Gambling Harms and the Prevention Paradox in Massachusetts

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SEIGMA

SOCIAL AND ECONOMIC IMPACTS OF GAMBLING IN MASSACHUSETTS

UNIVERSITY OF MASSACHUSETTS SCHOOL OF PUBLIC HEALTH AND HEALTH SCIENCES

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Executive Summary

Until quite recently, gambling harms have largely been identified with the clinical entity of problem gambling. In the past decade, however, a broader view of the impacts of gambling has emerged with a shift in focus from problem gambling to 'gambling-related harm.' This approach recognizes that there are many more people harmed by gambling than reflected in the rates of problem gambling alone. Similar to public health and health promotion approaches to alcohol consumption, this perspective on gambling consumption recognizes that gambling has some positive impacts on society, including generation of revenues to governments, industry employment, and new leisure options for communities, and that the majority of people gamble without experiencing any evident harm.

Use of the term 'Prevention Paradox' in relation to gambling focuses on the recognition that a far greater number of individuals experiencing gambling-related harm are low-risk gamblers because there are far more low-risk gamblers than high-risk gamblers in the population. The 'paradox' is that more aggregate harm is suffered by the low-risk gambling population even though, individually, people in the high-risk population (e.g., heavy gamblers and those experiencing gambling problems) suffer the greatest amount of harm per individual.

A public health approach to understanding and minimizing gambling harm requires: (a) a clear and consistent definition of the concept, (b) identification of the potential types of harm, and (c) the use of assessment instruments that adequately measure and capture this harm. While gambling harm can be challenging to define and measure, significant research has been done to classify the impacts associated with regular or heavy gambling involvement and to develop measures for use in population surveys.

The purpose of the present report is to examine whether the 'Prevention Paradox' in relation to gambling harm holds up in the Massachusetts context. In addition to extending our understanding of gambling harm in different cultural and regulatory contexts, this analysis builds on prior work by using Massachusetts population survey data and by employing an instrument that comprehensively and unambiguously assesses harm to self and others. The goal is to examine the distribution of different gambling harms in the Massachusetts context and to assess the extent to which different types of harm are concentrated in higher risk groups.

The analyses presented here draw from two population surveys that were carried out in Massachusetts in 2013 and 2014, prior to the opening of any casinos in the Commonwealth. These surveys were the Baseline General Population Survey (BGPS) and the Baseline Online Panel Survey (BOPS). While recognizing that the BOPS respondents were much more likely to engage in heavy gambling and to experience gambling problems compared with the BGPS respondents, the decision to combine the samples was a practical one taken to create a sample sufficient to analyze the **relative** prevalence of gambling harms among groups with different levels of gambling severity. We further chose to focus on regular gamblers because only these individuals were routed through the section of the survey questionnaire that assessed gambling harms. For the present analysis, endorsements of gambling harms based on responses to these survey questions were collapsed into six categories: financial, health, emotional/psychological, family/relationships, work/school, and illegal acts. The analysis is based on 5,852 individuals who gambled at least once a month on one or more of nine types of gambling.

In addition to differences in gambling participation and problem gambling rates, BOPS regular gamblers were significantly more likely than BGPS regular gamblers to be male and under the age of 65, and to have annual household incomes between $50,000 and $100,000. BOPS regular gamblers were significantly less likely than BGPS regular gamblers to be aged 65 and older, to have attended college or graduate school or attained a graduate degree, and to have annual household incomes over $150,000.

The approach to assessing gambling severity was modeled on a recent study in Finland that utilized the same measure to assess problem gambling as was used in Massachusetts. For the present report, only items measuring impaired control and behavioral dependence were used to define the gambling severity groups in order to avoid overlap with the outcome of harmful impacts. Scores on items for impaired control and behavioral dependence were added and categorized into four Gambling Severity groups: None, 1-2, 3-4, and 5 or more. There was a strong relationship between scores on the subset of impaired control and behavioral dependence and scores on the full measure.

Descriptive analyses were conducted to summarize the prevalence of harms reported by different severity groups. Results clearly demonstrated the inverse relationship between gambling severity and gambling harms and how these combine to contribute to the aggregate impact of each group. Due to the much larger size of the three lower severity groups, even the much smaller average number of harms endorsed by members of these groups account for nearly three-quarters (72.9%) of the aggregate number of harms across all of the groups. The analysis also illustrated that while almost all of the individuals in the highest severity group reported one or more harms, any particular individual reporting one or more harms was far more likely to be in a lower severity group. An important limitation of this result is that it ignores differing degrees of harm.

A more nuanced view of the distribution of gambling harm across severity groups examined the prevalence of regular gamblers reporting different numbers of harms, separated by gambling severity. This analysis demonstrated that the most severe group makes up less than a third of gamblers reporting one, two or three harms but more than 70% of those reporting six or seven harms and 90% or more of those reporting nine or more harms. Since a limitation of examining the aggregate count of harms is that it ignores differences in type and severity of harms, the final analysis examined the relative proportion of harms reported, separated by both harm domain and severity group. This analysis showed that financial, health, and emotional/psychological harms were the most common types of harm and the most broadly distributed across the gambling severity groups. However, even in the case of less common harms such as work/school, relationship, and illegal harms, the harms were broadly distributed across the different severity groups. Our conclusion is that the Prevention Paradox was supported across all of the harm domains in Massachusetts—a finding that contrasts with the Finnish study which found that the highest gambling severity group accounted for over 50% of the harms in the less common domains.

The classic formulation of the Prevention Paradox suggests that, if the aggregate number of harms is higher among individuals with less severe problems, then **primary** prevention efforts aimed at altering unhealthy or unsafe behaviors across the entire population should be emphasized, rather than or in addition to **secondary** prevention efforts aimed at halting or slowing the progress of the disorder among individuals at risk and **tertiary** prevention efforts aimed at helping those already experiencing gambling problems. The evidence suggests that the Prevention Paradox is indeed occurring in relation to gambling in Massachusetts and supports the notion that more resources should go toward primary prevention (including universal, selective, and indicated strategies) to forestall the development of gambling harms and somewhat fewer resources should go to the provision of formal treatment and recovery maintenance services.

This is counter to results from the Massachusetts Gambling Impact Cohort study, where we found that the majority of problem gamblers in Massachusetts were relapsed, rather than first-time, problem gamblers. It is possible that gambling harms among individuals with more severe problems have intensified since the casinos in Massachusetts opened. We plan to analyze data from two follow-up surveys (general population and online panel) that will be fielded in September 2021 to determine whether the paradox effect has changed since the opening of the casinos. It is also worth noting that our analysis of gambling harms is based on cross-sectional data and does not take into account the recurring nature of harms among those experiencing gambling problems. Massachusetts may be a jurisdiction where successful treatment of existing problem gamblers is just as important as prevention of problem gambling onset.

High rates of financial harms and health harms among regular gamblers in Massachusetts suggest the importance of raising awareness about gambling-related harm and educating community-based organizations about the extent of gambling harm among regular gamblers. Beyond community organizations, health professionals, financial counselors and even financial institutions such as banks and credit unions would benefit from a better understanding of the scope of gambling harm among their clientele as well as some knowledge of how to sensitively ask their clients about their gambling and the gambling of their family members and friends.

Both the BGPS and the BOPS have some limitations that must be acknowledged. With regard to the BGPS, one potential limitation is the 36.6% response rate attained in the survey. Another limitation of the BGPS is that the survey was restricted to adults living in households and did not include adults living in group quarters, incarcerated individuals, or homeless individuals. A third limitation is that the questionnaire was translated into Spanish but not into other languages. Like other prevalence surveys, the BGPS is a cross-sectional 'snapshot' of gambling and problem gambling at a single point in time which limits our ability to draw any causal conclusions from reported associations in the data. With regard to the BOPS, the main limitation is the non-representative nature of online panels and the fact that a non-random minority of people do not use the Internet, and thus are not eligible to be part of an online panel. A limitation of the decision to combine the samples for the present analysis is that the results cannot confidently be generalized to Massachusetts as a whole. A final limitation relates to the nature of self-report in surveys more generally which raises the possibility that respondents in the BGPS and BOPS under-reported their gambling behavior and harms due to social stigma.

Introduction

Gambling and problem gambling exist on a continuum that stretches from non-gambling, at one end, to problem gambling, at the other end. In Massachusetts, 2% of adults aged 18 and over meet criteria for problem gambling and another 8% are classified as at-risk for problem gambling (Volberg et al., 2017). Problem gambling is associated with a range of physical and emotional health issues, including depression, anxiety, suicidal ideation, substance use and addiction (Hodgins & el-Guebaly, 2009; Petry, 2005). While most of these consequences are associated with problem gambling, there is research showing that heavy gambling is also associated with harm in individuals who would not meet criteria for the clinical entity (e.g., Afifi, Cox, Martens, Sareen, & Enns, 2010; Browne et al., 2017).

