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# Self-reported Impact of the COVID-19 Pandemic on Cannabis Use in Canada and the United States

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## ABSTRACT

The current study examined the self-reported impact of the COVID-19 pandemic on cannabis consumption and behaviors among past 12-month cannabis consumers in Canada and the U.S. across different cannabis laws. Cross-sectional survey data were collected in 2020 from respondents recruited through online commercial panels, aged 16–65, who consumed cannabis in the past 12 months ( $n = 13,689$ ). Weighted multinomial logistic regression models examined differences between jurisdictions for five outcomes: 1) cannabis consumption; 2) use of product types; 3) use of sources to obtain cannabis; 4) legality of source used; and 5) access to cannabis. Approximately one third of cannabis consumers reported changes to their consumption during the pandemic. Edibles (23% – 31%) and dried flower (21% – 30%) were the two most common products that respondents reported they were “more likely” to use during the pandemic. Most consumers reported “no difference” to changes in sourcing cannabis. Compared to consumers in U.S. recreational states, consumers in U.S. medical (AOR = 1.27, 95% CI: 1.07, 1.50) and illegal states (AOR = 1.22, CI: 1.00, 1.48) had higher odds of reporting it was “harder” to access cannabis, and consumers in Canada had lower odds (AOR = 0.73, CI: 0.63, 0.84). Future research should examine whether these changes remain after public health restrictions due to the pandemic are removed.

## ARTICLE HISTORY

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COVID-19; cannabis;  
marijuana; Canada; United  
States

## Introduction

The COVID-19 pandemic has impacted the health and wellbeing of individuals worldwide. Altered day-to-day routines, including self-isolation, job loss, increased work hours and/or working from home, have led to many lifestyle changes, including substance use. The impact of the COVID-19 pandemic on substance use may depend on the substance. For example, alcohol consumption in both population-based surveys and sales increased in both Canada and the United States (U.S.) (Asare et al. 2021; Barbosa, Cowell, and Dowd 2021; Castaldelli-Maia, Segura, and Martins 2021; MacKillop, Cooper, and Costello 2021; National Center for Health Statistics 2021; Pollard, Tucker, and Green 2020; Rotermann 2020; Statistics Canada 2021a; Substance Abuse and Mental Health Services Administration 2021). In terms of tobacco consumption, in 2020, tobacco sales and prevalence of cigarette smoking generally followed historical declines in Canada, whereas increased cigarette sales were observed in the U.S. relative to historical trends (Federal Trade Commission 2020; Statistics Canada 2021b).

Emerging evidence on the impact of the COVID-19 pandemic on cannabis use is mixed. In a nationally representative survey of Canadians, one third of cannabis consumers reported increasing their consumption compared to pre-pandemic, and one in ten reported decreasing their consumption (Statistics Canada 2021c). In two studies examining 2020 sales data, one conducted in Canada and one conducted in four U.S. states with legal recreational cannabis laws, cannabis sales increased during the COVID-19 pandemic (MacKillop, Cooper, and Costello 2021; Schauer et al. 2021). The impact of COVID-19 on cannabis use may be transient. In a nationally representative sample of the U.S., the number of days cannabis was used increased in the initial months of the pandemic but returned to pre-pandemic levels three to eight months later (Brenneke et al. 2021). Moreover, a Canadian study among young adults found that those who engaged in self-isolation during the pandemic used 20% more cannabis than those who did not (Bartel, Sherry, and Stewart 2020). Other studies have found little change: 92% of Canadians 15 years and older reported no change to

their weekly cannabis consumption, and 90% of Canadian adults who stayed home during the pandemic reported no changes to their cannabis consumption (Canadian Centre on Substance Use and Addiction 2020; Rotermann 2020).

Cannabis regulations vary across Canada and the U.S. In 2018, Canada legalized recreational cannabis at the federal level for adults aged 18 years and older. However, certain regulations, such as retail structure, vary across the provinces and territories. In the U.S., cannabis remains illegal at the federal level; however, as of May 2022, 18 states and the District of Columbia have legalized recreational cannabis, 37 states have legalized medical cannabis, and an additional six have low-THC/CBD cannabis laws. In jurisdictions with legal markets, such as Canada and U.S. states that have legalized recreational cannabis, the pandemic may also have affected the types of cannabis products used and how these products are sourced. Although dried flower remains the most common cannabis product type, the cannabis market in North America has been rapidly evolving toward more highly manufactured and potent products (Goodman et al. 2020). To date, there is no evidence on the extent to which the pandemic may have accelerated or slowed this trend. In addition, reduced social interactions and retail store closures may have impacted how consumers source their products, including whether consumers in “recreational” markets purchase from a legal retail store. This study aimed to examine the self-reported impact of the COVID-19 pandemic on cannabis use, product types, source, and access among past 12-month cannabis consumers in Canada and U.S. states that had recreational and medical cannabis laws, medical laws only, or no recreational or medical cannabis laws (U.S. recreational, U.S. medical only, and U.S. illegal states, respectively).

