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Cannabis Use, Harms and Perceived Risks among Canadian Students

Technical Report

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Executive Summary

Background

Cannabis is one of the most widely used psychoactive substance among Canadian youth. This fact is particularly concerning given that early initiation and frequent use of cannabis are associated with many adverse health effects (e.g., impaired cognitive function, increased risk of psychological and substance use disorders). Student drug use surveys (SDUS) are regularly occurring surveys that collect data in classroom settings on the use of alcohol and other substances by students in grades 7 through 12. Survey results are used to monitor emerging trends and inform decision making about policies, programs and services to improve the health outcomes of youth. This information is particularly important since the recent legalization of non-medical cannabis use. A primary aim of the *Cannabis Act* is to prevent youth from accessing cannabis. This report compiles results from provincial and national SDUS to provide a pan-Canadian perspective on baseline trends before legalization in cannabis use, associated harms and perceived risks among Canadian students in grades 7 through 12. It is intended to inform policy makers, substance use treatment and prevention program developers, researchers, health professionals and those working with youth.

Methods

Led by the Canadian Centre on Substance Use and Addiction (CCSA), data on common indicators of cannabis use, harms and perceived risk from seven student drug use surveys were provided by members of the SDUS Working Group for survey cycles occurring between 2007 and 2015. Two national surveys and five provincial surveys (British Columbia, Manitoba, Quebec, New Brunswick, and Newfoundland and Labrador) contribute to this report.

Prevalence estimates for each indicator are presented in this report as a proportion (%) of all survey respondents with accompanying 95% confidence intervals (CIs). Significant differences were determined by assessing whether 95% CIs overlapped. If there was no overlap, estimates were considered significantly different at $p < 0.05$. Where data variability and sample size permitted, estimates by sex/gender, and grade (7 to 12) are also reported.

Results

Although there was considerable variability in questionnaire wording among the contributing surveys, when examining common indicators of cannabis use, harms and perceived risks across the seven surveys, four key results were noted:

1. Among students in grades 7 to 12 surveyed between 2012 and 2015, up to one third reported using cannabis in the past year.
2. Overall cannabis use decreased in the past decade. This decrease was present when examining lifetime, past-year, monthly/past-month and daily cannabis use.
3. More frequent cannabis use (monthly/past-month, daily) was more likely to be reported by male students.
4. Approximately one out of five students who have used cannabis reported that they had driven after cannabis use, and this was more frequently reported among males.



Implications and Conclusions

This report builds on our understanding of the prevalence and trends of cannabis use, harms and perceived risks among Canadian students. While it provides a baseline snapshot of these indicators before legalization of non-medical cannabis use in Canada, it also makes clear that there are gaps that need to be addressed in our knowledge of many contextual and behavioural factors associated with cannabis use. The findings presented here will help to inform the development of future youth-targeted policies, programs and community initiatives, as well as the development of improved monitoring surveys and tools to continuously assess the impact of these policies, programs and community initiatives within the context of a changing legislative and policy landscape in Canada.



Introduction

Cannabis is one of the most widely used psychoactive substance among Canadian youth aged 15–19 and is more prevalent among males than females (Health Canada, 2018a). Past-year cannabis use by 16–19 year olds is more than twice that of adults aged 25 and older (Health Canada, 2017). Compared to other developed countries, Canadian youth have been noted as having one of the highest rates of past-year cannabis use (Currie, 2012). This rate is concerning as early initiation and frequent cannabis use during adolescence is associated with long-lasting adverse effects, including impaired cognitive function and increased risk for psychological disorders (George & Vaccarino, 2015; Moore et al., 2007; Volkow, Baler, Compton, & Weiss, 2014). Youth are also more likely than adults to experience more harms from problematic use and engage in associated risky behaviours while high (Adlaf, Begin, & Sawka, 2005; George & Vaccarino, 2015).

Rates of cannabis use are significantly higher among young men and they are more likely to develop cannabis dependence, compared to young women (George & Vaccarino, 2015). This evidence, however, is in contrast to the perceptions of youth, who often do not fully understand the risks associated with using cannabis, including impairment and addiction (McKiernan & Fleming, 2017). The relationship between perceived risk and cannabis use among Canadian youth is important to understand given that the Monitoring the Future survey of American youth has previously shown an inverse relationship between perceptions of risk associated with cannabis use and past-year use, especially among older students (i.e., Grade 12) (Volkow et al., 2014).

Currently, a number of national population surveys assess cannabis use among those aged 15–19. However, student drug use surveys (SDUS) are able to provide more in-depth analyses of emerging trends in cannabis use, harms and perceived risks among those less than 15 years old. They also typically report higher response rates and are thus capable of discerning differences by sex/gender, grade and other population characteristics (SDUS Working Group, 2013). Compared to other methods, surveying students in schools is also an efficient and cost-effective means of collecting data from youth (SDUS Working Group, 2013). While there are several provincial and national student surveys that have collected information on cannabis use in schools, these results have not yet been brought together in one place to assess interprovincial similarities and differences in student cannabis use and harms, as well as perceptions about the risk of cannabis-related harms.

Understanding these interprovincial similarities and differences is important as on October 17, 2018, Canada legalized non-medical cannabis use. One of the primary aims of the [Cannabis Act](#) is to restrict youth access and prohibit promotions that might encourage youth to use cannabis. Therefore, monitoring and surveillance of cannabis-related use and harms among this population is critical. To conduct this monitoring, it is important to assess cannabis indicators pre- and post-legislative change to better understand the impact of legalization on Canadian youth. Thus, the primary objective of this report is to synthesize cannabis-related indicator data from student surveys across Canada to help establish a pre-legalization baseline assessment of students' cannabis use, harms and perceptions of risks. These data can then be compared with data collected post-legalization. This report is intended to inform policy makers, substance use treatment and prevention program developers, researchers, health professionals and those working with youth.

The Student Drug Use Surveys Working Group

Led by the Canadian Centre on Substance Use and Addiction (CCSA), the SDUS Working Group was formed in 2003. The group consists of nine representatives from jurisdictions with dedicated



programs of reliable, valid, regularly occurring provincial or national student surveys. Previous reports published by the SDUS Working Group include:

- Cross-Canada Report on Student Alcohol and Drug Use (Young et al., 2011)
- The Value of Student Alcohol and Drug Use Surveys (SDUS Working Group, 2013)
- Urban and Rural Student Substance Use (McInnis et al., 2015)

In December 2012, under a new mandate, the SDUS Working Group decided that the great diversity of questions asked and data collected by the various surveys offered an opportunity to explore more specific questions about student drug use across Canada. Thus, the group's priority shifted to focus on specific research topics of interest. This report is the second to take this angle and provides a comprehensive assessment of cannabis use, harms and perceived risks among Canadian students.