Until quite recently, gambling harms have largely been identified solely with the clinical entity of problem gambling. The assumption underlying this approach is that gambling harm can be minimized by treating individuals with this condition or by preventing people from progressing to this state. In the past decade, however, a broader view of the impacts of gambling has emerged internationally with a shift in focus from problem gambling to 'gambling-related harm' (Abbott et al., 2018; Browne et al., 2017; Langham et al., 2016; Shannon, Anjoul, & Blaszcynski, 2017). This approach recognizes that there are many more people harmed by gambling than reflected in the rates of problem gambling alone.

Similar to public health and health promotion approaches to alcohol consumption, adoption of this approach to gambling consumption recognizes that gambling is regulated by governments which directly benefit from the revenues generated. This approach also recognizes that gambling has some positive impacts on society, including generation of revenues to governments, industry employment, and new leisure options for communities (Williams, Rehm, & Stevens, 2011). Finally, as with alcohol consumption, the large majority of people gamble without experiencing any evident harm (Currie et al., 2017; Williams, Volberg, & Stevens, 2012).

The Prevention Paradox and Gambling Harm

The term 'Prevention Paradox' was coined by the British epidemiologist Geoffrey Rose (1992). In this classic text, Rose called for a shift from public health prevention strategies focused primarily on individuals to strategies focused on populations. Prevention strategies focused on individuals seek to identify high-risk, susceptible individuals and offer them some individual protection. In contrast, prevention strategies focused on populations seek to modify or mitigate the determinants of disease in the population as a whole. A focus on populations led Rose to argue that, since the large number of individuals with less exposure to a risk factor generally will lead to a greater number of cases than the small number of individuals with higher levels of exposure, the emphasis in prevention should be on shifting the distribution curve in a favorable direction to reduce risks for the population as a whole. The paradox of such an approach, however, is that preventative measures that bring large benefits to the community may offer little to each participating individual. This is because there is no direct, causal link between one person changing their behavior and another person's experiences.

Use of the term 'Prevention Paradox' in relation to gambling focuses on one aspect of the original concept, namely the situation in which a far greater number of individuals experiencing gambling-related harm are low-risk gamblers because there are far more low-risk gamblers than high-risk gamblers in the population (Browne & Rockloff, 2018). The 'paradox' is that more aggregate harm is suffered by the low-risk gambling population even though, individually, people in the high-risk population (e.g., heavy gamblers and problem gamblers) suffer the

greatest amount of harm per individual. While the 'Prevention Paradox' in relation to gambling does not fully reflect the original concept, it can be a useful lens with which to explore the distribution of the impacts of gambling in the population and the degree to which various forms of harm are concentrated in high-risk groups.

Alcohol use arguably provides the closest analogue to gambling, since it is a legal behavior with high population prevalence in most jurisdictions that is also associated with addiction and harm. Kreitman (1986) first reported evidence that the prevention paradox applies to alcohol, with most individuals reporting harm related to intoxication not meeting thresholds for hazardous drinking. Subsequent literature largely supported this initial finding so, for example, alcohol-related injuries are more commonly associated with those who are not alcohol-dependent (Spurling & Vinson, 2005). In a representative population study, O'Dwyer et al. (2019) considered a variety of forms of alcohol-related harm: finances, health, work or study, friendships or social life, home life or marriage, been in a physical fight, been in an accident, and stopped by the police. They found that high-risk drinkers (7% of the population) accounted for about one-quarter (27%) of harms experienced by survey respondents. The relative proportions attributable to each risk category were roughly equivalent for the various forms of harm, although work/study harms and harms to friendships/social life were slightly more concentrated among more severe risk categories. Thus, in the case of alcohol, low-risk categories do not equate to no-risk, and do in fact contribute the larger proportion of harm at the population level.

Operationalizing Gambling Harm

A public health approach to understanding and minimizing gambling harm requires: (a) a clear and consistent definition of the concept, (b) identification of the potential types of harm, and (c) the use of assessment instruments that adequately measure and capture this harm.

In a previous report on gambling harms in Massachusetts (Volberg, Evans, Zorn, & Williams, 2020), we noted that harmful gambling can be challenging to define and that there is, as yet, no broad consensus on the best way of measuring it. The typical approach has been to identify harms experienced by people with subclinical levels of problem gambling symptomatology (e.g., Canale, Vieno, & Griffiths, 2016; Currie, Miller, Hodgins, & Wang, 2009; Raisamo, Mäkelä, Salonen, & Lintonen, 2015). However, this approach does not adequately assess harm caused to other people since questions in assessment instruments usually refer only to harms experienced and reported by individuals. Additionally, as Delfabbro and King (2017) point out, endorsement of some questions in these problem gambling assessment instruments may portend future harm but do not represent unambiguous current harm in and of themselves (e.g., feeling guilty about gambling; gambling with larger amounts of money to get the same feeling of excitement, etc.).

Two comprehensive definitions of gambling harm have been proposed in recent years (Abbott et al., 2018; Langham et al., 2016). Both represent an important evolution in the conceptualization of gambling harm consistent with population health frameworks. Both definitions distinguish between gambling behavior and gambling-related harm, thereby separating harmful gambling from problem gambling status. Both definitions also expand the focus beyond harms experienced by the individual gambler to include harms experienced by family members and communities. In contrast to the international definition (Abbott et al., 2018), the Australian definition (Langham et al., 2016) explicitly includes harms that occur over time, reflecting an important expansion in addressing gambling harm from a public health perspective.

The Australian research team developed a taxonomy of gambling harm based on data obtained from focus groups, interviews and posts to problem gambling support forums as well as an online panel survey. This taxonomy distinguished gambling harms at three levels, including the person who gambles, affected others, and the broader community (Browne et al., 2017; Langham et al., 2016). The dimensions of harm identified in this taxonomy include:

- Financial harm
- Relationship disruption, conflict or breakdown
- Emotional or psychological distress
- Decrements to health
- Reduced performance at work or study
- Criminal activity
- Cultural harm

Measuring Gambling Harm

Following development of a taxonomy of gambling-related harms, the Australian research team created a 72-item instrument for use in population surveys (Browne, Bellringer, et al., 2018; Browne et al., 2017).[1] In addition to studies in Australia and New Zealand, this instrument was recently included in a survey in Finland, carried out as part of a national effort to evaluate reform of the Finnish gambling market (Browne, Volberg, Rockloff, & Salonen, 2020). Recognizing the challenge of adding a 72-item checklist to population surveys, the Australian researchers subsequently developed a 10-item brief harms scale (Browne, Goodwin, & Rockloff, 2018).

Significant criticism has been aimed at the 72-item Gambling Harms Checklist as well as the 10-item Short Gambling Harm Screen since their development. One key concern is that both instruments only assess harm to the individual and not harm to others. Another concern is that the instrument includes several items that do not represent significant or unambiguous harm ('reduction of available spending money'; 'reduction of your savings', 'regrets that made you feel sorry about your gambling') and other items contain inappropriate value judgements about the recreational value of gambling ('less spending on recreational expenses such as eating out, going to the movies…', 'less time attending social events', 'reduced my contribution to community obligations') (Delfabbro & King, 2017, 2019; Shannon et al., 2017).

An alternative approach to assessing gambling-related harm—adopted in this report—is to use the items that make up the 'Problems' section of the 14-item Problem and Pathological Gambling Measure (PPGM) (Williams & Volberg, 2010, 2014). These items comprehensively assess the range of unambiguous harms associated with excessive gambling (i.e., financial, relationship, psychological, physical health, work/school, illegal activity) and only ask about clear and 'significant' harm in each of these categories. Further, the PPGM asks about problems/harms caused to the person or someone close to them (see Appendix A2 for the specific wording of these questions). (Note: While the PPGM items specifically seek information about harms caused to people apart from the survey respondent, it is important to acknowledge that all of the questions rely on self-report and may not accurately reflect the breadth or depth of harms experienced by others).

Purpose of Report

In an earlier report on gambling harms in Massachusetts (Volberg et al., 2020), we focused on identifying gambling harms reported by key demographic groups in the population and without regard to the prevalence of problem gambling within these groups. The purpose of the current report is to examine whether the 'Prevention Paradox' in relation to gambling harms holds up in the Massachusetts context. In addition to extending our understanding of gambling harms in different cultural and regulatory contexts, this analysis builds on prior work by using Massachusetts survey data and by employing an instrument that comprehensively and unambiguously assesses harm to self and others. The aim is to determine whether the Prevention Paradox applies to

[1] This effort to evaluate the total impact of gambling harms on quality of life used an established World Health Organization 'health state valuation methodology' (also known as the Burden of Disease approach).

Massachusetts, to examine the distribution of different harms in the population, and to assess the extent to which different types of harm are concentrated in higher risk groups.

The present analysis relies on survey data collected in 2013 and 2014, prior to the opening of any casinos in Massachusetts and it is possible that the distribution of gambling harms has changed since the casinos opened. To address this concern, we plan to analyze data from two follow-up surveys (general population and online panel) that will be fielded in September 2021 to determine whether the paradox effect in Massachusetts has changed since the opening of the casinos.

Overview of Methods

The analysis presented below draws from two population surveys that were carried out in Massachusetts in 2013 and 2014, prior to the opening of any casinos in the Commonwealth. These surveys were the Baseline General Population Survey (BGPS) and the Baseline Online Panel Survey (BOPS). In this section, we provide a brief overview of the methods employed in these surveys.

