

## Relationships Between Increases in Canadian Cannabis Stores, Sales, and Prevalence

Michael J. Armstrong, associate professor  
Goodman School of Business, Brock University  
St. Catharines, Ontario, L2S 3A1, Canada  
michael.armstrong@brocku.ca

### Abstract

*Background:* This study estimated the relationships between increases in legal cannabis stores, legal cannabis sales, and cannabis prevalence in Canadian provinces between 2018 and 2020.

*Method:* Government data were used to calculate changes in licensed store numbers, retail sales dollars, and past-three-month users in 10 provinces across six time periods. The resulting  $N = 60$  observations were standardized per million residents aged 15 and up, and then analyzed via linear regression.

*Results:* Store growth explained 46.3% of the variation in provincial sales growth; each added store was associated with added quarterly sales of \$305 (95% CI: \$208 to \$402) thousand. By contrast, store growth explained only 7.7% of the variation in provincial user growth; each added store was associated with 696 (95% CI: 58 to 1334) added users.

*Conclusion:* From 2018 to 2020, Canada's rapid cannabis retail expansion was strongly related to legal sales growth but only weakly related to prevalence growth. This implies prevalence growth during that period was related more to legalization's other aspects and/or to the continuation of already-existing trends.

*Keywords:* Cannabis; legalization; drug policy; health economics; marijuana.

© 2021. This manuscript version is made available under the CC-BY-NC-ND 4.0 license <http://creativecommons.org/licenses/by-nc-nd/4.0/>. It is the author's accepted manuscript for:

Michael J. Armstrong, "Relationships between increases in Canadian cannabis stores, sales, and prevalence", *Drug and Alcohol Dependence*, 2021, 109071.  
<https://doi.org/10.1016/j.drugalcdep.2021.109071>

### 1. Introduction

When the Canadian government legalized recreational (i.e., non-medical) cannabis use nationwide in October 2018, its 10 provincial and three territorial governments became responsible for regulating cannabis retailing within their respective jurisdictions. Some of those governments in turn gave municipalities partial control over store numbers and locations, and/or let them opt-out of having them. All these governments consequently had to decide whether to restrict or promote cannabis store openings, given two competing policy goals: encouraging existing users to switch to legal products, while discouraging non-users from starting.

This study investigated that important issue by estimating the extent to which increased legal store numbers were associated with increased legal sales, and the extent to which increased stores or increased sales were associated with increased prevalence, in Canada's 10 provinces between 2018 and 2020. The study's results could help Canadian regulators develop better

retailing policies. The results might also interest other countries considering national legalization, such as the U.S., Mexico, Luxembourg, and Israel.

### ***1.1 Canadian market growth***

When preparing for legalization, each Canadian jurisdiction approached cannabis retailing differently. Some opened government-owned stores while others licensed businesses; all allowed online sales in some form. Similarly, while some areas began with relatively few stores, others opened many (Myran et al, 2021). The country's total legal store count rose rapidly from 168 in December 2018 to 643 in December 2019, and to 1,318 in December 2020, though this store growth was not evenly distributed across all provinces.

After initial production shortfalls were resolved (Armstrong, 2021a), legal retail sales experienced similarly rapid increases. Total monthly sales (online and in-store combined) grew from \$59 million (Canadian dollars) in December 2018 to \$148 million in December 2019, and to \$297 million in December 2020 (Statistics Canada, 2021b). They consequently surpassed legal medical cannabis sales in 2018's 4th quarter and illegal cannabis sales in 2020's 3rd quarter (Statistics Canada, 2021d). Although online sales initially were important in regions with few stores, by September 2019 they had declined to only 5.9% of the national total (Statistics Canada, 2019), and provinces with ample store coverage saw online sales under 2% (see e.g., Prince Edward Island Cannabis Management Corporation, 2019: 28).

By comparison, estimated prevalence increased more slowly. Prevalence had been rising before legalization, with self-admitted past-*twelve*-month rates among residents aged 15 and over increasing from 10.6% in 2013 to 12.3% in 2015, and to 14.8% in 2017 (Statistics Canada 2018). More recent surveys of past-*three*-month rates showed similar increases, from 14.0% in 2018's 1st quarter, to 17.5% in 2019's 1st quarter, and 20.0% by 2020's 4th quarter (Rotermann, 2021). The latter percentage represented some 6.2 million Canadians, including 2.4 million consuming daily or almost daily.