## Methods

Data are from the 2020 International Cannabis Policy Study (ICPS), conducted in Canada and the U.S. Data were collected via self-completed web-based surveys conducted in September–October 2020 with respondents aged 16–65. A non-probability sample of respondents was recruited through the Nielsen Consumer Insights Global Panel and their partners’ panels. The Nielsen panels were recruited using a variety of probability and non-probability sampling methods. For the ICPS surveys, Nielsen draws stratified random samples from the online panels, with quotas based on age and state/province of residence. Nielsen emailed panelists an invitation to access the ICPS survey via a hyperlink, and respondents were unaware of the survey topic prior to

accessing the link. Respondents confirmed eligibility and provided consent before completing the survey. Respondents aged 16 and 17 required parental consent before accessing the survey. Upon completion, respondents were transferred back to the Nielsen platform and received remuneration in accordance with their panel’s usual incentive structure (e.g., points-based or monetary rewards,

chances to win prizes). Monetary incentives have been shown to increase response rates and decrease response bias in subgroups under-represented in surveys, including disadvantaged subgroups (Groves et al. 2009).

Surveys were conducted in English in the U.S. and English or French in Canada. Median survey time was 21 min. Data integrity measures include checks for “speeders” based on completion times, the quality of open-ended responses, patterns of “Don’t Know/Refusal” responses, and inconsistent responses across items (American Association of Public Opinion Research (AAPOR) 2018). As an additional data integrity check, respondents were asked to identify the current month from a list toward the end of the survey to verify survey engagement. In 2020, 74,438 respondents accessed the survey link, of whom 48,633 completed the entire survey for an AAPOR cooperation rate of 62% (American Association for Public Opinion Research 2016). The study was reviewed by and received clearance through a University of Waterloo Research Ethics Committee. A full description of the study methods can be found in the ICPS Technical Report and methodology paper (Goodman, Burkhalter, and Hammond 2021; Hammond et al. 2020).

## Measures

Demographic information included jurisdiction of residence, sex at birth, age group, ethnicity/race, education level, income adequacy and device used to complete survey (computer, tablet, or smartphone) (see Table 1 for response options).

Jurisdiction of residence included the U.S. and Canada. U.S. consumers were further coded as U.S. recreational states for consumers residing in states with recreational cannabis laws; U.S. medical states for consumers residing in states with medical cannabis laws but no recreational cannabis laws; and U.S. illegal states for consumers residing in states without medical or recreational cannabis laws.

Frequency of cannabis use was asked among past 12-month cannabis consumers. Past 12-month cannabis consumers were determined by asking lifetime cannabis consumers: “When was the last time you

**Table 1.** Sample characteristics of past 12-month cannabis consumers in Canada and U.S. jurisdictions, 2020 (n = 13,689).

	Canada (n = 5,011)	U.S. Illegal states (n = 1,214)	U.S. Medical states (n = 1,767)	U.S. Recreational states (n = 5,697)
<b>Sex</b>				
Female	46.8 (3032)	48.1 (822)	45.3 (1129)	48.0 (3763)
Male	53.2 (1979)	51.9 (392)	54.7 (638)	52.0 (1934)
<b>Age group</b>				
16–25	18.1 (899)	21.7 (323)	21.5 (431)	17.9 (848)
26–35	28.3 (1133)	28.3 (240)	25.3 (311)	29.1 (1361)
36–45	21.4 (1033)	22.6 (245)	21.1 (347)	22.2 (1306)
46–55	17.1 (921)	16.5 (199)	17.7 (265)	16.4 (930)
56–65	15.0 (1025)	11.1 (207)	14.4 (413)	14.4 (1252)
<b>Ethnicity/race</b>				
White	75.5 (3902)	73.3 (936)	74.3 (1409)	77.4 (4518)
Other/Mixed/Unstated	24.5 (1109)	26.8 (278)	25.7 (358)	22.6 (1179)
<b>Education level</b>				
Less than high school	14.5 (496)	10.5 (155)	9.1 (186)	6.1 (286)
High school diploma or equivalent	29.3 (859)	29.7 (330)	25.9 (425)	23.4 (1135)
Some college/technical training	33.5 (2127)	39.8 (473)	39.6 (645)	41.8 (2207)
Bachelor's degree or higher	21.8 (1487)	19.7 (251)	25.0 (501)	28.3 (2035)
Unstated	0.9 (42)	0.4 (5)	0.4 (10)	0.4 (34)
<b>Income adequacy ("ability to make ends meet")</b>				
Very difficult	8.9 (434)	12.8 (160)	11.2 (199)	10.2 (595)
Difficult	20.5 (1070)	22.2 (301)	20.4 (393)	21.0 (1230)
Neither easy nor difficult	36.4 (1808)	31.4 (381)	34.6 (615)	34.8 (1959)
Easy	21.5 (1069)	18.3 (212)	18.5 (317)	19.2 (1108)
Very easy	9.4 (488)	12.8 (126)	12.2 (195)	12.4 (657)
Unstated	3.3 (142)	2.5 (34)	3.1 (48)	2.4 (148)
<b>Cannabis use frequency</b>				
Past 12-month consumer	29.9 (1685)	25.0 (353)	24.1 (488)	23.4 (1569)
Monthly consumer	18.7 (935)	19.8 (239)	18.4 (311)	19.3 (1061)
Weekly consumer	16.7 (812)	17.1 (188)	15.2 (275)	17.6 (905)
Daily/almost daily consumer	34.7 (1579)	38.2 (434)	42.2 (693)	39.7 (2162)
<b>Self-reported medical user</b>				
Yes	21.1 (1113)	27.3 (320)	34.4 (586)	28.5 (1494)
No/unstated	79.0 (3898)	72.7 (894)	65.6 (1181)	71.5 (4203)