While there are some differences in the gambling behavior of the BGPS and BOPS respondents, the decision to combine the samples was practical and undertaken to create a sample sufficient to analyze the **relative prevalence of gambling harms among different groups**. While differences in samples and survey methods can limit the conclusions drawn, combining data from different sources can yield important policy-relevant findings (Elliott, Raghunathan, & Schenker, 2018).

Combining the BGPS and BOPS samples comes with advantages and disadvantages. The clearest advantage is the large increase in the sample size available for analysis which is accompanied by narrower confidence intervals around the findings. The main disadvantage is that we are not able to clearly define the larger population that the sample represents. We have therefore not weighted the combined sample to the Massachusetts adult population. However, it is important to acknowledge this feature of the study as a limitation and to be cautious about generalizing the results to Massachusetts as a whole.

BGPS Recruitment and Sample

In carrying out the BGPS, an Address-Based Sampling (ABS) approach was employed whereby a random sample of Massachusetts addresses was initially chosen, with over-selection of Western Massachusetts addresses to ensure acceptable precision in establishing problem gambling prevalence in this part of the state. All selected addresses were mailed a letter and subsequent postcards inviting the adult (18+) household member with the most recent birthday to complete an online (WEB) survey. Households where no response was received after four weeks were mailed paper versions of the questionnaire and invited to alternatively complete the survey via this modality and return it by mail (SAQ). Households where no response was received after another four weeks were called on their landline (this number was available in 78% of cases) and invited to answer the questions over the telephone (CATI). The BGPS survey was launched on September 11, 2013 and data collection ended on May 31, 2014. A complete description of the methodology utilized for this survey can be found in the BGPS report (Volberg et al., 2017). A final sample of 9,578 respondents was obtained with a 36.6% AAPOR RR3 response rate (American Association for Public Opinion Research, 2016).[2] Forty percent of the questionnaires were self-administered online, 52% were completed using the self-administered paper-and-pencil format, and 7% were completed by telephone interview. A total of 152 self-administered questionnaires and/or telephone interviews (1.6%) were completed in Spanish.

BOPS Recruitment and Sample

Ipsos Public Affairs (Ipsos) conducted the SEIGMA Baseline Online Panel Survey (BOPS). Ipsos maintains an online panel of individuals across the country who have agreed to participate in research studies. The Massachusetts panel contains approximately 17,000 individuals. When respondents joined the Ipsos panel, they

[2] The response rate calculations recommended by the American Association for Public Opinion Research (AAPOR) are commonly used in academic research. A Response Rate 3 (RR3) is equivalent to the Council of American Survey Research Organizations (CASRO) rate, which is the number of completed interviews divided by the estimated number of eligible respondents.

provided demographic information about themselves and their household (e.g., age, gender, state of residence, county of residence). Ipsos used this information to email a stratified sample of respondents by age, gender and region (Western versus Eastern Massachusetts) that was proportional to the number of people in these groups as reported by the U.S. Census. Over the time period in which the survey was in the field, Ipsos drew additional replicate samples and monitored completion rates until at least 5,000 complete surveys were obtained. To obtain a final sample of 5,000, Ipsos supplemented their own online panel sample with Massachusetts online panel members from seven partner vendors. BOPS was launched in late October 2013, and data collection ended in late March 2014 to run coincident with data collection in the BGPS. A complete description of the methodology utilized for this survey and a comparison of the BGPS and BOPS survey methodologies can be found in the BOPS report (Williams et al., 2017). Of the 26,913 people who began the BOPS, 18,580 were deemed to be not eligible (primarily out-of-state panelists), 2,946 quit before finishing, 293 were excluded because of a full age x gender quota, and 48 were removed because of data quality issues. In the end, a total of 5,046 completed surveys were obtained.

Demographics of the BGPS and BOPS Samples

The BGPS survey resulted in a total of 9,578 respondents and the BOPS survey resulted in a total of 5,046 respondents. Table 1 provides details of select demographic characteristics of the BGPS and BOPS samples.

Table 1: Select Demographics of the BGPS and BOPS Samples (unweighted)

		Baseline General Population Survey (BGPS) *(N = 9,578)*		Baseline Online Panel Survey (BOPS) *(N = 5,046)*	
		%	95% CI	%	95% CI
Gender	Male	39.7	(38.8, 40.7)	47.1	(45.7, 48.5)
	Female	59.1	(58.1, 60.1)	52.9	(51.5, 54.3)
	Missing	1.1	(0.9, 1.4)	0.0	NA
Age	18 - 34	14.1	(13.4, 14.8)	28.2	(27.0, 29.5)
	35 - 64	51.0	(50.0, 52.0)	53.1	(51.7, 54.4)
	65+	30.0	(29.1, 30.9)	18.7	(17.6, 19.8)
	Missing	4.9	(4.5, 5.4)	0.0	NA
Ethnicity	Hispanic	5.0	(4.6, 5.5)	5.2	(4.6, 5.9)
	Black	3.8	(3.5, 4.2)	4.1	(3.6, 4.7)
	White	83.0	(82.3, 83.8)	85.2	(84.2, 86.1)
	Asian	3.8	(3.4, 4.2)	3.9	(3.4, 4.5)
	Other or missing	4.3	(3.9, 4.7)	1.6	(1.3, 2.0)
Education	High School or less	18.0	(17.2, 18.7)	22.6	(21.5, 23.8)
	Some college or BA	52.2	(51.2, 53.2)	61.6	(60.3, 62.9)
	Graduate degree	27.9	(27.0, 28.8)	15.2	(14.3, 16.3)
	Missing	1.9	(1.7, 2.2)	0.5	(0.4, 0.8)
Annual Household Income	Less than $15,000	8.8	(8.3, 9.4)	9.0	(8.3, 9.9)
	$15,000 - <$30,000	10.8	(10.2, 11.4)	13.7	(12.8, 14.7)
	$30,000 - <$50,000	13.9	(13.2, 14.6)	17.6	(16.5, 18.6)
	$50,000 - <$100,000	25.9	(25.0, 26.8)	30.7	(29.4, 32.0)
	$100,000 - <$150,000	14.3	(13.6, 15.0)	12.6	(11.7, 13.5)
	$150,000 or more	11.8	(11.2, 12.5)	5.4	(4.8, 6.0)
	Missing	14.5	(13.8, 15.2)	11.1	(10.2, 12.0)

Table 1 shows that BOPS respondents were significantly more likely than BGPS respondents to be male, under the age of 35, and White. BOPS respondents were significantly less likely than BGPS respondents to have attended college and to have annual household incomes over $100,000.

Analytic Approach

An important methodological issue raised in relation to our original BOPS report (Williams et al., 2017) concerned whether people experiencing gambling problems identified in the BOPS were systematically different from people experiencing gambling problems identified in the BGPS. If there were systematic differences, it would be unwise to combine the people experiencing gambling problems from the two samples for analytic purposes. A multivariate analysis found that there were significant differences between people experiencing gambling problems in the BGPS versus the BOPS, although the magnitude of the differences was fairly small. The group differences were attributable to five variables: immigrant status, age, region of Massachusetts, participation in extreme sports, and current tobacco use. We concluded that while the BOPS problem gamblers were quite similar to the BGPS problem gamblers, enough differences existed such that the prudent thing would be not to combine the samples, especially when one of the goals of this study was to have a sense of overall population prevalence. We therefore reported results separately for the two samples (Williams et al., 2017).

We have taken a different approach in the present report. While recognizing that there are substantially higher rates of heavy gambling and problem gambling among the BOPS respondents compared with the BGPS respondents, we believe that combining the samples in the present instance is justified since we are not attempting to produce accurate prevalence rates of gambling-related harms in the Massachusetts population. Instead, our focus is on the **relative prevalence of gambling-related harms among different gambling severity groups.**

Selecting Regular Gamblers

Since the same questionnaire was used for both the BGPS and BOPS, identical questions about gambling participation were utilized to define 'regular gamblers.' We chose to focus on regular gamblers because only these individuals were routed through the PPGM section of the questionnaire and these are the individuals most likely to experience any gambling-related harm.

From the total of 9,578 BGPS and 5,046 BOPS respondents, individuals were considered to be regular gamblers if they gambled at least once a month or more in the past 12 months on one or more of the following activities (see Appendix A1 for the specific wording of these questions):

- Traditional lottery
- Instant games
- Raffle tickets
- Daily lottery games
- Sports betting
- Bingo
- Casino
- Horse racing
- Private betting

High-risk stocks and online gambling were not included in the definition of regular gambling. This is because high-risk stock purchases are not universally viewed as a form of gambling and frequency of participation in online gambling was not collected in either the BGPS or the BOPS due to the low base rate of this activity. It should be noted that this definition of 'regular gambling' differs slightly from the definition used in our earlier report on gambling harms in Massachusetts (Volberg et al., 2020) but was adopted to align more closely with

the way that regular gamblers were defined in the Finnish Gambling Harms study (Browne et al., 2020). This selection process resulted in a dataset of 5,852 respondents with 57.3% from the BGPS and 42.7% from the BOPS. Table 2 provides details of select demographic characteristics of regular gamblers in the BGPS and BOPS samples.

