier to stick to the guidelines.
- Try to **limit your access to money**. Consider leaving credit and debit cards at home. There are also apps that can prevent your phone from making payments.
- Try to **schedule activities** right after gambling sessions, which can set a limit on the amount of time you have to gamble.
- **Gambling with other people can affect how you gamble**. Think about how having gambling companions or gambling alone might impact you.
- **Entertainment money**. It is important to keep in mind how much money you are able to spend on entertainment when deciding how much to gamble.
- **Set limits**. If you have a big trip or special event coming up where you'll be gambling, plan ahead, remember the guidelines and set limits.

Visit www.gamblingguidelines.ca for more information.

WHAT ARE THE NEGATIVE CONSEQUENCES (HARMS) RELATED TO GAMBLING?

Losing money is the gambling harm that first comes to mind. But gambling can lead to other harms:

- Relationship conflicts, such as neglect of relationship, social isolation, arguing with your spouse
- Emotional distress, such as feelings of guilt, loneliness and isolation.
- Health problems, such as problematic use of alcohol or other drugs

Following these guidelines can help reduce your risk of gambling harms.

THINK ABOUT YOUR REASONS FOR GAMBLING

Is it for fun? If you're gambling to escape problems, you're more likely to experience harm from gambling and might find it harder to stick to the suggested limits.

If you think you are not in control or feel uncomfortable with your gambling, please visit [microsite link] for a list resources in your region.

These guidelines were developed for people of legal gambling age who want to make more informed choices about their gambling.

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IF YOU THINK YOU ARE NOT IN CONTROL OR FEEL UNCOMFORTABLE WITH YOUR GAMBLING, PLEASE VISIT WWW.GAMBLINGGUIDELINES.CA/GETTING-HELP FOR A LIST OF RESOURCES IN YOUR REGION.

Executive Summary

Gambling is a legal activity that poses potential risks to Canadians. Although only about 1% to 3% of the population struggles with a gambling disorder (Williams, Volberg, & Stevens, 2012), harms related to gambling are distributed widely across the entire population of people who gamble (Browne, 2020). Yet people are not aware of the risks of gambling-related harms and there is a lack of evidence-informed guidelines for people who gamble to help them do so in a way that reduces their risk of experiencing these harms.

The poster included at the beginning of this report presents the Lower-Risk Gambling Guidelines (LRGGs). They are the culmination of four years' work and have been produced by the first large-scale, comprehensive project in the world to develop lower-risk gambling guidelines. The guidelines provide a set of quantitative limits and a summary of information about special risk populations, contextual factors and other health messages that should be included when educating the public about how to gamble in a lower-risk manner. These guidelines are the result of:

- Collaboration with an international group of experts made up of the some of the top gambling researchers in the world;
- Risk curve analyses of over 60,000 people who gamble from eight different countries;
- Feedback from over 10,000 Canadians collected via an online gambling survey administered twice;
- A series of interviews and focus groups with over 50 people who gamble from across Canada;
- Two comprehensive literature reviews; and
- Consultation with a pan-Canadian, multi-sectoral advisory committee of over 20 members.

This report provides an overview and discussion of the guidelines and the evidence used to develop them. Its intended audience is anyone interested in learning about the methods and evidence used to develop the guidelines and about the rationale for them.

The most effective, long-term, sustainable strategy to ensure that the LRGGs reduce harms related to gambling is for organizations or teams dedicated to reducing these harms to use the guidelines and incorporate them in their products and promotional activities. It is hoped that existing initiatives and programs, public health professionals developing awareness campaigns to inform the public about lower-risk gambling, and those developing training materials and capacity-building programs aimed at identifying and preventing risky gambling will use the guidelines in their messaging and products so that they become an important component of a public health response to the issue of harms related to gambling.

See the project web site, www.gamblingguidelines.ca, for more information on adapting and using the guidelines. The LRGG main poster and accompanying products are available for download there. Detailed methods for and results of the research conducted to develop the guidelines have been published in scientific, peer reviewed journals and are available through open access. The published research is referenced throughout this report as appropriate. A full list of the scientific publications emerging from this project is available on the project website at www.gamblingguidelines.ca.

We sincerely hope that the LRGGs will be useful to all those dedicated to reducing the harms related to gambling.

Introduction

Gambling is a legal activity that poses potential risks to Canadians. Although only about 1% to 3% of the population struggles with a gambling disorder (Williams et al., 2012), harms related to gambling are distributed widely across the entire population of people who gamble (Browne, 2020). Gambling harms include financial harms (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), and health problems (e.g., reduced levels of self-care, tobacco smoking or use of alcohol or illegal substances). Yet people are not aware of the risks of gambling-related harms and there is a lack of evidence-informed guidelines for people who gamble to help them do so in a way that reduces their risk of harm.

In April 2016, the Canadian Centre on Substance Use and Addiction (CCSA) began leading a project to develop Lower-Risk Gambling Guidelines (LRGGs) using a collaborative, evidence-informed approach similar to that used to produce Canada's Low-Risk Alcohol Drinking Guidelines (Butt, Beirness, Gliksman, Paradis, & Stockwell, 2011) and the Lower-Risk Cannabis Use Guidelines (Fischer et al., 2017). CCSA accepted the project given its role as an independent, non-partisan and trusted third-party expert on substance use and addiction, its lead role in developing and promoting Canada's Low-Risk Alcohol Drinking Guidelines, and its role as a national, not-for-profit organization dedicated to reducing the harms associated with substance use and addiction, and given the co-morbidity between substance use disorder and gambling (Allami et al., 2021)

The LRGGs are intended to assist a wide variety of audiences, including:

- Anyone who gambles or who has friends or family who gamble;
- Policy makers, gambling regulators and operators with an interest in promoting lower-risk gambling;
- Those developing training materials and capacity-building programs for healthcare providers and allied professionals on how to identify risky gambling behaviour;
- Primary care, regional health authorities, mental health and addiction counsellors; and
- Those in public health and elsewhere who are developing campaigns to inform the public about lower-risk gambling.

This report provides an overview and discussion of the guidelines and the evidence used to develop them. Its intended audience is anyone interested in learning about the methods and evidence used to develop the guidelines and about the rationale for them.

Developing the Guidelines

To begin work on the LRGGs, CCSA established a scientific working group and an advisory committee:

- The **Lower-Risk Gambling Guidelines Scientific Working Group** (LRGG-SWG) was established in July 2016 to provide expert advice, conduct research to support developing the LRGGs and, ultimately, formulate guidelines for quantitative limits on frequency, duration and expenditure that are associated with a reduced risk of experiencing the harms related to gambling.
- The **National Lower-Risk Gambling Advisory Committee** was formed in November 2016 to provide guidance for the project and facilitate the uptake of the LRGGs once developed. The committee is made up of representatives from sectors associated with gambling-related issues, such as prevention, treatment, public health, regulation and finance, as well as the gambling industry.

Following the creation of these groups, the LRGG-SWG developed and published a research plan (Currie et al., 2018). The plan laid out the following research, which has been performed to develop the guidelines:

1. Reviewed the published literature and adopted a working model of gambling-related harm that could be used to examine the relationship between gambling involvement and gambling harm.
2. Assessed the relationship between gambling involvement and harm by:
    i. Collecting an inventory of high-quality, Canadian and international population datasets that could be used to assess the relationship between gambling involvement and gambling-related harm;
    ii. Calculating risk curves using these datasets;
    iii. Using the results of these analyses to develop a range of upper and lower quantitative limits that could reliably discriminate between higher- and lower-risk gambling; and
    iv. Calculating how risk of harm changes through the full range of calculated upper and lower quantitative limits, including points below the lower limit and above the upper limit.
3. Conducted a systematic literature review and meta-analysis assessing special risk populations and contextual factors associated with elevated risk of gambling harm.
4. Conducted a literature review to assess how alcohol, cannabis or other substances might influence how people gamble and the possible implications for the LRGGs.
5. Conducted an online survey of over 10,000 Canadians who gamble.
6. Conducted focus groups and interviews across Canada with over 50 people who gamble.

