Cannabis advertising, promotion and branding: Differences in consumer exposure between 'legal' and 'illegal' markets in Canada and the US

Jennifer Rup, Samantha Goodman, David Hammond*

School of Public Health and Health Systems, University of Waterloo, 200 University Ave W, N2L 3G1 Waterloo, ON, Canada

ABSTRACT

Relatively little evidence exists on the impact of exposure to cannabis marketing, including potential differences between 'legal' and 'illegal' cannabis markets. The current study examined cannabis advertisement exposure and brand awareness across three jurisdictions: (i) all Canadian provinces immediately prior to legalization, (ii) US states that had not legalized non-medical cannabis (US 'illegal' states) as of August 2018, and (iii) US states that had legalized non-medical cannabis (US 'legal' states). Data are from Wave 1 of the International Cannabis Policy Study, an online survey conducted from August 27–October 7, 2018. The current sample (n = 26,710) included respondents from Canada (n = 9840), US illegal states (n = 9578), and US legal states (n = 7292). Regression models were fitted to examine cannabis advertisement exposure and brand awareness. Exposure to cannabis advertising and brand awareness differed across jurisdictions. Respondents in US legal states were more likely to report noticing advertisements, while those in Canada were more likely to report higher brand recall. Across jurisdictions, social media was cited among the most frequent channels from which cannabis advertisements were noticed in the past month. Higher rates of advertisement awareness and brand recall were also associated with greater frequency of cannabis use and self-reported proximity to cannabis retail stores. Results from this study indicate that advertisement exposure was higher in legal cannabis markets, although brand awareness for cannabis products was low across all jurisdictions. The findings reflect the relative novelty of legalized cannabis markets and provide a benchmark for evaluating the impact of cannabis advertising as legal markets become established.

1. Introduction

On October 17, 2018, Canada legalized cannabis for non-medical use. One of the fundamental principles in the Canadian Cannabis Act is that cannabis should not be advertised or promoted in ways that increase consumption (Cannabis Act, 2018). The Act prohibits most forms of traditional advertising, including on TV and in print. 'Informational' and 'brand preference' promotions are allowed in limited circumstances in which they cannot be viewed by young persons, such as at the point-of-sale, when directed at an adult, and in venues where young people are not permitted by law (Cannabis Act, 2018). While the Cannabis Act allows sponsorships, it restricts promotion of sponsorships that include references to any cannabis brand element. In addition, the Cannabis Act prohibits any lifestyle advertising and "…any promotion, packaging and labelling of cannabis that could be appealing to young persons or encourage its consumption" (Cannabis Act, 2018). For example, cannabis packages can only display one background colour, and the brand imagery or logo is restricted to the size of the government-mandated 'cannabis symbol' that appears on all packs (Government of Canada, 2019).

In the 11 US states that have legalized non-medical cannabis (Alaska, California, Colorado, Illinois, Maine, Massachusetts, Michigan, Nevada, Oregon, Vermont, Washington State), and the District of Columbia (DC), advertising and promotion are generally less restricted than in Canada. In this context, 'legalization' refers to the date on which individuals of minimum legal age (MLA) (ranging from 18 to 21 years, depending on the jurisdiction), are permitted to possess and purchase non-medical cannabis. While the specific regulations vary by state, regulations generally restrict marketing that is false, misleading, promote overconsumption, and represent the use of cannabis as curative or therapeutic. All states have a general prohibition on advertising and promotions that appeal to children; however, what constitutes 'advertising to children' is only vaguely defined in most cases. Several states allow forms of traditional advertising through print newspapers or magazines, billboards, posters, or certain types of promotions inside and outside of cannabis retail stores, whereas fewer states permit

advertisements on taxis, buses, or public transit, events (e.g., sporting events, concerts), or bars and nightclubs. Most states also allow advertising through digital platforms such as websites and social media. The widespread use of social media promotes the sharing of information, and online profiles can be conveniently accessed through various outlets (e.g., laptops, tablets, mobile apps). This allows the opportunity for cannabis companies and businesses to increase brand awareness and build an online presence. In turn, the high prevalence of social media use among youth places them at a greater risk of exposure to advertisements and promotional activities.

Research on alcohol and tobacco products consistently demonstrates that marketing can increase consumption, including among young people (U.S. Department of Health and Human Services, 2014; Babor et al., 2010; Anderson et al., 2009). However, there is substantially less evidence on marketing of cannabis products, given the relative novelty of legalized cannabis markets (Pacula et al., 2014). Several studies to date have examined self-reported exposure to cannabis marketing and common sources of cannabis advertisements among youth in the US. In a cross-sectional national online survey conducted among 18–34-year-old past-month cannabis users in the US, over half of respondents reported exposure to cannabis advertising in the past month via Internet, digital, and social media (Krauss et al., 2017). In a study conducted in Oregon following the legalization of non-medical cannabis, more than half of adult respondents reported seeing cannabis advertising in the past month (Fiala et al., 2018). A national survey conducted among adolescents in the US in 2014–2015 found that exposure to cannabis advertisements was associated with greater prevalence of cannabis use (Dai, 2017). Medical cannabis advertisements have also been associated with cannabis use: approximately one third of middle school students in Southern California reported seeing at least one medical cannabis ad in the month they were surveyed, and exposure to ads was associated with a higher probability of cannabis use and intentions to use 1 year later (D'Amico et al., 2015). Finally, one third of the young adult users across the US had viewed or sought product reviews about cannabis via YouTube videos in the past month, and it was revealed that videos normalized cannabis use and could be easily accessed by underage youth (Cavazos-Rehg et al., 2018). To date, there is no published evidence to our knowledge on exposure to cannabis advertising in a Canadian context.