Weighted %, Unweighted n.

U.S. recreational states are those that have recreational cannabis laws. U.S. medical states are those that have medical cannabis laws only. U.S. illegal states are those without recreational and medical cannabis laws.

used cannabis?" (More than 12 months ago/More than 3 months ago but less than 12 months ago/More than 30 days ago, but less than 3 months ago/Within the past 30 days). Frequency of past 12-month cannabis use was coded as: Past 12-month consumer, Monthly consumer, Weekly consumer, and Daily/almost daily consumer.

Medical cannabis use was assessed by asking, "Do you self-identify as a medical marijuana user? By 'medical marijuana user,' we mean someone who uses marijuana only to treat a medical condition" (Yes, No).

Impact on cannabis use was measured by asking past 12-month cannabis consumers, "Did the COVID-19 pandemic affect your marijuana use at any point in the last year?" (Yes, No). If yes, they were asked, "Is the COVID-19 pandemic affecting your current marijuana use?" (Yes, No) and "How did/has the COVID-19 pandemic affected your marijuana use?" (I stopped using marijuana, I started using marijuana, I use(d) less, I use(d) more).

Impact on product types used was measured by asking past 12-month cannabis consumers, "Has the COVID-19 pandemic affected the types of marijuana products you use?" followed by a list of nine product types (see Figure 1) (Less likely, More likely, No difference/Not applicable).

Impact on cannabis source was measured by asking past 12-month cannabis consumers, "Has the COVID-19 pandemic affected whether you get your marijuana from legal or illegal sources?" (More likely to get from legal sources, More likely to get from illegal sources, No difference) and "Has the COVID-19 pandemic affected where you get your marijuana?," followed by a list of five retail sources (see Figure 2) (Less likely, More likely, No difference).

Impact on cannabis access was measured by asking past 12-month cannabis consumers, "Overall, has the COVID-19 pandemic made it harder or easier for you to get marijuana?." Past 12-month cannabis consumers were also asked, "Overall, has the COVID-19 pandemic

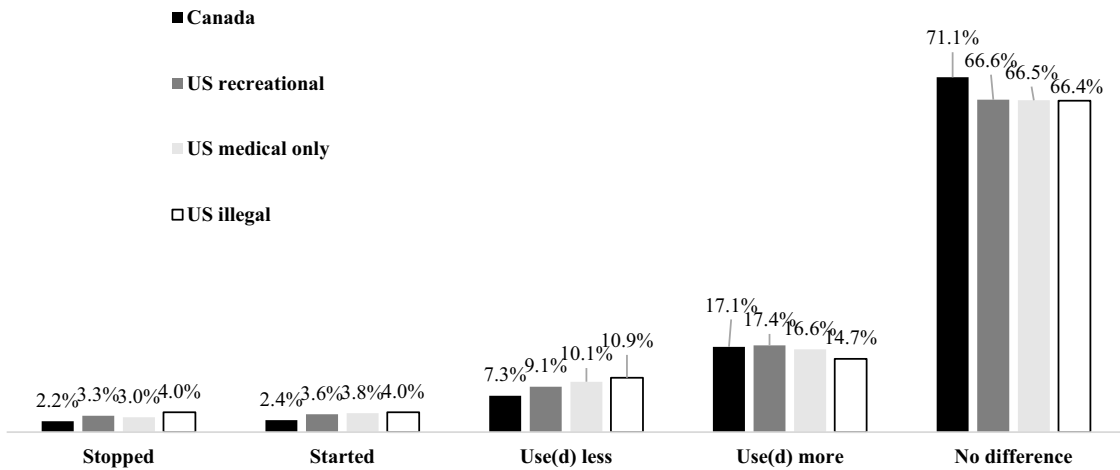


Figure 1. Self-reported impact of COVID-19 pandemic on cannabis use in Canada and U.S. jurisdictions (n = 13,689).

made it harder or easier for you to afford marijuana?” (response options for both: A lot harder, A little harder, No difference, A little easier, A lot easier). Answers were re-categorized to: Harder (A lot, A little), No difference, Easier (A lot, A little).

