

Health Reports

An analysis of cannabis home cultivation and associated risks in Canada, before and after legalization

by Nick Cristiano, Karen Pacheco, Elle Wadsworth, Christina Schell,
Nayani Ramakrishnan, Elissa Faiazza, Elisabeth Beauchamp and Sarah Wood

Release date: September 15, 2022



Statistics
Canada

Statistique
Canada

Canada

How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website, www.statcan.gc.ca.

You can also contact us by

Email at infostats@statcan.gc.ca

Telephone, from Monday to Friday, 8:30 a.m. to 4:30 p.m., at the following numbers:

- Statistical Information Service 1-800-263-1136
- National telecommunications device for the hearing impaired 1-800-363-7629
- Fax line 1-514-283-9350

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed standards of service that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca under “Contact us” > “[Standards of service to the public](#).”

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

Published by authority of the Minister responsible for Statistics Canada

© His Majesty the King in Right of Canada as represented by the Minister of Industry, 2022

All rights reserved. Use of this publication is governed by the Statistics Canada [Open Licence Agreement](#).

An [HTML version](#) is also available.

Cette publication est aussi disponible en français.

An analysis of cannabis home cultivation and associated risks in Canada, before and after legalization

by Nick Cristiano, Karen Pacheco, Elle Wadsworth, Christina Schell, Nayani Ramakrishnan, Elissa Faiazza, Elisabeth Beauchamp and Sarah Wood

DOI: <https://www.doi.org/10.25318/82-003-x202200900003-eng>

ABSTRACT

Background

In 2018, Canada legalized the use and sale of non-medical cannabis, with most provinces also permitting home cultivation. To advance the knowledge of home cultivation patterns in Canada within the context of legalization, this study examines (1) the demographics and use patterns of cannabis home growers before and after legalization and (2) the relationship between home cultivation and cannabis-related risks, including workplace use and driving after cannabis use (DACU).

Data and methods

The study is based on seven waves of the National Cannabis Survey, dating from 2018 to 2019. Descriptive statistics were used to analyze home cultivation across several individual and sociodemographic characteristics pre- and post-legalization. Logistic regression was used to examine whether home cultivation is correlated to selected cannabis-related risks.

Results

The rate and demographics of home cultivation remained relatively unchanged post-legalization. Those most likely to cultivate cannabis post-legalization were male; 35 years and older; not single; married, common law, divorced, separated or widowed; lived in the Atlantic provinces; consumed cannabis medically or medically and non-medically on a daily or almost daily basis; had more than a high school diploma; and reported “smoking” as their primary consumption method. Home cultivation was correlated to workplace use but not to DACU.

Interpretation

The research provides early insights into home cultivation within a legalized framework. It also shows a relationship between home cultivation and certain cannabis-related risks (e.g., workplace use), suggesting a need for future research to determine whether tailored education and policy interventions are needed to target cannabis home growers.

Keywords

Cannabis, home cultivation, legalization, Canada, risk

AUTHORS

Nick Cristiano, Karen Pacheco and Elle Wadsworth are with the Canadian Centre on Substance Use and Addiction. Nick Cristiano is also with the Department of Sociology and Anthropology at the University of Guelph, and Elle Wadsworth is also with the School of Public Health Sciences at University of Waterloo. Christina Schell, Nayani Ramakrishnan, Elissa Faiazza, Elisabeth Beauchamp and Sarah Wood are with the University of Toronto.

What is already known on this subject?

- In 2018, Canada legalized the non-medical use of cannabis, including provisions to allow adults to grow up to four plants per household for personal use. All provinces, except Manitoba and Quebec, permit home cultivation for non-medical purposes.
- Data from 2019 suggest that nearly 10% of Canadians who use cannabis either grow it themselves or have someone else grow it for them.
- The self-reported benefits of home cultivation include more control over the quality and strength of the cannabis, reduced cost and reduced risks associated with purchasing it from the illegal market.
- International trends suggest that home cultivators are most likely to be employed, 20- to 40-year-old males who live in rural areas and report regular or heavy cannabis consumption.

What does this study add?

- The percentage of people who report cultivating cannabis at home has not significantly changed from pre- to post-legalization.
- The individual and sociodemographic characteristics of home cultivation remain relatively unchanged pre- and post-legalization, with a few exceptions. Following legalization, 35- to 54-year-olds are significantly more likely to cultivate cannabis at home, as are those living in the Atlantic provinces, while those who are 55 and older are significantly less likely to do so.
- Post-legalization, those most likely to cultivate cannabis at home are male; 35 years and older; married, common law, divorced, separated or widowed; not single; live in the Atlantic provinces; consume cannabis for medical or medical and non-medical reasons; use cannabis on a daily or almost daily basis; have more than a high school diploma; and report “smoking” as their primary consumption method.

In October 2018, the *Cannabis Act* came into effect, legalizing the use and sale of cannabis for non-medical purposes in Canada. Included in the act are provisions for home cultivation, allowing up to four plants to be grown per household, with each province and territory given the power to enact additional restrictions.¹ Quebec and Manitoba, for example, prohibit home cultivation for non-medical purposes, while the other provinces allow up to four plants to be grown. According to the 2019 National Cannabis Survey (NCS), approximately 10% of Canadians who use cannabis grow it for themselves or have someone grow it for them.²

Few studies have examined the demographics of home cultivation, most of which have been conducted outside of Canada. These studies find that the individuals most likely to grow cannabis at home are 20- to 40-year-old males who are employed or are a student, live in rural areas and use cannabis frequently.³⁻⁹ The most common motivation for growing cannabis at home is for medical purposes, either for oneself or for others.^{7,10-12} The self-reported benefits of growing cannabis at home include more control over quality, reduced costs and avoidance of the illicit market.^{6,12,13}

Some of the documented risks associated with home cultivation include electrical and fire hazards, accidental exposure to children and trafficking of home-cultivated cannabis on the illicit market.¹⁴⁻¹⁶ Because growing cannabis at home for non-medical purposes has been associated with increased access, stronger cannabis (i.e., higher tetrahydrocannabinol [THC] concentration) and increased frequency of use, research suggests that home growers may be at greater risk of developing

cannabis use problems (including dependency) and other mental health problems.^{4,17,18} However, the relationship between home cultivation and other cannabis-related risks, such as workplace use and driving after cannabis use (DACU), has been far less studied.