The result is a recommended set of quantitative limits, and information about special risk populations, contextual factors and other health messages that should be included when educating the public about how to gamble in a lower-risk manner. The limits, information and messaging are provided in the LRGG poster included at the beginning of this report. Detailed methods for and results of the research conducted to develop the guidelines have been published in scientific, peer reviewed journals and are available through open access. The published research is referenced throughout this report as appropriate. A full list of the scientific publications emerging from this project is available on the project website at www.gamblingguidelines.ca.

Evidence and Recommendations

In this report, we describe the evidence supporting the guidelines, as well as the factors influencing the decisions and final recommendations made by the LRGG-SWG, balancing epidemiological evidence, expert judgment and pragmatic considerations, as suggested by Holmes, Angus, Meier, Buykx, & Brennan (2019).

Adopting a Working Model of Gambling-Related Harm

To begin developing the LRGGs, it was first necessary to determine exactly what harms these guidelines would lower the risk of experiencing. The most comprehensive and evidence-based description of harms related to gambling to date is in *Assessing Gambling-related Harm in Victoria: A Public Health Perspective*. In this 2016 report, Browne and colleagues define 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" (Browne, et al., 2016, p. 36). The report outlines the following harm categories:

1. Financial (e.g., erosion of savings, bankruptcy)
2. Relationship disruption, conflict or breakdown (e.g., neglect of relationship, social isolation)
3. Emotional or psychological distress (e.g., distorted cognition, suicidal behaviours)
4. Health problems (e.g., reduced levels of self-care, tobacco smoking, use of illegal substances and alcohol)
5. Cultural harm (e.g., reduced engagement in the community, not meeting social expectations)
6. Reduced performance at work or study (e.g., decreased engagement, job loss)
7. Criminal activity (e.g., child neglect, conviction)

Given its comprehensiveness and the rigour with which it was developed, the LRGG-SWG decided to adopt this model.

To measure harm, we decided to use the Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001). Using the PGSI meant that it was possible to assess the Victoria-defined categories of relationship, financial, psychological and health harms consistently across any data sources that included the index (see Table 1). Unfortunately, three categories mentioned in Victoria's taxonomy are absent from PGSI: cultural harm, reduced performance and criminal activity.

Table 1: Harm categories and how they are operationalized using items from the Problem Gambling Severity Index

Harm category	PGSI Item
Financial	"Have you bet more than you could really afford to lose?" (PGSI 1) "Have you borrowed money or sold anything to get money to gamble?" (PGSI 4) "Has your gambling caused any financial problems for you or your household?" (PGSI 9)
Relationship disruption, conflict or breakdown	"Have you felt people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?" (PGSI 7)
Emotional distress	"Have you felt that you might have a problem with gambling?" (PGSI 5) "Have you felt guilty about the way you gamble, or what happens when you gamble?" (PGSI 6)
Health problems	"Has your gambling caused you any health problems, including a feeling of stress or anxiety?" (PGSI 8)

Assessing the Relationship Between Gambling Involvement and Harm

To assess the relationship between gambling involvement and harm we began by assessing and selecting a set of high-quality, Canadian and international population datasets that could be used to assess the relationship between gambling involvement and gambling-related harm. Once these datasets were selected, we calculated risk curves using them. Using the results of these analyses we next developed ranges of upper and lower quantitative limits that could reliably discriminate between higher- and lower-risk gambling. Finally, we assessed how risk of harm changed through the full range of calculated upper and lower quantitative limits. Detailed descriptions of the methods and results are described in Hodgins et al. (2021).

Selecting Appropriate Datasets

To begin, the LRGG-SWG conducted an exhaustive review of potential national and international population datasets that could be used to examine the relationship between each of the four harm categories (financial, relationship, emotional and psychological, and health) and gambling involvement. Gambling involvement was assessed using the following variables:

- **Expenditure:**
  - Self-reported net loss on all forms of gambling in a month
  - Self-reported percentage of gross monthly income before tax spent on all forms of gambling in a month
- **Frequency:**
  - Self-reported number of days an individual gambles in a typical month
- **Duration:**
  - Self-reported minutes spent gambling in a typical session
- **Types:**
  - Number of gambling types played in the past year

This review yielded 11 representative population datasets in which the PGSI was used to assess harm. All these studies used similar questions to assess gambling involvement (frequency, expenditure, duration and type of game). Similar methods of participant recruitment (random, targeted, oversampling of people who gamble at high risk) were used in all the surveys. See Table 2 for notes on the 11 datasets identified by the review.

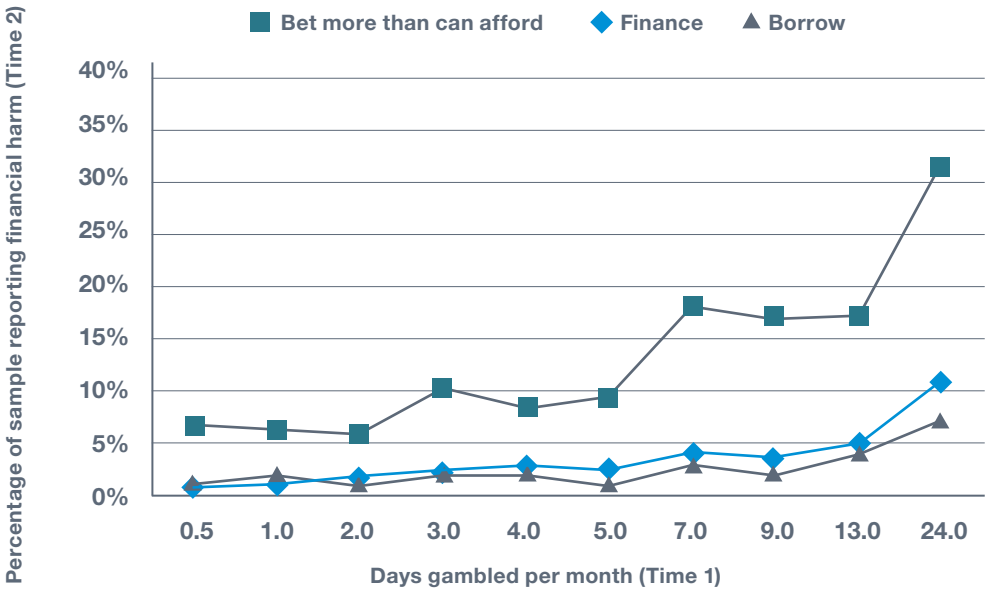
Once selected, the principal investigators in charge of each of the datasets (hereafter referred to as the international experts) were contacted to assess their interest in participating in the project. If interested, each expert was asked to determine how feasible it was to conduct risk curves on their data — that is, to plot each gambling involvement indicator against each harm indicator. An example of a risk curve is presented in Figure 1. All investigators contacted determined that it was feasible to conduct the requested analyses and accepted an invitation to participate in the project (Table 2).