The full questionnaire is available in the ICPS 2020 survey ([www.cannabisproject.ca/methods](http://www.cannabisproject.ca/methods)). All questions included “Don’t know” and “Refuse to answer” options. Except “perceived income adequacy,” which may have lower responses due to the sensitive nature

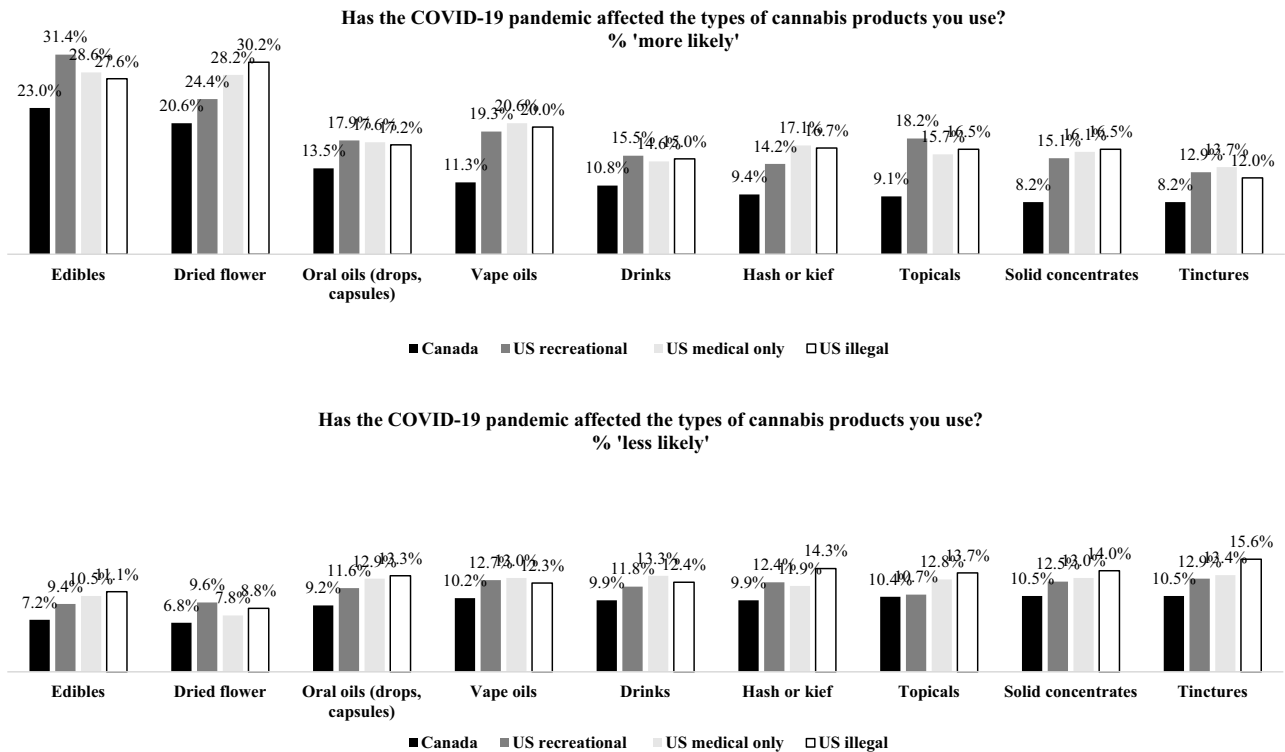


Figure 2. (a,b) Self-reported impact of COVID-19 on cannabis products in Canada and U.S. jurisdictions, 2020 (n = 13,689).

of the question, all “Don’t know” and “Refuse to answer” responses were set to missing.

### Data analysis

A total of 48,633 respondents completed the 2020 survey. After removing respondents due to reasons such as dishonesty and speeding ( $n = 2,953$ ), 45,680 respondents were retained. The current study reports data on past 12-month cannabis consumers only ( $n = 13,689$ ).

Post-stratification sample weights were constructed based on the Canadian and U.S. Census estimates. Respondents from Canada were classified into age-by-sex-by-province, education and age-by-tobacco smoking status groups. Respondents from U.S. recreational states were classified into age-by-sex-by-state, education-by-state, region-by-race and age-by-tobacco smoking status groups, while those from medical and illegal states were classified into age-by-sex, education, region-by-race and age-by-tobacco smoking status groups. Separately for each jurisdiction, a raking algorithm was applied to the cross-sectional analytic sample ( $n = 45,680$ ) to compute weights that were calibrated to these groupings. Weights were rescaled to the respective sample sizes. See the 2020 Technical Report for further details (Goodman, Burkhalter, and Hammond 2021). Estimates are weighted unless otherwise specified.