Two studies to date suggest that proximity to retail stores may be an important determinant of exposure to cannabis marketing and use. The 2015–2016 Oregon survey found that adults living in counties with retail stores reported higher levels of advertising exposure, with no differences reported among cannabis users and non-users, or across age groups (Fiala et al., 2018). In addition, a study in the Netherlands found that individuals who grew up within 20 km of a cannabis shop were more likely to start using cannabis at an early age (Palali and Van Ours, 2015).

Overall, relatively little evidence exists on the scope or impact of cannabis marketing, including potential differences between 'legal' and 'illegal' cannabis markets. Using survey data from the International Cannabis Policy Study (ICPS), the current study sought to examine and compare cannabis advertisement exposure and brand awareness across three jurisdictions: (i) all Canadian provinces immediately prior to legalization, (ii) US states that had not legalized non-medical cannabis as of August 2018 (US 'illegal' states), and (iii) the nine US states that had legalized non-medical cannabis (US 'legal' states).

2. Methods

Data are from Wave 1 of the ICPS, conducted in Canada and the US. Data were collected via self-completed web-based surveys conducted from August 27–October 7, 2018 with participants aged 16–65 (Hammond et al., 2018). Participants were recruited through the Nielsen Consumer Insights Global Panel and their partners' panels. Email invitations (with a unique link) were sent to a random sample of panelists (after targeting for age and country criteria); panelists known to be ineligible were not invited. Surveys were conducted in English in the US and English or French in Canada. Median survey time was 19.9 min. The study was reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE# 22392/31330).

2.1. Participants

Individuals were eligible to participate if they resided in a Canadian province or US state, were 16–65 years of age at the time of recruitment and had access to the internet. Incentives were provided to increase survey response rates and decrease response bias. Respondents received remuneration in accordance with their panel's usual incentive structure (e.g., points-based or monetary rewards, chances to win prizes). A total of 27,169 participants completed the survey and provided consent for the use of their data. For the current analysis, respondents were excluded if they either refused to answer or did not provide valid responses to the questions of interest, including outcome measures and sociodemographic questions (n = 459). The final analytic sample included 26,710 respondents, including those living in Canada (all provinces, n = 9840), US states that had not legalized non-medical cannabis (n = 9578), and states that had (n = 7292).

2.2. Survey measures

Socio-demographic measures included: age group, sex at birth, self-identification as a visible minority (i.e., non-Caucasian) (yes/no/unstated), highest level of education obtained, and income adequacy ('difficulty making ends meet'; very difficult/difficult/neither easy nor difficult/easy/very easy/unstated), which was recoded into fewer categories (very difficult or difficult/neither easy nor difficult/very easy or easy/unstated). Jurisdiction was coded as Canada, US 'legal' states (Alaska, California, Colorado, Maine, Massachusetts, Nevada, Oregon, Vermont, Washington State), and US 'illegal' states (remaining 41 states).

2.2.1. Cannabis use status

Participants were asked whether, how recently and how often they use(d) cannabis. Responses were recoded into the following mutually exclusive categories: "no use in the past 12 months" (including those who have never used cannabis), "used in the past 12 months," "used in the past month," and "used daily/almost daily."

2.2.2. Cannabis retail store proximity

Participants were asked: "How long would it take you to get to the nearest store that sells marijuana using your usual mode of transportation?" Respondents chose from the following time increments: < 5 min, 5 min, 10 min … [5-minute increments up to 1 h], then 'more than 1 h'. Responses were recoded into " > 60 min away", "30–60 min away", and " < 30 min away".

2.2.3. Exposure to cannabis marketing

Participants' exposure to cannabis marketing was assessed by asking: "In the past 12 months, have you noticed marijuana being advertised or promoted in any of the following places?" Respondents were presented with the following list of 16 'channels' from which they selected any advertisements or promotions they noticed (see Table 2). A dichotomous indicator variable of exposure to any cannabis marketing channel was created (0 = no ads noticed across any of the 16 marketing channels; 1 = ad noticed at ≥1 channel(s)).

2.2.4. Brand recall

Cannabis brand recall was assessed by asking: "Can you name any brands or company names of marijuana products?" Respondents were asked to enter up to five cannabis brands or company names (not the

name of marijuana strains or types). A response of "don't know" was treated as "no brands recalled". Of a total 5420 text entries, invalid responses (n = 137) (e.g., nonsensical or random words), and cannabis strains (n = 205) (e.g., 'Sativa, Purple Kush') were recoded as missing entries. Brands recalled were coded as 0 for "No brands recalled" and 1 for "At least one brand recalled".