Table 2. Datasets commissioned to conduct risk curves assessing the association between gambling involvement and gambling-related harm

Dataset	International Expert	Region	Year	Survey Design and Sampling	Sample N
The Leisure, Lifestyle, and Lifecycle Project and the Quinte Longitudinal Study (datasets merged)	Shawn Currie, David Hodgins	Alberta and Ontario, Canada	2009–2012	Longitudinal, random population sample + oversampling of people who gamble at risky levels	4,930
Icelandic Gambling Project	Daníel Ólason	Iceland	2005, 2007, 2011	Cross-sectional, random population sample	4,817
Finnish Gambling Population Survey	Anne Salonen, Jukka Kotto	Finland	2011, 2015	Cross-sectional, random population sample	6,934
SWELOGS	Ulla Romild	Sweden	2008–2014	Longitudinal, random population sample + oversampling of people who gamble at-risky levels	8,827
Enjeu 2014 - Enquête nationale sur les jeux d'argent et de hasard	Jean-Michel Costes	France	2014	Cross-sectional, random population sample	8,652
e-Enjeu - Enquête nationale 2012 sur les jeux d'argent et de hasard en ligne (online gambling)	Jean-Michel Costes	France	2012	Cross-sectional, random population sample	6,133
ENHJEU-Quebec	Sylvia Kairouz	Quebec, Canada	2012	Cross-sectional, random population sample	7,983
Victorian Gambling Study	Rosa Billi, Kristal Yeung	Australia	2008–2012	Longitudinal, random population sample + oversampling of people who gamble at risky levels	3,719
New Zealand 2012 National Gambling Study	Max Abbott, Nick Garrett	New Zealand	2012	Cross-sectional, random population sample	4,950
The Massachusetts Gambling Impact Cohort	Rachel Volberg	Massachusetts, United States	2013–2015	Longitudinal, random population sample + oversampling of people who gamble at-risky levels	2,617
Consolidated gambling prevalence surveys from Canadian provinces*	Shawn Currie	Ontario, Manitoba, New Brunswick and Newfoundland and Labrador, Canada	2005–2016	Cross-sectional random population sample	15,765

***Note:** Datasets from provincial gambling prevalence surveys conducted in Ontario (2005), Manitoba (2006, 2013, 2016), New Brunswick (2009, 2014), and Newfoundland and Labrador (2005, 2009) were merged to create a consolidated data source for the project. Datasets from other provinces could not be used because we could not obtain access from the data custodian or the survey data was considered too old (pre-2005).

Figure 1. Example of a risk curve plotting self-reported number of days gambled at time 1 (initial administration of survey) vs. percentage of sample reporting financial harm at time 2 (follow-up administration of survey) (data from merged datasets of Leisure, Lifestyle, and Lifecycle Project and Quinte Longitudinal Study)



Establishing a Range of Lower-Risk Gambling Involvement

The LRGG-SWG used statistical methods from previous studies on the gambling dose–response relationship (Currie et al., 2008) to generate risk curves for the selected datasets. To establish a common approach, a data collection tool was prepared to ensure the international experts derived comparable aggregate measures of gambling frequency, expenditure, duration and number of gambling types. The international experts produced separate risk curves for each measure of gambling involvement and each harm item (Table 1) and were asked to provide lower and upper limits[1] of a lower-risk band of gambling involvement. Similar criteria were used by Australia in their report on empirically derived responsible gambling limits (Dowling et al., 2018).

Using the results provided by the risk curve analyses conducted by the contributing international experts, the LRGG-SWG established ranges of limits based on a modal analysis, an assessment of the mean of the upper and lower range limits, and validation via visual inspection of the risk curves themselves.

In deciding upon the ranges for the quantitative limits, the LRGG-SWG reviewed over 260 risk curves, involving over 60,000 people. There was considerable similarity in the risk curves generated from international datasets and the Canadian longitudinal data from Ontario and Alberta and cross-sectional data from Quebec. This convergence of findings was encouraging given the different survey countries, years conducted, languages and cultures, as well as the different survey questions, survey design and sampling strategies employed by the contributing surveys. These findings suggest the dose–response relationship between gambling activity and harm is robust. It also suggests the LRGGs may be applicable in the countries that provided data for the project.

[1] The Youden Index was applied, an approach that attempts to maximize both sensitivity and specificity. According to this criterion, the identified limit gives equal weighting to and thus optimizes both sensitivity and specificity. Application of the Youden index can lead to a high proportion of false positives, resulting in overly conservative limits. To establish a higher limit, international experts were asked to maximize specificity while ensuring that sensitivity was fixed at 0.5 or higher.

Based on these analyses, the LRGG-SWG derived ranges of limits for gambling expenditure, frequency and number of gambling types. However, it determined that developing quantitative limits on duration of play was not possible due to the limited data available (see Table 3).

Table 3. Lower-risk gambling ranges derived from risk curves developed using 11 datasets from eight different countries

Gambling involvement indicator	Lower-risk gambling range
Expenditure	
- as CAD per month	$60 to $120 per month
- as percentage of income	1.0% to 3.0% of gross monthly income
Frequency	5 to 8 days per month
Number of gambling types	3 to 4 different game types in a month
Duration	Insufficient quality data to assess at present

***Note:** Expenditure amounts were provided by the international experts in local currency (e.g., euros, U.S. dollars, króna, etc.) and were converted to Canadian dollars using the purchasing power parity conversion rates developed by the Organization for Economic Co-operation and Development. "Purchasing power parities (PPPs) are the rates of currency conversion that equalise the purchasing power of different currencies by eliminating the differences in price levels between countries. In their simplest form, PPPs show the ratio of prices in national currencies of the same good or service in different countries. PPPs are also calculated for groups of products and for each of the various levels of aggregation up to and including GDP. The basket of goods and services priced is a sample of all those that are a part of final expenditure: household consumption, government services, capital formation and net exports, covered by GDP." Quoted from https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm

Sex Differences

All international experts were asked to produce separate risk curves for males and females, and to statistically test whether the low-risk limits were different for males and females for all the harms. Results indicated that less than 30% of analyses submitted found significant differences according to sex, and there was a lack of consistency among the datasets as to which harms showed such differences. Based on these results, the LRGG-SWG felt there was not enough evidence to conclusively determine whether there is a sex difference in the relationship between gambling involvement and risk of harms. Thus, the group decided there was insufficient justification to develop separate risk curves for males and females. Further research is recommended to determine conclusively whether there should be different limits established for men and women.

Guidelines about Quantitative Limits

Once the ranges of limits were developed, the LRGG-SWG worked with the international experts to develop tables describing change in risk of harm associated with increased gambling involvement. Combining all 11 data sets resulted in sample sizes of approximately 60,000, depending on the specific variables involved. This analysis permitted the LRGG-SWG to assess how risk of a particular harm increased as gambling involvement increased through the range of possible limits. In addition to these risk change calculations, participants in our focus groups[2] were asked about the ranges of possible limits (Flores Pajot et al., 2021). Further, in our online survey of over 10,000 Canadians who gamble,[3] we solicited feedback on different limits. Using this information, the LRGG-SWG agreed on recommended quantitative limits for expenditure, frequency and number of gambling types. Detailed descriptions of the methods and results are described by Young et al. (2021).

Expenditure

The expenditure guideline derived from the risk curve analyses ranged between $60 and $120 per month when expressed as Canadian dollars and between 1% and 3% of gross monthly household income. Information acquired via the online survey of people who gamble regularly and the focus groups indicated that, for many, an exact dollar figure would not be credible given the variability of income among Canadians. For this reason, percentage of household income was preferred.

Gamble no more than 1% of household income before tax per month.