Table 2: Select Demographics of the BGPS and BOPS Samples among Regular Gamblers (unweighted)

		Baseline General Population Survey (BGPS) *(N = 3,355)*		Baseline Online Panel Survey (BOPS) *(N = 2,497)*	
		%	95% CI	%	95% CI
Gender	Male	50.5	(48.8, 52.2)	56.4	(54.5, 58.4)
	Female	48.5	(46.8, 50.2)	43.6	(41.6, 45.5)
	Missing	1.0	(0.7, 1.4)	0.0	NA
Age	18 - 34	10.4	(9.4, 11.5)	26.2	(24.5, 28.0)
	35 - 64	53.1	(51.5, 54.8)	57.1	(55.2, 59.1)
	65+	32.6	(31.1, 34.2)	16.6	(15.2, 18.1)
	Missing	3.8	(3.2, 4.6)	0.0	NA
Ethnicity	Hispanic	4.9	(4.3, 5.7)	6.4	(5.5, 7.4)
	Black	4.3	(3.7, 5.1)	4.4	(3.7, 5.3)
	White	84.4	(83.1, 85.5)	85.3	(83.9, 86.6)
	Asian	2.3	(1.9, 2.9)	2.6	(2.0, 3.3)
	Other or missing	4.1	(3.4, 4.8)	1.3	(0.9, 1.8)
Education	High School or less	24.9	(23.5, 26.4)	26.0	(24.3, 27.8)
	Some college or BA	54.8	(53.1, 56.5)	61.2	(59.2, 63.0)
	Graduate degree	18.5	(17.2, 19.8)	12.3	(11.0, 13.6)
	Missing	1.8	(1.4, 2.3)	0.6	(0.3, 0.9)
Annual Household Income	Less than $15,000	9.8	(8.9, 10.9)	8.2	(7.2, 9.4)
	$15,000 - <$30,000	11.9	(10.8, 13.0)	13.9	(12.6, 15.4)
	$30,000 - <$50,000	15.6	(14.4, 16.9)	18.4	(16.9, 20.0)
	$50,000 - <$100,000	27.2	(25.8, 28.8)	32.8	(31.0, 34.7)
	$100,000 - <$150,000	13.9	(12.8, 15.2)	13.3	(12.1, 14.7)
	$150,000 or more	9.4	(8.5, 10.5)	4.8	(4.1, 5.8)
	Missing	12.0	(11.0, 13.2)	8.4	(7.4, 9.6)

Table 2 shows that BOPS regular gamblers were significantly more likely than BGPS regular gamblers to be male and under the age of 65, and to have annual household incomes between $50,000 and $100,000. BOPS regular gamblers were significantly less likely than BGPS regular gamblers to be aged 65 and older, to have attended college or graduate school or attained a graduate degree, and to have annual household incomes over $150,000.

Assessing Gambling Severity

The approach to assessing gambling severity in this report is modeled on that taken in the Finnish Gambling Harms Survey which utilized the PPGM to assess problem gambling (Browne et al., 2020). The Finnish study tested whether the prevention paradox applied to gambling in Finland among regular gamblers and built on previous work by restricting the measure of risk to PPGM items that captured only impaired control and behavioral dependence and not harms more generally.

Past-year gambling severity was assessed in the BGPS and the BOPS using the 14-item PPGM. The PPGM includes items that measure three constructs: problems/harms (7 items), impaired control (4 items) and 'other

issues' suggestive of behavioral dependence (i.e., preoccupation, craving, tolerance) (3 items). In the full instrument, gambling severity is classified on a continuum from recreational gambling through at-risk gambling to problem/pathological gambling. The PPGM has good internal consistency (Cronbach's alpha = 0.76-0.81) and one-month test-retest reliability (r = 0.78) (Williams & Volberg, 2010, 2014). It also has superior construct validity (Christensen, Williams, & Ofori-Dei, 2019) as well as better sensitivity, positive predictive power, diagnostic efficiency, and overall classification accuracy in the population assessment of problem gambling compared to other instruments (Williams & Volberg, 2010, 2014).

For the present report, only items measuring impaired control and behavioral dependence were used to define the at-risk groups. This was done to ensure as much comparability as possible with the Finnish study.

Table 3: Impaired Control and Behavioral Dependence Items from the PPGM

Category	Question #	Description of question
Impaired Control	GP4	Went back to win money lost in past year
	GP15	Gambled more frequently or with more money in past year
	GP16	Successful in attempt to control gambling
	GP17	Anyone else who would say you have difficulty controlling gambling
Behavioral Dependence	GP18	Preoccupied with gambling
	GP19	Restless or irritable when tried to cut down
	GP20	Needed to gamble with more money for same excitement

Examination of endorsement patterns for these items showed that 455 individuals were missing responses to one or more of these items. Rather than code these responses as "No" (as was done in the Finnish study), we chose to exclude some of these respondents from the analysis. Missing responses were set to zero for those respondents whose PPGM total score was zero; respondents with missing responses whose PPGM total score was more than zero were excluded because of uncertainty about why they chose not to answer specific questions. This resulted in the exclusion of 148 respondents from the analysis. Scores for the impaired control and behavioral dependence items were added together and categorized into four Gambling Severity groups: None, 1-2, 3-4, and 5 or more. In the present study the 5+ threshold defines the high-risk group for the purposes of evaluating the prevention paradox among the Massachusetts survey respondents. This threshold was primarily adopted to replicate the Finnish analysis as closely as possible.

An important assumption underlying our analysis is that the gambling severity scores derived from a subset of the PPGM questions are a suitable proxy for the full instrument. Although the two measures are clearly not independent, we examined the strength of the relationship between the impaired control and behavioral items and the full PPGM in two ways. First, the Pearson correlation coefficient of the subset of PPGM items with the full PPGM total score was 0.82 ($p<.001$), illustrating a strong relationship between scores on the subset of impaired control and behavioral items and scores on the full PPGM. Second, we confirmed that 95.3% of individuals scoring 5+ on the gambling severity measure were classified as Problem or Pathological Gamblers using the full PPGM. These results confirm the substantial overlap between the severity index used here and the full PPGM classification.

Table 4: Distribution of Gambling Severity Scores

Number of impaired control/other items (set to missing, if missing individual control item)	Frequency	Percent	Recoded Gambling Severity Groups
.	148	.	
0	4660	81.70	4660 (81.70%) None
1	688	12.06	860 (15.08%) 1-2
2	172	3.02	
3	86	1.51	120 (2.11%) 3-4
4	34	0.60	
5	31	0.54	64 (1.12%) 5+
6	29	0.51	
7	4	0.07	

Harms Associated with Gambling

Table 5 presents the PPGM main and branching questions that were used to assess gambling harms in the BGPS and the BOPS. For the present analysis, endorsements of gambling harms based on responses to these questions were collapsed into six categories: financial, health, emotional/psychological, family/relationships, work/school, and illegal acts. Three branching questions used to assess gambling harms were excluded from the analysis; these questions inquired about average number of days of work or school missed due to gambling (GP13b), average amount of money received from public assistance/welfare due to gambling (GP13e), and average number of days incarcerated due to gambling (GP14h). These questions were excluded because anyone who answered them would already have endorsed a prior item within that set (i.e., work or school problems, committing illegal acts).

Table 5: Gambling Harms in the Past 12 Months

Category	Question #	Description of question
Financial	GP6a	Financial problems because of gambling
	GP6b	Filed for bankruptcy because of gambling
Health	GP7a	Health or stress problems because of gambling
	GP7b	Gambling-related health problems resulted in seeking medical or psychological help
Emotional/psychological	GP10a	Significant guilt, anxiety or depression because of gambling
	GP10b	Suicidal thoughts because of gambling
	GP10c	Attempted suicide because of gambling

Category	Question #	Description of question
Family/relationships	GP11a	Relationship problems because of gambling
	GP11b	Domestic violence because of gambling
	GP11c	Separation or divorce because of gambling
	GP12a	Neglect of children or family because of gambling
	GP12b	Child welfare services involved because of gambling
Work/school	GP13a	Work or school problems because of gambling
	GP13c	Lost job or quit school due to gambling
	GP13d	Received public assistance or welfare payments because of gambling
Illegal	GP14a	Commission of illegal acts because of gambling
	GP14b	Average amount of money illegally obtained to gamble
	GP14c	Arrested because of gambling
	GP14d	Convicted of offense because of gambling
	GP14g	Incarcerated because of gambling