Multinomial logistic regression models examined differences between jurisdictions (Canada, U.S. illegal states, U.S. medical states, U.S. recreational states) for five separate outcomes: 1) cannabis consumption (Started use, Used more, Used less, Stopped use *vs.* No difference); 2) use of each of nine product types (More likely, Less likely *vs.* No difference); 3) use of five sources to obtain cannabis (More likely, Less likely *vs.* No difference); 4) legality of source used (More likely to get from legal sources, More likely to get from illegal *vs.* No difference); and 5) access to cannabis (Harder, Easier *vs.* No difference). All models were adjusted for jurisdiction, age group, sex, education, ethnicity/race, income adequacy, device type, frequency of cannabis use, and self-reported medical cannabis use. Adjusted odds ratios (AORs) are reported. Analyses were conducted using survey procedures in SAS (version 9.4, SAS Institute Inc., Cary, NC, U.S.).

### Results

Sample characteristics are shown in Table 1. Slightly over half the sample was male, approximately three-quarters identified as white, and slightly over two-thirds were aged between 16 and 45. Approximately

one quarter were educated to a Bachelor's degree or higher, and close to one third were daily or almost daily cannabis consumers.

### Self-reported impact of the COVID-19 pandemic on cannabis consumption

Approximately two-thirds of consumers in both Canada and all U.S. jurisdictions reported no change to their cannabis consumption due to the pandemic (Figure 1). Consumers in Canada were less likely to report stopping cannabis use (AOR = 0.61, 95% CI: 0.42, 0.88), starting cannabis use (AOR = 0.67, CI: 0.48, 0.93), and using less cannabis (AOR = 0.78, CI: 0.63, 0.97) due to the pandemic than consumers in U.S. recreational states, with no differences compared to all U.S. jurisdictions in using more cannabis. No significant differences were found among U.S. medical, and U.S. illegal states compared to U.S. recreational states.

### Self-reported impact of the COVID-19 pandemic on cannabis product types

Figure 2a shows the types of products that cannabis consumers were “more likely” to use during the pandemic across all jurisdictions. Edibles (23% – 31%) and dried flower (21% – 30%) were the two most common products that respondents reported being “more likely” to use during the pandemic across all jurisdictions. Tinctures (11% – 16%) and solid concentrates (11% – 14%) were the two most common products that respondents reported being “less likely” to use during the pandemic across all jurisdictions (Figure 2b).

Compared to consumers in U.S. recreational states, consumers in Canada had lower odds of reporting any change (i.e., more or less likely) to their product use across all product types (all contrasts  $p < .05$ ) (Supplemental Table 1). Consumers in U.S. illegal states had higher odds of reporting being “more likely” to use dried flower than consumers in U.S. recreational states (AOR = 1.38, CI: 1.14, 1.67). Consumers in U.S. recreational states had higher odds of reporting being “more likely” to use topical products than consumers in U.S. medical states (AOR = 1.29, CI: 1.04, 1.59).

### Self-reported impact of the COVID-19 pandemic on cannabis source

The majority of consumers across all jurisdictions reported “no difference” to whether the pandemic affected where they sourced their cannabis across all

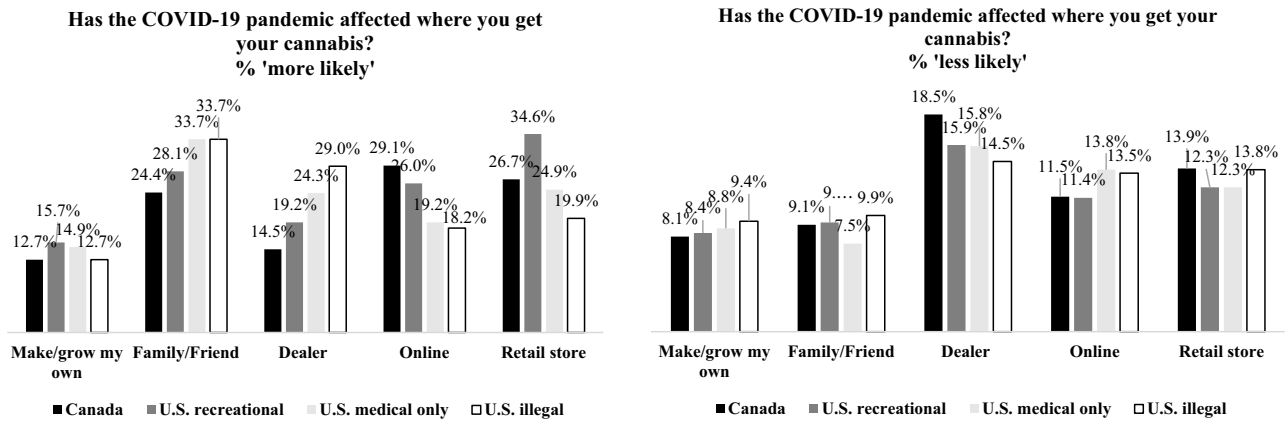


Figure 3. Self-reported impact of the COVID-19 pandemic on cannabis sources in Canada and U.S. jurisdictions (n = 13,689).