[2] To understand how people who gamble use self-control strategies and to gauge reactions and feedback from people who gamble on different versions of the LRGGs, nine focus groups and five individual interviews (n= 56; 27 male and 29 female) were conducted in English and in French (Flores-Pajot et al., 2021).

[3] The LRGG-SWG collaborated with the Alberta Gambling Research Institute on the first national online survey on gambling and problem gambling in Canada. This collaboration permitted the LRGG-SWG to assess how limits at the lower and upper ranges would be understood and received by people who gamble. The survey collected responses from online participants who gamble in two phases: Phase I in August 2018 (n= 10,199) and phase II in August 2019 (n=4,583). The phase II survey was used to assess the validity, clarity and interpretation of draft LRGG quantitative messages, display different LRGG limits, gauge reactions and solicit additional feedback on LRGG messaging.

Table 4. Change in risk from reference group (i.e., <=0.1%) occurring when gambling expenditure (%) per month predicts financial, relationship, emotional and psychological, and health harms (N=59,099)

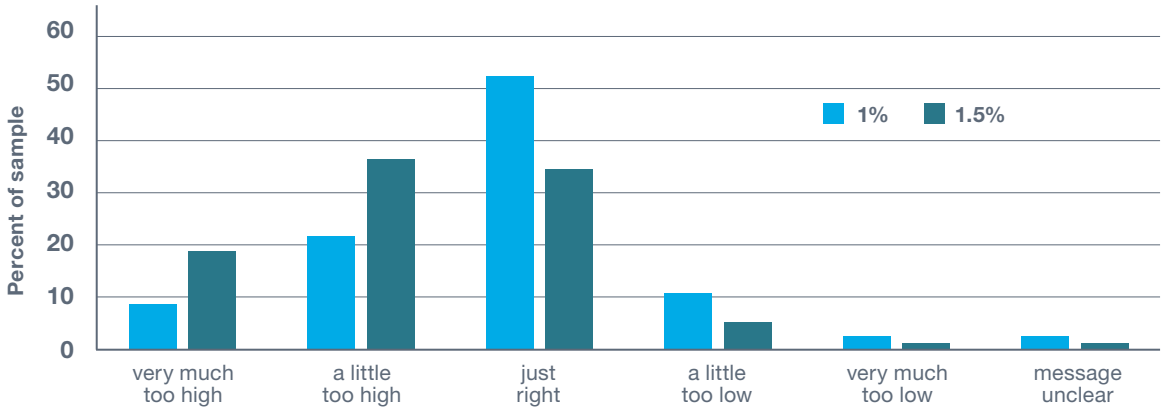
	≤0.1%	0.11 to 0.50	0.51 to 1.00	1.1 to 2.0	2.1 to 3.0	3.1 to 4.0	4.1 to 5.0	5.1 or more
Sample size in category	17,634	15,926	7,708	6,250	2,988	1,700	1,082	5,811
HARM								
Financial								
Sample reporting harm (n)	335	535	429	507	337	221	144	1,510
% reporting harm	1.9%	3.4%	5.6%	8.1%	11.3%	13.0%	13.3%	26.0%
Risk relative to reference group		1.8X	3.0X	4.3X	5.9X	6.8X	7.0X	13.7X
Relationship								
Sample reporting harm (n)	173	249	207	287	178	129	99	1,045
% reporting harm	1.0%	1.6%	2.7%	4.6%	6.0%	7.6%	9.1%	18.0%
Risk relative to reference group		1.6X	2.7X	4.7X	6.1X	7.7X	9.3X	18.3X
Emotional/psychological								
Sample reporting harm (n)	441	638	460	616	374	250	178	1,551
% reporting harm	2.5%	4.0%	6.0%	9.9%	12.5%	14.7%	16.5%	26.7%
Risk relative to reference group		1.6X	2.4X	3.9X	5.0X	5.9X	6.6X	10.7X
Health problems								
Sample reporting harm (n)	142	221	157	219	133	87	76	776
% reporting harm	0.8%	1.4%	2.0%	3.5%	4.5%	5.1%	7.0%	13.4%
Risk relative to reference group		1.6X	2.5X	4.4X	5.5X	6.4X	8.7X	16.6X

< 2.0X and > 1.0X
< 4.0X and >=2.0X
>=4.0X

When examining increase in risk associated with expenditures of 1.0% to 3.0% of gross monthly household income (Table 4), it was clear that, relative to those gambling less than 0.1%, risk of harm increases four times as expenditure increases beyond 1.0% of gross monthly household income. This increase aligns with the lower limit for monthly expenditure when expressed as Canadian dollars. According to the 2016 Canadian census,[4] the median Canadian household pre-tax income was $70,336. One percent of $70,000 is equivalent to approximately $60 per month. The limit of 1% (vs. 1.5%) was also preferred by respondents in our online panel survey (Figure 2).

[4] Income Highlight Tables, 2016 Census. Retrieved from https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/inc-rev/Table.cfm?Lang=Eng&T=102&PR=0&D1=1&RPP=25&SR=1&S=108&O=D

Figure 2. Responses (n=4,583) to the question, "To reduce the risk of experiencing problems, does the message of gambling no more than (1% or 1.5%) per month seem too high, too low or just right for most people who gamble?"



For these reasons, the LRGG-SWG recommends the following quantitative limit for expenditure:

However, percentage household income before tax is challenging to communicate clearly in a public health message. Focus group participants suggested including a table describing the monthly equivalent of 1% of household income for a variety of different gross incomes and the LRGG-SWG agreed. The message about expenditure should be accompanied by a table similar to Table 5.

Table 5. Monthly spending amount based on 1% of yearly income

Yearly household income	Maximum monthly amount
$10,000	**$8**
$30,000	**$25**
$50,000	**$42**
$70,000	**$58**
$90,000	**$75**
$110,000	**$92**
$130,000	**$108**
$150,000	**$125**

Frequency

Similar to expenditure, for frequency the LRGG-SWG began by examining the ranges of frequency limits emerging from the risk curve analyses. The frequency ranges derived from the risk curve calculations ranged from five to eight days per month. When examining increase in risk associated with gambling across this range (Table 6), it was found that gambling five to six days per month results in a 2.0 to 2.5 times increased risk of gambling related harm compared to those who gambled once or fewer times per month; gambling seven to eight days per month results in about a threefold increase in risk of harm; and those gambling nine days or more a month are more than seven times more likely to report harm.

Gamble no more than 4 days per month.

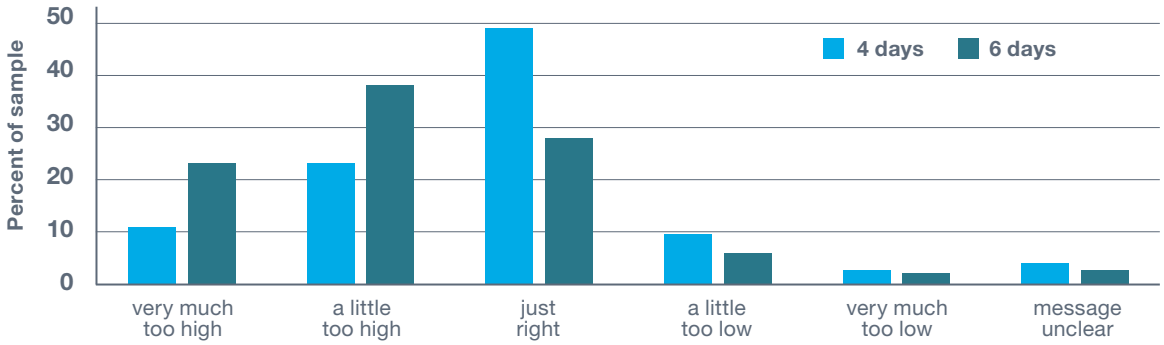
Table 6. Change in risk occurring when number of gambling days per month predicts probability of reporting financial, relationship, emotional and psychological, and health harms (N=64,706)