2.3. Analysis

SPSS (version 25.0) was used for all statistical analyses. Post-stratification sample weights were constructed for respondents from Canada (age-by-sex-by-province and education groups) and the US (age-by-sex-by-legal state, education, and region-by-race groups) using population estimates from Statistics Canada (Statistics Canada, 2017; Statistics Canada, 2016) and the US Census Bureau (US Census Bureau, 2018). Respondents from DC (n = 14) were excluded from the dataset due to insufficient cell counts for weighting. A raking algorithm was applied to the full analytic sample (n = 27,169) to compute weights that were calibrated to these groupings. Binary logistic regression models were fitted to examine differences between jurisdictions for cannabis advertisements noticed and brands recalled. All regression models were adjusted for jurisdiction, age, sex, visible minority status, education level, income adequacy, cannabis use status, and cannabis retail store proximity. Unless otherwise noted, analyses were conducted on weighted data, and adjusted odds ratios (AORs) are reported along with 95% confidence intervals (95%CI).

3. Results

3.1. Sample characteristics

Table 1 shows the weighted and unweighted sample characteristics included in the current analyses from the ICPS 2018 (Wave 1) survey.

3.2. Exposure to cannabis marketing

Table 2 shows the frequency of noticing advertising in different channels. Across all jurisdictions, social media and websites were among the most prevalent channels for noticing advertisements. In US legal states, advertisements were most frequently noticed on billboards and posters (23.8%), whereas websites (11.5%) were most common in US illegal states, and TV or radio (17.7%), and social media (17.2%) were the most common in Canada.

Table 3 presents the results of a binary logistic regression model examining correlates of noticing cannabis advertisements. Compared to Canada, noticing cannabis advertising was higher in US legal states (AOR = 1.22, 95% CI = 1.14, 1.30) and lower in US illegal states (AOR = 0.80, 95% CI = 0.75, 0.85). Additional contrasts with US illegal states as the reference group indicate that advertisement exposure was higher in US legal states compared to illegal states (AOR = 1.54, 95% CI = 1.43, 1.65) (data not shown).

Frequent cannabis users, and respondents who reported greater proximity to cannabis retail stores were more likely to notice advertising (see Table 3). In addition, males were more likely to notice advertisements than females, and respondents aged 16–20 were significantly more likely to report noticing cannabis advertisements compared to all other age groups. Respondents with less than a high school education were less likely to report noticing advertisements compared to those with higher education levels. Those who indicated it was very difficult/difficult to make ends meet were more likely to notice advertisements than those with unstated or higher income adequacy, while there was no difference compared to those who indicated it is 'neither difficult nor easy' to make ends meet (Table 3). Visible minority status was not significantly associated with odds of noticing advertisements.

3.3. Brand recall

Table 4 shows the top five brand names recalled in each jurisdiction, and the results of a binary logistic regression model examining correlates of cannabis brand awareness are presented in Table 5. In US legal states, 12.2% of respondents reported recalling at least one cannabis brand, compared to 10.2% of respondents in Canada and 5.9% in US illegal states. After adjusting for other factors in the model, respondents in US illegal states (AOR = 0.62, 95% CI = 0.55, 0.69) and US legal states (AOR = 0.85, 95% CI = 0.77, 0.94) were less likely to recall at least one cannabis brand compared to Canadian respondents. In addition, contrasts with US illegal states as the reference group indicate that the likelihood of brand recall was higher in US legal states compared to illegal states (AOR = 1.38, 95% CI = 1.22, 1.57) (data not shown).

As Table 5 indicates, brand recall was higher among more frequent cannabis users and respondents who reported greater proximity to retail stores. Brand recall also differed by age group, sex, and visible minority status. Those aged 16–20 were less likely to recall brands compared to those aged 21–35 or 36–45 years. Males were significantly more likely to recall cannabis brands than females. Respondents who did not identify as a visible minority were more likely to recall at least one brand compared to those who did not disclose their visible minority status, while no significant differences were observed compared to those who identified as a visible minority. Differences in brand recall were also observed for income adequacy and education. Higher perceived income was associated with a higher likelihood of brand recall, and those with the least education reported lower brand recall.

4. Discussion

The current study found differences in cannabis advertising and branding across jurisdictions: those in US legal states were more likely to notice cannabis advertisements than those in Canada or US illegal states, while respondents in Canada were more likely to notice advertisements compared to those in US illegal states. This pattern reflects the increased visibility of cannabis advertisements that occurs through the regulated promotion and commercial sale of products. The findings also reinforce the prominence of cannabis advertising even in markets where non-medical cannabis is prohibited. This is likely due to the medical cannabis market, which has been legal in Canada for almost two decades, as well as in 33 US states. However, it may also reflect the widespread availability of illicit cannabis retailers. An analysis of advertisements on Weedmaps—a popular online retail site for both legal and unauthorized cannabis sources—found that cannabis retailers have a strong and visible presence on the Internet (Bierut et al., 2017). Additionally, some forms of cannabis advertising permitted in legal jurisdictions may 'spill over' into illegal jurisdictions, particularly with respect to digital marketing. Over half of respondents in US legal states reported noticing at least one advertisement, which is understandable given that regulations allow a certain amount of advertising. It is also consistent with surveys conducted in Oregon following the legalization of non-medical cannabis, where more than half of respondents reported seeing cannabis advertising in the past month (Fiala et al., 2018). The number of advertisements noticed in Canada was notably higher than in US illegal states. This difference could be attributed to the fact that the survey was conducted immediately before legalization occurred in Canada, and many companies had initiated marketing campaigns in anticipation of the legalization of cannabis on October 17, 2018 (Cannabis in Canada, 2019; Drug Free Kids Canada, 2019).