Increased access to cannabis through home cultivation may result in increased frequency of use, a strong predictor of workplace use.¹⁹ However, a recent study found that home cultivation laws are associated with reductions in workplace fatalities. Perhaps this is because the greater access to cannabis afforded by these laws enables workers to substitute cannabis for other drugs, like alcohol and opioids, which arguably pose more serious risks to workplace safety.²⁰ Some workers also use cannabis for medical reasons to support their wellbeing at work (i.e., for pain or psychological treatment),²¹⁻²⁴ and thus, laws permitting home cultivation may result in reductions in workplace injuries and fatalities by increasing access to cannabis for these workers. At the same time, cannabis in the workplace can pose several safety risks, especially for individuals who use it recreationally, who use high THC products and who work in safety-sensitive positions.¹⁹ Recent estimates suggest that approximately 25% of Canadian workers who consume cannabis have used it within the workplace.¹⁹

With respect to DACU, rates of cannabis-impaired driving increased in some U.S. jurisdictions after non-medical cannabis legalization.²⁵⁻²⁸ In Canada, a recent study based on provincial and national population survey data found that self-reported rates of DACU have remained relatively unchanged since the legalization of non-medical cannabis.²⁹ However, a study of

Table 1
Summary of the waves of the National Cannabis Survey used for descriptive statistics and regression models

Wave	Collection date	Before or after		
		legalization	Descriptive statistics	Regression models
Wave 1	February to March 2018	Before	included	...
Wave 2	May to June 2018	Before	included	...
Wave 3	August to September 2018	Before	included	...
Wave 5	February to March 2019	After	included	included
Wave 6	May to June 2019	After	included	included
Wave 7	August to September 2019	After	included	included
Wave 8	November to December 2019	After	included	included

... not applicable

Source: National Cannabis Survey—first, second and third quarters of 2018 and first, second, third and fourth quarters of 2019.

motor vehicle accidents in British Columbia found that the rate of moderately injured drivers with a THC blood content level above 2 ng/ml has more than doubled.³⁰ These conflicting findings might result from differences in each study’s data sources (i.e., self-reported rates versus rate of cannabis-involved motor vehicle accidents). Nonetheless, further research is needed to better understand the impact legalization has had on cannabis-impaired driving in Canada.

Cannabis increases the risk of a motor vehicle accident by impairing several cognitive and psychomotor functions related to driving performance.^{31–34} A U.S. study looking at home cultivation provisions found that the likelihood of DACU did not differ between jurisdictions that allowed home cultivation and those that did not.³⁴ While these studies provide some important insights, they are ecological studies that focus on home cultivation policies and whether risk behaviours like DACU and workplace use are more likely in areas where home cultivation is allowed. To our knowledge, no cross-sectional studies have been conducted to look at whether people who cultivate cannabis at home are more likely to engage in DACU or workplace use than those who do not. Furthermore, much of the existing literature is conducted in countries where cannabis is not legalized, and thus, there is a need for research on home cultivation patterns and behaviours within the context of legalization.

Using the NCS, the present study examines the individual and sociodemographic characteristics of home cultivation in Canada and selected associated risks. The objectives of the study are two-fold: (1) to describe changes in the demographics and use patterns of Canadians growing cannabis at home before and after legalization, and (2) to examine the relationship between home cultivation and cannabis-related risks, including workplace use and DACU. The research will help broaden our understanding of the relationships between home cultivation and legalization and home cultivation and certain cannabis-related risks. The findings are important to the three-year legislative review of the *Cannabis Act*, as home cultivation is identified as one of the specific topics in the act for review, and the protection of public health and safety is one of the act’s stated objectives.

Methods

Data

The data for the study comes from Statistic Canada’s NCS, which collects waves of data on cannabis use patterns and behaviours at three-month intervals, before and after legalization (Statistics Canada 2020).³⁵ The survey’s target population is non-institutionalized people aged 15 years or older who are living in one of Canada’s ten provinces (except for the second quarters, when data from the three capital cities of the territories were also included). The survey is based on a cross-sectional design, with a sample of approximately 6,000 respondents for each wave, stratified by province to allow for provincial estimates. Response rate was, on average, 50%.

The analyses were conducted on respondents who reported cannabis use in the past three months and were based on seven waves of NCS data, as indicated in Table 1. For the descriptive statistics, waves 1 to 3 and waves 5 to 8 were selected so that there could be a comparison before and after legalization. We excluded Wave 4 because it was conducted between November and December 2018, and the reference period for the survey is the “past three months.” This would cross over into the period after legalization (October 17, 2018). Some of the variables, specifically income, reason for use and method of consumption, were only examined for post-legalization (i.e., waves 5 to 8) because they were not included in the pre-legalization waves. We combined the NCS waves by merging and appending the data at the microdata level.³⁶

Logistic regression was used to determine factors independently associated with workplace use and DACU after accounting for sociodemographic factors. The logistic regression analyses were based on waves 5 to 8. The “pre-legalization” waves could not be included because workplace use and some of the control variables were not available in the earlier version of the survey. Bootstrap weights were used for both the descriptive statistics and regression models to account for the survey’s complex design. Listwise deletion was used to remove a small number of missing cases. All analyses were conducted at a Statistics Canada Research Data Centre using Stata (version 16).

Table 2
Prevalence of home cultivation of cannabis by time relative to legalization and selected demographics, household population aged 15 or older who reported consuming cannabis in the past 3 months, Canada (provinces only), 2018 and 2019