jurisdictions (Grow your own: 76–79%; Family/Friends: 56–66%; Dealer: 57–67%; Online: 59–68%; Stores: 53–66%). Across all jurisdictions, dealers were the most common source from which respondents were “less likely” to source their cannabis due to the pandemic (Figure 3). Close to a quarter of consumers in Canada and U.S. recreational states, and close to a third of consumers in U.S. medical and illegal states reported being “more likely” to source their cannabis from family and friends due to the pandemic. Approximately one third of consumers in U.S. recreational states reported being “more likely” to source their cannabis from stores/dispensaries; in Canada and U.S. medical states, this was closer to one quarter of consumers.

Consumers in U.S. recreational states had higher odds of reporting being “more likely” to grow their own cannabis than consumers in U.S. illegal states (p = .038) (Supplemental Table 2). Consumers in U.S. medical and illegal states had higher odds of

reporting being “more likely” to source their cannabis from family or friends and dealers than consumers in U.S. recreational states (all p < .01). Consumers in Canada had higher odds of reporting being more likely to source cannabis online than consumers in all U.S. jurisdictions (all p < .001). Consumers in U.S. recreational states had higher odds of reporting being “more likely” to source cannabis from stores/dispensaries than consumers in Canada, U.S. medical, and U.S. illegal states (all p < .001).

**Self-reported impact of the COVID-19 pandemic on legality of source**

The majority of past 12-month consumers reported “no difference” in whether they obtained their cannabis from legal or illegal sources due to the pandemic across all jurisdictions (Figure 4). A total of 28.2% and 32.8% of consumers in Canada and U.S. recreational states were

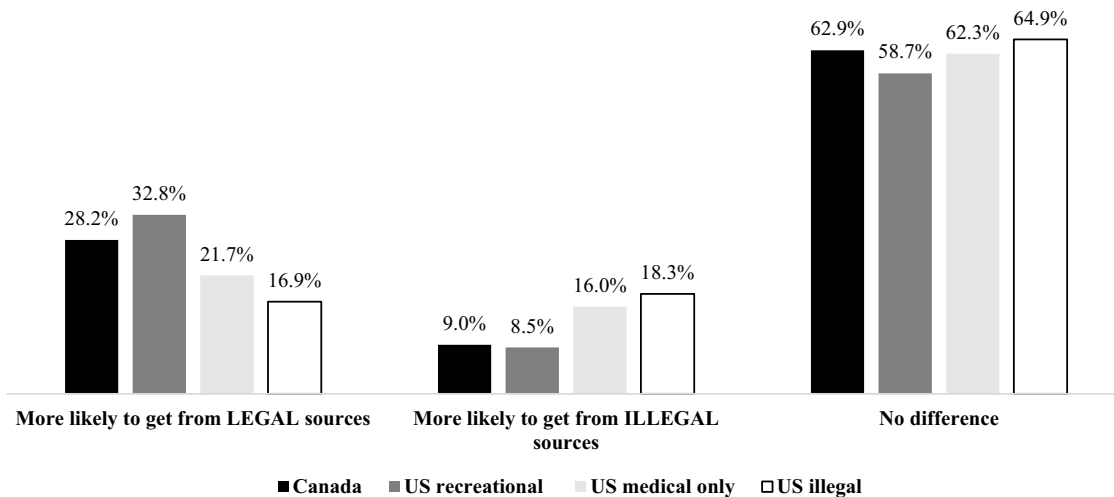


Figure 4. Self-reported impact of the COVID-19 pandemic on sourcing cannabis legally or illegally in Canada and U.S. jurisdictions (n = 13,689).

more likely to get cannabis from legal sources, whereas 9.0% and 8.5% were more likely to get cannabis from U.S. illegal sources, respectively.

Compared to consumers in U.S. recreational states, consumers in U.S. medical (AOR = 1.71, CI: 1.36, 2.15) and U.S. illegal states (AOR = 1.89, CI: 1.48, 2.41) had higher odds of reporting that they were more likely to get their cannabis from *illegal* sources due to the pandemic. Conversely, compared to consumers in U.S. recreational states, consumers in U.S. medical (AOR = 0.58, CI: 0.49, 0.69) and U.S. illegal states (AOR = 0.47, CI: 0.37, 0.58) had lower odds of reporting that they were more likely to get cannabis from *illegal* sources due to the pandemic. No significant differences were found between consumers in U.S. recreational states and Canada in the legality of where they sourced their cannabis.

