



GAMBLING RESEARCH
EXCHANGE ONTARIO
DRIVING KNOWLEDGE INTO ACTION

Applying a public health perspective to gambling harm

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Gambling Research Exchange Ontario

Table of Contents

Background	3
Introduction.....	4
Gambling harm.....	5
The Continuum of Gambling Harms	6
Comorbid Disorders	7
Major Depression	7
Bipolar Disorder.....	7
Generalized Anxiety Disorder.....	8
Antisocial Personality Disorder.....	8
Suicidal Ideation	8
Other Psychiatric Disorders.....	8
Alcohol Use Disorders	9
Substance Use Disorders.....	9
Tobacco Consumption	9
Vulnerable Populations and the Social Determinants of Health	10
Adolescents	10
Older Adults.....	10
Indigenous Peoples	10
Low Socioeconomic Status Populations	11
Problem Gambling and Criminality.....	11
Adopting a Public Health Lens	12
Conclusion.....	13
References	18

Background

The harms experienced from problem gambling have been studied extensively through clinical and epidemiological studies (Lorains et al., 2015). Problem gambling, which encompasses a more moderate form of the clinical diagnosis of Disordered Gambling (as specified in the DSM-V), can have profound negative financial, emotional, and professional impacts on an individual, family, or community level. Furthermore, problem and disordered gambling are closely associated with a wide range of mental health and substance abuse disorders. These comorbid disorders can exacerbate the degree of harm experienced by the individual, and intensify coexisting conditions the gambler may have.

The purpose of this report is to summarize literature examining the relationship between problem gambling and comorbid mental health and substance abuse disorders, and the prevalence of gambling disorders among target demographics that are more susceptible to its associated harms. This report will also place emphasis on the capacity for a public health framework to enhance and inform the prevention, policies, and treatment of both problem gambling and its associated comorbid disorders, including but not limited to:

- Major Depression
- Suicidal Ideation
- Bipolar Disorder
- Generalized Anxiety Disorder
- Antisocial Personality Disorder
- Alcohol Use Disorders
- Substance Use Disorders
- Tobacco Dependence

A public health framework identifies systematic disparities in health status and applies this understanding to develop and incorporate best practices, health policy, and interventions to improve the health and wellbeing of whole groups or populations of people. The application of a public health framework to other mental health and substance use disorders that typically co-occur, such as tobacco, has led to public health responses yielding significant reductions in population morbidity and mortality. With a wealth of evidence highlighting the interconnectedness of problem gambling and associated comorbid disorders, and the disparities in the distribution of harm from gambling in the population, it is fundamental to view these parallels as an opportunity to intervene more effectively under a unified public health approach (Browne et al., 2016). Importantly, addressing the context and the environment in which gambling is consumed by promoting healthy behaviour, introducing harm reduction strategies, and developing preventative measures that address the disadvantaged among the population who are uniquely susceptible to adversity and hardship, would engage and emphasize the majority of gambling harm as it manifests in the population.

Applying a comprehensive public health perspective to address gambling-related harm could reinforce and complement existing public health frameworks that encompass substance use, alcohol and tobacco consumption, and other pressing health concerns that fall under the mandate of public health. Moreover, this perspective would promote a broader upstream focus that mitigates the burden of gambling harm from a population level.

Introduction

The most recent prevalence rates of moderate risk and problem gamblers in Canada ranges from 0.3-4.0%, and 0.2-1.2% respectively, as reported in *The Gambling Digest* using the Canadian Problem Gambling Index (Canadian Partnership for Responsible Gambling, 2016). The Canada Problem Gambling Index (CPGI) is a standardized instrument that categorizes the degree to which gamblers are at-risk for experiencing harms from gambling, ranging from the non-gambler to individuals with a Gambling Disorder. While the terms “problem gambling” and “disordered gambling” are sometimes used interchangeably, problem gambling refers to a more moderate form of disordered gambling. Disordered gamblers are unable to control their gambling behaviour, leading to serious negative impacts on their personal lives (Lorains et al., 2011; Welte et al., 2001). Although problem and disordered gamblers experience significant harms from their gambling behaviour, non-gamblers and recreational gamblers can also experience harms from gambling. In fact, the majority of the harms experienced from gambling are a result of lower-risk gambling activity, specifically among recreational gamblers who do not struggle with an addiction (Raisamo et al., 2014).

There has been an overall improvement in many population health indicators across Canada in recent decades. However, there are still prominent and widespread inequities in the health and wellbeing of Canadians related to the social determinants of health. Addictions, mental health disorders, poverty, and other public health issues are influenced by the social determinants of health, including socioeconomic standing and the distribution of wealth, education, employment status, access to important health and social services, ethnicity, and other defining population characteristics. In many individuals, the same risk factors and health disparities that influence a person’s chances of developing a substance use or mental health disorder also make them more susceptible to problem or disordered gambling and gambling harms (Petry, 2007). Gambling harms can be intensified when an individual also suffers from substance use or mental health disorders or inequities associated with the social determinants of health.