Methods

Data from seven student surveys were provided by members of the SDUS Working Group for the survey cycles occurring between 2007 and 2015. This period was selected based on both availability and alignment of cycles between jurisdictional surveys and to reflect data before the legalization of non-medical cannabis use. Several survey samples were weighted to ensure appropriate representation of the provincial or national student population based on school enrolment. National and provincial estimates included in this report are from the following surveys (see Appendix A for details on individual survey designs):

- **National:** Health Behaviour in School-Aged Children (HBSC) survey (2010, 2014), Youth Smoking Survey (YSS) (2008–2009, 2010–2011, 2012–2013) and Canadian Student Tobacco, Alcohol and Drugs Survey (CSTADS) (2014–2015); the HBSC survey includes data from all 10 provinces and three territories, whereas CSTADS includes the 10 provinces only.
- **British Columbia:** B.C. Adolescent Health Survey (BC AHS) (2008, 2013);
- **Manitoba:** Alcohol and Other Drugs: Students in Manitoba Survey (2007); Youth Health Survey (2012);
- **Quebec:** Quebec Survey of Smoking, Alcohol, Drugs and Gambling in High School Students (2008, 2013);
- **New Brunswick:** Student Drug Use Survey in the Atlantic Provinces (2007, 2012);
- **Newfoundland and Labrador:** Student Drug Use Survey in the Atlantic Provinces (2007, 2012).

Note: At the time of data collection, relevant data from the Ontario Student Drug Use and Mental Health Survey could not be accessed through the SDUS Working Group and so is not included in this report.

Cannabis Indicators

Although there is considerable variability in questionnaire wording among the contributing surveys, the following common indicators were agreed-upon by the SDUS Working Group for inclusion in this report. See Appendix B for details on the specific wording and timeframe of variables included in individual surveys.



Cannabis Use Indicators

- **Lifetime cannabis use** refers to the proportion of students who reported having used cannabis in their lifetime.
- **Past-year cannabis use** refers to the proportion of students who reported using cannabis in the past 12 months.
- **Monthly or past-month cannabis use** refers to the proportion who used cannabis at least once a month in the past 12 months or to the proportion of students who reported using cannabis specifically in the past month only.
- **Daily or almost daily use** of cannabis refers to the proportion of students who reported daily or almost daily use of cannabis in the past 30 days or past 12 months.
- **Age at first use** refers to the age at which cannabis was first used.

Cannabis Use and Driving Indicators

- **Driving after cannabis use** refers to the proportion of all students or of those who had ever used cannabis who reported driving a motor vehicle¹ after using cannabis.
- **Passenger where driver used cannabis** refers to the proportion of students who reported being a passenger in a motorized vehicle when the driver had used cannabis.

Harms and Perceived Risks Indicators

- **Use with alcohol or other drugs** refers to the proportion of students who reported using cannabis in combination with alcohol or other drugs.
- **Perceived risk or harms** refers to the proportion of students perceiving a risk² to themselves from smoking cannabis regularly or once in a while.
- **Perceived access** refers to the proportion of students who perceived access to cannabis as “easy”³ or where cannabis was accessed the last time it was used.

Analytic Strategy

Prevalence estimates for cannabis indicators were provided using the terms sex (male/female) or gender (boys/girls)⁴ and grade where data variability and sample size permitted. The majority of surveys did not provide further indicators of gender identity beyond the terms boys and girls. Grade levels of respondents differed slightly by survey, but generally ranged from grades 7 to 12 with the exception of the HBSC, which had groupings of grades 6–8 and grades 9–10, and Quebec, which does not have a Grade 12 equivalent. The cycle year of each survey varied with the best and most recent overlap in cycles occurring between 2012 and 2015.

1 Motor vehicles identifies a broad range of vehicles including cars, motorcycles, off-road vehicles (including agricultural machinery such as tractors), light trucks and regular trucks.

2 Responses for perceived risk use a Likert-type scale for both CSTADS (no risk, slight risk, moderate risk, great risk, don't know) and HBSC (no risk, slight/moderate risk, great risk).

3 Responses for perceived ease of access in CSATDS survey use a Likert-type scale (very or fairly difficult, very or fairly easy, don't know).

4 Surveys varied in adoption of sex or gender categorization, but available responses within a survey were limited to binary options. Throughout the report, male/female are the terms used to describe sex/gender disaggregated data.



Prevalence estimates are presented in this report as a proportion (%) of the student population the survey is weighted to, with accompanying 95% confidence intervals (CIs). Age at first use is presented as a mean or as a proportion of all students who used before age 15. Four surveys (CSTADS, BC AHS, Que., and N.L.) also provided prevalence estimates (daily, monthly/past month, driving after cannabis use), specifically among students who reported ever using cannabis. Following the Statistics Canada (2011) guidelines, any indicator estimates where the coefficient of variation⁵ was greater than 0.333 or the cell size was less than $n=30$ were suppressed in reported tables. It is also noted that estimates with a coefficient of variance between 0.166 and 0.333 should be interpreted with caution. Significant differences for sex/gender and grade were determined by assessing whether the 95% CIs were overlapping. If there was no overlap, estimates were considered significantly different at $p < 0.05$. It is worth noting that this conservative approach to assessing significance likely resulted in instances where real differences in sex/gender or grade did not meet the threshold of significance and are thus not indicated in this report. However, because this test of significance could be easily and consistently applied across surveys and because of the large number of comparisons being made, the SDUS Working Group opted to employ this strategy.

Differences in Contributing Surveys

Differences in survey design methodologies across the different jurisdictions can affect the comparability of estimates. These differences include whether all school districts participated, who administered the survey (e.g., teachers, public health nurses, research staff, etc.) and whether students trusted that their answers would be kept confidential. Differences in samples sizes and other methodological factors among the surveys are described in Appendix A.