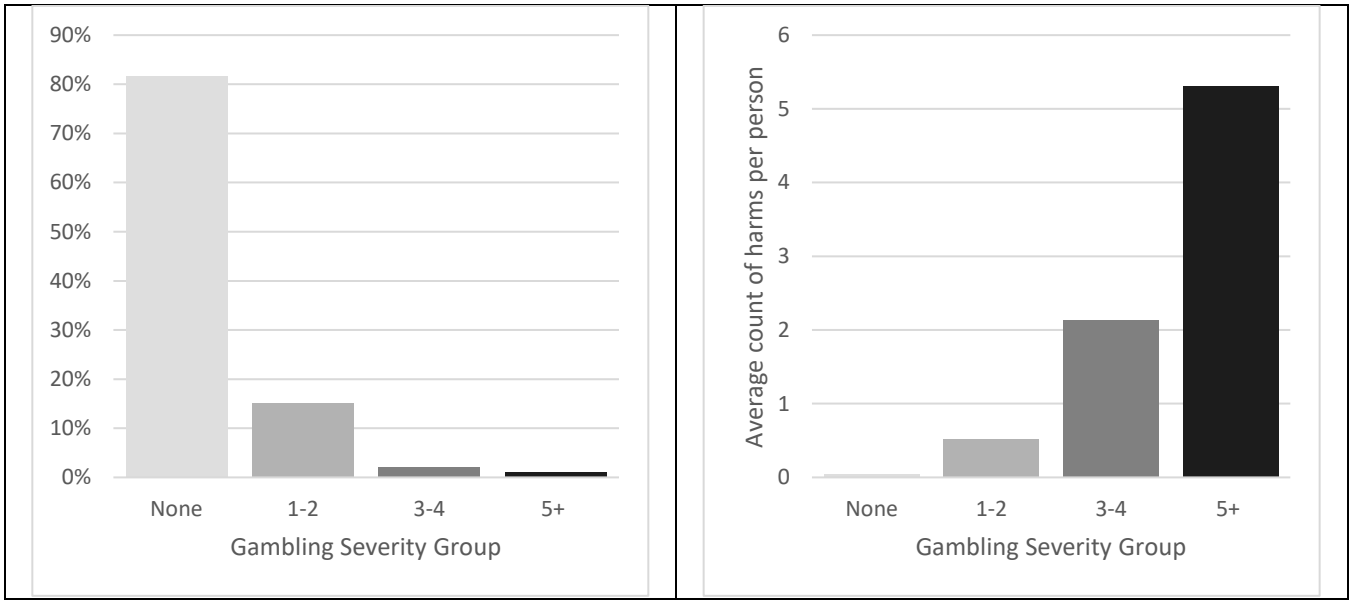
Descriptive analyses were conducted to summarize the prevalence of harms reported by different severity groups, as captured by the relevant subscales of the PPGM. Summaries were calculated for each specific item of harm although not all of these are reported due to small cell sizes.[3] As in other reports, we have chosen to present many of our results in graphic form. In this report, we have relied primarily on mosaic plots which provide a way to visualize relative frequencies conditional on two factors/variables in which the area of each rectangle is proportional to the probability that it will be observed. Mosaic plots are similar to stacked bar charts but with the width of each bar determined by the relative size of the group. (Mosaic Plot | Introduction to Statistics | JMP).

[3] Following SEIGMA data reporting conventions, any cells that contain less than five respondents are suppressed in both the body of the report and the appendices.

Results

Figure 1 illustrates the inverse relationship between gambling severity and gambling harms and how these combine to contribute to the aggregate impact of each group. The first panel presents the proportion of individuals in each of the PPGM severity categories among regular gamblers in the combined BGPS-BOPS sample. This panel demonstrates that prevalence decreases markedly in relation to increasing severity. The second panel shows the average count of harms (across all domains) conditional on membership in each severity group and demonstrates that the number of harms increases markedly in relation to increasing severity. Across all individuals, the Pearson correlation coefficient between PPGM severity score and the count of harms was 0.51 which is quite similar to the same correlation in the Finnish study (0.49).

Figure 1: Prevalence of Gambling Severity and Gambling Harms



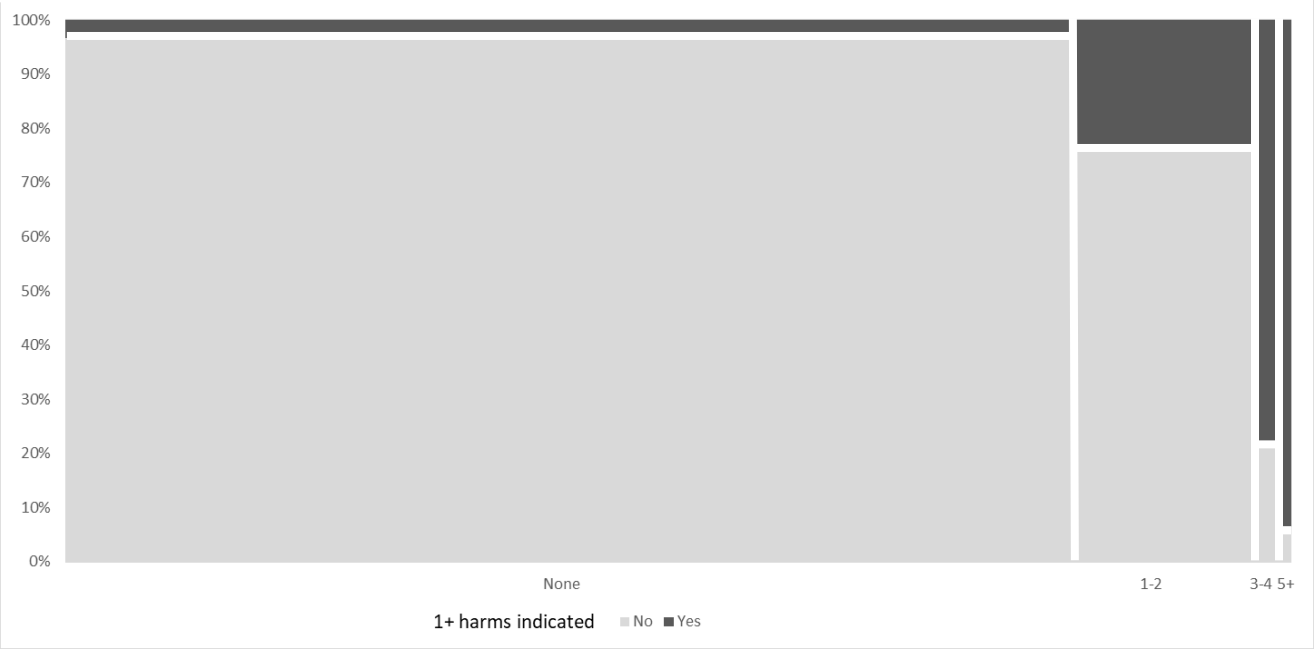
Taken together, Figure 1 and Table 6 illustrate that because of the larger size of the three lower severity groups, even the much smaller average number of harms endorsed by members of these groups accounts for nearly three-quarters (72.9%) of the aggregate number of harms across all of the groups.

Table 6: Proportion of Harms by Gambling Severity Group

Gambling Severity Group	Group Size	Average # Harms	Total Harms by Group	Proportion of Harms by Group
None	4,476	0.0436	195	16.4%
1-2	829	0.5138	426	35.8%
3-4	115	2.1391	246	20.7%
5+	61	5.3114	324	27.2%
	5,481	0.2172	1,191	100.0%