The purpose of this report is to examine the comorbid disorders that often coincide with gambling, and the societal conditions and factors that can shape an individual’s experience with gambling and gambling harm. This report will:

- Review the prevalence and antecedents of comorbid mental health and substance use disorders in populations of problem and disorder gamblers
- Explore population-specific vulnerabilities associated with the social determinants of gambling that influence the inequities and disparities in gambling harm
- Propose key considerations for addressing gambling harms within a unified public health approach

Gambling harm

Gambling harms can have detrimental and long-term impacts at three broad levels: the individual gambler, their friends and family, and within a community context. These harms include, but are not limited to, impacts to (Browne et al., 2016):

Emotional Health

- Reduced feeling of self-worth
- Feelings of inadequacy, shame, insecurity
- Vulnerability to intense mental stress, suicidal ideation

Physical Health

- Increased sedentary behaviour
- Biological impacts of stress (increased blood pressure, insomnia, physical disability)

Financial Wellbeing

- Loss of savings
- Inability or reduced capacity to meet essential needs
- Sustained financial hardship

Relationships

- Dishonesty, disengagement in core relationships
- Separation/rejection, isolation from partner and society
- Increased risk of relapse into problematic gambling behaviour due to missing social support network

Cultural Harm

- Cultural shame in relation to culturally-based roles and expectations
- Persistent loss of connection to community
- Reduced cultural practices

The harms associated with gambling are not restricted to the gambler. Gambling harm can first develop through initial financial and emotional stress, tension in important relationships, and increased sedentary behaviour. These harms can progress to the point where essential needs are neglected and the gambler experiences social isolation and rejection from their partner, close friends, and family. Without treatment, gambling harm can generate lasting impacts, where the harm continues to effect the lives of the gambler, their family, and the community- even if an individual stops gambling.

A recent survey reported that only 7-12% of problem gamblers have ever sought treatment for their gambling behaviour (Slutske, 2006). There are a number of barriers to treatment for problem gamblers:

- Desire to handle the problem independently
- Shame and stigma
- Denial of problematic behaviour
- Language and literacy issues
- Cultural barriers

Women are also less likely than men to seek treatment for problem gambling behaviour (Braun et al., 2014).

The Continuum of Gambling Harms

Gambling behaviours occur across a spectrum where the harms vary in intensity and severity. The categories in the spectrum classify gambling behaviours as recreational, harmful, problem or disordered activity. The infographic below outlines these categories of gambling behaviours, the associated harms, and how primary, secondary and tertiary public health prevention measures relate to each of the categories.