### ***1.2 Relationships among the measurements***

A relationship between cannabis stores and sales seems natural; indeed, Armstrong (2021a) found that provinces with more stores per capita tended to have higher sales per capita during legalization's first year. There is also some evidence that sales *changes* in specific jurisdictions were attributable to store *changes* there: for example, Ontario's sales more than doubled when it finally opened its first stores in April 2019 (Statistics Canada, 2021b). However, the strength of the stores-to-sales relationship has not previously been quantified.

The relationship of stores with prevalence is less clear. For example, Wadsworth et al (2021) found that existing users in Canada who lived closer to legal stores were more likely to purchase cannabis legally, but not examine whether such proximity made non-users more likely to start. Rotermann (2021) had speculated that prevalence increases were largely due to expanded retailing but noted that other factors also mattered. For example, after legalization removed criminal penalties and perhaps reduced social stigmas, non-users might have become more willing to try cannabis, and/or existing users might have become more willing to admit to

such use. Furthermore, the effects of store openings could have varied across demographic segments. For example, Turna et al (2021) found that while previous non-users in Canada were more likely to report using cannabis after legalization, previous users were less likely to do so.

Canada's prevalence estimates also included substantial margins for sampling error, especially when broken down by province. For example, Alberta's 4th quarter 2020 rate was 21.7% (95% CI: 17.5, 26.6), meaning that the lower end of the confidence interval was fully one-third less than the higher end (Rotermann, 2021). The estimates also depended on respondents willingly admitting to cannabis use on government surveys. Both factors created some uncertainty regarding the extent to which usage had increased.

In the U.S., most research has confirmed only that prevalence rose, and perhaps only in some age groups, after states passed recreational cannabis laws (Cerdá et al, 2020; Kerr et al, 2018; Kim et al, 2021). One study did find larger prevalence increases among individuals living closer to legal stores (Everson et al., 2019), but another found no significant association between usage intentions and living near stores (Shih et al, 2021). U.S. research has also been complicated by cannabis remaining federally illegal there, meaning that U.S. results might not fully apply in countries like Canada that have legalized nationally.

The presumed but uncertain connection between stores and prevalence has important policy relevance, given provincial governments' struggles to find the best balance of priorities for retail regulations (Staniforth, 2021). Similarly, some municipal governments continue to opt-out of allowing stores (Fox, 2021), while retailers themselves wonder how many stores each market can support (Hadley, 2021).

### ***1.3 Research questions***

Given the above-mentioned issues, this study sought answers to two basic research questions regarding Canada's legal recreational cannabis market:

1. To what extent were increased numbers of stores associated with increased retail sales?
2. To what extent were increased stores or sales associated with increased numbers of users?

## **2. Method**

### ***2.1 Study Design***

The study analyzed aggregate government data via linear regression to estimate the relationships between changes in legal cannabis stores, legal cannabis retail sales, and total cannabis users, from 2018's 3rd quarter to 2020's 4th quarter. This study did not require research ethics approval, as it used publicly available data that did not pertain to individuals.

### ***2.2 Data***

Statistics Canada (2021a) conducted a National Cannabis Survey (NCS) each quarter in 2018 and 2019, plus in the 4th quarter of 2020; these averaged 5,540 respondents each. The NCS estimated the number of residents aged 15 and over who used cannabis during the preceding

three months. (Most of these surveys did not cover the three territories, so those were excluded from this study.) Each province’s estimates were compared to its population aged 15 or over (Statistics Canada 2021c) to yield prevalence numbers in thousands of users per million residents (hereinafter, “users”).

Statistics Canada (2021b) also reported recreational cannabis retail sales, in-store and online combined, in Canadian dollars each month in each province. The data came from provincial cannabis regulatory agencies, so it included all retail sales rather than just survey samples. Each province’s total sales per quarter were divided by the population aged 15 or above to yield quarterly retail sales in millions of dollars per million residents (hereinafter, “sales”).