	Home cultivation in the past 3 months					
	Before legalization			After legalization		
	%	95% confidence interval		%	95% confidence interval	
From		To	From		To	
Pre- and post-legalization (n~5,500)						
Total	4.8	3.6	6.0	5.2	4.1	6.3
Age (years)						
15 to 34 (ref)	2.4 ^E	1.1	3.7	3.5 ^E	2.1	4.9
35 to 54	4.8 ^{E,*}	2.9	6.7	7.3 ^{‡,*}	5.0	9.7
55 or older	12.7 ^{E,*}	8.4	17.0	6.3 ^{‡,*}	4.3	8.4
Age regroup (years)						
15 to 34 (ref)	2.4 ^E	1.1	3.7	3.5 ^E	2.1	4.9
35 or older	7.7 [*]	5.6	9.8	7.0 [*]	5.3	8.6
Gender						
Male (ref)	5.0	3.5	6.6	5.9	4.4	7.5
Female	4.5 ^E	2.6	6.3	4.1 ^{E,*}	2.6	5.5
Marital Status						
Married or common law (ref)	6.0	4.2	7.8	6.4	4.8	8.1
Divorced, separated or widowed	11.3 ^{E,*}	4.5	18.1	6.5 ^{E,*}	3.4	9.6
Single	2.2 ^{E,*}	0.9	3.5	3.3 ^{E,*}	1.8	4.9
Education						
High school or less (ref)	4.7 ^E	2.6	6.8	4.1 ^E	2.5	5.7
Trade or college	7.3 [*]	5.0	9.5	7.2 [*]	5.1	9.2
University	1.8 ^{E,*}	4.2	3.1	3.7 ^{E,‡}	1.8	5.6
Education regroup						
High school or less (ref)	4.7 ^E	2.6	6.8	4.1 ^E	2.5	5.7
More than high school	4.8	3.4	6.3	5.8 [*]	4.4	7.2
Province						
Atlantic provinces (ref)	5.2 ^E	3.3	7.1	8.9 [‡]	7.0	10.8
Quebec	6.1 ^E	2.5	9.6	F		
Ontario	5.5 ^{E,*}	3.4	7.7	5.9 ^{E,*}	3.7	8.2
Prairie provinces	1.8 ^{E,*}	0.7	3.0	3.2 ^{E,*}	1.7	4.6
British Columbia	5.0 ^{E,*}	2.4	7.7	6.4 ^E	3.9	8.8
Frequency of use						
Monthly or less (ref)	2.0 ^E	8.7	3.0	2.3 ^E	1.1	3.5
Weekly	4.9 ^{E,*}	2.3	7.5	3.1 ^E	1.6	4.7
Daily or almost daily	7.9 [*]	5.5	10.3	9.9 [*]	7.5	12.3
Post-legalization only (n~3,000)						
Income (\$)						
Less than 40,000 (ref)	...	...	...	5.0 ^E	2.5	7.6
40,000 to 80,000	...	...	...	6.2 ^E	4.1	8.3
80,000 or more	...	...	...	4.9	3.3	6.4
Reason for use						
Non-medical (ref)	...	...	...	3.1 ^E	1.7	4.6
Medical	...	...	...	6.0 ^{E,*}	3.5	8.5
Both	...	...	...	8.2 [*]	5.8	10.7
Method of consumption						
Smoke (ref)	...	...	...	6.1	4.6	7.7
Vape	...	...	...	3.8 ^E	1.8	5.9
Other	...	...	...	3.3 ^{E,*}	1.7	4.9

... not applicable
^{*} significantly different from reference category ($p < .05$)
[‡] significantly different from before legalization ($p < .05$)
^E use with caution
^F too unreliable to be published
Notes: ref = reference category. Atlantic provinces include Newfoundland and Labrador, Nova Scotia, Prince Edward Island and New Brunswick; Prairie provinces include Manitoba, Saskatchewan and Alberta.
Source: National Cannabis Survey—first, second and third quarters of 2018 and first, second, third and fourth quarters of 2019.

Descriptive statistics

We used descriptive statistics to examine home cultivation patterns before and after legalization. The dependent variable for the descriptive statistics was home cultivation. The survey question asks, “In the past three months, where did you get the cannabis you used?” One of the responses available is, “I grow my own.” We turned this into a binary variable measuring home cultivation (0 = No, 1 = Yes). Because the survey responses to the supply source question are not mutually exclusive, it is possible for respondents to have reported growing their own

cannabis as well as obtaining it elsewhere. Thus, our dependent variable is not a measure of whether a respondent obtained cannabis exclusively from home cultivation, but whether they obtained at least some of their cannabis from home cultivation in the past three months.

The focus of the analyses was on the relationship between home cultivation and age, gender, marital status, education, province, income, reason for use, frequency of use and method of consumption (see Table 2 for the breakdown of these variables). The selection of these variables was informed by the existing

literature.^{3–12} We had to group the Prairie provinces together (i.e., Alberta, Manitoba and Saskatchewan) and the Atlantic provinces together (i.e., Nova Scotia, Newfoundland and Labrador, New Brunswick, and Prince Edward Island) because of low case counts. We created a binary variable for legalization by coding waves 1 to 3 as “pre-legalization” and waves 5 to 8 as “post-legalization.” Whenever possible, legalization was included as a third variable in the descriptive tables to account for how home cultivation patterns have changed before and after legalization. Z-tests were conducted to compare differences between proportions pre- and post-legalization, as well as between each category of the key independent variables. We discuss only those differences that were statistically significant at $p < 0.05$. The sample size for the pre- or post-analyses was approximately 5,500 (rounded to the nearest 500 to protect confidentiality). The sample size for the analyses of income, reason for use and method of consumption (post-analysis only) was approximately 3,000 (also rounded to the nearest 500 to protect confidentiality).

Logistic regression

We used a logistic regression to examine the relationship between home cultivation and cannabis-related risks while controlling for sociodemographic variables.³⁷ For these analyses, home cultivation was the key independent variable. We tested the effect of home cultivation on two dependent variables: workplace use and DACU. The first captures whether a respondent has, in the past three months, used cannabis before or during work. The second captures whether a respondent has, in the past three months, driven a motor vehicle within two hours of using cannabis. Both are categorical variables with a binary outcome (0 = No, 1 = Yes). Those respondents who reported that they were not employed or did not have a valid driver’s license were excluded from the sample. The final sample size, which we can report unrounded because there are no residual disclosure issues that would compromise confidentiality, was 2,274.

In each of the logistic regression analyses, the frequency of use variable was entered in a stepwise fashion to examine whether home cultivation has a separate effect from frequency of use on likelihood of risk. We then tested for an interaction effect between frequency of use and home cultivation.

Results

The demographics of home cultivation pre- and post-legalization

Table 2 displays home cultivation patterns pre- and post-legalization. Approximately 5.2% of people who use cannabis reported growing it at home post-legalization, a number not significantly different from the period pre-legalization (4.8%). The demographics of home cultivation remained relatively unchanged between the pre- and post-periods, with a few exceptions. Following legalization, those aged 35 to 54 were

significantly more likely to grow cannabis at home, whereas those aged 55 and older were significantly less likely to grow cannabis at home. There were also notable provincial differences between the pre- and post-periods, with home cultivation in the Atlantic provinces significantly rising from 5.2% to 8.9%.