### Self-reported impact of the COVID-19 pandemic on cannabis access

The majority of past 12-month consumers reported “no difference” in whether it was harder or easier to get cannabis during the pandemic across all jurisdictions (Figure 5). A small percentage of consumers (6%-8%) reported that it was easier to get cannabis, and close to a quarter of consumers reported that it was harder to get cannabis (18%-28%).

Compared to consumers in U.S. recreational states, consumers in U.S. medical (AOR = 1.27, CI: 1.07, 1.50) and U.S. illegal states (AOR = 1.22, CI: 1.00, 1.48) had higher odds of reporting it was “harder” to access cannabis, and consumers in Canada had lower odds of

reported it was “harder” to access cannabis (AOR = 0.73, CI: 0.63, 0.84).

### Discussion

The COVID-19 pandemic did not affect past-year cannabis consumption for the majority of cannabis consumers in Canada and the U.S., with close to two-thirds of past 12-month cannabis consumers reporting no effect. Similar results were found in two national surveys in Canada, where over half of past 12-month cannabis consumers reported no change to their consumption due to the pandemic (Government of Canada 2020; Statistics Canada 2021c). Similarly, two-thirds of U.S. cannabis consumers in a longitudinal study reported no change in their cannabis use due to the pandemic (Miller et al. 2021). However, in the current study, more consumers in all jurisdictions reported increasing versus decreasing their use due to the pandemic. Increases in cannabis consumption were also found in other studies conducted during the pandemic (Brenneke et al. 2021; Canadian Centre on Substance Use and Addiction and Mental Health Commission of Canada 2021a; Cousijn et al. 2021; Imtiaz et al. 2020; Rotermann 2020; Statistics Canada 2021b). In contrast, in a national Canadian survey, a comparable percentage of cannabis consumers used more and less cannabis due to the pandemic (21.7% v 22.1%). The latter survey was conducted earlier in the pandemic than the current study and may not have captured longer trends (Government of Canada 2020).

Findings suggest that the pandemic may have had a modest impact on the types of cannabis products

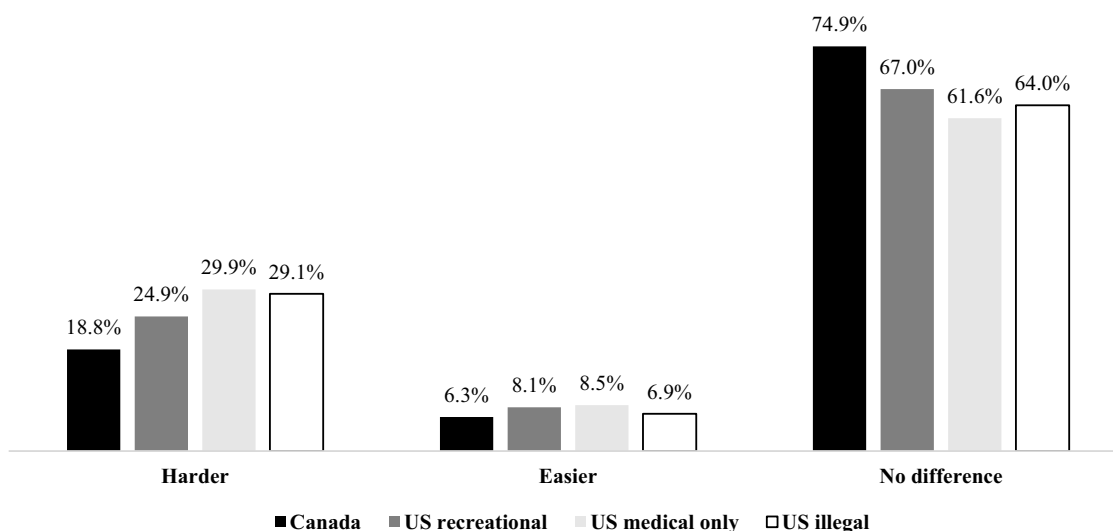


Figure 5. Self-reported impact on access to cannabis due to the COVID-19 pandemic in Canada and U.S. jurisdictions (n = 13,689).



used by consumers. In the current study, more consumers reported that they were more likely to use edibles and dried flower than other products during the pandemic. The greater interest in dried flower and edibles may reflect an overall increase in already popular products. Indeed, the less popular products (e.g., tinctures) are less frequently used and had greater percentages of reduced interest. For instance, in the 2020 Canadian Cannabis Survey, dried flower and edibles were the two most common products used by past 12-month consumers (Government of Canada 2020). Another study of changes in product use among U.S. adult medical cannabis consumers found a movement away from inhaled routes of administration (such as smoking and vaping) toward non-inhaled products (Vidot et al. 2021). The current study did not observe a similar shift, perhaps due to the inclusion of all cannabis consumers, rather than just medical cannabis consumers. Medical cannabis consumers may have underlying conditions that predispose them to worse COVID-19 symptom severity, and therefore may wish to avoid inhaled substances (Vidot et al. 2021).