Results

Cannabis Use

The majority of surveys contributed prevalence estimates for lifetime, past-year, monthly or past-month and daily cannabis use (Figure 1). For the most recent year of data (2012–2015), lifetime prevalence estimates ranged between 21.8% and 33.3%, and past-year estimates ranged between 16.5% and 30.0%. In terms of indicators of more frequent cannabis use, prevalence of past-month or monthly use of cannabis ranged from 4.2% to 16.5% and estimates of daily or almost daily cannabis use ranged from 1.4% to 5.4%.

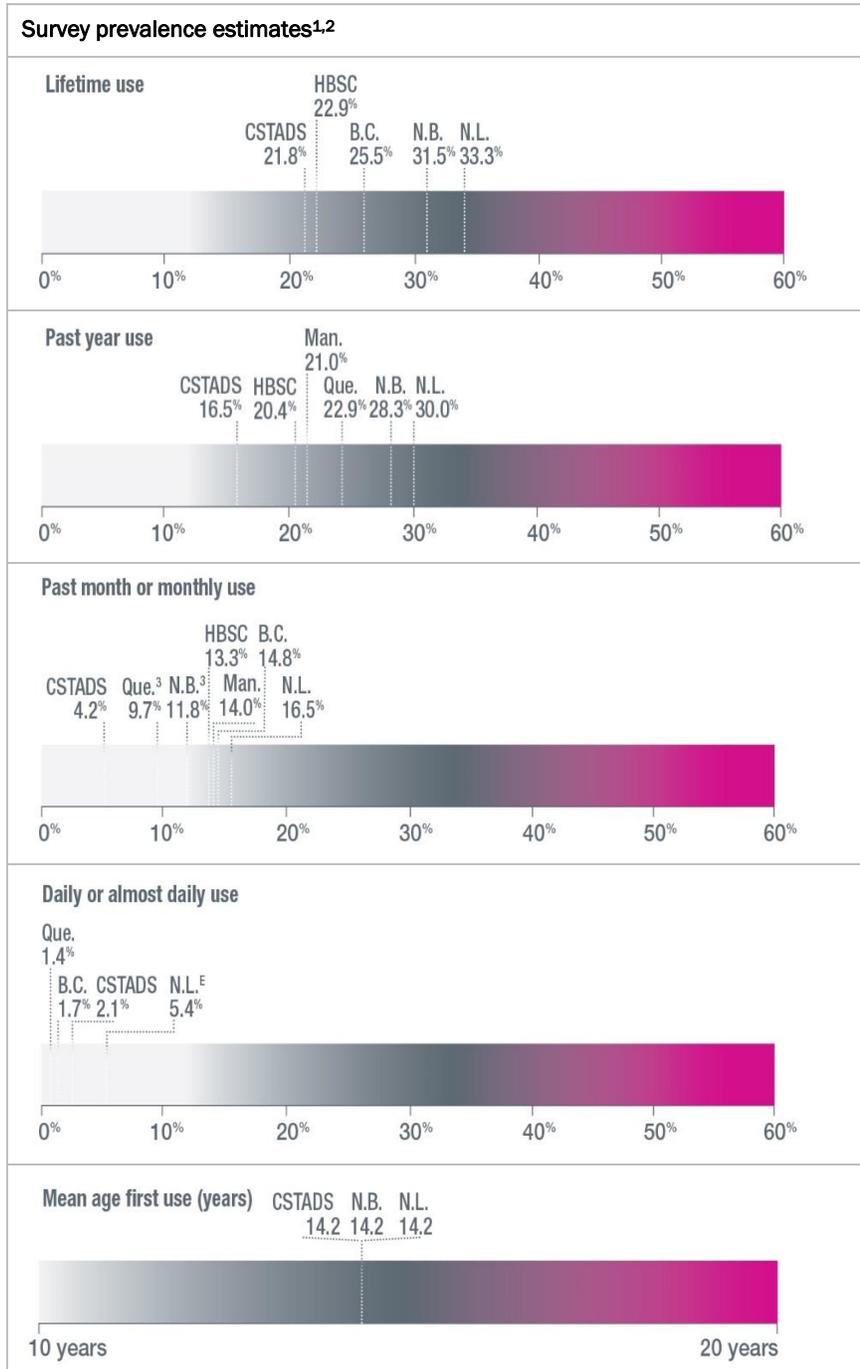
Among surveys contributing estimates by sex/gender, none of them noted significant differences between males and females in relation to lifetime or past-year cannabis use (Figure 2), but three of five surveys reported that a significantly higher proportion of males (13.2%–18.9%) used cannabis in the past month or on a monthly basis, compared to females (9.7%–13.8%). Where estimates were available, lifetime, past-year and monthly use significantly differed by grade and were higher among Grade 12 students compared with Grade 7 students (Figure 3).

Five out of seven surveys examined age at first use of cannabis in the most recent cycle. Among those surveys that assessed mean age of first use, all reported a mean of 14.2 years. The remaining surveys reported estimates for the proportion of students who first used before age 15 (15.2%–19.4%). Of the four surveys providing estimates by sex/gender, British Columbia and New Brunswick noted a significantly earlier age at first use of cannabis among males compared with females.

⁵ The coefficient of variation is a statistic that represents the relative magnitude of the error associated with the estimate to the estimate itself. It is calculated by dividing the standard error of the estimate by the estimate itself, resulting in a ratio of the standard error to the point estimate.



Figure 1. Summary of Cannabis Use Indicators across Jurisdictional Surveys (2012–2015)