	≤1 day	2 days	3-4 days	5-6 days	7-8 days	9+ days
Sample size in category	26,659	7,238	10,417	6,311	3,154	10,927
HARM						
Financial						
Sample reporting harm (n)	645	319	511	384	274	2064
% reporting harm	2.4%	4.4%	4.9%	6.1%	8.7%	18.9%
Risk relative to reference group		1.8X	2.0X	2.5X	3.6X	7.8X
Relationship						
Sample reporting harm (n)	275	162	305	160	121	1436
% reporting harm	1.0%	2.2%	2.9%	2.5%	3.8%	13.1%
Risk relative to reference group		2.2X	2.8X	2.5X	3.7X	12.7X
Emotional/psychological						
Sample reporting harm (n)	772	450	663	431	286	2273
% reporting harm	2.9%	6.2%	6.4%	6.8%	9.1%	20.8%
Risk relative to reference group		2.1X	2.2X	2.4X	3.1X	7.2X
Health problems						
Sample reporting harm (n)	263	128	232	128	91	1073
% reporting harm	1.0%	1.8%	2.2%	2.0%	2.9%	9.8%
Risk relative to reference group		1.8X	2.3X	2.1X	2.9X	10.0X

< 2.0X and > 1.0X
< 4.0X and >=2.0X
>=4.0X

When consulting individuals involved in the focus groups and interviews, most participants reported four days per month or about once a week as reasonable and easy to understand. Further, when presented frequency limits of four and six days per month, almost 50% of respondents of our online panel survey rated a limit of four days per month as "just right" and almost 40% rated six days as "a little too high" (Figure 3).

Figure 3. Responses (n=4,583) to the question, "To reduce the risk of experiencing problems, does the message of gambling no more than (4 days or 6 days) per month seem too high, too low or just right for most people who gamble?"



Another factor in deciding about messages was how easily they could be remembered and communicated. The limit of four days per month could be easily communicated as once a week. For these reasons, the LRGG-SWG recommend the following quantitative limit for frequency:

Number of Gambling Types

Similar to expenditure and frequency, for number of gambling types the LRGG-SWG began by examining the ranges. The risk curve analyses indicated that risk of harm increased more rapidly when people gambled on more than three to four different game types per year. Examining the increase in risk associated with increased number of types (Table 7), gambling on three game types in the past year results in a doubling of risk of harm and gambling on four game types results in almost triple the risk for financial and relationship harms and more than quadruple the risk for emotional and psychological harms. However, for the other quantitative limits, we were able to assess how risk of harm increased based on past month gambling involvement. For the assessment of number of gambling types, we could only assess the number of gambling types played in the past year. Because the other limits are expressed as monthly guidelines and we could not do so for this limit, the LRGG-SWG decided to frame this guideline differently. Therefore, the LRGG-SWG recommends the following quantitative limit for number of gambling types:

Avoid regularly gambling at more than 2 types of games.

Table 7. Change in risk occurring when number of gambling types played in the last year predicts financial, relationship, emotional and psychological, and health harms (N=66,873)

	≤1	2	3	4	5	6+
Sample size in category	27,452	18,286	10,485	6,037	3,214	3,399
HARM						
Financial						
Sample reporting harm (n)	964	856	781	588	438	827
% reporting harm	3.5%	4.7%	7.4%	9.7%	13.6%	24.3%
Risk relative to reference group		1.3X	2.1X	2.8X	3.9X	6.9X
Relationship						
Sample reporting harm (n)	537	471	406	343	257	496
% reporting harm	2.0%	2.6%	3.9%	5.7%	8.0%	14.6%
Risk relative to reference group		1.3X	2.0X	2.9X	4.1X	7.5X
Emotional/psychological						
Sample reporting harm (n)	1060	980	891	711	513	888
% reporting harm	3.9%	5.4%	8.5%	11.8%	16.0%	26.1%
Risk relative to reference group		1.4X	2.2X	4.1X	5.7X	9.8X
Health problems						
Sample reporting harm (n)	487	377	311	261	160	364
% reporting harm	1.8%	2.1%	3.0%	4.3%	5.0%	10.7%
Risk relative to reference group		1.2X	1.7X	2.4X	2.8X	6.0X

< 2.0X and > 1.0X
< 4.0X and >=2.0X
>=4.0X

When consulting individuals involved in the focus groups and interviews, many participants did not understand what was meant when discussing gambling type and how limiting play on more than one type of game during a given time period might lower their risk of gambling-related harms. Given potential issues about comprehension of this limit, some information should be provided about what constitutes different types of gambling. A suggested example is provided in the next section.

The Importance of "And"

The analyses conducted to arrive at the quantitative limits were conducted independently. This means that adhering to one limit (e.g., gambling less than four times per month), but exceeding another (e.g., spending more than 1% of gross household income in a month) results in an increased risk of harm. Therefore, the final messaging of the guidelines needs to emphasize that to remain at lower risk of gambling-related harms, **all three** of the quantitative limits must be followed. When the guidelines are described, the "and" connecting them as a unit is essential.

Recommendations about Special Risk Populations and Contextual Factors to Be Considered

To determine if there are special risk populations or other contextual factors that must be included as part of the guidelines, the LRGG-SWG commissioned a systematic search of the published and grey literature to identify all population prevalence surveys conducted world-wide up to March 2019. Prevalence studies conducted prior to 2011 had previously been identified (Williams et al., 2012). The search identified 255 studies in total, of which 104 contained information about problem gambling correlates useful for meta-analysis (Allami et al., 2021). The key factors that emerged were gambling type, mental health and substance use, and whether someone had a family history of gambling problems — all factors that can increase the risk of developing a gambling problem. Interestingly, the smallest effect sizes were found among demographic variables and no sex differences were detected.

Types of Gambling

The results of this analysis indicated that the type of gambling in which a person regularly engages is strongly associated with the risk of reporting gambling problems. Different gambling types are associated with different levels of gambling involvement. For example, discontinuous forms of gambling, such as lottery tickets, generally tend to be associated with lower frequency and expenditure of gambling involvement, such as the individual who purchases a lottery ticket weekly or monthly. In contrast, continuous forms of gambling, such as electronic gaming machines (both venue-based and online versions) encourage continued play, frequent betting in one sitting and greater expenditure. The results of the meta-analysis indicated that online gambling and electronic gaming machines had the largest odds ratios and strongest effect sizes of all the correlates assessed. Because the LRGGs are aimed at providing guidelines to lower-risk levels of gambling involvement through lower frequency and expenditure, the LRGG-SWG recommended including the following statement about the role of gambling type in lower-risk gambling:

What you play matters. Fast-paced games that involve quick and repeated betting can more quickly lead to problems.

For example, with many forms of online gambling, slot machines, electronic gaming machines and poker, people can spend large amounts of money in a short time.

Substance Use and Mental Health

After removing types of gambling from the meta-analysis, there were a total of 14 problem gambling correlates that met the inclusion criterion established by the LRGG-SWG of medium effect size or higher and more than five studies assessing the relationship. These correlates are presented in Table 8.