Across all jurisdictions, social media was cited among the most frequent channels from which cannabis advertisements were noticed in the past month. This is unsurprising given the shift from traditional media advertising to more accessible digital platforms. It is also consistent with a previous study conducted in the US, where over half of cannabis users aged 18–34 included in a national survey reported exposure to cannabis advertising via digital media in the past month

Table 1
Sample characteristics by jurisdiction (n = 26,710).

Characteristic	Canada (pre-legalization) (n = 9840)		US illegal states (n = 9578)		US legal states (n = 7292)	
	Unweighted % (n)	Weighted % (n)	Unweighted % (n)	Weighted % (n)	Unweighted % (n)	Weighted % (n)
Age group (years)						
16–20	8.2% (804)	14.5% (1426)	19.4% (1862)	16.6% (1592)	6.0% (440)	14.0% (1019)
21–35	18.7% (1837)	24.5% (2413)	16.5% (1578)	24.3% (2328)	21.1% (1536)	27.9% (2027)
36–45	15.2% (1497)	19.4% (1913)	15.2% (1457)	18.9% (1812)	17.1% (1249)	17.4% (1264)
46–55	21.9% (2157)	21.1% (2081)	19.5% (1868)	20.4% (1956)	21.3% (1550)	21.9% (1594)
56–65	36.0% (3545)	20.4% (2007)	29.4% (2813)	19.9% (1910)	34.5% (2517)	18.8% (1369)
Sex						
Female	58.3% (5741)	50.2% (4940)	61.6% (5903)	50.6% (4861)	66.4% (4839)	50.2% (3652)
Male	41.7% (4099)	49.8% (4898)	38.4% (3675)	49.4% (4737)	33.6% (2453)	49.8% (3621)
Self-identified as visible minority						
No	88.5% (8706)	85.4% (8399)	88.7% (8500)	81.8% (7849)	89.6% (6535)	82.9% (6027)
Yes	10.2% (1006)	12.8% (1260)	8.5% (811)	14.0% (1339)	7.8% (572)	12.6% (917)
Unstated	1.3% (128)	1.8% (180)	2.8% (267)	4.3% (410)	2.5% (185)	4.5% (917)
Education level						
Less than high school	8.6% (845)	15.3% (1510)	17.0% (1631)	15.3% (1465)	4.9% (354)	11.9% (864)
High school diploma or equivalent	15.5% (1523)	26.8% (2635)	16.2% (1550)	19.5% (1874)	13.5% (982)	15.9% (1155)
Some college, technical training	42.8% (4211)	32.8% (3225)	30.2% (2893)	38.4% (3690)	34.9% (2542)	42.3% (3076)
Bachelor's degree or higher	33.1% (3.261)	25.1% (2470)	36.6% (3506)	26.8% (2569)	46.8% (3414)	29.9% (2178)
Income adequacy						
Very difficult/difficult	28.1% (2765)	28.5% (2805)	30.5% (2924)	31.6% (3064)	26.8% (1955)	28.6% (2084)
Neither difficult nor easy	35.8% (3522)	36.1% (3550)	31.1% (2978)	31.7% (3040)	33.1% (2417)	32.4% (2354)
Very easy/easy	33.8% (3324)	32.5% (3198)	36.7% (3511)	34.9% (3352)	38.4% (2798)	36.4% (2649)
Unstated	2.3% (229)	2.9% (286)	1.7% (165)	1.8% (172)	1.7% (122)	2.6% (186)
Cannabis use						
No use in the past 12 months	76.5% (7526)	73.1% (7195)	79.8% (7641)	76.7% (7359)	68.6% (5002)	66.3% (4821)
Used in the past 12 months	8.4% (827)	8.5% (840)	6.8% (651)	7.0% (670)	10.2% (742)	9.4% (684)
Used in the past month	7.8% (771)	9.6% (947)	7.6% (728)	9.1% (871)	10.8% (787)	13.1% (951)
Used daily/almost daily	7.3% (716)	8.7% (857)	5.8% (558)	7.3% (698)	10.4% (761)	11.2% (817)
Proximity to cannabis stores						
> 60 min away	4.3% (419)	3.5% (340)	8.9% (848)	8.8% (842)	1.7% (127)	1.7% (125)
30 to 60 min	8.1% (799)	8.3% (814)	5.6% (583)	5.9% (567)	5.7% (414)	6.9% (503)
< 30 min	42.0% (4137)	39.3% (3866)	16.9% (1620)	18.7% (1799)	71.6% (5222)	65.0% (4728)
Don't know	45.6% (4485)	49.0% (4819)	68.6% (6572)	66.6% (6391)	21.0% (1529)	26.4% (1917)

(Krauss et al., 2017). In US illegal states, the most frequent noticing of ads occurred via social media, whereas in US legal states, ads were most frequently noticed via billboards/posters and outside stores that sell cannabis. Canadian respondents reported lower levels of ad exposure through traditional channels such as print newspapers, magazines, billboards/posters, which reflects the presence of more strict regulations compared to the US. However, higher levels of advertisement exposure in Canada occurred through channels such as TV or radio compared to the US, which likely reflects the high volume of news coverage related to cannabis and the sharing of this information leading up to legalization.