1 Estimates expressed as a proportion of all youth surveyed.

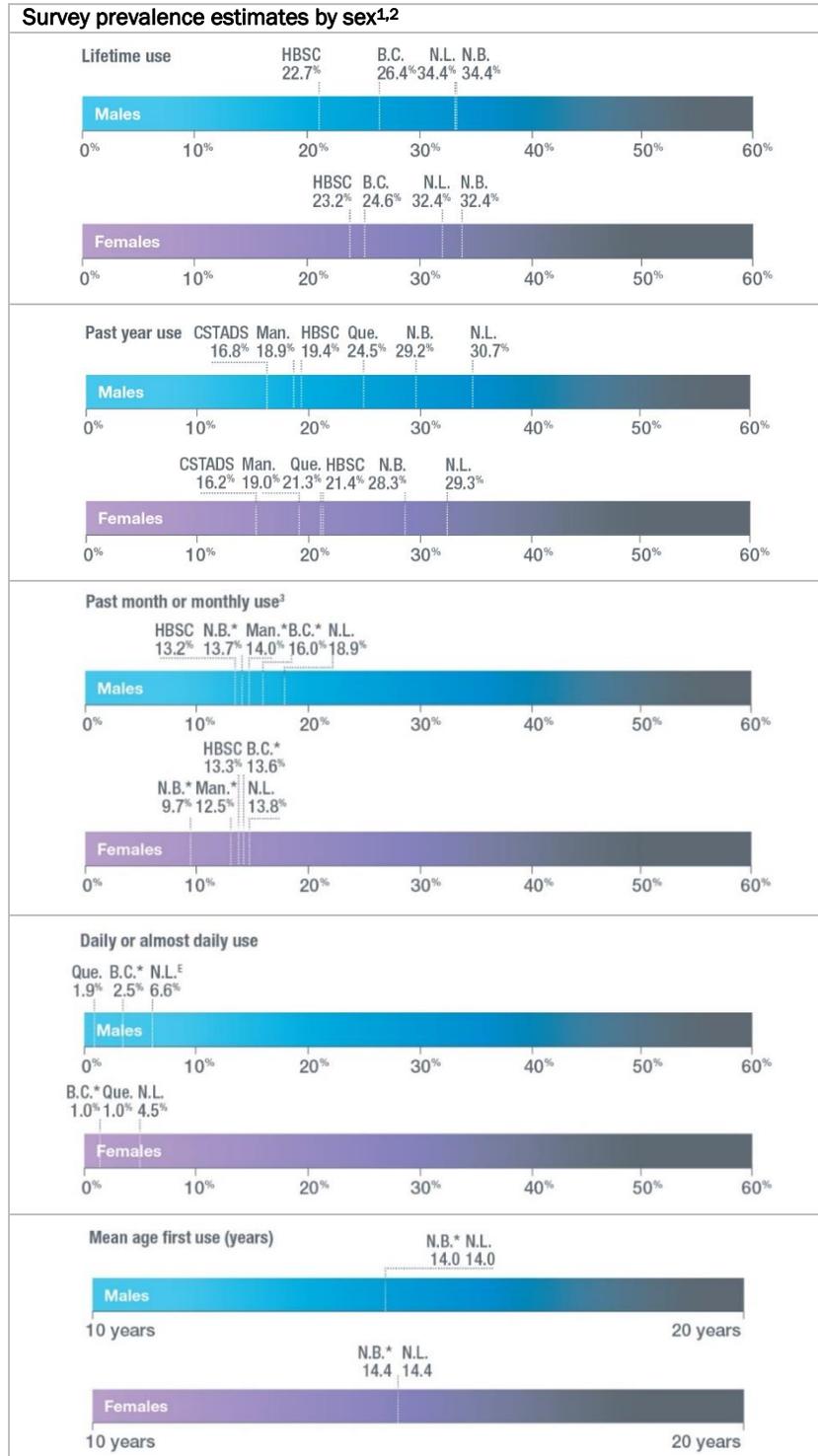
2 Direct comparisons of estimates should be interpreted with caution due to methodological differences between surveys.

3 Estimates for N.B. reflect proportion of students who used cannabis “more than once a month,” while those for Que. reflect “less than once a month or about once a month in past 12 months.”

E Estimate should be interpreted with caution due to high sampling variability.



Figure 2. Sex Differences for Cannabis Use Indicators across Jurisdictional Surveys (2012–2015)



1 Significance at $p < 0.05$ denoted by *.

2 Estimates expressed as a proportion of all youth surveyed.

3 Estimates for N.B. reflect proportion of students who used cannabis “more than once a month.”

E Estimate should be interpreted with caution due to high sampling variability.



Figure 3. Differences between Grades 7 and 12 for Cannabis Use Indicators across Jurisdictional Surveys (2012–2015)



1 Significance at $p < 0.05$ denoted by *.

2 Estimates expressed as a proportion of all youth surveyed.

3 Differences in estimates by grade for Que. were tested between Secondary 1/2 (Grades 7/8) combined and Secondary 5 (Grade 11).

4 Estimates for N.B. reflect proportion of students who used cannabis “more than once a month.”

E Estimate should be interpreted with caution due to high sampling variability.



Trends

Prevalence of cannabis use among students has significantly decreased over time both nationally and provincially across all cannabis use indicators, with the exception of the two contributing Atlantic provinces where trends have remained stable across survey years (Table 1).

When examined by sex/gender, trends in cannabis use in the past month significantly decreased among both males and females in the BC AHS, but only for males in the HBSC. In Newfoundland and Labrador, trends in past month prevalence remained stable by sex/gender. Among Quebec students, the prevalence of daily cannabis use also significantly decreased over time among both males and females.

In Newfoundland and Labrador, age at first use remained stable. However, nationally and in British Columbia, estimates for the age at which students first tried cannabis significantly increased over time. The HBSC survey reported a significant decrease in the proportion of males, but not females, who first used at age 12 as well as a significant increase in the proportion of males, but not females, who had never used at all.

Table 1. Summary of Cannabis Use Trends across All Jurisdictions Surveyed

	National (YSS/CSTADS)	National (HBSC)	B.C.	Man.	Que.	N.B.	N.L.
Survey cycles used in assessing trends ¹	2010–2011, 2014–2015	2010, 2014	2008, 2013	2007, 2013	2008, 2013	2007, 2012	2007, 2012
Cannabis Use Indicator							
Lifetime use	—	↓ (38%)	↓ (17%)	-	-	→	→
Past-year use	↓ (28%)	↓ (32%)	—	↓ (16%)	↓ (19%)	→	→
Past-month or monthly use ²	↓ (29%)	↓ (31%)	↓ (16%)	→	→	—	→
Daily or almost daily use	↓ (90%)	—	—	—	↓ (86%)	—	→
Age at first use ³	↑ (0.5 yrs.)	↑ (28%)	↑ (29%)	—	—	—	→

Note: Arrows indicate directionality of trends over time, which were significant at $p < 0.05$. Average percent changes across the two survey cycles are indicated in parentheses where differences are significant. Horizontal arrows indicate stable trend over time. Dash indicates that no trend data was available.