Counts of licensed cannabis stores were obtained at the beginning of each month from provincial cannabis agency web sites. These were then prorated to reflect two major closures: all stores in Prince Edward Island were closed from 19 March to 21 May 2020 due to the COVID-19 pandemic (Fraser, 2020); and 10 stores in Newfoundland were closed from 23 August to 16 November 2020 due to labor disputes (Canadian Press, 2020). The monthly store counts were averaged for each quarter and then divided by the population aged 15 or above to get average stores per million residents (hereinafter, “stores”).

Figure 1 illustrates how the national total for these metrics evolved during the period under study: the values are normalized so that 2020’s 4th quarter equals 100 in each case.

### Figure 1

Quarterly total Canadian cannabis stores, sales, and users, from 2018’s 1st quarter to 2020’s 4th quarter, all scaled to equal 100 for 2020’s 4th quarter.

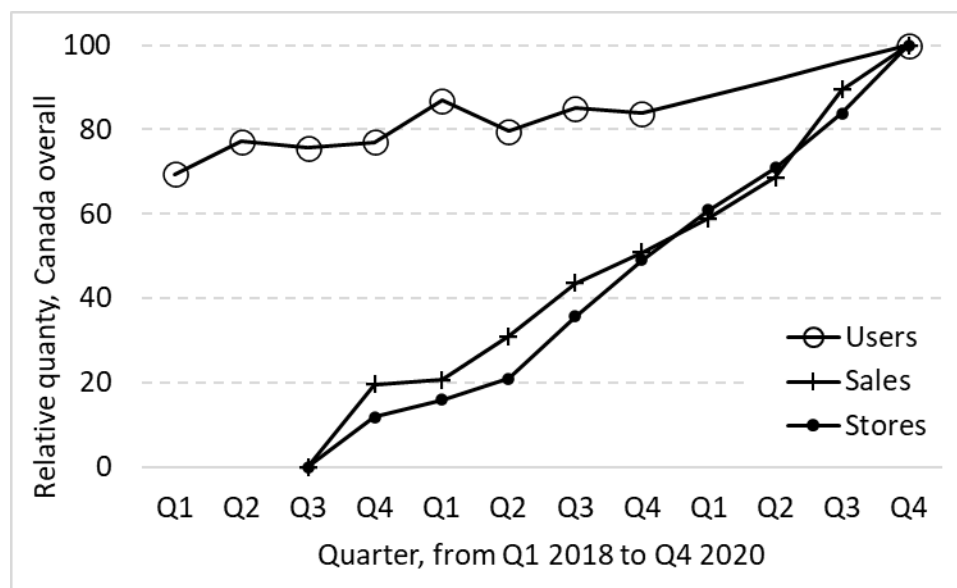


Table 1 provides a data snapshot by showing each province’s stores, sales, and users for 2020’s 4th quarter. Note the wide range in store densities: Alberta has 22 times as many stores per capita as Quebec, but less than three times as many sales and users per capita.

**Table 1**

Average number of stores, quarterly retail sales in millions of Canadian dollars, and thousands of users, all per million residents, during 2020's 4th quarter

	Stores	Sales	Users
Alberta	148.85	\$48.49	213.1
British Columbia	62.70	\$26.41	232.6
Saskatchewan	52.39	\$41.82	131.1
Newfoundland	41.29	\$29.21	187.8
Manitoba	40.55	\$27.58	209.0
New Brunswick	29.88	\$28.61	172.3
Prince Edward Island	29.58	\$36.64	216.7
Nova Scotia	21.76	\$26.63	264.9
Ontario	17.50	\$20.55	227.1
Quebec	6.69	\$19.90	103.7
Canada overall	38.65	\$25.81	193.5

Changes from one period to the next (i.e., the first differences) were calculated by subtracting the previous quarter's level from the current level: e.g., Alberta's 1st quarter sales were subtracted from its 2nd quarter sales to get its 2nd quarter's sales growth in millions of dollars.

The first period's changes in users were handled slightly differently. Because legalization did not occur until 2018's 4th quarter, Rotermann's (2020) pooled prevalence estimates from the first three quarters combined were used to provide more reliable pre-legalization starting levels. These were subtracted from 2018's 4th quarter levels to calculate the first period's user growth.

The last period's changes were also calculated differently. During 2020, the NCS only occurred once, in the 4th quarter. So, 2019's 4th quarter values were subtracted from 2020's 4th quarter values to provide the last period's changes; these consequently represented growth over 12 months, whereas the other observations represented three months.