As expected, the findings indicated that residential proximity to a

Table 2
Frequency of noticing cannabis advertising or promotions in the past 30 days, by channel, Aug 27–Oct 7, 2018 (n = 26,710).

	Canada (pre-legalization) (n = 9840)	US illegal states (n = 9578)	US legal states (n = 7292)
Channels	% (n)	% (n)	% (n)
Billboards or posters	6.2% (611)	4.6% (439)	23.8% (1728)
Outside stores that sell marijuana	9.1% (894)	4.1% (396)	19.4% (1412)
Social media	17.2% (1685)	16.0% (1540)	19.4% (1408)
Websites	14.5% (1429)	11.5% (1107)	16.2% (1180)
Inside stores that sell marijuana	5.0% (493)	3.3% (315)	12.3% (892)
TV or radio	17.7% (1745)	8.3% (794)	11.3% (882)
Print newspapers or magazines	8.1% (797)	4.7% (453)	10.6% (772)
Email or text messages	4.1% (400)	6.6% (635)	7.9% (575)
Flyers	3.6% (356)	2.5% (237)	7.7% (562)
Bars, pubs, nightclubs	2.7% (262)	2.5% (236)	4.6% (336)
Taxis or buses/public transit	1.6% (159)	1.5% (142)	4.4% (318)
Events (e.g., sporting events, concerts, festivals)	2.7% (264)	2.4% (230)	4.2% (305)
Kiosks	2.3% (230)	1.7% (165)	3.5% (258)
Pharmacies	2.8% (279)	2.2% (209)	3.3% (237)
Regular postal mail	1.3% (125)	1.4% (138)	2.8% (207)
At the movies	1.9% (184)	2.6% (252)	2.0% (146)
Noticed cannabis ads in any channel			
% (n)	44.0 (4332)	33.9 (3255)	56.7 (4121)
Total number of channels where ads were noticed			
Mean (SD) (range = 0–16)	1.01 (1.63)	0.76 (1.43)	1.54 (2.06)

Table 3

Correlates of noticing cannabis advertisements or promotions in the past 30 days[a], Aug 27–Oct 7, 2018 (n = 26,710).

Variable	Noticed at least one ad % (95% CI)	AOR (95%CI)	Wald χ^2	P-value
Jurisdiction			142.46	< 0.001
Canada	44.0% (43.0%, 45.0%)			
US illegal states	33.9% (33.0%. 34.9%)	0.80 (0.75, 0.85)		
US legal states	56.7% (55.5%, 57.8%)	1.22 (1.14, 1.30)		
Age group			209.89	< 0.001
16–20 (ref)[b]	46.4% (44.8%, 47.9%)			
21–35	50.4% (49.2%, 51.6%)	0.74 (0.66, 0.82)		
36–45	43.2% (41.8%, 44.6%)	0.60 (0.53, 0.67)		
46–55	39.1% (37.8%, 40.4%)	0.51 (0.45, 0.57)		
56–65	39.2% (37.9%, 40.5%)	0.54 (0.48, 0.60)		
Sex			4.94	0.026
Female (ref)	41.8% (40.9%, 42.6%)			
Male	45.9% (45.1%, 46.8%)	1.06 (1.01, 1.12)		
Self-identified as visible minority			3.14	0.208
No (ref)	43.8% (43.1%, 44.4%)			
Yes	45.9% (44.3%, 47.6%)	1.03 (0.95, 1.11)		
Unstated	37.9% (34.8%, 41.0%)	0.89 (0.77, 1.03)		
Education level			73.68	< 0.001
Less than high school (ref)	42.0% (40.4%, 43.5%)			
High school diploma or equivalent	39.7% (38.5%, 41.0%)	1.16 (1.04, 1.29)		
Some college, technical training	45.1% (44.1%, 46.1%)	1.42 (1.28, 1.58)		
Bachelor's degree or higher	46.3% (45.2%, 47.5%)	1.50 (1.34, 1.69)		
Income adequacy			37.08	< 0.001
Very difficult/difficult (ref)	43.9% (42.8%, 44.9%)			
Neither difficult nor easy	43.6% (42.5%, 44.6%)	0.94 (0.88, 1.01)		
Very easy/easy	45.0% (44.0%, 46.0%)	0.90 (0.84, 0.96)		
Unstated	30.9% (27.4%, 34.5%)	0.58 (0.48, 0.70)		
Cannabis use status			116.72	< 0.001
No use in the past 12 months (ref)	40.0% (39.3%, 40.7%)			
Used in the past 12 months	45.7% (42.6%, 47.8%)	0.96 (0.87, 1.05)		
Used in the past month	59.2% (57.4%, 61.1%)	1.50 (1.37, 1.64)		
Used daily/almost daily	55.6% (53.6%, 57.6%)	1.36 (1.24, 1.49)		
Cannabis retail store access			1735.08	< 0.001
> 60 min away (ref)	42.1% (39.5%, 44.8%)			
30 to 60 min away	58.5% (56.3%, 60.7%)	1.70 (1.47, 1.96)		
< 30 min away	61.6% (60.7%, 62.5%)	1.81 (1.61, 2.05)		
Don't know	27.8% (27.1%, 28.6%)	0.53 (0.47, 0.60)		

[a] Binary logistic regression model (1 = at least one ad noticed, 0 = no ads noticed).