1 Trends assessed in grades 7–12, except HBSC survey (grades 9–10) and Quebec (Secondary 1 through Secondary 5).

2 Estimates for N.B. reflect proportion of students who used cannabis “more than once a month,” while those for Que. reflected “less than once a month or about once a month in past 12 months.”

3 Estimates expressed as a mean age at first use for CSTADS and N.L. Estimates expressed as a proportion of students < 15 years at first use for B.C and HBSC.

Cannabis Use and Driving

In addition to cannabis use indicators, four of seven surveys asked students about driving a motorized vehicle after using cannabis or about being a passenger with a driver who had recently used cannabis (Table 2). Among students who had ever used cannabis, estimates of ever driving after cannabis use ranged from 15.3% to 21.4% and for driving after cannabis use in the past month ranged from 8.5% to 19.0%. Among all students, prevalence for driving after cannabis use in the



past year ranged between 6.8% and 7.7%. Of the three surveys assessing these indicators by sex/gender, both British Columbia and New Brunswick noted significantly higher prevalence of driving after cannabis use among males (5.2%–9.5%) compared to females (2.8%–5.6%).

From the two Atlantic surveys, nearly a quarter of students reported being a passenger with a driver who had recently used cannabis in the past year, while data from CSTADS and the BC AHS indicated only 14% of students were ever a passenger with a driver who had recently used cannabis, while approximately 7% were in the past month. Only New Brunswick reported significant differences by sex/gender and grade with a higher proportion of females reported being a passenger with a driver who had recently used cannabis as well as students in Grade 12.

Table 2. Summary of Cannabis Use and Driving Indicators across Jurisdictional Surveys (2012–2015)

Cannabis Use and Driving Indicator	Surveys contributing estimates	Range of prevalence estimates ¹	Surveys reporting sex/gender differences ²	Surveys assessing grade differences (7 to 12) ²
Ever driver ³	CSTADS B.C.	4.0%–4.8%	B.C.* (Males: 5.2%, Females: 2.8%)	—
Ever driver (among students who have ever used) ³	CSTADS B.C.	15.3%–21.4%	B.C.* (Males: 19.3%, Females: 11.1%)	—
Past-year driver ³	N.B. N.L.	6.8%–7.7%	N.B.* (Males: 9.5% Females: 5.6%) N.L.	N.B.* (Gr. 12: 16.8% Gr. 7: 0.8%)
Past-year driver (among students who have ever used)	N.B. N.L.	17.5%	N.L.	—
Past-month driver ⁴	HBSC B.C.	2.2%–2.3%	B.C.* (Males: 3.1% Females: 1.4%)	—
Past month driver (among students who have ever used) ⁴	HBSC B.C.	8.5%–19.0%	B.C.* (Males: 11.3% Females: 5.8%)	—
Ever passenger ⁵	CSTADS B.C.	14.0%–14.8%	—	—
Past-year passenger	N.B. N.L.	23.6%–24.4%	N.B.* (Females: 26.3%, Males: 22.5%) N.L.	N.B.* (Gr. 12: 41.9%, Gr. 7: 4.8%)
Past-month passenger ⁵	HBSC B.C.	6.7%–7.1%	B.C.	—

Note: Dash indicates no trend data were provided for assessing sex/gender or grade difference.

1 Estimates expressed as a proportion of all youth surveyed, unless otherwise specified.

2 Significance at $p < 0.05$ denoted by *.

3 Estimates from N.B. and N.L. specify driving within 1 hour of using cannabis.

4 Estimates from CSTADS specify driving within 2 hours of smoking cannabis.

5 Estimates from CSTADS specify being a passenger with a driver who had used cannabis within 2 hours of driving.



Trends for cannabis use and driving were generally not reported in most surveys as these indicators were only assessed in the most recent survey cycle. British Columbia's AHS observed a significant decrease in the prevalence of ever driving after cannabis use (both overall and among students who had used cannabis) among both males and females, while New Brunswick and Newfoundland and Labrador's noted stable trends across survey cycles for past-year driving after cannabis use. This trend also held for sex/gender for Newfoundland and Labrador. Regarding students being a passenger with a driver who had used cannabis, the two Atlantic provinces noted no significant change in prevalence of this indicator (past 12 months) across the survey years assessed.

Harms and Perceived Risks

Four surveys asked about the use of cannabis in combination with alcohol or other drugs. In British Columbia, 5.6% of all surveyed students reported using cannabis and alcohol on the Saturday preceding the survey (a significant decrease in prevalence from 2008) with a significantly higher proportion of males (6.6%) reporting combining cannabis and alcohol use compared to females (4.6%). New Brunswick and Newfoundland and Labrador surveys asked about the use of cannabis specifically with alcohol in the past year and reported similar estimates (15.0% and 14.7%, respectively), but no significant change in trends over time or by sex/gender. Finally, Quebec assessed past-year use of cannabis in combination with other substances more generally and noted a significant decrease in prevalence from 27.2% to 22.9% between cycles (2008, 2013).

Both national surveys (CSTADS and HBSC) included questions about the perceived risks of cannabis use. Smoking cannabis more frequently was perceived to be high risk. Specifically, CSTADS (2014–2015) reported that 57.7% of students perceived a great risk of harm and 18.6% perceived a moderate risk of harm for smoking cannabis on a regular basis. Comparatively, there were mixed perceptions of risk for smoking cannabis once in a while: 24.6% reported great risk and 31.5% reported moderate risk. A similar pattern emerged from the HBSC 2010 survey⁶ with perceived risk significantly higher among students in grade 7 compared to 12. 71.7% of all students (not just those who smoked cannabis) in grades 9 and 10 and 81.7% of those in grades 6 to 8 perceived smoking cannabis on a regular basis to be of great risk, while only 20.6% and 9.1% of those in grades 9 and 10 and grades 6 to 8, respectively, perceived a slight or moderate risk. In contrast, only 34.3% of students in grades 9 and 10 and 49.2% in grades 6 to 8 perceived smoking cannabis once in a while to be a great risk. Only the HBSC survey provided data by sex/gender and grade and found that a significantly higher proportion of females (grades 6 to 8, 84.4%; grades 9 and 10, 77.9%) perceived regular cannabis smoking to be of great risk, compared to males (grades 6 to 8, 78.9%, grades 9 and 10, 64.1%).