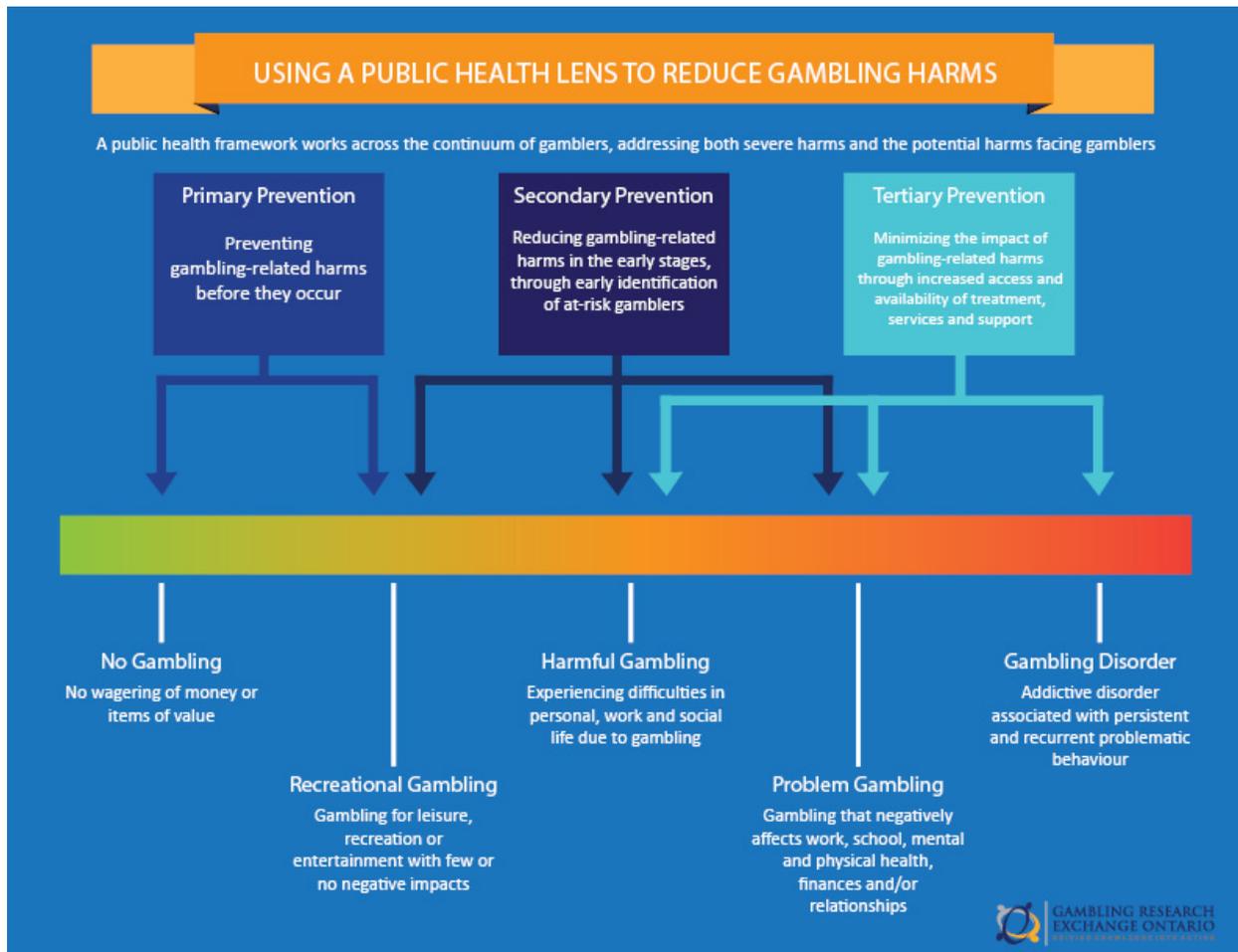


Figure 1. Using a Public Health Lens to Reduce Gambling Harms

Gambling Disorder is classified as a non-substance related addiction in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V). The threshold for diagnosis is responding positively to four or more of the nine criteria:

- Gambling frequently when feeling distressed
- Gambling with increasing amounts of money to achieve the same excitement
- Repeated unsuccessful attempts to control or cut back on gambling
- “Chasing” one’s losses through repeated visits after losing
- Lying to conceal the extent of involvement with gambling
- Restless or irritable when attempting to cut down or stop gambling
- Often preoccupied with gambling
- Jeopardized or lost a significant relationship, job or opportunity because of gambling
- Relies on others to provide money to relieve desperate financial situations caused by gambling

Men are more likely to develop gambling problems than women; men also gamble more and bet more money than women (Hing et al., 2014). Gender and other factors also influence the types of gambling activities:

- Male gambling participation is highest for raffles, lottery-type games, table games, sports betting, race wagering, Electronic Gaming Machines (EGMs)
- Women are more likely to gambling on raffles/sweeps/competitions, bingo, and lottery type games
- Younger men more likely than older men to take part in private betting, EGMs, table games, race wagering, sports betting, scratch tickets, and phone competitions
- Older men more likely than younger men to participate in lottery-type games, raffles, sweeps, and other competitions
- Younger men are more likely to be moderate risk/problem gamblers compared to younger women

Comorbid Disorders

There are high rates of comorbid disorders among problem gamblers (Dell'Osso et al., 2005). Problem gamblers have a higher prevalence of mental health and substance use disorders than the general population. Problem gambling and substance use disorders share several characteristics:

- The intense desire to satisfy a need
- The individual's lack of control over their behaviour related to the use of the substance
- Obsessive thoughts about the substance use or activity
- Persistent engagement in destructive and harmful behaviour despite experiencing emotional, physical, and professional consequences (Dell'Osso et al., 2005)

Mental health and substance use disorders and problem gambling have an additive and reciprocal relationship. Each influences and intensifies the other's harms to the gambler, to their family and close friends, and to the community.

Major Depression

- In a study conducted by Quigley et al. (2015), the prevalence of major depression among problem gamblers was found to be 32.4%, compared with the national average of 4.7% (Quigley et al., 2015). Studies have demonstrated higher prevalence rates of major depression among problem gamblers in the community, as well as among those seeking treatment, than non-gamblers (Lorains et al., 2011; Dowling et al., 2015a).
- Problem gamblers with depression reported more severe gambling problems and gambling-related harms. They also had significantly greater childhood trauma scores and higher levels of neuroticism than problem gamblers without depression (Quigley et al., 2015).