In the post-legalization period, growing cannabis at home was significantly more likely among those aged 35 years and older (7%) than those aged 15 to 34 years (3.5%). Males were significantly more likely than females to grow cannabis at home, with 5.9% of males reporting home cultivation in the past three months. Those who are married or common law were more likely than those who are single to engage in this practice as were those with more than a high school diploma than those with a high school diploma or less.

Home cultivation was more common in the Atlantic provinces (8.9%) and less common in the Prairie provinces (3.2%). It was more common among those who reported daily or almost daily use, with 9.9% reporting engagement in this activity in the past three months. Those who use cannabis for medical or medical and non-medical reasons were significantly more likely to grow it at home than those who use it for non-medical reasons only, and those who consume cannabis primarily by smoking it were more likely to grow cannabis at home than those who consume it by methods other than inhalation, such as edibles.

Home cultivation and risk

Table 3 provides the sample characteristics for the logistic regression analyses. Table 4 shows the percentages of workplace use and DACU by home cultivation.

The odds ratios of workplace use and DACU for people who cultivate cannabis at home are provided in Table 5. The regression analysis examining the relationship between home cultivation and workplace use revealed that respondents who reported cultivating cannabis at home were significantly more likely to also report using cannabis in the workplace. In Model 1, which does not include frequency of use, the effect of home cultivation was statistically significant. In Model 2, which includes frequency of use, the effect of home cultivation on workplace use remained statistically significant. We tested for an interaction effect between frequency of use and home cultivation in Model 3. The interaction term was statistically significant, suggesting that a person who cultivates cannabis at home and uses it on a weekly, daily or almost daily basis is more likely to use in the workplace than a person who cultivates cannabis at home but uses it on a monthly basis or less.

The regression analysis examining the relationship between home cultivation and DACU found that respondents who reported cultivating cannabis at home were not significantly more likely to also report driving within two hours of using cannabis. In Model 4 (without frequency of use), home cultivation was significant. However, when controlling for the effect of frequency of use in Model 5, the effect of home cultivation on DACU was no longer significant, suggesting that

Table 3
Sample characteristics for models 1 to 5, household population aged 15 or older who reported consuming cannabis in the past 3 months, Canada, 2019 (provinces only) (n=2,274)

Characteristics	percent
Home cultivation	
Yes	5
Age (years)	
15 to 34	54
35 to 54	34
55 or older	12
Gender	
Male	62
Female	38
Marital status	
Married or common law	52
Divorced, separated or widowed	7
Single	41
Reason for use	
Non-medical	53
Medical	17
Both	30
Household income (\$)	
Less than 40,000	14
40,000 to 80,000	27
80,000 or more	59
Province	
Atlantic provinces	8
Quebec	18
Ontario	39
Prairie provinces	20
British Columbia	15
Education	
High school or less	30
Trade or college	41
University	29
Method of consumption	
Smoke	68
Vape	13
Other	19
Frequency of use	
Monthly or less	48
Weekly	22
Daily or almost daily	30
Driving after cannabis use	
Yes	14
Workplace use	
Yes	11

Notes: Atlantic provinces include Newfoundland and Labrador, Nova Scotia, Prince Edward Island and New Brunswick; Prairie provinces include Manitoba, Saskatchewan and Alberta.

Source: National Cannabis Survey—first, second, third and fourth quarters of 2019.

the effect of home cultivation was explained by the effect of frequency of use. An interaction between home cultivation and frequency of use was estimated in a third model but was not significantly significant.

Discussion

Home cultivation among those who reported cannabis consumption in the past three months did not significantly change in the year before and the year after legalization. Likewise, the individual and sociodemographic characteristics of home cultivation remained relatively unchanged, with a few exceptions including age and province. Before and after legalization, those who are 35 years and older were more likely to cultivate cannabis at home than those who are 15 to 34 years old. After legalization, the rate of home cultivation increased for 35- to 54-year-olds and decreased for those aged 55 and older. Historically, older adults have had higher rates of medical cannabis use,³⁸⁻⁴² and this, as seen in this study, is a strong predictor of home cultivation. This might explain why those who are 55 years and older were far more likely to grow

cannabis pre-legalization than 35- to 54-year-olds, as home cultivation was permitted before legalization for those with medical authorization. The significant drop in the rate of home cultivation for the 55 and older age group post-legalization might be explained by the greater availability, accessibility and variety of legal cannabis afforded by the new non-medical market. With increasing availability, accessibility and options for purchasing cannabis, older adults who were growing cannabis for medical reasons pre-legalization may now prefer the convenience of buying cannabis from the legal retail market. Future research should examine whether the legalization of non-medical cannabis has changed the sources used, particularly home cultivation, among those who use it for medical reasons.

The finding that home cultivation was most common in the Atlantic provinces might be explained by differences in provincial laws. While home cultivation for non-medical purposes is allowed in the Atlantic provinces, it is prohibited in Quebec and Manitoba. Comparable findings coming out of the United States show that states with more restrictive cannabis policies report lower home cultivation rates.^{5,43} Price and access also likely play an important role in explaining the high rates of

Table 4
Cross-tabulation of workplace use and driving after cannabis use by home cultivation, household population aged 15 or older who reported consuming cannabis in the past 3 months, Canada (provinces only), 2019 (n=2,274)

	Home cultivation	
	No (%)	Yes (%)
Workplace use		
No	96	4
Yes	86	14
Driving after cannabis use		
No	96	4
Yes	88	12

Source: National Cannabis Survey—first, second, third and fourth quarters of 2019.

home cultivation in the Atlantic provinces, as research has shown that both are important factors in determining supply sources.⁴⁴ The Atlantic provinces have some of the lowest rates of cannabis stores per capita and have increased retail access only marginally since legalization.⁴⁵ For comparison, Alberta had approximately 14 cannabis stores per 100,000 individuals (aged 15 and older) two years after legalization, whereas Newfoundland and Labrador, New Brunswick, Nova Scotia and Prince Edward Island each had six stores or fewer per 100,000 individuals (aged 15 and older).⁴⁵ Furthermore, a recent study of provincial policies and home cultivation in Canada found that Canadians living in rural areas had higher odds of home cultivation than those living in urban areas.⁴⁶ This might explain the high rates of home cultivation in the Atlantic provinces, where more people live in rural areas and, consequently, are at a greater distance to legal retailers and have more space and freedom to grow cannabis without disturbing neighbours and other disruptions.⁴⁶