[b] Ref = reference group.

Table 4

Top five cannabis brands recalled, by jurisdiction, Aug 27–Oct 7, 2018 (n = 26,710).

	Canada (pre-legalization) (n = 9840)		US illegal states (n = 9578)		US legal states (n = 7292)	
Brands	% (n)		% (n)		% (n)	
1	Aurora	2.6% (265)	Canopy Growth	0.3% (36)	Canopy Growth	0.4% (33)
2	Canopy Growth	2.1% (214)	Willie's Reserve	0.2% (27)	Willie's Reserve	0.4% (23)
3	Tweed	1.6% (148)	Marley Natural	0.3% (20)	Phat Panda	0.2% (19)
4	Aphria	1.1% (120)	Aurora	0.1% (13)	Marley Natural	0.2% (13)
5	CannTrust	0.5% (54)	Aphria	0.0% (8)	Aphria	0.1% (7)
					Aurora	0.1% (7)
Recalled at least one brand						
% (n)	10.2% (1003)		5.9% (569)		12.2% (891)	
Total number of brands recalled						
Mean (SD) (range = 0–5)	0.10 (0.30)		0.10 (0.23)		0.10 (0.34)	

cannabis retail store was associated with a higher likelihood of noticing advertisements. Those who used cannabis daily were also more likely to notice advertisements compared to those who were infrequent users. This is consistent with findings from a cross-sectional study in the US which showed that exposure to cannabis advertising among 18–34-year-old past-month users was common and associated with heavier use (Krauss et al., 2017).

Advertisement exposure differed across sociodemographic groups; however, in most cases the magnitudes of these differences were modest. Most notably, youth aged 16–20 were more likely to report noticing cannabis advertisements after adjusting for other factors. This could be the result of a more active presence on social media among younger compared to older respondents. Given that the MLA to purchase cannabis in US legal states is 21 years, this finding suggests that existing regulations may be ineffective at limiting exposure to cannabis advertising among young people. It is worth noting that with the exception of Quebec, which raised the MLA for cannabis to 21 (effective Jan 2020, after our study period), the MLA in Canadian provinces is 18 or 19 years, which is lower than the MLA in US legal states. Thus, some of the youth aged 16–20 years in Canadian provinces would have been above the MLA (Canadian Centre on Substance Use and Addiction, 2019). Greater exposure to cannabis advertising among young people is concerning given the research on alcohol and tobacco indicating that advertising exposure is associated with lower risk perceptions and

Table 5

Correlates of brand recall[a], Aug 27–Oct 7, 2018 (n = 26,710).

Variable	Recalled at least one brand % (95% CI)	AOR (95% CI)	Wald χ^2	P-value
Jurisdiction			67.51	< 0.001
Canada	10.2% (9.6%, 10.8%)			
US illegal	5.9% (5.5%, 6.4%)	0.62 (0.55, 0.69)		
US legal	12.2% (11.5%, 13.0%)	0.85 (0.77, 0.94)		
Age group (years)			42.70	< 0.001
16–20 (ref)[b]	5.9% (5.2%, 6.7%)			
21–35	13.2% (12.4%, 14.0%)	1.35 (1.11, 1.64)		
36–45	10.6% (9.8%, 11.5%)	1.28 (1.04, 1.57)		
46–55	7.9% (7.2%, 8.6%)	1.03 (0.84, 1.27)		
56–65	6.8% (6.1%, 7.5%)	0.92 (0.74, 1.13)		
Sex			43.09	< 0.001
Female (ref)	7.2% (6.8%, 7.6%)			
Male	11.3% (10.7%, 11.8%)	1.35 (1.23, 1.48)		
Self-identified as visible minority			8.99	0.011
No (ref)	9.3% (8.9%, 9.7%)			
Yes	10.1% (9.2%, 11.2%)	1.08 (0.95, 1.23)		
Unstated	4.2% (3.1%, 5.7%)	0.63 (0.45, 0.89)		
Education level			87.39	< 0.001
Less than high school (ref)	6.3% (5.6%, 7.1%)			
High school diploma or equivalent	7.0% (6.4%, 7.7%)	0.90 (0.74, 1.10)		
Some college, technical training	9.8% (9.2%, 10.4%)	1.30 (1.07, 1.57)		
Bachelor's degree or higher	11.7% (11.0%, 12.5%)	1.72 (1.41, 2.10)		
Income adequacy			62.87	< 0.001
Very difficult/difficult (ref)	7.6% (7.0%, 8.2%)			
Neither difficult nor easy	9.0% (8.4%, 9.6%)	1.16 (1.03, 1.30)		
Very easy/easy	11.4% (10.8%, 12.1%)	1.47 (1.31, 1.65)		
Unstated	1.9% (1.0%, 3.1%)	0.37 (0.21, 0.67)		
Cannabis use status			964.93	< 0.001
No use in the past 12 months (ref)	5.3% (5.0%, 5.6%)			
Used in the past 12 months	10.2% (9.0%, 11.5%)	1.72 (1.47, 2.02)		
Used in the past month	20.1% (18.7%, 21.6%)	3.28 (2.91, 3.70)		
Used daily/almost daily	27.7% (25.9%, 29.5%)	5.93 (5.27, 6.68)		
Cannabis retail store access			330.95	< 0.001
> 60 min away (ref)	10.0% (8.5%, 11.7%)			
30 to 60 min away	17.3% (15.7%, 19.1%)	1.61 (1.28, 2.02)		
< 30 min away	14.3% (13.7%, 15.0%)	1.23 (0.99, 1.50)		
Don't know	3.9% (3.6%, 4.3%)	0.48 (0.39, 0.59)		

[a] Binary logistic regression model (1 = at least one brand recalled, 0 = no brands recalled).