Bipolar Disorder

- In a study examining data from the Canadian Community Health Survey, McIntyre et al. (2007) reported the presence of bipolar disorder among 6.3% of disordered gamblers, compared with 2% of the general population.
- In meta-analyses examining comorbid psychiatric disorders among problem gamblers seeking treatment and problem gamblers not seeking treatment, the mean prevalence of bipolar disorder was found to be 8.8% and 9.8% (respectively).
- Similarly, a study conducted by Jones et al. (2015) determined that moderate to severe gambling problems were four times higher in people with bipolar disorder than in the general population.

Generalized Anxiety Disorder

- Studies examining the prevalence of comorbid generalized anxiety disorder (GAD) found that 14.4% of problem gamblers seeking treatment and 11.1% of problem gamblers not seeking treatment had a comorbid GAD (Dowling et al., 2015a; Lorains et al., 2011).
- Surveys examining psychiatric disorders in the general population have determined the lifetime prevalence of GAD to be 5.1% (results of the National Comorbidity Survey) to 8.5% (results of the Epidemiological Catchment Area Survey). In a given year, GAD affects about 3% of the general population (Kessler et al., 2005).
- There is evidence that stress and generalized anxiety may provoke gambling activity. Although GAD is more prevalent among problem and disordered gamblers than the general population, no causal relationship has been identified between the two.

Antisocial Personality Disorder

- Problem gambling has been associated with an increased prevalence of antisocial personality disorder (ASPD), also known as sociopathy. On average, ASPD was demonstrated to be prevalent among 14.5% of problem gamblers across two studies (Blaszczynski and McConaghy, 1994; Dowling et al., 2015b). However, studies examining ASPD have identified the comorbid presence of this condition in up to 35% of problem gamblers (Cunningham et al., 1998).
- Patterns of problematic gambling behavior can accompany symptoms of ASPD. In one study examining a potentially causal relationship between disordered gambling and gambling-related illegal behaviours, over 60% of subjects with ASPD reported committing a criminal offense, with 40.4% of these subjects committing gambling-only offenses and 13.7% committing both gambling-related and non-gambling offenses (Blaszczynski et al., 1989).

Suicidal Ideation

- Studies examining the relationship between both attempted suicide and suicidal problem gambling respectively found that when major depression was present, attempted suicide was significantly associated with disordered gambling (Newman and Thompson, 2003).
- A study conducted by Petry and Kiluk, (2002) examined suicidal ideation and attempted suicide in individuals seeking treatment for disordered gambling. Their findings demonstrated that up to 32% of participants had experienced suicidal ideation, while 17% had attempted suicide in the past. Furthermore, those with suicidal ideation suffered a greater intensity and range of psychiatric symptoms, were less satisfied with their living situation, and experienced more days of conflict in the month before seeking gambling treatment.
- An analysis of the results from the Canadian Community Health Survey Cycle 1.2 indicated that disordered gamblers were over three times more likely to have attempted suicide than the general population, even after adjusting for a range of sociodemographic and psychiatric variables (Newman and Thompson, 2003).

Other Psychiatric Disorders

- Studies have underscored a significant comorbid relationship between Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD), and problem gambling. Four studies examining the prevalence of ADD and ADHD in problem gamblers seeking treatment found a weighted mean prevalence of 9.3%, compared to 4-5% of adults in the general population (Goodman et al., 2009; Grall-Bronnec et al., 2011; Dowling et al., 2015a).
- Other comorbid disorders found among study populations of problem gamblers seeking treatment and problem gamblers in the community include kleptomania, psychotic disorder, somatoform disorder, intermittent explosive disorder, adjustment disorder, and impulse control disorder (Lorains et al., 2011; Dowling et al., 2015a).

Alcohol Use Disorders

- Alcohol use disorders are one of the more common comorbidities seen in problem gamblers.
- A high prevalence of alcohol use disorders have been found in problem gamblers; on average, 21.2% of treatment-seeking problem gamblers and 28.1% of non-treatment seeking problem gamblers have been found to have a comorbid alcohol use disorder (Lorains et al., 2011; Dowling et al., 2015a).
- Dowling et al.'s (2015a) meta-analysis further classified the prevalence of this comorbidity in terms of alcohol abuse (18.2%) and alcohol dependence (15.2%) in problem gamblers.
- A study examining the comorbid occurrence of AUDs and problem gambling in the U.S. reported that the odds of having a current alcohol dependence diagnosis were 23 times higher among those diagnosed as disordered gamblers than in the general population.