Indicators related to ease of access to cannabis were collected by two surveys. In CSTADS 2014-15, an approximate equal proportion of students perceived access to cannabis to be easy (41.4%) or difficult (43.1%). The BC AHS asked where students accessed cannabis the last time they used it and noted that among students who had used cannabis, 82.1% accessed it from a youth outside of the family and 17.2% from an adult outside the family.

Discussion and Implications

The findings presented in this report were compiled from seven national and provincial SDUS, and provide a pan-Canadian perspective on recent trends in cannabis use, associated harms and perceived risks among students. Overall, there are four notable findings from this report:

⁶ Questions about perceived risk were not asked in the 2014 HBSC survey.



1. Among students in grades 7 to 12 surveyed between 2012 and 2015, up to one third reported using cannabis in the past year.
2. Overall cannabis use decreased in the past decade. This decrease was present when examining lifetime, past-year, monthly/past month and daily cannabis use.
3. More frequent cannabis use (monthly/past month, daily) was more likely to be reported by male students.
4. Approximately one out of five students who have used cannabis reported that they had driven after cannabis use, and this was more frequently reported among males.

The following section discusses these key findings in relation to their implications for policy makers, substance use treatment and prevention program developers, researchers, health professionals and those working with youth. These implications include considering age and sex/gender when developing new research, policy and prevention programs, as well as when educating youth about the effects and harms of cannabis use.

Cannabis Use Trends

Across the different student surveys for lifetime, past-year, past-month and daily usage, there was consistent evidence for a multi-year pattern of stable or decreasing cannabis use among Canadian students. These results are consistent with other Canadian surveys: a stable or decreasing trend in past-year cannabis use among youth has been reported since the mid-2000s in school and household surveys of young Canadians (Boak, Hamilton, Adlaf, & Mann, 2017; Health Canada, 2014; Rotermann & Langlois, 2015) and among youth in the United States (Azofeifa, 2016; Johnston et al., 2018). Several studies have also shown that the majority of Canadians are most likely to try cannabis for the first time before age 18 (Hango & LaRochelle-Côté, 2018; Spackman et al., 2017). That students' average age of first use of cannabis increased over time across the surveys included in this report is an encouraging result given that earlier age at initiation is associated with more frequent cannabis use (McCreary Centre Society, 2016) and greater risk of experiencing harms (George & Vaccarino, 2015; Hall, 2015).

High-frequency cannabis use (i.e., daily or near-daily use) by youth is also associated with increased harms such as developing a cannabis use disorder (George & Vaccarino, 2015; Hall, 2015; Nakamura et al., 2011). Thus, this is a key indicator deserving particular attention in student populations. In the period of study, many of the contributing surveys reported a decreasing trend of frequent cannabis use.

Consistent across the included surveys and with previous research was the finding that male students were more likely to report monthly or daily cannabis use and that they initiated use at an earlier age (Hango & LaRochelle-Côté, 2018; Health Canada, 2017; Johnson et al., 2015; Pirie & Simmons, 2014; Health Canada, 2016; Young et al., 2011). This finding might in part be explained by gender differences in risk-taking behaviours. Increased perceptions of risk associated with regular cannabis use have been observed among females (Okaneku, Vearrier, McKeever, LaSala, & Greenberg, 2015; Pacek, Mauro, & Martins, 2015), while comparatively increased prevalence of risk-taking behaviours have been noted among male students (Centers for Disease Control and Prevention, 2018; Croisant, Haque Laz, Rahman, & Berenson, 2013; Mahalik et al., 2013).

A recent Canadian study also highlighted that males are more likely than females to report “easy” access to cannabis (Leos-Toro, Rynard, Murnaghan, MacDonald, & Hammond, 2019). Sex-related factors such as physiological response and tolerance to the amount and potency of cannabis used could also play a role in determining frequency and initiation of use, but this relationship is not



currently well understood. Further research on why more frequent cannabis use occurs among males would be useful for developing effective prevention and treatment strategies, especially given that this behaviour contributes to young males' elevated likelihood of developing a cannabis use disorder (George & Vaccarino, 2015).

Cannabis Use and Driving

Youth comprise one of the largest groups of drivers who die in motor vehicle crashes where cannabis and other psychoactive substances are implicated (Canadian Centre on Substance Abuse, 2015). Across the surveys analyzed for this report, students frequently reported driving after using cannabis or being a passenger with someone who had used cannabis. Youth aged 15–24 are more than twice as likely to report driving after using cannabis compared to older Canadians (Canadian Centre on Substance Use and Addiction, 2018), but are also twice as likely to report being a passenger of a driver who had used cannabis than being a driver themselves (Beirness, 2014). In contrast, Canadian youth are only slightly more likely to report driving after drinking alcohol compared with older adults.

Research suggests that Canadian youth are not fully aware of the risks associated with cannabis use and driving, and perceive cannabis to pose less of a risk for driving compared to alcohol (McKiernan & Fleming, 2017). This misperception is supported by evidence showing that among young males and females the prevalence of driving after using cannabis is higher than after using alcohol (Canadian Public Health Association, 2018; Cook, Shank, Bruno, Turner, & Mann, 2017; McKiernan & Fleming, 2017).

That males were more likely to drive following cannabis use aligns with other survey results (Canadian Centre on Substance Use and Addiction, 2018; Government of Canada, 2017). This finding might be because young males are more likely to engage in risky behaviours in general – including driving after cannabis use (Croisant et al., 2013; Mahalik et al., 2013). In some U.S. states, research has indicated that cannabis legalization was accompanied by an increase in the rate of driving under the influence of cannabis among adults (Masten & Guenzburger, 2014; Salomonsen-Sautel, Min, Sakai, Thurstone, & Hopfer, 2014). It will therefore be important to develop and monitor the impact of targeted education efforts for Canadian youth, especially males, aimed at informing them of the risks of driving after using cannabis.

Harms and Perceived Risk of Cannabis Use

Among students in Canada, use of alcohol and cannabis simultaneously is relatively common (Boak et al., 2017; Richardson, 2013) and is associated with more harms than use of either substance alone (Meyer & Leece, 2018). Cannabis use is also closely associated with increased use of other substances among youth (Grant & Bélanger, 2017). Encouragingly, data from some of the student surveys included in this report suggest a decrease in the use of cannabis alongside other substances, particularly alcohol. These findings are consistent with evidence that past-year prevalence of alcohol use alone has decreased since 2008–2009 among students (Health Canada, 2018b).