Altogether this gave six periodic growth measurements for each of the 10 provinces, and so  $N = 60$  province-period observations. Table 2 shows summary statistics for this data. Note that the standard deviation for user growth is much higher than that for store growth or sales growth, and that store growth has a much stronger correlation with sales growth than with user growth.

For robustness-checking purposes, several alternative data sets were prepared.

- To remove the "noisiest" data, the first period (when legal sales started from zero) and last period (which represented 12 months instead of 3) were deleted, leaving  $N = 40$  observations.
- To ensure all time periods had equal lengths (instead of five being quarterly and one being annual), annual changes between the 4th quarters of 2018, 2019, and 2020 were calculated, giving  $N = 20$  observations.
- To see whether retail growth might have had a delayed effect on prevalence, user growth was compared to the previous quarter's store and sales growth, giving  $N = 50$  observations.

**Table 2**

Mean, sample standard deviation, minimum, and maximum of changes across  $N = 60$  province-period observations, along with the corresponding Pearson correlation coefficients (top number) and their statistical significance (bottom number).

	Mean	SD	Min	Max	1	2
1. Store growth	7.520	12.969	-13.999	56.511		
2. Sales growth	5.097	6.407	-2.952	26.685	.672 .000	
3. User growth	7.147	35.718	-61.891	121.920	.219 .092	.266 .040

With the original  $N = 60$  data set, follow-up regressions were also run that tried adding the following control variables one at a time: the change in the proportion of the provincial population that was aged 20 to 29, as a continuous covariate; the change in the proportion of the provincial population that was male, as a continuous covariate; and the province, as a categorical factor with 10 levels.

### 2.3 Analysis

The data were analyzed using SPSS 26 software's linear regression and general linear model features. The analysis covered three models: store growth to explain sales growth, store growth to explain user growth, and sales growth to explain user growth. White's test and residual plots checked for heteroskedasticity; histograms and normal probability plots checked for non-normality; and the regression routine identified potential outliers having residuals greater than three standard deviations. Where results showed signs of heteroskedasticity, heteroskedasticity-consistent (HC3) confidence intervals and significance values were calculated in addition to the default ones; the study then reported whichever values were most conservative. If a regression identified data points as potential outliers, the regression was rerun with the points excluded, and the new results were presented alongside the originals.

## 3. Results

### 3.1 Sales growth

The left side of Table 3 shows the regression from using store growth to explain sales growth. The relationship was highly significant and had good explanatory power; however, there was one potential outlier and White's test suggested potential heteroskedasticity. The table's right side shows the results of repeating the regression after excluding the outlier: the heteroskedasticity indication disappeared while the other values remained similar. The revised regression indicated that provincial quarterly sales increased \$305 (95% CI: \$208, \$402) thousand on average per store added. Figure 2 illustrates the revised regression graphically.

Regressions with the alternative data sets also showed good significance ( $p$  between .000 and .005) and fit ( $R^2$  between 19.1% and 51.8%). Regressions adding each of the extra control

variables (the change in proportion that was aged 20-to-29, the change in proportion that was male, and the province) found that none were significant. These results provided assurance that the estimated stores-versus-sales relationship was not an artifact of the analysis choices.

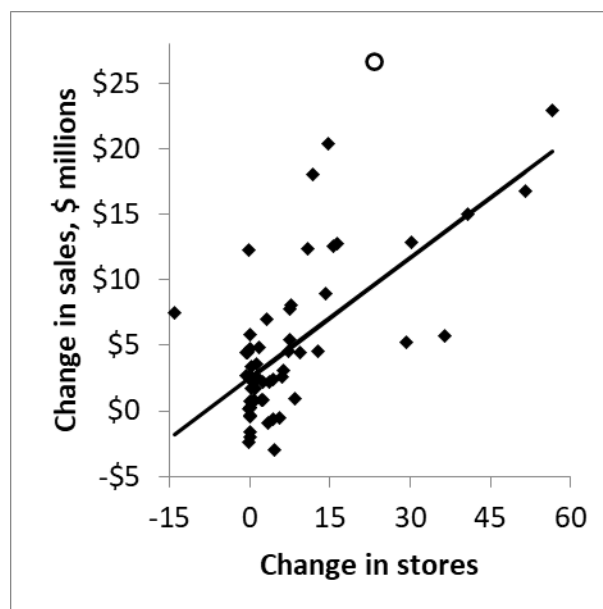
**Table 3**

Regression results for sales growth versus store growth, using the full data set (left) and after excluding one outlier (right). The columns show each regression coefficient  $B$  beside its 95% confidence interval  $CI$ , standard error  $SE$ , and significance  $p$ , along with the overall model's fit  $R^2$  and the significance  $p$  of White's test for heteroskedasticity.