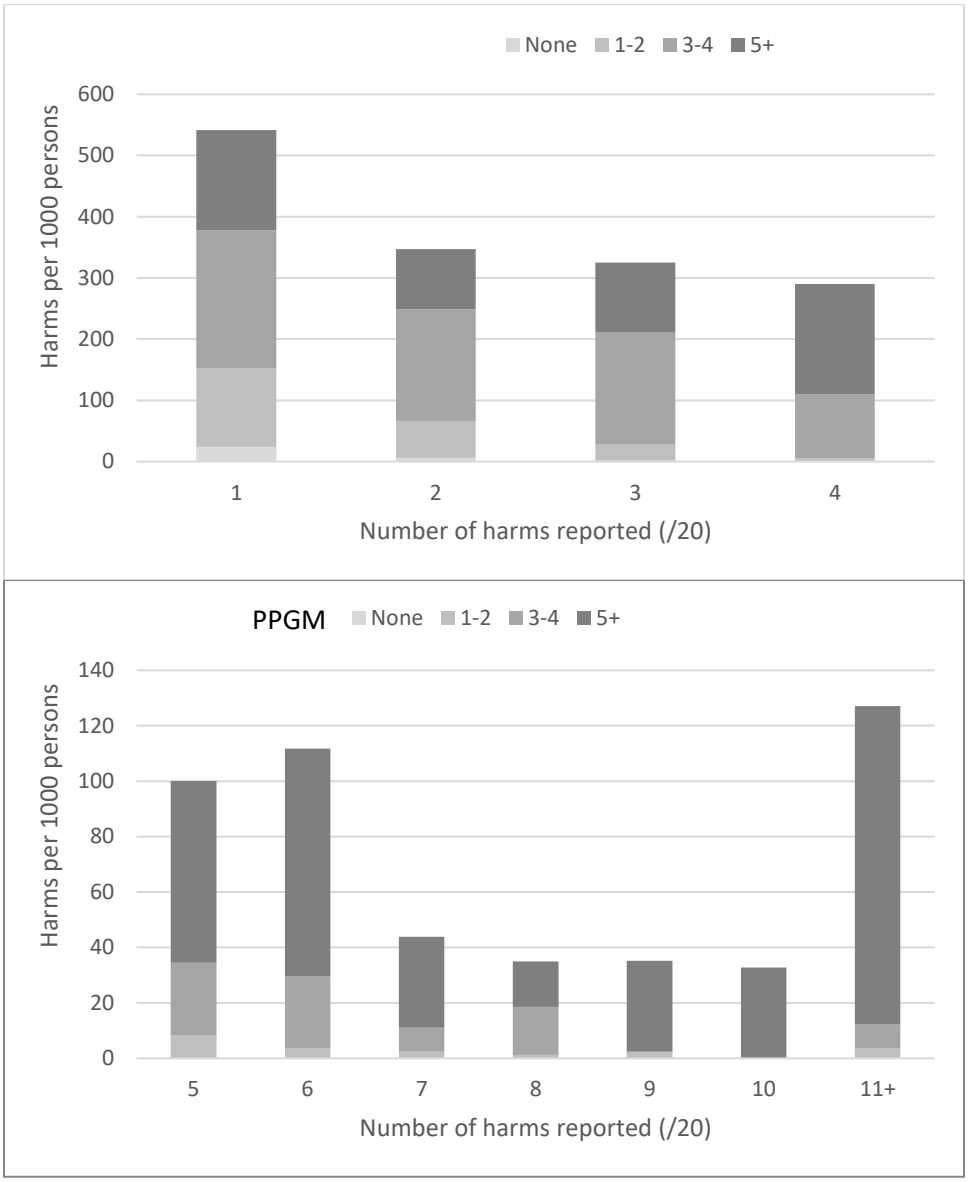
Figure 2 presents a mosaic plot of the number of individuals experiencing at least one harm across the gambling severity categories. The relative area of each dark shaded rectangle describes the probability that a member of the sample will report one or more harms **and** be a member of a given severity group. This figure illustrates that while almost all of the individuals in the highest severity group report one or more harms, any particular individual reporting one or more harms is far more likely to be in a lower severity group. An important limitation of this figure is that it ignores differing degrees of harm. It should not be assumed that an individual reporting just one harm is necessarily experiencing a meaningfully large **degree** of harm.

Figure 2: Proportion of Severity Groups Reporting One or More Harms



A more nuanced view of the distribution of gambling harms across severity groups is provided in Figure 3. This figure shows the proportional distribution of severity by number of harms. The shading of each bar illustrates the proportion of regular gamblers in each gambling severity group reporting an increasing number of harms which range from 1 to 11+ harms (out of a total of 20 harms measured). Keeping in mind the differing scales on the y-axis for the two panels, the figure demonstrates that the most severe group (5+) makes up less than a third of gamblers reporting one, two or three harms but more than 70% of gamblers reporting six or seven harms and 90% or more of gamblers reporting nine or more harms.

Figure 3: Gambling Severity Groups and the Number of Harms

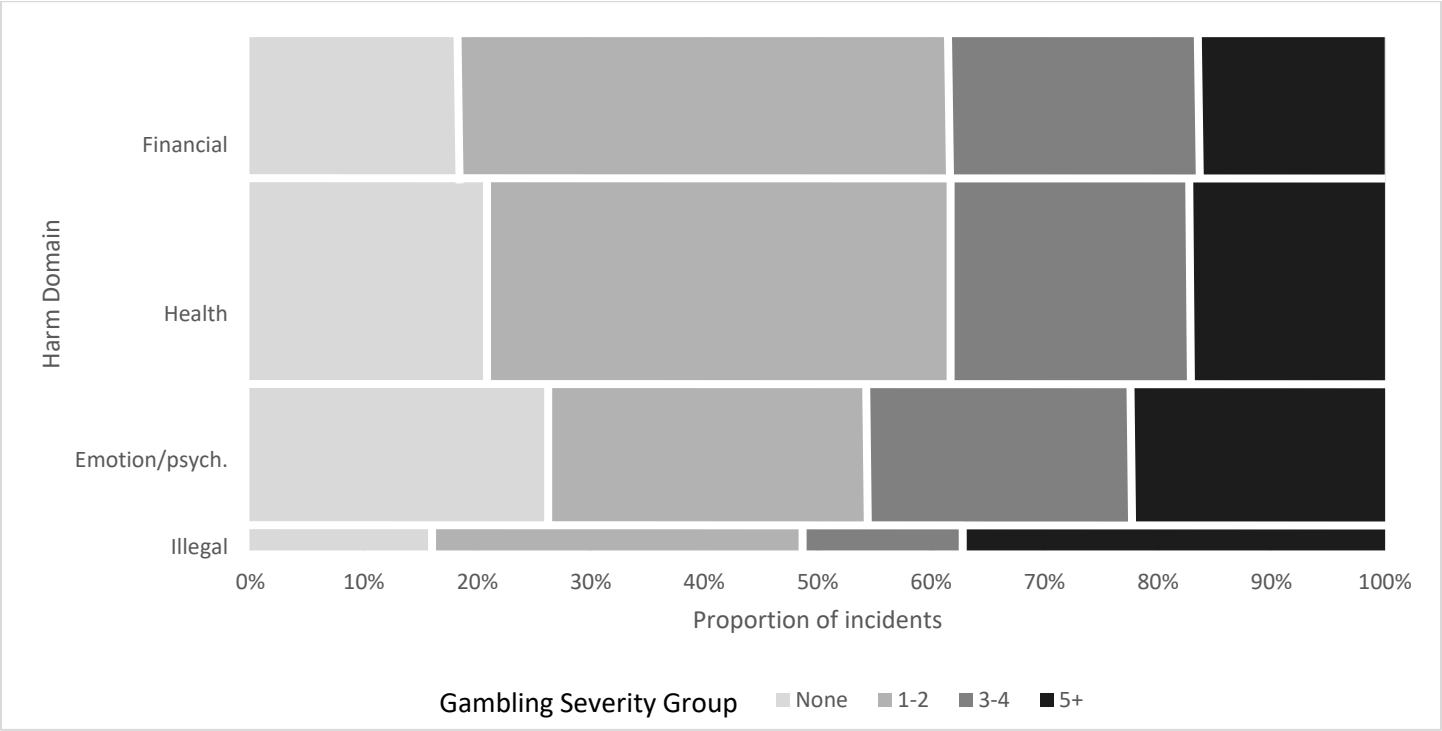


A limitation of examining the aggregate count of harms is that this approach ignores differences in type and severity of harms. Figure 4 illustrates the relative proportion of harms reported, separated by harm domain and severity group. This figure shows that financial, health, and emotional/psychological harms are more common and more broadly distributed across the gambling severity groups. The Prevention Paradox is supported for these harm domains. In contrast, illegal harms are not commonly reported and are much more likely to be reported by the highest risk severity group. However, even in the case of these less common harms, the harms are broadly distributed across the different severity groups with the 5+ gambling severity group accounting for 37.2% of illegal harms.[4] This finding contrasts with the Finnish study (Browne et al., 2020) which found that the

[4] Work/school and relationship harms cannot be displayed because the cell size for the lowest PPGM severity group is less than five. However, the PPGM 5+ severity group accounts for 36.6% of work/school harms, and 32.0% of relationship harms.

most severe group accounted for over 50% of the harms in the health, relationships, and illegal harms domains. This led the researchers to conclude that the Prevention Paradox was not supported for these domains in Finland.

Figure 4: Proportion of Harms as a Function of Harm Domains and Gambling Severity Group



Discussion

The original Prevention Paradox focused attention on the importance of populations, as opposed to individuals, when developing prevention strategies intended to modify or mitigate determinants of disease. In cases where a large proportion of the population with limited risk actually represents the greater burden of disease, the focus should be on shifting the distribution curve lower to reduce the risk for the entire population. This notion is variously referred to as the 'total consumption model' or the 'single distribution theory' and has been used internationally to justify measures to restrict alcohol consumption in order to reduce total consumption and thereby reduce the proportion of heavy drinkers in the population. The paradox in the original Prevention Paradox is that measures to restrict alcohol consumption, for example, may bring large benefits to the community but can be onerous for individual consumers.

In the gambling studies field, more attention has been garnered by the broader, population-focused approach to understanding the impacts of gambling. From this perspective, the Prevention Paradox refers to the notion that more aggregate harm is suffered by gamblers who do not meet the diagnostic criteria for problem or disordered gambling because there are so many more of these gamblers compared with heavy gamblers who suffer much greater individual harm.

This report has examined the prevalence of gambling-related harms among regular gamblers in Massachusetts and specifically the number of harms attributable to different levels of gambling severity as assessed by the PPGM. Using the lens of the Prevention Paradox, we investigated whether the majority of harms arose from the highest severity category: those displaying control issues and behavioral dependence at the highest 5+ level. Overall, we found that the Prevention Paradox was supported in Massachusetts with approximately 70% of all harms arising from the lower severity groups. The large majority of respondents reporting gambling harms reported less than 0.17 harms and these individuals were unlikely to be in the highest risk group. Nevertheless, the respondents reporting the most harms (10 or more out of 20) were very likely to be in the highest risk group. The proportion of aggregate harms represented by the 5+ severity group is 23 times higher than the size of the group in relation to the whole; the proportion represented by the 3-4 severity group is 9 times higher than the size of the group in relation to the whole; and the proportion represented by the 1-2 severity group is 2 times higher.