Most surveys did not provide data on the perceived risk of cannabis use. National survey data, however, indicates that the majority of students, particularly in younger grades, perceived regular use of cannabis (smoking specifically) to be associated with great risk. This finding is again an encouraging result since regular cannabis use is associated with the most harms. However, research on perceptions of cannabis have noted that youth often lack clarity on how cannabis affects the brain and body (McKiernan & Fleming, 2017). This indicator does not provide information to distinguish whether students' perceived risks are attributable to cannabis itself compared to the



mode of delivery (i.e., smoking, vaping, edibles), which are important factors to understanding risks and harms associated with cannabis use. Also noteworthy is that female students, across all grades, are more likely to perceive more risk associated with cannabis use in general. Lower perceived risk of cannabis use among males might contribute to the earlier age of initiation, increased frequency of use and higher rates of participation in risky behaviours such as driving after use (Okaneku et al., 2015; Pirie & Simmons, 2014).

Perceived risk of cannabis use is an important indicator to monitor after legalization, since it is inversely related to the likelihood of using cannabis (Boak et al., 2017; Grant & Bélanger, 2017; Hasin, 2018; McKiernan & Fleming, 2017; Volkow et al., 2014), although this relationship is not always present (Johnston et al., 2018). American states that have legalized the non-medical use of cannabis have reported decreased perceptions of risk among youth, but impacts on the overall rates of cannabis use have been mixed (Colorado Department of Public Safety, 2016; Roffman, 2016).

Some of the national data in this report indicates mixed perceptions around the availability of cannabis. Perceived availability has been found to be a strong predictor for frequent cannabis use among youth at age 15 (Leos-Toro et al., 2019; Ter Bogt et al., 2014), and ease of availability plays a key role in incentivizing use among youth (McKiernan & Fleming, 2017). As a result, monitoring of perceived ease of access to cannabis will be an important indicator to assess after legalization.

Limitations

As the first report to bring together provincial and national estimates on key cannabis indicators from different surveys in Canada, this report also highlights several challenges arising from the differences in these data and the conclusions that can be drawn from comparing them. First, inconsistencies in the timing of survey cycles means that each jurisdiction had data collected for somewhat different time points between 2007 and 2015, and therefore might not have captured the same most recent year of data nor the same year-to-year trends in cannabis indicators. The prevalence measures and trends reported in this report also only capture students attending private or public schools, excluding youth living on reserves, those not attending school or attending other kinds of schools, and those who are institutionalized or street-entrenched youth (except for a Manitoba survey, which included some of these groups). These exclusions are important considerations given that there is evidence of higher substance use among groups of youth not well represented by surveys administered in schools (Greene, Ennett, & Ringwalt, 1997). For example, tobacco-smoking rates among Indigenous youth remain significantly higher than among their non-Indigenous peers (Jetty, 2017).

Differences in some of the wording of indicators also make comparisons across surveys more difficult, so results from different jurisdictions about the same indicator should be interpreted with caution. For example, some surveys asked about driving within one hour of smoking cannabis, while others specified two hours (Appendix B). Further, differences in sampling and methodology (e.g., sampling frames, response rates, informed consent procedures, etc.) also limit inter-survey comparisons.

It is also worth noting that the scope of this report is limited to reporting prevalence and trends for cannabis indicators in isolation from other behaviours and factors that are known to be associated with population-level changes in cannabis use. Examples include smoking tobacco, the prevalence of which has decreased among North American and Canadian students in the past decade (Hublet et al., 2015; Janz, 2012), and the perceived ease of access to cannabis, which has also decreased in recent years alongside past-year use (Leos-Toro et al., 2019).

Finally, the comprehensiveness and national representation of this report may be limited by the fact that some provinces and territories do not have (current or past) student surveys that address substance use, while others were unable to contribute data for the current report.



Future Directions for Research

Legalization and regulation of non-medical cannabis use will likely change the way that youth perceive, interact with and use this psychoactive substance. Although some improvements have been made in the amount and quality of data collected on the prevalence and associated harms of cannabis use among youth in Canada, many gaps still remain.

In particular, the current data collection either focuses on indicators related to smoking cannabis specifically or does not distinguish between different modes of cannabis consumption. Moving forward, other methods of cannabis use besides smoking (e.g. vaping, edibles, topical) among youth should be addressed in student surveys. Research will need to collect information about product format and method of ingestion, as these will be important indicators for risks and harms associated with cannabis use in the era of legalized non-medical cannabis use. For example, the most recent Monitoring the Future report noted that one in ten students in Grade 12, reported vaping cannabis in the past year (Johnston et al., 2018). Results from the Canadian Cannabis Survey in 2017 indicate that vaping cannabis was the third most common method of consumption after smoking and eating it in food (Government of Canada, 2017). Significant gender differences in the method of cannabis use among students have also been reported: males are significantly more likely than females to use cannabis in electronic cigarettes or a water pipe, or to consume it in a drink (Boak et al., 2017).

While this report broadly compiles patterns of cannabis use among students in grades 7 to 12 across Canada, it also reveals that further research about the effects of sex/gender and age on these indicators, as well as associated and perceived harms of cannabis use, are needed. Future research should prioritize expanding understanding of harms and perceptions associated with the use of cannabis according to key sociodemographic characteristics.

Developing questions in surveys that address these gaps will be crucial for more accurately capturing non-medical use patterns and for understanding the impact of legalization. Compilation of the survey results in this report also make it clear that greater consistency among surveys in the wording of questions is needed to permit valid inter-survey comparisons of prevalence rates. Developing a systematic approach across jurisdictions for assessing cannabis use and harms will be essential for improving school-based assessment of cannabis indicators. This approach is especially relevant following legalization of non-medical cannabis use since each province and territory is responsible for implementing rules and regulations around distribution and use of cannabis for their jurisdiction, as well as sanctions for youth possession of up to five grams of cannabis. Different rules and regulations could differently affect the prevalence and perceptions of cannabis use among youth living in different parts of the country.

Conclusion

This report builds on our understanding of the prevalence and trends of cannabis use, as well as the associated harms and perceptions of risk among Canadian students. While this provides a baseline snapshot of these indicators prior to legalization of non-medical cannabis use in Canada, it also makes clear that there are gaps in our knowledge of many contextual and behavioural factors associated with cannabis use that need to be addressed. The findings presented here will help to inform the development of future youth-targeted policies, programs, and community initiatives, as well as the development of improved monitoring surveys and tools to continuously assess the impact of these policies and programs in the context of a changing landscape in Canada.