	$B$	Original 95% $CI$	$SE$	$p$	$B$	Revised 95% $CI$	$SE$	$p$
Intercept	2.598	1.167, 4.300	0.715	.001	2.517	1.232, 3.801	0.641	.000
Stores	0.332	0.221, 0.443	0.048	.000	0.305	0.208, 0.402	0.044	.000
$R^2$	45.2%				46.3%			
White's $p$	.098				.519			

**Figure 2**

Regression plot showing sales growth versus store growth per million residents after excluding one outlier (shown as a circle, top center).



### 3.2 User growth

Table 4's left side shows the results of using store growth to explain user growth. The relationship was only marginally significant and had little explanatory power. The table's right side shows that after excluding one outlier, significance and fit improved slightly: provinces gained 696 (95% CI: 58, 1334) added users per added store. Figure 3a illustrates the revised result. With the alternative data sets, the relationship was not significant ( $p$  between .254 and

.665) and had a weaker fit ( $R^2$  between 0.4% and 7.2%). None of the extra control variables were significant when added.

**Table 4**

Regression results for user growth versus store growth, using the full data set (left) and after excluding one outlier (right).

	Original				Revised			
	<i>B</i>	95% <i>CI</i>	<i>SE</i>	<i>p</i>	<i>B</i>	95% <i>CI</i>	<i>SE</i>	<i>p</i>
Intercept	2.608	-7.914, 13.130	5.257	.622	-0.122	-9.708, 9.464	4.787	.980
Stores	0.604	-0.103, 1.310	0.353	.092	0.696	0.058, 1.334	0.319	.033
$R^2$	4.2%				7.7%			
White's <i>p</i>	.220				.230			

**Figures 3a and 3b**

Regression plots showing user growth versus store growth (left) and user growth versus sales growth (right), per million residents, after excluding one outlier each (shown as a circle).