Table 8. Problem-gambling correlates assessed, category, the number of studies from which data were extracted and effect size strength, according to criteria in Chen, Cohen, & Chen (2010)

Problem gambling correlate	Category	Effect size strength	Number of studies
Any mental health problem	MH	Medium	29
Internalizing symptoms	MH	Medium	19
Depression issues	MH	Medium	17
Suicidal thoughts	MH	Medium	8
Anxiety issues	MH	Medium	7
Attempted suicide	MH	Medium	6
Daily tobacco use	SU	Medium	27
Problems due to alcohol or drugs (general)	SU	Medium	17
Marijuana use	SU	Medium	16
Illicit drug use	SU	Medium	14
Problems due to alcohol	SU	Medium	11
Binge drinking	SU	Medium	10
Cocaine use	SU	Medium	7
Excitement or challenge	CD	Medium	18
Family member ever had a gambling problem	FH	Medium	32

***Note:** Categories: MH = mental health; SU = substance use; CD = cognitive distortions; FH = family history.

Based on the correlates presented in Table 8, the LRGG-SWG decided it was important to include the information about contextual variables in the final LRGGs.

Those who are gambling to escape problems are at greater risk of harm. The LRGG-SWG recommended including the following statement about reasons for gambling:

> **Think about your reasons for gambling. Is it for fun?**
> **If you're gambling to escape problems, you're more likely to experience harm from gambling and might find it harder to stick to the suggested limits.**

The risk of gambling harm is associated with the following contextual factors:

- Current or history of mental health problems;
- Current or history of problems associated with alcohol, cannabis or other drug use; and
- Current, history of or family history of gambling problems.

The LRGG-SWG recommended including the following statement about mental health, substance use and background:

HOWEVER, these limits may not be suitable for you.
You should consider gambling less than these guidelines recommend or not at all if you ...

- **Experience problems from alcohol, cannabis or other drug use;**
- **Experience problems with anxiety or depression;**
- **Have a personal or family history of problems with gambling.**

Other Information that Should Accompany the LRGGs

While developing the LRGGs, the LRGG-SWG kept a list of key information that should accompany the final LRGGs, which includes the following items:

- The guidelines should indicate that they were developed using the most current scientific evidence available.
- Findings from the focus groups and interviews indicated there was confusion about what was meant by gambling. For example, many did not consider lottery play as gambling. Similarly, there was confusion about what was meant by gambling harms. Public messaging about the LRGGs should include clear, concise explanations of what is meant by "gambling" and "gambling harms."
- The guidelines should include a statement about special events or trips similar to this: "If you are going on a trip or to a gambling event, remember the LRGGs, plan ahead and set limits."
- Any public document about the risk of gambling harms should include information on where to seek help for gambling problems for those in distress.
- The guidelines should note they are directed at and developed for those of legal gambling age.

Safer Gambling Tips

As was included in the Canadian Low-Risk Alcohol Drinking Guidelines (Butt et al., 2011), the LRGG-SWG also recommended that the LRGGs could be accompanied by suggestions that would help people adhere to them. These tips were derived from the focus groups (Flores-Pajot et al., 2021), the online surveys (Currie et al., 2020; Young et al., 2021) and the literature reviews (Allami et al., 2021).

Use of Alcohol or Other Drugs while Gambling

The systematic review of gambling correlates conducted for this project revealed a strong association between substance use disorders and problem gambling. However, research on the association between acute use of alcohol and other drugs and risk-taking is limited. Nonetheless, respondents from the online panel survey reported that limiting their alcohol and cannabis consumption was helpful in reducing their gambling (Currie et al., 2020). Focus group and interview participants reported that consuming alcohol or using substances while gambling was a problematic practice as it could negatively influence their gambling (Flores-Pajot et al., 2021).

The LRGG-SWG decided the most prudent approach would be to include a safer gambling tip to limit consumption of alcohol, cannabis and other substances while gambling:

Try to limit your consumption of alcohol, cannabis and other drugs while gambling. This will make it easier to stick to the guidelines.

Other Safer Gambling Tips

Our literature review of self-regulatory strategies and their effectiveness in reducing harms related to gambling revealed that there is still much that remains unknown or unclear about such strategies (Lubman et al., 2015; Rodda et al., 2018; Thomas et al., 2010). The amount of evidence available for different strategies is often limited or inconsistent across studies (Drawson, Tanner, Mushquash, Mushquash, & Mazmanian, 2017). Nonetheless, the uptake of self-help strategies can be associated with perceptions of self-efficacy (Lubman et al., 2015), potentially helping to improve an individual's decision making and resource use, and to encourage the formation of partnerships between patients and healthcare providers (Matheson et al., 2019). Public health messaging promoting these strategies could help people better manage their gambling (Hing et al., 2019).

For these reasons, the LRGG-SWG recommended that "safer gambling tips" accompany the guidelines. The quantitative limits should remain the focus of messaging and knowledge products, but including safer gambling tips could help people stay within the limits. Based on the results of the reviews conducted, the LRGG-SWG recommended including the following safer gambling tips:

1. **Regarding special events**
   Set limits. If you have a big trip or special event coming up where you'll be gambling, plan ahead, remember the guidelines and set limits.
2. **Regarding access to money**
   Try to limit your access to money. Consider leaving credit and debit cards at home. There are also apps that can prevent your phone from making payments.
3. **Regarding planning engagements**
   Try to schedule activities right after gambling sessions, which can set a limit on the amount of time you have to gamble.
4. **Regarding social influences**
   Gambling with other people can affect how you gamble. Think about how having gambling companions or gambling alone might impact you.
5. **Regarding strategies to monitor expenditure**
   Entertainment money. It is important to keep in mind how much money you are able to spend on entertainment when deciding how much to gamble.

From Evidence to Public Messaging

Throughout the project, the LRGG-SWG carefully considered the most effective way to provide people information about lower-risk gambling in an easily understood, accessible manner. To assist us in doing so, we reviewed the literature on risk communication before developing a first iteration of LRGG messages. A presentation of these messages in poster format was then presented to online focus groups.[5] Feedback from these groups was then incorporated into the wording of the guidelines. The final messages recommended by the LRGG-SWG and illustrated in the LRGG poster provided at the beginning of this report are collected in tables 9 and 10.

Table 9. Recommendations of the LRGG-SWG on content to be included in the final LRGGs

Quantitative Limits
The following quantitative limits should be included: To reduce your risk of experiencing harms from gambling, the Lower-Risk Gambling Guidelines recommend that you consider: *HOW MUCH — Gamble no more than **1%** of household income before tax per month.* *and* *HOW OFTEN — Gamble no more than **4 DAYS** per month* *and* *HOW MANY — Avoid regularly gambling at more than **2 TYPES** of games*
Special Risk Populations and Contextual Factors
Reasons for Gambling Because a person's motivation for gambling is a key predictor of gambling related harms, the following text should be included: *Think about your reasons for gambling. Is it for fun? If you're gambling to escape problems, you're more likely to experience harm from gambling and might find it harder to stick to the suggested limits.* **Background** Because some populations are at greater risk of gambling-related harms, the following text should be included: *HOWEVER, these limits may not be suitable for you. You should consider gambling less than these guidelines recommend or not at all if you ...* *Experience problems from alcohol, cannabis or other drug use* *Experience problems with anxiety or depression* *Have a personal or family history of problems with gambling"* **Gambling Type** People who engage in some forms of gambling are at greater risk of gambling-related harms. Include the following statement with examples of what is meant by different types of gambling: *What you play matters* *Fast-paced games that involve quick and repeated betting can more quickly lead to problems.* *For example, with many forms of online gambling, slot machines, electronic gaming machines and poker, people can spend large amounts of money in a short time.*

[5] A total of 34 individuals participated in the online focus groups. The groups were held on Monday, July 20, 2019, and conducted using itracks Bulletin Board Platform. Participants logged on to the platform throughout the day and answered questions posted by the moderators. French and English language groups were conducted on separate boards (17 participants each). Participants in each group were segmented into three categories: those who abstain from gambling, those who gamble infrequently (1–3 times per month), and those who gamble more frequently (4 times a month or more). Participants who gambled participated in a variety of different gambling activities. Participants in the English language group resided in British Columbia, Alberta, Saskatchewan, Manitoba and Ontario. Participants in the French language group resided in Quebec.