Our analysis shows that, among regular gamblers in Massachusetts, while almost all of the individuals in the 5+ severity group report one or more harms, any particular individual reporting one or more harms is far more likely to be in a lower severity group. We also found that the 5+ severity group is more likely than lower severity groups to report experiencing multiple harms and makes up 90% or more of the regular gamblers reporting 10 or more harms. Finally, we found that some harms are more common and more broadly distributed across the gambling severity groups while other harms are less common. However, in contrast to the Finnish study, which utilized a more contentious measure of harm, the 5+ group in Massachusetts does not account for over 50% of harms **in any domain**. Our conclusion is that the Prevention Paradox is supported across **all harm domains in Massachusetts**.

Implications for Problem Gambling Prevention and Treatment

The question posed by the present analysis is whether the aggregate number of gambling-related harms is higher among individuals with less severe problems compared to those clearly experiencing problems and, if so,

whether there are distinct public health, prevention, and treatment implications of such a finding. The classic formulation of the Prevention Paradox would suggest that, if the aggregate number of harms is higher among individuals with less severe problems, then **primary** prevention efforts aimed at altering unhealthy or unsafe behaviors across the entire population should be emphasized, rather than or in addition to **secondary** prevention efforts aimed at halting or slowing the progress of the disorder among individuals at risk for gambling problems and **tertiary** prevention efforts aimed at helping people manage long-term or chronic issues among those already experiencing gambling problems.

The challenge is not to eliminate these latter programs in favor of primary programs but, rather, to balance the proportion of effort going to each type of prevention. The evidence suggests that the Prevention Paradox is indeed occurring in relation to gambling in Massachusetts which supports the notion that more resources should go toward primary prevention (including universal, selective, and indicated strategies) to forestall the development of gambling harms and somewhat less resources should go to the provision of formal treatment and recovery maintenance services.

The results of the present analysis dovetail with our findings from the Massachusetts Gambling Impact Cohort (MAGIC) study (MAGIC Research Team, 2021). In that study, we identified a fairly large number of variables (n=17) that predicted concurrent or future problem gambling. These included gambling-related predictors as well as non-gambling predictors. There was also an important group of variables that predicted problem gambling remission. Based on the cohort study findings, we made several recommendations regarding the minimization and mitigation of problem gambling in Massachusetts. Most significantly, we argued that there is no 'silver bullet' to prevent problem gambling but rather **a wide array of educational and policy initiatives is needed to address the multi-faceted biopsychosocial etiology** of the disorder.

One facet of problem gambling that is addressed in MAGIC but cannot be examined in the current context is the temporal dimension of the development of gambling problems and the experience of gambling harms. In our final report on MAGIC, we noted that since the majority of problem gamblers in the later waves of the study were relapsed rather than first-time problem gamblers, Massachusetts may be a jurisdiction where successful treatment of existing problem gamblers is equally as important as prevention of problem gambling onset.

In considering the implications of our analysis of the Prevention Paradox in relation to gambling in Massachusetts, it is probably too simplistic to look at a single time period in considering the distribution of gambling harms in the population. Such an approach does not take into account the recurring nature of harms among individuals experiencing gambling problems although there have been calls for explicit attention to be paid to the temporal and 'legacy' harms of gambling problems as these manifest generationally in families (Langham et al., 2016). It is quite possible that the majority of respondents in Massachusetts who experienced harms only experienced one or two harms or only experienced them briefly and, having "burnt their fingers," then modified their gambling behavior. Once an individual develops a gambling problem, the harms tend to recur such that the total number of harms experienced by individuals with problems may in fact outweigh the total number of harms experienced by individuals with less severe experiences.

Nevertheless, the findings in this report replicate findings from our analysis of the negative impacts of gambling among people experiencing gambling problems in Massachusetts as well as our analysis of the negative impacts of gambling among regular gamblers in different demographic groups (gender, age, race/ethnicity, number of children in the household) (Volberg et al., 2020; Williams et al., 2017). Financial problems and health problems were the most common negative impacts reported by people experiencing gambling problems in Massachusetts; these are also the types of harm most commonly reported by regular gamblers in Massachusetts. Similarly, work/school problems and illegal acts were the least common negative impacts

reported by people experiencing gambling problems and these are also the types of harm least likely to be reported by regular gamblers. Information on endorsement rates of specific gambling harms among BGPS and BOPS regular gamblers is presented in Appendix B.

Higher rates of financial and health harms among regular gamblers in Massachusetts suggest the importance of raising awareness about gambling-related harm and educating community-based organizations about the extent of gambling harms among regular gamblers. Beyond community organizations, health professionals, financial counselors and even financial institutions such as banks and credit unions would benefit from a better understanding of the scope of gambling harm among their clientele as well as some knowledge of how to sensitively ask their clients about their gambling and where to direct them for help if they express concerns.

While the MAGIC results suggest that the focus of prevention and treatment efforts in Massachusetts should be on individuals currently experiencing gambling problems, the Prevention Paradox results indicate that such efforts must be counterbalanced by ongoing prevention efforts aimed at individuals not yet experiencing problems. This is due to the fact that while individual harms may be less severe, the majority of the total sum of harms is still found in the general population. In our view, this means that all of the general prevention strategies that were outlined in the final MAGIC report are still needed. In particular, it will be important to:

- Develop and field a wide array of educational and policy initiatives to address the multi-faceted biopsychosocial etiology of gambling problems;
- Ensure screening for problem gambling in substance abuse and mental health clinical settings;
- Limit the placement of gambling opportunities and marketing in lower socioeconomic neighborhoods;
- Develop and field educational efforts to promote knowledge, motivations, and attitudes conducive to responsible gambling with particular focus on males and individuals with lower household income, via a wide array of means of communication, and with content focused on countering gambling fallacies and the adoption of lower-risk gambling guidelines;
- Restrict advertising which is a known cause of relapse and counteracts educational messages;
- Increase the availability of self-help materials;
- Continue to encourage treatment seeking; and
- Implement policies that have been shown in other research to be effective in curtailing risky gambling practices.

In addition to these efforts, it might be wise to target heavy gamblers since reducing their gambling involvement is likely to lead to the greatest gains in gambling harm reduction.

Looking Ahead

With the upcoming likely legalization of sports betting and online gambling in Massachusetts, the foregoing recommendations are even more important. In addressing gambling harms related specifically to sports betting and online gambling in Massachusetts, it will be critical to (a) tie prevention messages to the provision of sports betting through regulatory action (e.g., requiring sports betting operators to include responsible gambling messages in all of their advertising); (b) develop educational materials related to sports betting with a particular focus on gambling fallacies; (c) develop self-help materials aimed at college and university students and provide these materials along with training in prevention and where to refer to healthcare providers at colleges and universities; and (d) train healthcare professionals at colleges and universities to screen for involvement in sports betting with a specific focus on young males.

Limitations

Both the BGPS and the BOPS have some limitations. With regard to the BGPS, one potential limitation is the 36.6% response rate attained in the survey. While we attempted to minimize systematic bias by introducing the

study as a survey of 'health and recreation,' the response rate for the BGPS was lower than desirable. Another limitation of the BGPS is that the survey was restricted to adults living in households and did not include adults living in group quarters, incarcerated individuals, or homeless individuals. A third limitation is that the questionnaire was translated into Spanish but not into other languages. By not providing for surveys in additional languages, we were unable to include such individuals in our sample. Finally, it is important to emphasize that, like other prevalence surveys, the BGPS is a cross-sectional 'snapshot' of gambling and problem gambling at a single point in time. This limits our ability to draw any causal conclusions from reported associations in the data.

With regard to the BOPS, the main limitation is the non-representative nature of online panels. This is due to the fact that most online panelists have not been randomly selected, but instead, have initiated membership themselves. Although online panels are usually stratified to be demographically representative of the population, behavioral differences typically exist. One obvious difference is that a non-random minority of people do not use the Internet, and thus are not eligible to be part of an online panel.

A limitation of both the BGPS and the BOPS is that these data were collected in 2013 and 2014, prior to the opening of any casinos in Massachusetts. It is possible that the distribution of gambling harms in Massachusetts has changed since the casinos opened and we plan to analyze data from two follow-up surveys (general population and online panel) that will be fielded in September 2021 to determine whether in fact this has happened.