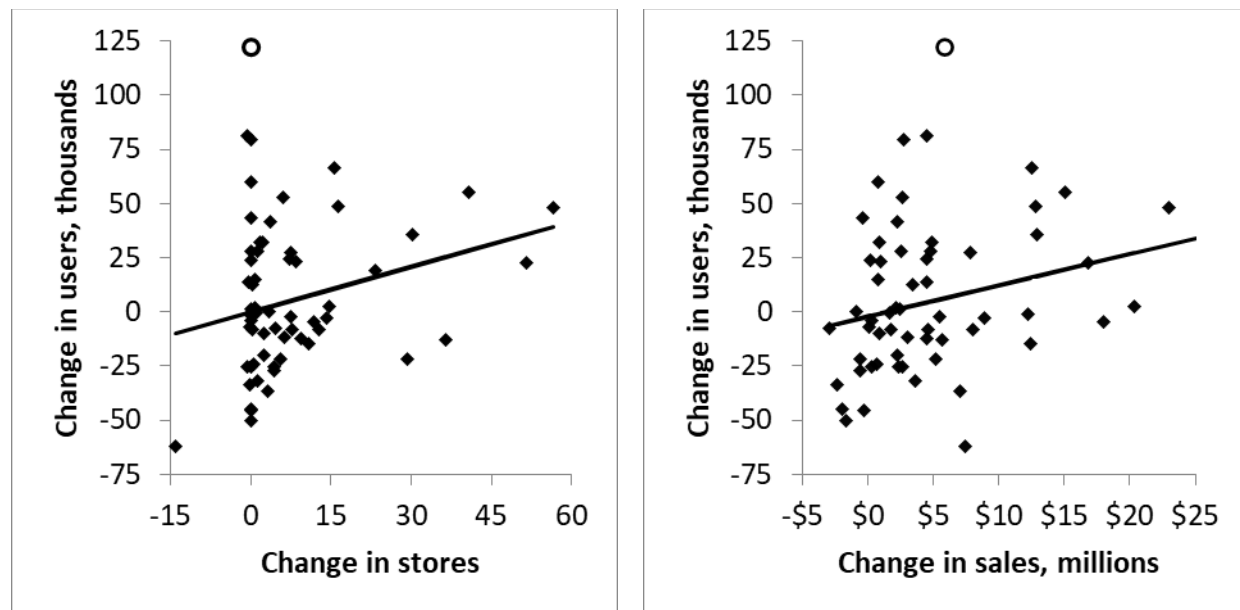


Table 5 and Figure 3b show that sales growth was not much better for explaining user growth. Each extra million dollars sold was associated with 1447 (95% CI: 162, 2731) more users. The alternative data sets gave similarly weak significance ( $p$  between .036 and .761) and fit ( $R^2$  between 0.5% and 11.1%). None of the control variables were significant when added.



**Table 5**

Regression results for user growth versus sales growth, using the full data set (left) and after excluding one outlier (right).

	<i>B</i>	Original 95% <i>CI</i>	<i>SE</i>	<i>p</i>	<i>B</i>	Revised 95% <i>CI</i>	<i>SE</i>	<i>p</i>
Intercept	-0.401	-11.907, 11.104	5.748	.945	-2.154	-12.661, 8.353	5.247	.683
Stores	1.481	0.069, 2.893	0.706	.040	1.447	0.162, 2.731	0.641	.028
$R^2$	7.1%				8.2%			
White's <i>p</i>	.448				.589			

## 4. Discussion

### 4.1 Overall conclusions

This study found a strong positive relationship between increased licensed stores and increased legal retail sales in Canada's 10 provinces between 2018 and 2020. By contrast, it found only a weak positive relationship between increased stores and increased prevalence, and between increased sales and increased prevalence. These findings were robust with respect to alternative data sets and added control variables.

The minimal stores-to-prevalence relationship might have been due to many factors. On the policy side, Canada's restrictions on retail promotions (little advertising, no free samples, etc.) presumably made it harder for new stores to stimulate local demand. On the statistical side, the "noisiness" of the prevalence estimates would have partly obscured any connections with explanatory variables. Diverse individual responses might also have complicated the situation. For example, suppose nearby store openings made older adults feel more comfortable with cannabis, but made younger adults consider it less fashionable; in that case, the stores' influence might have been significant for each age group, but net to zero for the aggregate population.

The result might instead simply reflect the evolution of Canada's legal and illegal cannabis markets. Suppose that in a given region, illegal cannabis was readily available from local dealers, legal cannabis was initially only available online, and most users preferred to buy in person rather than online. In that case, opening licensed stores would have greatly improved access to legal cannabis and thereby increased legal sales, but it would have only marginally increased access to cannabis overall and so only marginally increased prevalence overall.

### 4.2 Comparisons with previous research

When comparing the results of this province-level analysis to previous work involving user-level surveys, it must be remembered that aggregate averages can differ from individuals' behavior. That said, this study's strong stores-to-sales relationship for provinces fits with the earlier finding that individual users near stores were more likely to buy legally (Wadsworth et al., 2021). To some extent, the weaker stores-to-prevalence relationship found for Canadian provinces herein also aligns with the somewhat inconsistent findings for U.S. individuals. For example, although proximity to retail stores seemed related to prevalence increases for

Washington state residents (Everson et al., 2019), it did not seem related to usage intentions for Los Angeles County residents (Shih et al. (2021).

### ***4.3 Policy implications***

One direct implication of these results is that jurisdictions which add more stores get substantial increases in legal sales but limited increases in prevalence. This divergence is noteworthy given that stores remain unevenly distributed both between provinces and within them. Provincial governments might therefore want to update their retailing policies, while municipal governments could reconsider their store bans. Conversely, cannabis retailers should perhaps approach expansion more cautiously, as it seems adding stores does not stimulate demand for cannabis as much as it might for other products.

An indirect implication of the results is that legal sales (so far) mostly represent market share taken away from illegal sellers, rather than new users entering the market. This implication is clearly interesting and presumably reassuring for Canadian policymakers. However, it must also be considered speculative, as many other variables could have confounded the apparent relationships among stores, sales, and users. Regarding the latter, the Canadian government should consider obtaining more precise and/or more frequent prevalence measurements, as those could help clarify the stores-to-prevalence relationship. Policymakers should also note that even if legal retailing contributes little toward prevalence growth, the health impacts of that growth must nonetheless be addressed.