Table 10. Recommendations of the LRGG-SWG on important information to accompany the LRGGs

Describe the Harms Associated with Gambling

The following description of what is meant by gambling-related harms should be included:

Losing money is the gambling harm that first comes to mind. But gambling can lead to other harms:

Relationship conflicts

Emotional distress

Health problems

Following these guidelines can reduce your risk of gambling harms.

Safer Gambling Tips

Some practices can make it easier for people to adhere to the guidelines and reduce their risk of gambling-related harms. To provide tips about these practices, the following text **can** be included (optional).

Try to limit your consumption of alcohol, cannabis and other drugs while gambling. This will make it easier to stick to the guidelines.

Try to limit your access to money. Consider leaving credit and debit cards at home. There are also apps that can prevent your phone from making payments.

Try to schedule activities right after gambling sessions, which can set a limit on the amount of time you have to gamble.

Gambling with other people can affect how you gamble. Think about how having gambling companions or gambling alone might impact you.

Entertainment money: It is important to keep in mind how much money you are able to spend on entertainment when deciding how much to gamble."

Set Limits. If you have a big trip or special event coming up where you'll be gambling, plan ahead, remember the guidelines and set limits.

Other Information

The following other pieces of information should be included:

These guidelines were developed using the most current scientific evidence available.

These guidelines were developed for people of legal gambling age who want to make more informed choices about their gambling.

Discussion

From the beginning of the project, the LRGG-SWG recognized that proposing limits on gambling behaviour could be controversial and stimulate debate on how the limits could impact gambling revenues, rates of gambling participation in the population and even regulatory practices. Holmes and colleagues (2019) astutely observe that when deciding on population guidelines such as these, developers must strike an appropriate balance between epidemiological evidence, expert judgement and pragmatic considerations when making recommendations about how to translate research evidence into guidelines. Their report reviews the range of subjective and non-statistical influences on the final determination of low-risk drinking limits that are promoted in many countries. The impact of these influences is most apparent when one considers the range of safe drinking thresholds across the world. If the statistical evidence on alcohol consumption and risk of harm was unequivocal, why are there such differences in the low-risk drinking limits across countries?

While the paper by Holmes et al. (2019) focuses on alcohol consumption thresholds, the points it raises and the recommendations arising from the study apply equally well to gambling. As a first step toward transparency, we adopted the suggestion from Holmes and colleagues to visually represent all the factors that were considered by the LRGG-SWG when determining the final quantitative limits. See Figure 4 for this representation.

Figure 4. Impact and importance of epidemiological judgments on guideline development

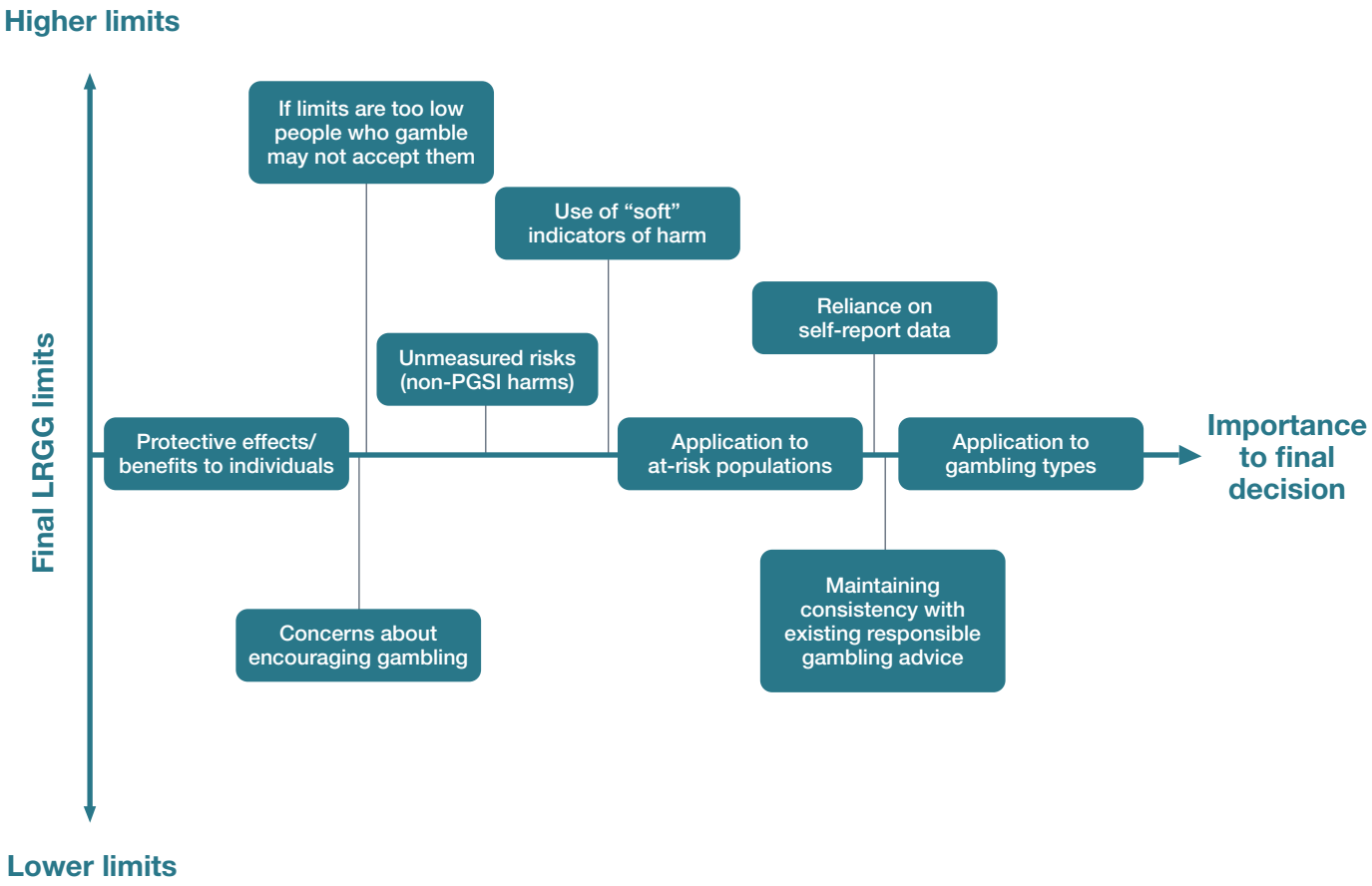


Figure 4 depicts the various categories of evidence and consideration not assessed by the research conducted for this project, and their relative weighting along two dimensions: how high the limits should be and importance to the LRGG-SWG decision making. Placement of each box on the vertical axis shows if it is an influence for higher or lower limits for expenditure, frequency and number of gambling types. The position of the box on the horizontal axis reflects the importance assigned to the influencing factor by the LRGG-SWG. Below is a description of each of the categories in Figure 4.