Substance Use Disorders

- As with alcohol use disorders, substance use disorders (SUDs) are prevalent among study populations of problem gamblers. In meta-analyses examining the comorbidity of substance use disorders in problem gamblers, the prevalence of these disorders was demonstrated to be 7.0% among problem gamblers seeking treatment.
- The meta-analysis performed by Lorains et al. (2015) determined an average prevalence of SUDs (including alcohol or illicit drug use disorders and nicotine abuse and/or dependence) among a community sample of problem gamblers to be 57.5%. In a meta-analysis examining treatment-seeking gamblers, the prevalence of any alcohol or substance use disorder individuals was determined on average to be 22.2% (Dowling et al., 2015a).
- Estimates from the meta-analysis conducted by Lorains et al., (2011) also suggested high rates of illicit drug use disorders among problem and pathological gamblers, with 17% reporting this comorbid issue on average, across studies examining community samples of problem gamblers.
- Problem gambling and substance use disorders share many clinical and biological similarities that reflect the complex and intertwined relationship between these conditions.
- In the maturing brain, under-developed mechanisms of self-control and an increased sensitivity to the effects of neurotoxic substances make adolescents more vulnerable to the effects of substance abuse. Moreover, early substance abuse is a major risk factor associated with an increased likelihood of substance dependence in later stages of the lifespan (Fong, 2005). A greater risk of substance use disorders in this demographic makes adolescents more susceptible to gambling harm.

Tobacco Consumption

- In Dowling et al.'s (2015a) meta-analysis, nicotine dependence was found to have the highest weighted mean prevalence (56.4%) of all comorbid disorders in their review. However, the prevalence of this comorbidity was demonstrated to vary from one study to another, ranging from 37.3-68.6% in this population.
- Daily smokers were discovered to be more likely to have a history of treatment for SUDs than non-daily smokers. Furthermore, daily smokers demonstrated more severe gambling and family/social and psychiatric problems than non-daily smokers. Daily smokers also demonstrated a higher frequency and financial investment in their gambling activity than their counterparts, as well as lower perceived control over their gambling behaviour (Petry and Onken, 2002; Fong, 2005).

Vulnerable Populations and the Social Determinants of Health

Problem gambling and its associated risk factors place certain demographics at an increased risk of experiencing addiction and suffering from gambling-related harm. Mental health concerns, particularly major depression, are common risk factors associated with the development of a gambling problem. In addition to mental health and substance use disorders, there are a host of societal factors that shape an individual's experience with gambling and gambling harms.

Adolescents

Strong evidence suggests that anywhere from 3-8% of adolescents have a significant gambling problem, while a further 10-15% are at risk of developing problematic gambling patterns and behaviour (Derevensky, 2007).

Risk factors that have been associated with problematic gambling in youth include, but are not limited to:

- Male gender
- Lower socioeconomic status
- Early gambling onset
- A history of a big win
- Extraversion
- Impulsivity
- Life stress
- Parental problem gambling
- Gambling availability
- Poor family connectedness

Other risk factors include delinquency and crime, poor academic performance, and low self-esteem problem gambling in youth (Stinchfield, 2005).

Older Adults

Older adults have high participation rates in gambling, with 73.5% participating in some type of gambling activity in the past year (Wiebe et al., 2004). Elevated participation rates are likely a result of the rapid expansion, accessibility, and variety of emerging gambling outlets. Among this demographic, participation may also be facilitated by trends of increased leisure time among older adults, as well as greater disposable (Fong, 2005; Hazel & Leslie, 2015). While 83% of adults gambled in the past year, older adults are at a higher risk of gambling harm. Older adults on a fixed income may not be able to recover financially as quickly, which can make financial loss irreversible and more devastating. Older adults may also lack the social support network to encourage moderate gambling behaviour and positive lifestyle choices (Fong, 2005). Well-established social support networks are important sources of community engagement and excitement among older adults (Fong, 2005).

Mental health disorders including dementia and Alzheimer's are suggested to influence an individual's control over problematic gambling behaviour. Repeated behaviour and response, attention difficulties, and impaired adaptability related to these mental health disorders could influence the harms experienced by an individual as a result of their gambling activity (Fong, 2005).

Gambling activities provide benefits to older adults including increased socialization, structure, and entertainment. Despite the potential for harm, sociocultural benefits have been demonstrated to positively impact the health, wellbeing and quality of life in the aging population (Desai et al., 2004, Fong, 2005).

Indigenous Peoples

Gambling among many North American Indigenous Peoples is considered a sacred activity. Sacred aspects of gambling are rooted in traditional myth and ceremony, although modern gambling practices have been thought to have significant cultural impact in many communities by replacing or reducing participation in more traditional cultural games and activities (Belanger, 2010; Breen & Gainsbury, 2013). However, recent literature suggests that traditional gambling practice continues to inform or influence contemporary Indigenous Peoples gambling behaviour in some cases (Belanger, 2010; McGowan and Nixon, 2004). Importantly, as Canadian Indigenous Peoples culture is widespread and diverse, with

distinct cultural and geographic specificities, incorporating local traditional knowledge is an important component of addressing gambling harm in these demographics (Belanger, 2010).