### ***4.4 Limitations and future research***

One general limitation of this study, like any done outside a lab, is that it could only show correlation, not causation. However, the study design partly mitigated this concern by not performing a cross-sectional analysis across provinces: e.g., if Alberta had more stores than Quebec, did Alberta also have more users than Quebec? Instead, it analyzed changes within provinces over time: e.g., if Alberta had more stores in summer than in spring, did Alberta also have more users in summer than in spring? This first differences approach provided a more direct logical connection between the metrics.

A limitation specific to this study was the prevalence data it used: only six national surveys had been conducted since legalization, each with relatively wide confidence intervals. It therefore would be worth repeating this research after more surveys are completed. Similarly, this study examined legal recreational sales but excluded legal medical sales. While recreational sales are much larger and more relevant to this study's research questions, future work could examine how medical sales might also relate to recreational stores and overall prevalence.

The use of alternative data sources would also be worth pursuing. For example, the very large sales transaction databases of provincial cannabis agencies could help researchers better quantify the relationship between stores and sales. Unfortunately, those agencies have so far made little of their data publicly available (Armstrong, 2021b).

Future studies could also investigate whether the relationships analyzed herein at the provincial level also apply for individuals: e.g., when a new store opens, how large are its sales, and how many nearby residents subsequently start using cannabis? Such research could include demographic details that might affect stores' influences. For example, do younger adults respond differently than older adults to store openings? Do occasional users respond differently than do daily users? Differences between the latter two groups could be particularly important, as daily users constitute the minority of consumers but the majority of consumption volume.

From a public health perspective, prevalence increases presumably matter less than the health impacts they can generate. So, future research could take this study a step further by comparing stores and health outcomes: e.g., to what extent are store openings associated with changes in cannabis use disorder, hospital emergency visits, or impaired driving incidents?

### **Declaration of Competing Interests**

No conflict declared.

### **References**

- Armstrong M.J. 2021a. Legal cannabis market shares during Canada's first year of recreational legalization. *Int J Drug Policy* 88, Feb, 103028. <https://doi.org/10.1016/j.drugpo.2020.103028>
- Armstrong M.J. 2021b. Provinces and territories should disclose cannabis data to support research. *CMAJ* 193 #10, E341-E342, 202041. <https://doi.org/10.1503/cmaj.202041>
- Canadian Press 2020. Strike is over for N.L. Dominion store workers, but there is no happy ending: Unifor. *CTV News*, 16 Nov. <https://atlantic.ctvnews.ca/strike-is-over-for-n-l-dominion-store-workers-but-there-is-no-happy-ending-unifor-1.5190787> (accessed 19 Jun 2021)
- Cerdá M., Mauro C., Hamilton A., Levy N.S., Santaella-Tenorio J., Hasin D., Wall M.M., Keyes K.M., Martins S.S. 2020. Association between recreational marijuana legalization in the United States and changes in marijuana use and cannabis use disorder from 2008 to 2016. *JAMA Psychiatry* 77 #2, 165–171. <https://doi.org/10.1001/jamapsychiatry.2019.3254>
- Everson E.M., Dilley J.A., Maher J.E, Mack C.E. 2019. Post-legalization opening of retail cannabis stores and adult cannabis use in Washington state, 2009–2016. *Am J Public Health* 109 # 9, 1294-1301. <https://doi.org/10.2105/AJPH.2019.305191>
- Fox C. 2021. Mississauga councillors vote against allowing legal cannabis stores once again. *CP24 News*, 9 June. <https://www.cp24.com/news/mississauga-councillors-vote-against-allowing-legal-cannabis-stores-once-again-1.5463396> (accessed 3 Jul 2021)
- Fraser S. 2020. P.E.I. Cannabis stores to reopen next week. *CBC News*, 14 May. <https://www.cbc.ca/news/canada/prince-edward-island/pei-government-reopen-public-services-1.5570157> (accessed 19 Jun 2021)
- Hadley A. 2021. As more pot shops pop up, Thunder Bay retailers confident consumer demand can keep up. *CBC News*, 19 May. <https://www.cbc.ca/news/canada/thunder-bay/cannabis-retail-thunder-bay-1.6031205> (accessed 3 Jul 2021)
- Kerr D.C.R., Bae H., Koval A.L. 2018. Oregon recreational marijuana legalization: Changes in undergraduates' marijuana use rates from 2008 to 2016. *Psychol Addict Behav* 32 #6, 670–678. <https://doi.org/10.1037/adb0000385>