The finding that home cultivation was higher among those who are married, common law, divorced, separated or widowed may reflect differences in age and home ownership. Youth and young adults are likely overrepresented among those who are single, and, as this study has shown, this age group is less likely than older adults to cultivate cannabis at home. Youth and young adults are also more likely to live at home with their parents or in rented or shared spaces, and this may not be conducive to home cultivation. Rented or shared living spaces are also subject to home cultivation restrictions, which may act as a deterrent.^{15,47,48}

Post-legalization, males were significantly more likely to cultivate cannabis than females, a finding supported by other studies on home cultivation^{3,5,12} and perhaps indicative of sex-based differences in cannabis use rates⁴⁹⁻⁵¹ and gendered stigmatization of females who use cannabis.^{4,52,53} Home cultivation was also more likely among those who consume cannabis for medical or *both* medical and non-medical reasons. It is possible that this group has higher odds of cultivating cannabis at home because home cultivation was permitted for individuals with medical authorization prior to legalization. Thus, those consuming cannabis for medical purposes may have been legally cultivating it for years before legalization.^{1,54} Furthermore, cultivating cannabis for medical purposes may be less stigmatized than cultivating it for non-medical purposes,⁵⁵ and thus, individuals may be more willing to grow it at home if they identify as medical consumers.

While the present study found that home cultivation was most common among those who reported smoking as their primary method of consumption, a recent study from the United States found that people who cultivate cannabis at home are also more likely to use edibles.⁴³ This might suggest that those who cultivate cannabis at home are more likely to engage in multiple methods of consumption. Frequency of use was also a significant correlate of home cultivation, with those who reported using cannabis on a weekly, daily or almost daily basis being more likely to engage in this practice than those who reported using cannabis on a monthly basis or less. This finding is consistent with existing literature that shows that people who grow cannabis tend to use cannabis more frequently than those who do not.³⁻⁹ It is possible that the increased accessibility offered by home cultivation results in increased consumption. It is also possible that frequent cannabis use leads to home cultivation, as people who frequently use cannabis may prefer growing it because it is more accessible and generally more cost-effective than purchasing it from a legal retailer (approximately \$3 per gram versus \$6 to \$7 per gram).^{56,57}

The findings also suggested a relationship between home cultivation and certain cannabis-related risks. In particular, those who cultivate cannabis at home were more likely to report using cannabis at work. It is possible that the effect of home cultivation is mitigated by medical consumption and frequent cannabis use, two factors that have been associated with workplace use.¹⁹ For example, those consuming cannabis at work may be doing so for medical reasons, such as managing pain or psychological symptoms.⁵⁸ These individuals may be using cannabis more frequently and may therefore have an increased tolerance to the drug's impairing effects.⁵⁹ In our study, we controlled for frequency of use and reason for use and tested for an interaction between frequency of use and home cultivation. The interaction was statistically significant, suggesting that those who grow cannabis at home and use cannabis frequently are more likely to use cannabis at the workplace than those who grow cannabis at home but use it less frequently. More research is needed to understand why people who cultivate cannabis at home are more likely to use it in the workplace while taking factors such as medical use, frequency of use, increased tolerance and type of profession into consideration.

Home cultivators were not more likely to report driving within two hours of using cannabis, a finding consistent with recent research that found no significant differences between DACU

Table 5
Logistic regression predicting workplace use and driving after cannabis use, household population aged 15 or older who reported consuming cannabis in the past 3 months, Canada, 2019 (provinces only) (n=2,274)