The sociocultural, geographic, familial, economic, and historical complexities that define Canadian Indigenous Peoples make it difficult to apply a single cohesive strategy in health prevention and harm reduction to address gambling-related harms. There are unique risk factors that warrant unique consideration when addressing gambling harms among Indigenous peoples of Canada, for whom unique disparities and inequities in the social, political, cultural and environmental determinants influence health and wellbeing.

Risk factors concurrently associated with problematic gambling behaviour in Indigenous Peoples include (Williams et al., 2011):

- Geographic proximity to a major gambling venue
- Low socioeconomic status
- Higher group gambling participation rates
- Cultural beliefs that may be conducive to gambling participation, or where cultural traditions have profound historical, secular, and sacred connections to gambling.

Low Socioeconomic Status Populations

Individuals in lower socioeconomic classes are more susceptible to gambling-related harm. The impact of gambling loss can be significant as this group is already experiencing financial hardship. A loss of \$500 or \$1000 will have a greater impact on a household with a net income of \$30,000 per year as compared with a household earning upwards of \$100,000 per year (Fong, 2005).

Problem gambling and gambling-related harm has the potential to manifest more rapidly and intensely in low-socioeconomic status (SES) populations. While higher income groups gamble more frequently, people with lower socioeconomic status have higher rates of problem gambling (Barnes et al., 2011; van der Maas, 2016).

The increased prevalence of problem gambling in this group is also attributed to geographic proximity. Gambling opportunities are both more readily available and more frequently associated with problem gambling in lower income areas (van der Maas, 2016). A higher concentration of these gambling outlets places this group at greater risk for developing problematic gambling behaviour or experiencing gambling harm (van der Maas, 2016; Welte et al., 2004).

Low-SES groups are also at a much greater risk for mental illness, substance abuse, and poorer overall health and wellbeing. The complexity of these relationships and the role of socioeconomic status in the development of, or influence on, mental health and substance use disorders results in higher levels of gambling, and gambling harms (Welte et al., 2004).

Problem Gambling and Criminality

In a study of incarcerated Canadian male offenders, the prevalence of disordered gambling was determined to be between 6.3 and 13.0% (depending on the diagnostic criteria used). Problem gamblers were significantly more likely to have committed income-related offenses (Turner et al., 2009).

Up to 65% of disordered gamblers and 20% of moderate problem gamblers reported that their criminal activity was a direct result of their gambling behaviour. Furthermore, a systematic review of 27 studies found that, on average, over 30% of prison inmates were diagnosed as problem gamblers (Williams et al., 2005; Mishra et al., 2011). Recent literature has highlighted the need for problem gambling treatment services in the correctional system in order to mitigate the influence of problem gambling on future illegality and criminal activity.

Adopting a Public Health Lens

The behavioural issues faced by an individual, and the treatment of these behaviours through downstream, treatment-based approaches, have been the focus of the majority of efforts to address gambling harm in Canada. A public health approach could be adopted to address the health inequities and impacts related to gambling harm from a prevention lens.

Adopting a public health framework or perspective could facilitate a multi-level response directed at preventing and mitigating gambling-related harm at the following levels (Korn and Schaffer, 1999; Victorian Responsible Gambling Foundation, 2015):

- At the individual and community level
 - Community awareness campaigns to increase awareness around gambling harm and signs of problem gambling
 - Put into perspective the costs of gambling (including the likelihood of long term losses, the chances of winning, the cost per hour)
 - Dissemination of research and information to empower community stakeholders to participate in the decision making process around gambling
- In the gambling environment
 - Warning labels to disclose the risks of problem gambling
 - Inform the process of the design and geographical placement of gambling venues
- The physical environment
 - Informing policy to regulate placement and density of gambling venues
 - Regulate hours of operation
 - Regulate types and forms of advertising
- The health and welfare/support system
 - Providing referral services and pathways for treatment
 - Act as an information source to assist the friends and families of gamblers

As outlined in a summary report from the Victorian Responsible Gambling Foundation (2015), a population-based public health approach to gambling harm:

- Supports healthy gambling behaviours and promotes responsible gambling
- Considers the potential consequences of problem gambling for the individual, for their family and friends, and for the community as a whole
- Accounts for the broad range of sociocultural, environmental, and economic risk factors that influence gambling behaviour
- Monitors the prevalence of problem and disordered behaviours in the communities, and broadens the scope from the treatment of problem gamblers to the prevention of gambling harm across the continuum
- Addresses all levels of prevention of problem gambling and gambling harm (whether primary, secondary, or tertiary), through harm minimization, treatment of disordered and problem gamblers to prevent relapse, promoting responsible gambling, and prioritizing the health inequities that subpopulations face in relation to gambling harm
- Engage in community development and consultation to adapt policy and program delivery to meet dynamic population-specific needs

Conclusion

Gambling is a public health concern with diverse impacts on individual and community health and wellbeing. The harms of gambling are inherently interconnected with many comorbid health issues. Expanding the existing public health policies, programs, and practices to encompass the prevention of gambling harm could produce tangible individual- and population-level improvements to human health and wellbeing.