- Kim J.H., Weinberger A.H., Zhu J., Barrington-Trimis J., Wyka K., Goodwin R.D. 2021. Impact of state-level cannabis legalization on poly use of alcohol and cannabis in the United States, 2004–2017, *Drug Alcohol Depend* 218, 108364. <https://doi.org/10.1016/j.drugalcdep.2020.108364>.
- Myran D.T., Staykov E., Cantor N., Taljaard M., Quach B.I., Hawken S., Tanuseputro P. 2021. 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 Alcohol Rev.* Early view 12 Jul. <https://doi.org/10.1111/dar.13351>
- Prince Edward Island Cannabis Management Corporation, 2019. *2019 Annual Report*. <https://peicannabiscorp.com/pages/corporate>
- Rotermann M. 2020. What has changed since cannabis was legalized? *Health Rep* 31 #2: 11-20. <https://www.doi.org/10.25318/82-003-x202000200002-eng>
- Rotermann M. 2021. Looking back from 2020, how cannabis use and related behaviours changed in Canada. *Health Rep* 32 #4. <https://www.doi.org/10.25318/82-003-x202100400001-eng>
- Shih, R.A., Tucker, J.S., Pedersen, E.R., Seelam R., Dunbar M.S., Kofner A., Firth C., D’Amico E.J. 2021. Density of medical and recreational cannabis outlets: racial/ethnic differences in the associations with young adult intentions to use cannabis, e-cigarettes, and cannabis mixed with tobacco/nicotine. *J Cannabis Res* 3 #28. <https://doi.org/10.1186/s42238-021-00084-y>
- Staniforth J. 2021. Too many cannabis retail stores? Provinces struggle to find the right balance, *Leafly*, 1 July. <https://www.leafly.ca/news/canada/provinces-struggle-number-cannabis-retail-stores> (accessed 3 Jul 2021)
- Statistics Canada. 2018. Canadian Tobacco, Alcohol, and Drugs Survey: Data about Canadians’ use of tobacco, alcohol, and drugs. <https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey.html> (accessed 7 Aug 2021)
- Statistics Canada. 2019. The retail cannabis market in Canada: A portrait of the first year. 11 Dec. <https://www150.statcan.gc.ca/n1/pub/11-621-m/11-621-m2019005-eng.htm> (accessed 7 Aug 2021)
- Statistics Canada. 2021a. Table 13-10-0383-01, Prevalence of cannabis use in the past three months, self-reported. <https://doi.org/10.25318/1310038301-eng> (accessed 19 Jun 2021)
- Statistics Canada. 2021b. Table 20-10-0008-01, Retail trade sales by province and territory (x 1,000). <https://doi.org/10.25318/2010000801-eng> (accessed 18 Mar 2021)
- Statistics Canada. 2021c. Table 17-10-0005-01, Population estimates on July 1st, by age and sex. <https://doi.org/10.25318/1710000501-eng> (accessed 19 Jun 2021)
- Statistics Canada. 2021d. Table 36-10-0124-01, Detailed household final consumption expenditure, Canada, quarterly (x 1,000,000). <https://doi.org/10.25318/3610012401-eng> (accessed 3 Jul 2021)
- Turna J., Belisario K., Balodis I., Van Ameringen M., Busse J., MacKillop J. 2021. Cannabis use and misuse in the year following recreational cannabis legalization in Canada: A longitudinal observational cohort study of community adults in Ontario. *Drug Alcohol Depend* 225, 108781. <https://doi.org/10.1016/j.drugalcdep.2021.108781>
- Wadsworth E., Driezen P., Hammond D. 2021. Retail availability and legal purchases of dried flower in Canada post-legalization. *Drug Alcohol Depend*, 225, 108794. <https://doi.org/10.1016/j.drugalcdep.2021.108794>.