If Limits are Too Low People Who Gamble May Not Accept Them

If the LRGGs contain overly conservative quantitative limits for expenditure and frequency, they may not be viewed as credible by people who gamble regularly and therefore might be dismissed by those who could benefit from them. Guidelines that propose abstinence or extremely low levels of involvement might be ignored by the public.

Use of "Soft" Indicators of Harm

While mortality or morbidity for serious diseases are the harms considered when developing alcohol guidelines, the harms assessed for gambling are mainly psychosocial and economical in nature. These harms, while emotionally painful and stressful to individuals, are rarely life threatening. Moreover, the statistical modelling in the current work adopted a relative risk approach to identifying limits. Although people who exceed the limits show a threefold or higher increase in risk compared to the reference group, many who gamble above the limits report no harm. The proportion reporting harm increases as the limit is raised. For this reason, one could argue a higher limit is indicated for psychosocial and economic harms.

Protective Effects and Benefits to the Individual

Although currently contested, it has been widely believed that drinking at low levels has health benefits for certain populations (Haseeb, Alexander, & Baranchuk, 2017). There is no conclusive research showing the benefits of low levels of gambling participation in terms of enhanced well-being, protection against physical or mental illness, or other benefits. That said, the methods used for this research project were not sensitive to potential benefits. Although research that focuses on potential benefits might emerge in the future (e.g., Wood, Wohl, Tabri, & Philander, 2017), the LRGG-SWG did not consider possible psychosocial and health benefits of lower-risk gambling in making decisions about the final content of the LRGGs.

Concerns about Encouraging Gambling

A theme that emerged from the online panel survey and focus groups was concern that LRGGs could encourage gambling in persons who do not gamble currently or gamble below the limits. That is, the LRGGs could create a false sense of security in the general population.

Unmeasured Risks

The identification of the lower-risk limits was based on survey data that captured only some of the possible harms people can experience from gambling. The PGSI is a brief screening tool that does not cover the full range of gambling-related harms identified in the Victorian taxonomy. Some evidence was provided indicating that the harm items that were used were reasonably representative of harms more broadly. Nonetheless, if the analysis had access to dose–response data that assessed all possible gambling-related harms, it is possible the risk limits would be lower. The harms considered for these guidelines are described in the messaging. The LRGG-SWG felt there was a moderate likelihood that the limits would be lower if more harms were measured in the dose–response curves. The LRGG-SWG recommends that future population gambling surveys include the full range of harms captured in the Victorian taxonomy, so that the risk curves can be re-calibrated at a later date.

Reliance on Self-Report Data

Although research is limited, self-reported gambling activity has been shown to be moderately accurate (Wood & Williams, 2007). Biased reporting likely relates to the fact that most data are collected retrospectively (Walker, 2004) and there has been a lack of consistency in how gambling expenditures are calculated (Blaszczynski, Dumlao, & Lange, 1997). For instance, people who gamble who report expenditures by including their wins and losses report higher expenditures than those using the net expenditure strategy (Blaszczynski, Ladouceur, Goulet, & Savard, 2006). The LRGG-SWG was aware that gambling survey data are vulnerable to error and people can under-report behaviour and harms due to shame or stigma, or to be socially acceptable. These measurement issues were also recognized during the development of the low-risk drinking guidelines. If gambling activity data are indeed under reported, the low-risk limits for harm would be higher.

Application to At-Risk Populations and All Gambling Types

The LRGG-SWG recognizes the limit for harm might be lower in persons with more individual risk factors for problem gambling. For at-risk populations, lower limits for gambling activity or abstinence could be indicated. Similarly, the application of a frequency lower-risk limit of four days a month might not be sufficient for people who choose only higher risk games such as slot machines or online gambling. The LRGG-SWG felt these were important considerations. Rather than recommend higher or lower limits for specific populations, or limits specific to types of games, the LRGG-SWG recommends that the LRGGs include messaging for at risk populations, with direction to gamble below the limits or not at all.

Maintaining Consistency with Existing Gambling Messages

The LRGG-SWG felt the guidelines would have greater credibility and acceptance by the public if they were viewed as a refinement or evolution of existing gambling advice. The advice to “set a limit and stick to it” and variations of it are already pervasive in gambling harm reduction messaging. The LRGGs will build on this advice with the addition of specific spending limits. Although this factor is not a justification for higher or lower risk limits, it was considered important by the LRGG-SWG.

Objectivity and Transparency

To improve objectivity and transparency in making decisions based on epidemiological evidence, Holmes and colleagues (2019) put forward eight recommendations for researchers and policy makers. They provide a systematic approach to examining the uncertainty of variables that are used in decision making. An example of this uncertainty from the LRGG initiative is the ambiguity inherent in choosing a limit that is intended to delineate lower- and higher-risk gambling behaviour.

There is no gold standard for setting an optimal limit when using a relative risk approach. Our approach was to examine the impact of varying the sensitivity and specificity criteria along various outputs, including overall classification accuracy (percentage of true positives and true negatives for limit), proportion of people who gamble in the high-risk category, effect size in terms of predicting high-risk cases, and visually on the risk curve. We also conducted validity testing of the limits with actual people who gamble.

Conclusion

The LRGGs are the culmination of four years' work and have been produced by the first large-scale, comprehensive project in the world to develop lower-risk gambling guidelines. Work conducted to develop the guidelines included many complementary methodological approaches, including the use of international surveys, a mixed methods approach using both quantitative and qualitative data, consultations with people working in public health and so on. (See www.gamblingguidelines.ca for a full list of scientific publications emerging from this work.) Specifically, the guidelines are the result of:

- Collaboration with an international group of experts made up of the some of the top gambling researchers in the world;
- Risk curve analyses of over 60,000 participants drawn from representative population datasets from eight different countries;
- Feedback from over 10,000 Canadians collected via an online gambling survey administered twice;
- A series of interviews and focus groups with over 50 people who gamble from across Canada;
- Two comprehensive literature reviews, including a comprehensive systematic literature review and meta-analysis assessing the special risk populations and contextual factors associated with elevated risk of gambling harm; and
- Consultation with a pan-Canadian, multi-sectoral advisory committee of over 20 members.

The LRGG-SWG recognizes that successful development and widespread dissemination of the LRGGs is an important but insufficient public health response to the issue of gambling harms. These guidelines focus on what individuals can do to decrease their risk of gambling-related harms. But there are environmental influences such as gambling availability, accessibility, marketing and promotion, regulation, gambling education, and ensuring that near wins as well as wins appear randomly in electronic gaming machines that are also critical to reducing harms related to gambling.

The most effective, long-term, sustainable strategy to ensure that the LRGGs reduce harms related to gambling is for organizations or teams dedicated to reducing the harm associated with gambling to use the guidelines and incorporate them in their products and promotional activities. It is hoped that existing initiatives and programs,[6] public health professionals developing awareness campaigns to inform the public about lower-risk gambling, and those developing training materials and capacity-building programs aimed at identifying and preventing risky gambling behaviour will use the guidelines in their messaging and products. Equally important is the collection of evidence of the direct and indirect impact of the LRGGs, which is essential to their future refinement.

See the project web site, www.gamblingguidelines.ca, for more information on adapting and using the guidelines. The main LRGG poster and accompanying products are available for download there. We sincerely hope that the LRGGs will be useful to all those dedicated to reducing the harms related to gambling.

[6] Such initiatives and programs include "Le jeu doit rester un jeu" promoted by Loto-Québec, "Play Smart" promoted by the Ontario Lottery and Gaming Corporation and "GameSense" promoted by Alberta Gaming, Liquor and Cannabis and the British Columbia Lottery Corporation.

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