Kerber et al., 2008**	TS	-	-	-	32.50%	-	-	-	-	-
Kessler et al., 2008*	PR	-	-	-	-	76.30%	-	-	63.00%	-
Korman et al., 2008**	TS	-	38.10%	-	-	-	-	-	-	19.0% ¹
Kroeber, 1992**	TS	47.80%	34.90%	30.20%	4.30%	-	-	-	-	-
Ladouceur et al., 2006**	TS	-	-	24.00%	-	-	-	-	-	-
Ledgerwood and Petry, 2006**	TS	-	-	-	-	-	-	-	-	-
Lee et al., 2011**	TS	-	10.30%	-	-	7.30%	-	-	-	-
Maccallum & Blaszczyński, 2002**	TS	-	24.00%	16.00%	8.00%	-	-	-	37.30%	10.6% ¹
Marshall and Wynne, 2004*	PR	-	15.00%	-	-	-	-	-	-	-
Martins et al., 2004**	TS	-	-	10.90%	-	-	-	-	-	-
Park et al., 2010*	PR	-	30.20%	-	-	69.80%	-	-	34.90%	-
Patterson et al., 2006**	TS	27.70%	27.70%	16.70%	11.10%	11.10%	11.10%	0.00%	-	-
Petry et al., 2005*	PR	-	73.20%	-	-	-	-	-	60.40%	38.10%
Sander and Peters 2009**	TS	19.90%	34.90%	-	-	54.80%	-	-	-	-
Sharp et al., 2014 ^{a/c}	PR	-	12.2%/39.4%	-	-	-	-	-	-	-
Smith et al., 2010**	TS	-	30.70%	16.50%	14.20%	-	-	-	-	-
Specker et al., 1995**	TS	-	-	-	-	-	-	-	-	-
Specker et al., 1996**	TS	7.50%/60.0% (L)	7.5%/50.0% (L)	-	-	0%/10.0% (L)	-	-	-	0%
Stinchfield and Winters, 2001**	TS	16.00%	-	-	-	-	-	-	-	-
Tavares & Gentil, 2007**	TS	-	-	-	20.00%	-	-	5.00%	62.50%	-
Tavares et al., 2003**	TS	-	-	-	16.40%	-	-	12.10%	68.60%	-
Welte et al., 2001*	PR	-	18.00%	-	-	-	-	-	-	-
Zimmerman et al., 2010**	TS	-	-	-	-	-	-	-	-	-

* = Studies identified in Lorains et al., (2011); ** = Studies identified in Dowling et al., (2015a); a= at-risk subthreshold; b= problem gambling subthreshold; c= pathological disorder. 1 = Cannabis-specific

PR= Population-representative. Study addresses the prevalence of comorbidity in problem gamblers living in the community

TS= Treatment-seeking. Study addressed the prevalence of comorbidity in problem gamblers seeking treatment.

L= Lifetime comorbidity examined specifically. All others are current or shorter time-frame.

Table 2. Prevalence of comorbid mood, anxiety, mental health disorders.