	Analysis 1: Workplace use									Analysis 2: Driving after cannabis use								
	Model 1			Model 2			Model 3			Model 4			Model 5					
	Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval				
	From	To	From	To	From	To	From	To	From	To	From	To	From	To				
Home Cultivation																		
No	REF	...	...	REF	...	...	REF	...	...	REF	...	...	REF	...	...	
Yes	2,97 *	1,49	5,90	2,12 *	1,04	4,32	6,91 *	1,25	38,13	2,44 *	1,26	4,74	1,62	0,83	3,14			
Age (years)																		
15 to 34	REF	...	...	REF	...	...	REF	...	...	REF	...	...	REF	...	...	
35 to 54	1,08	0,68	1,71	1,01	0,63	1,64	1,03	0,63	1,69	0,85	0,56	1,30	0,79	0,51	1,24			
55 or older	0,54	0,28	1,06	0,53	0,27	1,05	0,53	0,27	1,04	0,76	0,42	1,38	0,75	0,39	1,44			
Gender																		
Male	REF	...	...	REF	...	...	REF	...	...	REF	...	...	REF	...	...	
Female	0,69	0,44	1,08	0,81	0,51	1,30	0,81	0,50	1,30	0,50 *	0,33	0,78	0,59 *	0,37	0,94			
Marital status																		
Married or common law	REF	...	...	REF	...	...	REF	...	...	REF	...	...	REF	...	...	
Divorced, separated or widowed	0,77	0,30	1,52	0,66	0,32	1,35	0,67	0,34	1,33	1,14	0,64	2,02	0,93	0,48	1,81			
Single	1,11	0,67	1,82	1,12	0,68	1,87	1,14	0,70	1,84	0,83	0,54	1,30	0,82	0,52	1,32			
Reason for use																		
Non-medical	REF	...	...	REF	...	...	REF	...	...	REF	...	...	REF	...	...	
Medical	3,12 *	1,77	5,50	2,07 *	1,06	4,05	2,00 *	1,09	3,68	1,27	0,68	2,36	0,70	0,37	1,33			
Both	2,26 *	1,36	3,77	1,45	0,87	2,41	1,45	0,87	2,44	2,09 *	1,33	3,30	1,17	0,74	1,95			
Household income (\$)																		
Less than 40,000	REF	...	...	REF	...	...	REF	...	...	REF	...	...	REF	...	...	
40,000 to 80,000	0,66	0,36	1,22	0,59	0,30	1,19	0,59	0,29	1,20	0,71	0,37	1,36	0,62	0,29	1,30			
80,000 or more	0,52 *	0,28	0,98	0,46 *	0,24	0,91	0,47 *	0,23	0,93	0,74	0,38	1,46	0,67	0,31	1,43			
Province																		
Atlantic provinces	REF	...	...	REF	...	...	REF	...	...	REF	...	...	REF	...	...	
Quebec	0,60	0,29	1,26	0,69	0,32	1,46	0,69	0,32	1,49	1,22	0,72	2,09	1,52	0,84	2,74			
Ontario	1,30	0,77	2,18	1,55	0,89	2,68	1,54	0,90	2,64	1,18	0,73	1,92	1,38	0,83	2,31			
Prairie provinces	1,09	0,64	1,84	1,18	0,69	2,03	1,17	0,68	2,01	1,27	0,82	1,96	1,43	0,90	2,26			
British Columbia	1,01	0,54	1,90	0,93	0,49	1,77	0,93	0,48	1,81	1,45	0,84	2,49	1,40	0,80	2,43			
Education																		
High school or Less	REF	...	...	REF	...	...	REF	...	...	REF	...	...	REF	...	...	
Trade or college	0,62 *	0,38	0,99	0,67	0,40	1,13	0,67	0,40	1,12	1,60 *	1,00	2,58	2,04 *	1,24	3,37			
University	0,42 *	0,24	0,76	0,53	0,29	0,99	0,53	0,28	0,98	0,97	0,55	1,74	1,49	0,84	2,67			
Method of consumption																		
Smoke	REF	...	...	REF	...	...	REF	...	...	REF	...	...	REF	...	...	
Vape	1,16	0,54	2,50	1,39	0,60	3,22	1,41	0,61	3,25	0,66	0,34	1,27	0,73	0,38	1,42			
Other	0,69	0,40	1,19	1,09	0,57	2,07	1,10	0,59	2,02	0,50 *	0,28	0,89	0,83	0,45	1,54			
Frequency of use																		
Monthly or less	...	...	...	REF	...	...	REF	...	...	...	...	...	REF	...	...	
Weekly	...	...	...	2,26 *	1,04	4,91	2,57 *	1,16	5,67	...	...	...	3,06 *	1,45	6,45
Daily or almost daily	...	...	...	7,60 *	3,73	15,45	8,10 *	3,75	17,44	...	...	...	12,10 *	6,14	23,83
Home cultivation x frequency of use																		
Home cultivation and monthly or less	...	...	...	...	...	...	REF	...	...	...	...	...	...	...	...
Home cultivation and weekly	...	...	...	...	...	...	0,06 *	0,011	0,33	...	...	...	...	...	...
Home cultivation and daily or almost daily	...	...	...	...	...	...	0,31	0,05	1,92	...	...	...	...	...	...
Constant	0,19	...	...	0,06	...	...	0,06	...	...	0,15	...	...	0,04	...	...	

... not applicable

* significantly different from reference category (p < 0.05)

Notes: REF = Reference category. Atlantic provinces include Newfoundland and Labrador, Nova Scotia, Prince Edward Island and New Brunswick; Prairie provinces include Manitoba, Saskatchewan and Alberta.

Source: National Cannabis Survey—first, second, third and fourth quarters of 2019.

rates in U.S. jurisdictions with and without home cultivation provisions.³⁴ Our findings suggest that other variables better predict DACU, including gender and frequency of use. These findings are supported by other research on DACU that shows that males and people who use cannabis on a daily or almost daily basis are most likely to engage in this behaviour.^{2,27}

Limitations

There are several limitations to consider when interpreting the findings of this study. First, the analyses involved relatively rare events (i.e., workplace use and DACU) among a small sub-population of respondents (i.e., those who cultivate cannabis at home). This caused us to collapse categories and lose precision

in some of our variables. For example, we had to combine the Prairie provinces, an important limitation given that Manitoba is the only Prairie province that prohibits home cultivation for recreational purposes. We also did not include other variables on supply sources to assess whether people who grow cannabis at home are also getting it from other sources. Future research is needed to examine whether there are differences between people who obtain cannabis via home cultivation only and people who obtain it via home cultivation and other sources. Small sample sizes also prevented us from running separate analyses for respondents who reported medical versus non-medical use. Future research is needed to examine whether there are significant differences in home cultivation behaviours between these two groups.

While the pre–post design is a strength of the study, the pre-legalization period of data collection began in February 2018, which is only about 10 months before the *Cannabis Act* was enacted. Differences observed in this study may therefore more accurately reflect the immediate transition to the legalized framework. Likewise, the post-legalization data were limited to four waves, dating from February to December 2019. More research is needed to monitor the longer-term effects of legalization on home cultivation and related risks while considering the impact of increasing retail expansion.

Conclusion

Home cultivation among people who use cannabis did not significantly change immediately before and after legalization. The demographics and use characteristics of home cultivation also remained relatively stable, with a few exceptions including age and province. Those most likely to cultivate cannabis at home post-legalization were male; 35 years and older; married, common law, divorced, separated or widowed; lived in the Atlantic provinces; consumed cannabis for medical or medical and non-medical reasons; used cannabis on a daily or almost daily basis; had more than a high school diploma; and reported “smoking” as their primary method of consumption.

Additionally, home cultivation appeared to be a significant correlate of workplace use, but not of DACU. The finding that home cultivation is associated with workplace use might not necessarily translate to a greater risk of harm, as it is possible that cannabis is being used medically by workers who are using low THC products. Future research is needed to examine how and why home growers are at an increased risk of using cannabis in the workplace. A more important question to ask in future research might be whether legalization has impacted rates of workplace accidents or fatalities.

To our knowledge, this is one of the first studies to examine the changes in home cultivation demographics in Canada before and after legalization, as well as the relationship between home cultivation and cannabis-related risks. Much of the previous literature on home cultivation is conducted in countries where cannabis use is illegal or decriminalized, making this an early look at home cultivation through the lens of a legalized framework. Furthermore, the study creates a point of reference to monitor changes in cultivation patterns and to determine if tailored education, prevention and policy interventions are needed for people who grow cannabis at home.