The extent of the shift in product use may vary across jurisdiction. In the current study, Canadian consumers were less likely to report any change in their product use compared to those in U.S. recreational states. This could be due to product access and overall access during the pandemic. Indeed, consumers in the U.S. reported a harder time accessing cannabis compared to Canadian consumers. This is potentially due to the proliferation of online stores, delivery, and curbside pickup present in Canada during the pandemic (Alcohol and Gaming Commission of Ontario 2020). In the U.S., only a small number of states offer delivery services for recreational cannabis, whereas in Canada all provinces do. Therefore, even when physical stores were closed, Canadians could access cannabis legally through online services. In the current study, Canadians were more likely to use an internet/mail order service during the pandemic than U.S. respondents. Although Canadians experienced delays in online delivery at the start of legalization, most provinces now provide same-day delivery in some regions of each province (Alcohol and Gaming Commission of Ontario 2020; Leafly Canada Staff 2019; Loriggio 2018). In the first quarter of 2020, the Ontario Cannabis Store reported that approximately two thirds of consumers who accessed their store used express shipping (Ontario Cannabis Store 2020). During the pandemic, further changes were introduced to online sales, with some provinces allowing online ordering and curbside pickup from private physical retail stores, which was previously prohibited (Alcohol and Gaming Commission of Ontario 2020; Canadian

Centre on Substance Use and Addiction. Policy and Regulations (Cannabis) 2021b). Overall, the COVID-19 pandemic may have accelerated the transition to the newly legal recreational market due to widespread access to legal retail sources during the pandemic.

For most consumers, the pandemic did not change whether they obtained their cannabis from legal or illegal sources. This pattern is similar to results from the 2020 Canadian Cannabis Survey, where close to three-quarters of cannabis consumers reported no change in their access to either illegal or legal sources (Government of Canada 2020). Perhaps unsurprisingly, respondents in U.S. states that had legalized recreational cannabis were more likely to report increased use of legal sources than states that had not legalized recreational cannabis. This demonstrates that consumers will source cannabis legally if there are legal options to do so. Indeed, consumers in U.S. medical and illegal states were more likely to use family and friends or dealers (typical “illegal” sources) and consumers in recreational states were more likely to use retail stores (typical “legal” sources). Similarly, in a study examining cannabis sales in four states where non-medical cannabis was legalized, legal cannabis sales increased in all four states during the COVID-19 pandemic compared to the previous year (Schauer et al. 2021).

This study is subject to limitations common to survey research. Respondents were recruited using non-probability-based sampling; therefore, the findings do not provide nationally representative estimates. The data were weighted by age group, sex, region, education and smoking status in both countries and region-by-race in the U.S. However, compared to the national population, the U.S. sample had fewer respondents with low education levels and Hispanic ethnicity. Cannabis use estimates were within the range of national estimates for young adults, whereas estimates among the full ICPS sample were generally higher than national surveys in the U.S. and Canada. This is likely due to the fact that the ICPS sampled individuals aged 16–65, whereas the national surveys included older adults, who are known to have lower rates of cannabis use. In both countries, the ICPS sample also had poorer self-reported general health compared to the national population, which is a feature of many non-probability samples, and may be partly due to the use of web surveys, which provide greater perceived anonymity than in-person or telephone-assisted interviews often used in national surveys (Fahimi et al. 2018; Hays, Liu, and Kapteyn 2015).

The current study did not assess the extent of COVID-19-related policy restrictions at the time of survey. Moreover, due to the relatively recent changes in cannabis policy in Canada, the current study was unable

to disentangle whether changes experienced were due to the COVID-19 pandemic or changes in cannabis policy and increased access due to legalization. Finally, cannabis laws vary at the state level across the U.S., and therefore combining states by their broad cannabis laws may lose the nuance of individual state laws, especially with regards to the COVID-19 pandemic.

## Conclusion

The majority of consumers did not change their cannabis behaviors due to the COVID-19 pandemic, including consumption patterns, cannabis products used, and sources used. However, approximately one third of cannabis consumers did report changes to their consumption and source of cannabis during the pandemic, and the extent of these changes varied across jurisdictions. For example, consumers in legal jurisdictions were more likely to source cannabis legally due to the pandemic and found it easier to access than consumers in illegal jurisdictions; however, varying cannabis policies could have also contributed to differences demonstrated across jurisdictions. Future research should examine whether these changes in cannabis consumption and behaviors remain after public health measures due to the pandemic are lifted.

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