[b] Ref = reference group.

increased use among young people (Anderson et al., 2009; Hammond and Goodman, 2018).

Overall, brand recall was higher in US legal states compared to Canada and US illegal states. The higher prevalence of brand recall in US legal states could be a result of the higher number of retail stores, as well as higher rates of cannabis use compared to Canada (Cannabis use: Substance Abuse and Mental Health Services Administration (SAMHSA), 2017; Canadian Cannabis Survey, 2018). Indeed, proximity to a retail store was strongly associated with brand recall, as was also the case for noticing advertisements, which highlights the importance of the point-of-sale as a promotional setting. After adjusting for retail proximity, cannabis use and other socio-demographic factors, respondents in Canada were more likely to recall brands than those in the US. This could be attributed to the fact that medical cannabis has been legal in Canada since 2001, and there was a well-established illicit retail market that existed in Canada prior to non-medical cannabis legalization (Cox, 2018; Mahamad and Hammond, 2019). In addition, cannabis companies received considerable media coverage prior to legalization, which may have increased brand recognition. Differences in national context also pose implications for brand awareness in Canada and the US. Since cannabis remains federally illegal in the US, the interstate transport of cannabis is illegal. This means that a brand or company seeking to market products in multiple states would be required to establish separate business structures in each state. This could limit the dominance of single brands in the US market in comparison to Canada, where cannabis is legal at the federal level. Across jurisdictions, there were low levels of recall for any one cannabis company or brand, with the top five brands being recalled at rates of < 3%. This is in stark

contrast to the well-established alcohol and tobacco markets, where popular brands are more readily identified and recalled (Siegel et al., 2013; Hanewinkel et al., 2010). Future research should examine how levels of brand recall change over time as the cannabis industry evolves, particularly considering the entry of large multinational tobacco and alcohol companies in the cannabis market (CBC, 2018).

5. Limitations

This study is subject to common limitations of survey research, including potential bias due to non-response and social desirability. Compared to in-person surveys, the online survey mode of the ICPS may provide greater anonymity and promoted more truthful reporting on sensitive topics such as cannabis use. Respondents were recruited using nonprobability-based sampling; therefore, the findings do not provide nationally representative estimates (Dodou and de Winter, 2014; Krumpal, 2013). Self-reported measures of marketing exposure are subject to recall bias. However, self-reported measures of exposure have been shown to reflect the amount of advertising permitted in a particular jurisdiction or country: individuals living in jurisdictions with greater advertising report substantially greater exposure, and self-reported exposure decreases following restrictions in the same market (Wadsworth et al., 2018; Yong et al., 2008). The data in the current study are aggregated into jurisdictions; however, there are important differences between different 'legal' states, as well as 'illegal' states and provinces. For example, at the time of the survey, no legal retail sales outlets were operating in the 'legal' states of Maine and Vermont. Future research should examine variations within different legal and

illegal states to examine potential differences. Finally, the current data are cross-sectional and some of the differences observed for legal cannabis jurisdictions may reflect pre-existing trends established prior to legalization.

6. Conclusion

Cannabis advertisement exposure is highest in jurisdictions that have legalized cannabis and among youth and young adults. Levels of brand identification remain low given that formal branding strategies for cannabis products have only recently emerged in legal markets. Ongoing surveillance of cannabis marketing practices should be an important component of the monitoring framework to assess the impact of cannabis legalization, particularly among young people.

Authors contributions statement

Jennifer Rup: Conceptualization, Formal analysis, Writing- Original draft preparation. Samantha Goodman: Investigation, Resources, Formal analysis, Writing- Reviewing and Editing. David Hammond: Conceptualization, Investigation, Supervision, Writing- Reviewing and Editing, Funding acquisition.

Acknowledgments

Declaration of competing interest

None.

References

Anderson, P., de Bruijn, A., Angus, K., Gordon, R., Hastings, G., 2009. Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies. Alcohol and alcoholism 44 (3), 229–243.

Babor, T.F., Caetano, R., Casswell, S., et al., 2010. Alcohol: No Ordinary Commodity: Research and Public Policy. https://doi.org/10.1093/acprof:oso/9780199551149.001.0001.

Bierut, T., Krauss, M.J., Sowles, S.J., Cavazos-Rehg, P.A., 2017. Exploring marijuana advertising on Weedmaps, a popular online directory. Prev. Sci. https://doi.org/10.1007/s11121-016-0702-z.

Canadian Cannabis Survey https://www.canada.ca/en/services/health/publications/drugs-health-products/canadian-cannabis-survey-2018-summary.html.

Canadian Centre on Substance Use and Addiction: Policy and regulations (Cannabis). https://www.ccsa.ca/policy-and-regulations-cannabis. Published 2019.