References

- Government of Canada. *The Cannabis Act* [Internet]. 2021. Available at: <https://laws-lois.justice.gc.ca/eng/acts/c-24.5/>.
- Rotermann M. What has changed since cannabis was legalized? *Health Reports* 2020; 31(2): 11–20.
- Alvarez A, Gamella JF, Parra I. Cannabis cultivation in Spain: A profile of plantations, growers and production systems. *International Journal of Drug Policy* 2016; 37: 70–81.
- Amado BG, Villanueva VJ, Vidal-Infer A, Isorna M. Gender differences among cannabis self-cultivators in Spain. *Adicciones* 2020; 32(3): 181–192.
- Azofeifa A, Pacula RL, Mattson ME. Cannabis Growers in the United States: Findings From a National Household Survey 2010–2014. *Journal of Drug Issues* 2021; 51(3): 518–30.
- Decorte T. The case for small-scale domestic cannabis cultivation. *International Journal of Drug Policy* 2010; 21(4):271–5.
- Hakkarainen P, Perälä J. Green, green grass of home—Small-scale cannabis cultivation and social supply in Finland. In: Werse B, Bernard C, editors. *Friendly Business: International Views on Social Supply, Self-Supply and Small-Scale Drug Dealing* [Internet]. Wiesbaden: Springer Fachmedien Wiesbaden; 2016. p. 197–221. Available at: https://doi.org/10.1007/978-3-658-10329-3_10.
- Lenton S, Frank VA, Barratt MJ, Dahl HV, Potter GR. Attitudes of cannabis growers to regulation of cannabis cultivation under a non-prohibition cannabis model. *International Journal of Drug Policy* 2015; 26(3): 257–66.
- Werse B, Bernard C, editors. *Friendly Business* [Internet]. Wiesbaden: Springer Fachmedien Wiesbaden; 2016. Available at: <http://link.springer.com/10.1007/978-3-658-10329-3>
- Hough JM. *A growing market: The domestic cultivation of cannabis*. York: Joseph Rowntree Foundation; 2003.
- Potter G, Bouchard M, Decorte T. The globalization of cannabis cultivation. In: *The globalization of cannabis cultivation. World wide weed. Global trends in cannabis cultivation and its control*. Farnham: Ashgate; 2011. p. 1–17.
- Potter GR, Barratt MJ, Malm A, Bouchard M, Blok T, Christensen AS, et al. Global patterns of domestic cannabis cultivation: Sample characteristics and patterns of growing across eleven countries. *International Journal of Drug Policy* 2015; 26(3): 226–37.
- Eykelbosh A, Steiner L. Growing at Home: Health and Safety Concerns for Personal Cannabis Cultivation [Internet]. National Collaborating Centre for Environmental Health; 2018. Available at: https://www.nccch.ca/documents/evidence-review/growing-home-health-and-safety-concerns-personal-cannabis-cultivation?utm_source=email&utm_campaign=cannabis&utm_term=NSHA&utm_content=Growingathome050818.
- Eichelberger AH. Marijuana use and driving in Washington State: Risk perceptions and behaviors before and after implementation of retail sales. *Traffic injury prevention* 2019; 20(1): 23–9.
- Clare J, Garis L, Maxim P. Medicinal marijuana production creates problem residential properties: A routine activity theory explanation and a situational crime-prevention solution. *Canadian Journal of Criminology and Criminal Justice* 2017; 59(2): 143–67.
- Health Canada. *A framework for the legalization and regulation of cannabis in Canada: the final report of the Task Force on Cannabis Legalization and Regulation*. [Internet]. 2016. Available at: <http://www.deslibris.ca/ID/10064626>.
- van der Steur SJ, Batalla A, Bossong MG. Factors moderating the association between cannabis use and psychosis risk: A systematic review. *Brain Sciences* 2020; 10(2).
- Budney AJ, Sofis MJ, Borodovsky JT. An update on cannabis use disorder with comment on the impact of policy related to therapeutic and recreational cannabis use. *European Archives of Psychiatry and Clinical Neuroscience* 2019; 269(1): 73–86.
- Camide N, Lee H, Frone MR, Furlan AD, Smith PM. Patterns and correlates of workplace and non-workplace cannabis use among Canadian workers before the legalization of non-medical cannabis. *Drug and Alcohol Dependence* 2021; 218: 108386.
- Anderson DM, Rees DI, Tekin E. Medical marijuana laws and workplace fatalities in the United States. *International Journal of Drug Policy* 2018; 60: 33–9.
- Furrer D, Kröger E, Marcotte M, Jauvin N, Bélanger R, Ware M, et al. Cannabis against chronic musculoskeletal pain: A scoping review on users and their perceptions. *J Cannabis Res* 2021. 3(1): 41–41.
- Erridge S, Salazar O, Kawka M, Holvey C, Coomber R, Usmani A, et al. An initial analysis of the U.K. Medical Cannabis Registry: Outcomes analysis of first 129 patients. *Neuropsychopharmacol Reports* 2021; 41(3): 362–70.
- Harris M, Erridge S, Ergisi M, Nimalan D, Kawka M, Salazar O, et al. UK Medical Cannabis registry: An analysis of clinical outcomes of medicinal cannabis therapy for chronic pain conditions. *Expert Rev Clin Pharmacol*. 2021; 1–13.
- Sarris J, Sinclair J, Karamacoska D, Davidson M, Firth J. Medicinal cannabis for psychiatric disorders: A clinically-focused systematic review. *BMC Psychiatry* 2020; 20(1): 24.
- Couper FJ, Peterson BL. The prevalence of marijuana in suspected impaired driving cases in Washington State†. *Journal of Analytical Toxicology* 2014; 38(8): 569–74.
- Ghosh TS, Vigil DI, Maffey A, Tolliver R, Van Dyke M, Kattari L, et al. Lessons learned after three years of legalized, recreational marijuana: The Colorado experience. *Preventive Medicine* 2017; 104: 4–6.
- Santaella-Tenorio J, Wheeler-Martin K, DiMaggio CJ, Castillo-Carniglia A, Keyes KM, Hasin D, et al. Association of recreational cannabis laws in Colorado and Washington State with changes in traffic fatalities, 2005 to 2017. *JAMA Internal Medicine* 2020; 180(8): 1061–8.