Published Literature	PR vs. TS	Comorbidity								
		Bipolar Disorder	Major Depression	Gen. Anxiety Disorder	Any mood disorder	Any anxiety disorder	Antisocial Personality Disorder	ADD/ADHD	PTSD	Impulse Control Disorder
Afifi et al., 2010*	PR	4.00%	-	-	-	-	-	-	-	-
Bischof et al., 2013 ^{a/b/c}	PR	-	42.9/40.4/36.2	-	-	23.8/32.7/38.3	-	-	-	-
Sharp et al., 2014 ^{a/c}	PR	-	6.3%/18.7%	-	-	10.3%/28.7%	-	-	-	-
Bondolfi et al., 2000*	PR	-	-	-	-	-	-	-	-	-
Bondolfi et al., 2008*	PR	-	-	-	-	-	-	-	-	-
Cunningham et al., 1998*	PR	3.10%	8.80%	7.70%	-	-	35.00%	-	-	-
Fiegelman et al., 1998*	PR	-	-	-	-	-	-	-	-	-
Gerstein et al., 1999*	PR	32.50%	29.10%	-	-	-	-	-	-	-
Kessler et al., 2008*	PR	17.00%	38.60%	16.60%	55.60%	60.30%	-	-	-	-
Marshall and Wynne, 2004*	PR	-	24.00%	-	-	-	-	-	-	-
Park et al., 2010*	PR	0.00%	11.60%	-	11.60%	14.00%	-	-	-	-
Petry et al., 2005*	PR	22.80%	37.00%	11.20%	49.70%	41.30%	23.30%	-	-	-
Welte et al., 2001*	PR	-	-	-	-	-	-	-	-	-
Battersby et al., 2006**	TS	-	48.80%	-	-	-	-	-	-	-
Breen and Zimmerman, 2002**	TS	-	70% (L)	-	-	25% (L)	-	-	-	-
Dannon et al., 2006**	TS	3.80%	11.50%	3.80%	-	-	-	1.30%	-	-
Dowling et al., 2015a*	TS	-	-	-	-	-	14.00%	-	-	-
Echeburua et al., 2011**	TS	-	-	-	-	-	-	-	-	-
Grall-Bronnec et al., 2011**	TS	-	-	-	42.7% (L)	32.9% (L)	-	10.50%	-	-
Granero et al., 2009**	TS	-	-	-	-	-	-	-	-	-
Grant and Grosz, 2004**	TS	-	42.90%	-	-	-	-	-	-	-
Grant and Kim 2008**	TS	4.20%	10.4%/24.0% (L)	-	-	-	-	-	-	-
Grant and Kim, 2002**	TS	6.00%	28.00%	-	-	-	-	-	-	-
Grant and Kim, 2003 ^{c**}	TS	-	-	-	-	-	-	-	-	22.90%
Grant and Potenza, 2006**	TS	-	-	-	4.8%/29.5% (L)	8.6%/30.5% (L)	-	-	-	-
Grant et al., 2008**	TS	-	13.10%	-	29.50%	11.40%	-	-	-	-

Grant et al., 2009**	TS	-	-	-	36.3% (L)	30.5% (L)	-	-	-	-
Ibanez et al., 2001**	TS	-	-	-	8.7%/15.8% (L)	4.3%/7.2% (L)	-	-	-	-
Jimenez-Murcia et al., 2009**	TS	-	-	-	12.10%	10.10%	-	-	-	-
Kausch, 2003**	TS	-	-	-	-	7.00%	-	-	5.30%	-
Kennedy et al., 2005**	TS	-	25.70%	-	-	-	-	-	-	-
Kerber et al., 2008**	TS	20.00%	82.50%	22.50%	-	47.50%	-	7.50%	-	-
Korman et al., 2008**	TS	-	-	-	-	-	-	-	-	-
Kroeber, 1992**	TS	-	-	-	-	-	-	-	-	-
Ladouceur et al., 2006**	TS	-	-	-	-	-	-	-	-	-
Ledgerwood and Petry, 2006**	TS	-	-	-	-	-	-	-	34.20%	-
Lee et al., 2011**	TS	-	-	-	11.70%	-	-	-	-	-
Maccallum & Blaszczyński, 2002**	TS	-	-	-	-	-	-	-	-	-
Martins et al., 2004**	TS	-	-	-	-	-	-	-	-	-
Patterson et al., 2006**	TS	66.60%	16.70%	50.00%	83.00%	94.40%	-	-	16.70%	-
Quigley et al., 2015	PR	-	32.4%	-	-	-	-	-	-	-
Sander and Peters 2009**	TS	-	17.50%	-	18.50%	-	-	-	-	-
Smith et al., 2010**	TS	-	-	-	-	-	-	-	-	-
Specker et al., 1995**	TS	-	-	-	-	-	-	20.00%	-	-
Specker et al., 1996**	TS	0%	35%/70.0% (L)	5.00%	37.5%/77.5% (L)	22.5%/37.5% (L)	-	-	5.00%	-
Stinchfield and Winters, 2001**	TS	-	-	-	-	-	-	-	-	-
Tavares & Gentil, 2007**	TS	7.50%	45.00%	-	-	27.50%	-	-	-	-
Tavares et al., 2003**	TS	7.90%	71.40%	-	-	-	-	-	-	-
Zimmerman et al., 2010**	TS	-	28.10%	-	-	-	-	-	-	-
Goudriaan et al., 2010**	TS	-	17.00%	-	-	17.00%	-	-	-	-

* = Studies identified in Lorains et al., (2011); ** = Studies identified in Dowling et al., (2015a); a= at-risk subthreshold; b= problem gambling subthreshold; c= pathological disorder. 1 = Cannabis-specific

PR= Population-representative. Study addresses the prevalence of comorbidity in problem gamblers living in the community

TS= Treatment-seeking. Study addressed the prevalence of comorbidity in problem gamblers seeking treatment.

L= Lifetime comorbidity examined specifically. All others are current or shorter time-frame.

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