Cannabis in Canada. https://www.canada.ca/en/services/health/campaigns/cannabis.html. Published 2019.

Cannabis use: Substance Abuse and Mental Health Services Administration (SAMHSA). National Survey on drug use and health (NSDUH). https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHDetailedTabs2017/NSDUHDetailedTabs2017.htm#tab1-16A. Published 2017.

Cannabis Act, https://laws-lois.justice.gc.ca/eng/acts/C-24.5/.

Cavazos-Rehg, P.A., Krauss, M.J., Sowles, S.J., Murphy, G.M., Bierut, L.J., 2018. Exposure to and content of marijuana product reviews. Prev. Sci. https://doi.org/10.1007/s11121-017-0818-9.

CBC. Marlboro maker places $2.4B bet on Canadian marijuana company. https://www.cbc.ca/news/business/altria-group-marlboro-cannabis-cronos-1.4936531. Published 2018.

Cox, C., 2018. The Canadian cannabis act legalizes and regulates recreational cannabis use in 2018. Health Policy (New York). https://doi.org/10.1016/j.healthpol.2018.01.009.

Dai, H., 2017. Exposure to advertisements and marijuana use among us adolescents. Prev. Chronic Dis. https://doi.org/10.5888/pcd14.170253.

D'Amico, E.J., Miles, J.N.V., Tucker, J.S., 2015. Gateway to curiosity: medical marijuana ads and intention and use during middle school. Psychol. Addict. Behav. https://doi.org/10.1037/adb0000094.

Dodou, D., de Winter, J.C., 2014. Social desirability is the same in offline, online, and paper surveys: a meta-analysis. Comput. Hum. Behav. 36, 487–495 Jul 1.

Drug Free Kids Canada. https://www.drugfreekidscanada.org/practice-kids/. Published 2019.

Fiala, S.C., Dilley, J.A., Firth, C.L., Maher, J.E., 2018. Exposure to marijuana marketing after legalization of retail sales: Oregonians' experiences, 2015–2016. Am. J. Public Health. https://doi.org/10.2105/AJPH.2017.304136.

Government of Canada, Cannabis regulations (SOR/2018-144). Cannabis act. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2018-144/FullText.html. Published 2019.

Hammond, D., Goodman, S., 2018. Policy Approaches for Problematic Substance Use: Evidence Review.

Hammond, D., Goodman, S., Leos-Toro, C., et al., 2018. International Cannabis Policy Survey Study Wave 1 Survey (2018).

Hanewinkel, R., Isensee, B., Sargent, J.D., Morgenstern, M., 2010. Cigarette advertising and adolescent smoking. Am. J. Prev. Med. https://doi.org/10.1016/j.amepre.2009.12.036.

Krauss, M.J., Sowles, S.J., Sehi, A., et al., 2017. Marijuana advertising exposure among current marijuana users in the U.S. Drug Alcohol Depend. https://doi.org/10.1016/j.drugalcdep.2017.01.017.

Krumpal, I., 2013. Determinants of social desirability bias in sensitive surveys: a literature review. Qual. Quant. 47 (4), 2025–2047 Jun 1.

Mahamad, S., Hammond, D., 2019. Retail price and availability of illicit cannabis in Canada. Addict. Behav. https://doi.org/10.1016/j.addbeh.2018.12.001.

Pacula, R.L., Kilmer, B., Wagenaar, A.C., Chaloupka, F.J., Caulkins, J.P., 2014. Developing public health regulations for marijuana: lessons from alcohol and tobacco. Am. J. Public Health. https://doi.org/10.2105/AJPH.2013.301766.

Palali, A., Van Ours, J.C., 2015. Distance to cannabis shops and age of onset of cannabis use. Heal Econ (United Kingdom). https://doi.org/10.1002/hec.3104.

Siegel, M., Dejong, W., Naimi, T.S., et al., 2013. Brand-specific consumption of alcohol among underage youth in the United States. Alcohol. Clin. Exp. Res. https://doi.org/10.1111/acer.12084.

Statistics Canada, 2016. Census of population, statistics Canada catalogue no. 98-400-X2016242. Highest certificate, diploma or degree. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=110634&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2017&THEME=123&VID=0&VNAMEE=&VNAMEF.

Statistics Canada. Table 17-10-0005-01 population estimates on July 1st, by age and sex. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000501. Published 2017.

US Census Bureau, https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S1501&src=pt.

U.S. Department of Health, Services, Human, 2014. The Health Consequences of Smoking: 50 Years of Progress. A Report of the Surgeon General. U.S. Department of Health and Human Services, Centers for Disease. Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, Atlanta, GA. https://www.ncbi.nlm.nih.gov/books/NBK179276/pdf/Bookshelf_NBK179276.pdf.

Wadsworth, E., McNeill, A., Li, L., et al., 2018. Reported exposure to E-cigarette advertising and promotion in different regulatory environments: findings from the international tobacco control four country (ITC-4C) survey. Prev Med (Baltim). https://doi.org/10.1016/j.ypmed.2018.04.022.

Yong, H.H., Borland, R., Hammond, D., et al., 2008. Levels and correlates of awareness of tobacco promotional activities among adult smokers in Malaysia and Thailand: findings from the international tobacco control Southeast Asia (ITC-SEA) survey. Tob. Control. https://doi.org/10.1136/tc.2007.021964.