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Appendix A: Design of Contributing Surveys

	National	National	B.C.	Man.	Que.	N.L.	N.B.
Name of survey	Youth Smoking Survey (YSS); Canadian Students Tobacco and Drug Survey (CSTADS) (Both, grades 7–12)	Health Behaviour in School-aged Children (HBSC; Grades 6–8 and 9–10)	BC Adolescent Health Survey (Grades 7–12)	Alcohol and other Drugs: Students in Manitoba (AFM; Grades 7–12) Youth Health Survey (YHS; grades 7–12)	Quebec Survey of Smoking, Alcohol, Drugs, and Gambling in High School Students (secondary 1–5, equivalent to grades 7–11)	Student Drug Use Survey in the Atlantic provinces (Grades 7, 9, 10, 12)	Student Drug Use Survey in the Atlantic provinces (Grades 7, 9, 10, 12)
Data collection	YSS 2008–2009, 2010–2011, 2012–2013; CSTADS 2014–2015	2010, 2014	2008, 2013	AFM 2007 YHS 2012–2013	2008, 2013	2007, 2012	2007, 2012
Sample size	2014–2015: 42,094 students	2010: 26,078 students from 436 schools 2014: 29,784 students from 377 schools	2008: 29,315 students from 463 schools 2013: 29,832 students from 443 schools	2007: 4,992 students from 55 schools 2012–2013: 64,218 students from 476 schools	2008: 4,736 students from 144 schools 2013: 4,943 students from 153 schools	2007: 3,848 students from 102 schools 2012: 2,530 students from 72 schools	2007: 6,237 students from 84 schools 2012: 3,465 students in 110 schools
Clusters	Two-stage (school and class) cluster sampling	Two-stage (school and class) cluster sampling	Classes	2007: Two-stage (school and class) cluster sampling 2012–2013: Census	Two-stage (school and class) cluster sampling	Two-stage (school and class) cluster sampling	Two-stage (school and class) cluster sampling
Sex/gender categorization	Sex at birth: male or female)	Gender: boy or girl	Sex: male or female (2008) Are you: male or female (2013)	Sex: male or female Transgender was also included in the questionnaire for YHS 2012–2013 if schools opted to complete the Healthy Sexuality section.	Gender: boy or girl	Are you: male or female	Are you: male or female



	National	National	B.C.	Man.	Que.	N.L.	N.B.
Links	www.canada.ca/en/health-canada/services/canadian-student-tobacco-alcohol-drugs-survey/2014-2015-summary.html	healthycanadians.gc.ca/publications/science-research-sciences-recherches/health-behaviour-children-canada-2015-comportements-sante-jeunes/alt/health-behaviour-children-canada-2015-comportements-santé-jeunes-eng.pdf	www.mcs.bc.ca/pdf/blunt_talk.pdf	Please email progeval@afm.mb.ca for information on the AFM survey. https://partners.healthincommon.ca/wp-content/uploads/2014/11/2012-13-Manitoba-YHS-Report_FINAL.pdf	www.stat.gouv.qc.ca/statistiques/sante/enfants-ados/alcool-tabac-drogue-jeu/tabac-alcool-drogue-jeu-2013.pdf	www.health.gov.nl.ca/health/publications/Drug_Survey.pdf	www.gnb.ca/0378/pdf/2013/9230e.pdf



Appendix B: Cannabis-Related Variables from Contributing Surveys

	National YSS/CSTADS ⁷	National HBSC	B.C.	Man. AFM, YHS	Que.	N.L.	N.B.
Cannabis Use Indicators							
Lifetime	Lifetime	Lifetime	Lifetime	Lifetime	Not available	Lifetime	Lifetime
Past-year	Past 12 months	Past-year	Not available	Past-year	Past-year	Past-year	Past-year
Past month or monthly	At least once a month in past 12 months	Past month (ever)	Past month (one or more days)	Past month	Less than once a month or about once a month in past 12 months	Past month	Use more than once per month
Daily or almost daily	Daily use in past 12 months	Not available	Daily in past month	Daily (AFM 2007)	Daily	Daily or almost daily in past 30 days	Not available
Age at first use	Mean age at first use	Indicated which age first use. Summed to determined use before age 15.	First use before age 15	First use at age 13 or younger (AFM 2007)	Not available	Mean age at first use	Mean age at first use
Cannabis Use and Driving Indicators							
Driver after cannabis use	Ever drove a motorized vehicle within 2 hours of smoking marijuana	Not available	Ever driven when had been using; in past 30 days, driven when had been using	Drove within an hour or two of using marijuana, in the past 12 months (AFM 2007)	Not available	Impaired as a driver within an hour of using cannabis in the past 12 months	Drove within an hour of using cannabis in past 12 months
Passenger where driver used cannabis	Ever were passengers in a motorized vehicle with a driver who had used marijuana within 2 hours of driving	Not available	Ever passenger of someone driving who had been using; in past 30 days was passenger of someone driving who had been using	Ridden in a car with a driver who had been using marijuana, in the past 12 months (AFM 2007)	Not available	Passenger of someone driving while impaired in the past 12 months	Passenger in vehicle where driver used cannabis in past 12 months

⁷All CSTADS/YSS questions except those on impaired driving refer to cannabis (which includes marijuana, hash and hash oil), whereas driving indicators specify marijuana only.



Harms and Perceived Risks Indicators							
Use with other drugs	Not available	Not available	Used marijuana and alcohol last Saturday	Not available	Used cannabis in combination with other substances	Used cannabis and alcohol in the past year Used cannabis, alcohol and cigarettes in the past year	Used cannabis and alcohol
Perceived risk or harms	Perceived risk of smoking cannabis to self (among users): a) once in a while, and b) regularly	Perceived risk of smoking cannabis (among all youth): a) once in a while, and b) regularly	Not available	Perceived harms or risk to smoking cannabis and driving "There's nothing wrong with smoking cannabis and driving" (AFM 2007)	Not available	Not available	Not available
Perceived access	Perceived ease of access to cannabis, if wanted it	Not available	Where cannabis was accessed the last time used	Ease of access ("easily")	Not available	Not available	Not available