28. Tefft BC, Arnold LS, Grabowski JG. Prevalence of Marijuana Involvement in Fatal Crashes: Washington, 2010-2014. AAA Foundation for Traffic Safety. 2016. Available at: <https://aaafoundation.org/prevalence-marijuana-use-among-drivers-fatal-crashes-washington-2010-2014/>
29. Fischer B, Lee A, Robinson T, Hall W. An overview of select cannabis use and supply indicators pre- and post-legalization in Canada. *Substance Abuse Treatment, Prevention, and Policy* 2021; 16(1): 77.
30. Brubacher JR, Chan H, Erdelyi S, Staples JA, Asbridge M, Mann RE. Cannabis legalization and detection of tetrahydrocannabinol in injured drivers. *N Engl J Med* 2022; 386(2): 148–56.
31. Asbridge M, Hayden JA, Cartwright JL. Acute cannabis consumption and motor vehicle collision risk: Systematic review of observational studies and meta-analysis. *BMJ* 2012; 344: e536.
32. Beirness D, Porath A. *Clearing the Smoke on Cannabis: Cannabis Use and Driving – An Update*. Ottawa, ON: Canadian Centre on Substance Use and Addiction (CCSA); 2019.
33. Hartman RL, Huestis MA. Cannabis effects on driving skills. *Clinical Chemistry* 2013; 59(3): 478–92.
34. Seigny E. The effects of medical marijuana laws on cannabis-involved driving. *Accident Analysis & Prevention* 2018; 118: 57–65.
35. Statistics Canada. *National Cannabis Survey—metadata* [Internet]. 2021. Available at: <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5262>
36. Thomas S, Wannell B. *Combining cycles of the Canadian Community Health Survey* [Internet]. 2015. Available at: <https://www150.statcan.gc.ca/n1/pub/82-003-x/2009001/article/10795-eng.htm>
37. Long JS, Freese J. *Regression Models for Categorical and Dependent Variables Using STATA*. College Station; StataCorp LP; 2001.
38. Choi NG, DiNitto DM, Marti CN. Nonmedical versus medical marijuana use among three age groups of adults: Associations with mental and physical health status. *The American Journal on Addictions* 2017; 26(7): 697–706.
39. Gfroerer JC, Epstein JF. Marijuana initiates and their impact on future drug abuse treatment need. *Drug and Alcohol Dependence* 1999; 54(3): 229–37.
40. Han BH, Palamar JJ. Trends in cannabis use among older adults in the United States, 2015 to 2018. *JAMA Internal Medicine* 2020; 180(4): 609–11.
41. Lloyd SL, Striley CW. Marijuana use among adults 50 years or older in the 21st century. *Gerontol Geriatr Med* 2018; 4: 1-14.
42. Maxwell CJ, Jesdale BM, Lapane KL. Recent trends in cannabis use in older Americans. *Ann Intern Med* 2021; 174(1): 133–5.
43. Borodovsky JT, Budney AJ. Legal cannabis laws, home cultivation, and use of edible cannabis products: A growing relationship? *International Journal of Drug Policy* 2017; 50: 102–10.
44. Hathaway AD, Cullen G, Walters D. How well is cannabis legalization curtailing the illegal market? A multi-wave analysis of Canada's National Cannabis Survey. *Journal of Canadian Studies* 2021; 55(2): 307–36.
45. Myran DT, Staykov E, Cantor N, Taljaard M, Quach BI, Hawken S, et al. How has access to legal cannabis changed over time? An analysis of the cannabis retail market in Canada 2 years following the legalisation of recreational cannabis. *Drug and Alcohol Review* 2022; 41(2): 377-385.
46. Wadsworth E, Driezen P, Hammond D. Retail availability and legal purchases of dried flower in Canada post-legalization. *Drug and Alcohol Dependence* 2021; 225:108794.
47. Government of Alberta. *Cannabis in condos and rentals* [Internet]. Cannabis in condos and rentals. 2021. Available at: <https://www.alberta.ca/cannabis-condos-rentals.aspx>.
48. Nanowski N. *GTA condo boards move to ban homegrown cannabis inside units*. CBC News [Internet]. 2018 Apr 22; Available at: <https://www.cbc.ca/news/canada/toronto/marijuana-pot-cannabis-legalization-condo-landlord-1.4630048>.
49. Cuttler C, Mischley LK, Sexton M. Sex differences in cannabis use and effects: A cross-sectional survey of cannabis users. *Cannabis Cannabinoid Res* 2016; 1(1): 166–75.
50. Greaves L, Hemsing N. Sex and gender interactions on the use and impact of recreational cannabis. *IJERPH* 2020; 17(2): 509.
51. Health Canada. *Canadian Cannabis Survey 2020: Summary* [Internet]. 2021. Available at: <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/research-data/canadian-cannabis-survey-2020-summary.html>
52. Kozak T, Ion A, Greene S. Reimagining research with pregnant women and parents who consume cannabis in the era of legalization: The value of integrating intersectional feminist and participatory action approaches. *Cannabis and Cannabinoid Research* 2022; 7(1): 11-15.
53. Thomas N, Bull M. Representations of women and drug use in policy: A critical policy analysis. *International Journal of Drug Policy* 2018; 56: 30–9.
54. Government of Canada. *Cannabis for medical purposes under the Cannabis Act: information and improvements 2021* [Internet]. 2021. Available at: <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis.html>.
55. Hakkarainen P, Frank VA, Barratt MJ, Dahl HV, Decorte T, Karjalainen K, et al. Growing medicine: Small-scale cannabis cultivation for medical purposes in six different countries. *International Journal of Drug Policy* 2015; 26(3): 250–6.
56. Cain P. *At 25 cents a gram to produce, is outdoor-grown cannabis the key to lower legal prices?* [Internet]. Global News. 2019 [cited 2020 Dec 27]. Available at: <https://globalnews.ca/news/6258000/outdoor-grown-cannabis-lower-legal-weed-prices/>.
57. Joseph R. *Here's how much cannabis costs across Canada* [Internet]. Global News. 2018 [cited 2020 Dec 27]. Available at: <https://globalnews.ca/news/4563144/heres-how-much-cannabis-costs-across-canada/>
58. Schrot RJ, Hubbard JR. Cannabinoids: Medical implications. *Ann Med* 2016; 48(3) :128–41.
59. Turna J, Balodis I, Munn C, Van Ameringen M, Busse J, MacKillop J. Overlapping patterns of recreational and medical cannabis use in a large community sample of cannabis users. *Comprehensive Psychiatry* 2020; 102: 152188.