As we have noted previously, while combining the BGPS and BOPS samples provides a larger sample for analysis, this approach rests on the assumption that the respondents in the combined sample are a simple random sample. Appendix B presents information about endorsement rates of gambling harms among regular gamblers in the BGPS and BOPS. While endorsement rates of specific harms are three to four times lower among regular gamblers in the BGPS compared to the BOPS, the rank order of endorsements is similar, with financial problems and health problems ranking first or second and relationship problems, work/school problems and illegal acts ranking third, fourth and fifth. Depression/suicide is the only area of harm where the rank order differs across the two samples with the overall endorsement rate closer to health problems in the BGPS and intermediate between health problems and relationship problems in the BOPS. We believe the similar patterns of endorsement of harms in the two samples supports our decision but recognize this feature of the study as a limitation and urge caution in generalizing the results to Massachusetts as a whole. It should be noted that no other studies of gambling harm have used a combined sample. While this is likely because few jurisdictions have conducted multiple surveys of gambling behavior in a single window of time using identical questionnaires, this approach is a potential limitation.

Another limitation relates to the nature of self-report in surveys more generally. We have done our best to mitigate self-report bias, both by using the PPGM which, unlike other instruments, identifies problem gamblers in denial and by primarily utilizing a self-administered questionnaire, which further maximizes valid self-report. Nevertheless, it is possible that respondents in the BGPS and BOPS under-reported their gambling behavior and harms due to social stigma.

One final limitation relates to the restriction of our analysis to those respondents who gambled as least once a month or more often. Any harms experienced by affected or concerned others as well as those who gambled only occasionally—including those attempting to practice abstinence with infrequent relapses—were excluded from the analysis.

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Appendix A: BGPS/BOPS Questionnaire Sections

Appendix A1: Regular Gambler Criteria

Gambling Behavior

GY1a. In the past 12 months, how often have you purchased lottery tickets such as Megabucks, Powerball, Lucky for Life, or Mass Cash? (Please select one response)

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month, or
- Not at all

GY2a. In the past 12 months, how often have you purchased instant tickets or pull tabs? Would you say about… (Please select one response)

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month, or
- Not at all

GY2c. In the past 12 months, how often have you purchased raffle tickets? Would you say about… (Please select one response)

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month, or
- Not at all

GY3a. In the past 12 months, how often have you purchased keno or daily race game tickets? Would you say about… (Please select one response)

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month, or
- Not at all

GY4a. In the past 12 months, how often have you bet money on sporting events (this includes sports pools)? Would you say about… Please select one response

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month, or
- Not at all

GY5a. In the past 12 months, how often have you gone to a bingo hall to gamble? Would you say about… Please select one response

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month, or
- Not at all

GY8a. In the past 12 months, how many times have you gambled at a casino, racino, or slots parlor outside of Massachusetts? Would you say about… Please select one response

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month, or
- Not at all

GY9a. In the past 12 months, how often have you bet on a horse race at either a horse race track or an off-track site? Would you say about… Please select one response

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month, or
- Not at all

GY10a. In the past 12 months, how often have you gambled or bet money against other people on things such as card games; golf, pool, darts, bowling; video games; board games, or poker outside of a casino? Would you say about… Please select one response

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month, or
- Not at all

Appendix A2: Gambling Harm Items

Gambling Problems

GP6a. In the past 12 months, has your gambling caused any financial problems for you or your household? Please select one response

- Never
- Sometimes
- Most of the time, or
- Almost always
- Prefer not to answer

GP6b. In the past 12 months, have you filed for bankruptcy because of gambling? Please select one response

- No
- Yes
- Prefer not to answer

GP7a. In the past 12 months, has your gambling caused you any health problems, including stress or anxiety? Please select one response

- Never
- Sometimes
- Most of the time, or
- Almost always
- Prefer not to answer

GP7b. In the past 12 months, have these health problems caused you to seek medical or psychological help?
Please select one response

- No
- Yes
- Prefer not to answer

GP10a. Has your involvement in gambling caused significant mental stress in the form of guilt, anxiety, or depression for you or someone close to you in the past 12 months? Please select one response

- No
- Yes
- Prefer not to answer

GP10b. In the past 12 months, have you thought of committing suicide because of gambling? Please select one response

- No
- Yes
- Prefer not to answer

GP10c. In the past 12 months, have you attempted suicide because of gambling? Please select one response

- No
- Yes
- Prefer not to answer

GP11a. Has your involvement in gambling caused significant problems in your relationship with your spouse/partner or important friends or family in the past 12 months? Please select one response

- No
- Yes
- Prefer not to answer

GP11b. In the past 12 months, has your involvement in gambling caused an instance of domestic violence in your household? Please select one response

- No
- Yes
- Prefer not to answer

GP11c. In the past 12 months, has your involvement in gambling resulted in separation or divorce? Please select one response

- No
- Yes
- Prefer not to answer

GP12a. In the past 12 months, has your involvement in gambling caused you to repeatedly neglect your children or family? Please select one response

- No
- Yes
- Prefer not to answer

GP12b. In the past 12 months, has child welfare services become involved because of your gambling? Please select one response

- No
- Yes
- Prefer not to answer

GP13a. Has your involvement in gambling caused significant work or school problems for you or someone close to you in the past 12 months or caused you to miss a significant amount of time off work or school? Please select one response

- No
- Yes
- Prefer not to answer

GP13c. In the past 12 months, have you lost your job or had to quit school due to gambling? Please select one response

- No
- Yes
- Prefer not to answer

GP13d. In the past 12 months, did anyone in this household receive any public assistance (food stamps, Temporary Assistance for Needy Families (TANF)) or any other welfare payments from the state or local welfare office as a result of losing your job because of gambling? Please select one response

- No
- Yes
- Prefer not to answer

GP14a. In the past 12 months, has your involvement in gambling caused you or someone close to you to write bad checks, take money that didn't belong to you or commit other illegal acts to support your gambling? Please select one response

- No
- Yes
- Prefer not to answer

GP14b. In the past 12 months, about how much money have you illegally obtained in order to gamble? Please enter the amount in the box below

$_____

- Prefer not to answer

GP14c. In the past 12 months, has your gambling been a factor in your committing a crime for which you have been arrested? Please select one response

- No
- Yes
- Prefer not to answer

GP14d. Were you convicted for this crime? Please select one response

- No
- Yes
- Prefer not to answer

GP14g. Were you incarcerated for this crime? Please select one response

- No
- Yes
- Prefer not to answer

Appendix B: Endorsement of Harms by BGPS and BOPS Regular Gamblers

			BGPS			BOPS			p-value[1]
			Unweighted	%	95% CI	Unweighted	%	95% CI	
	Weighted N		3,355	57.3	(56.2, 58.5)	2,497	42.7	(41.5, 43.8)	
Financial	Financial problems		93	2.8	(2.3, 3.4)	273	10.9	(9.8, 12.2)	<0.0001
	Filed for bankruptcy		***9***	***0.3***	***(0.1, 0.5)***	27	1.1	(0.8, 1.6)	0.0013
Health	Health problems		96	2.9	(2.3, 3.5)	261	10.5	(9.3, 11.7)	<0.0001
	Health problems result in seeking medical or psychological help		19	0.6	(0.4, 0.9)	58	2.3	(1.8, 3.0)	<0.0001
Depression /suicide	Mental stress (guilt, anxiety, depression)		94	2.8	(2.3, 3.4)	127	5.1	(4.3, 6.0)	<0.0001
	Suicidal thoughts		***10***	***0.3***	***(0.2, 0.6)***	16	0.6	(0.4, 1.0)	<0.0001
	Attempted suicide			---		***11***	***0.5***	***(0.3, 0.8)***	0.0721
Relationship	Relationship problems		29	0.9	(0.6, 1.2)	71	2.8	(2.3, 3.6)	<0.0001
	Domestic violence		6	0.2	(0.1, 0.4)	37	1.5	(1.1, 2.0)	<0.0001
	Separation or divorce			---		23	0.9	(0.6, 1.4)	<0.0001
	Neglect of children or family		***8***	***0.2***	***(0.1, 0.5)***	46	1.8	(1.4, 2.5)	<0.0001
	Child welfare services involved		0	0.0		20	0.8	(0.5, 1.2)	<0.0001
Work/school	Work or school problems		13	0.4	(0.2, 0.7)	40	1.6	(1.2, 2.2)	<0.0001
	Lost job or quit school due			---		19	0.8	(0.5, 1.2)	<0.0001
	Received public assistance/welfare payments			---		15	0.6	(0.4, 1.0)	<0.0001
Illegal acts	Commission of illegal acts		15	0.4	(0.3, 0.7)	42	1.7	(1.2, 2.3)	<0.0001
	Amount of money illegally obtained	Mean (95% CI)	***3,282***	***8.3***	***(-6.6, 23.3)***	***2,441***	***1360.0***	***(-1289.3, 4009.3)***	<0.0001
	Amount of money illegally obtained	Median (95% CI)	***3,282***	***0.0***	***(0.0, 0.0)***	***2,441***	***0.0***	***(-0.0, 0.0)***	<0.0001
	Arrested			---		18	0.7	(0.5, 1.1)	<0.0001
	Convicted of offense			---		***11***	***0.4***	***(0.2, 0.8)***	<0.0001
	Incarcerated			---		***9***	***0.4***	***(0.2, 0.7)***	<0.0001
	Endorsed one of more harm	2=yes	204	6.4	(5.6, 7.3)	341	14.5	(13.1, 15.9)	<0.0001