International Cannabis Policy Study

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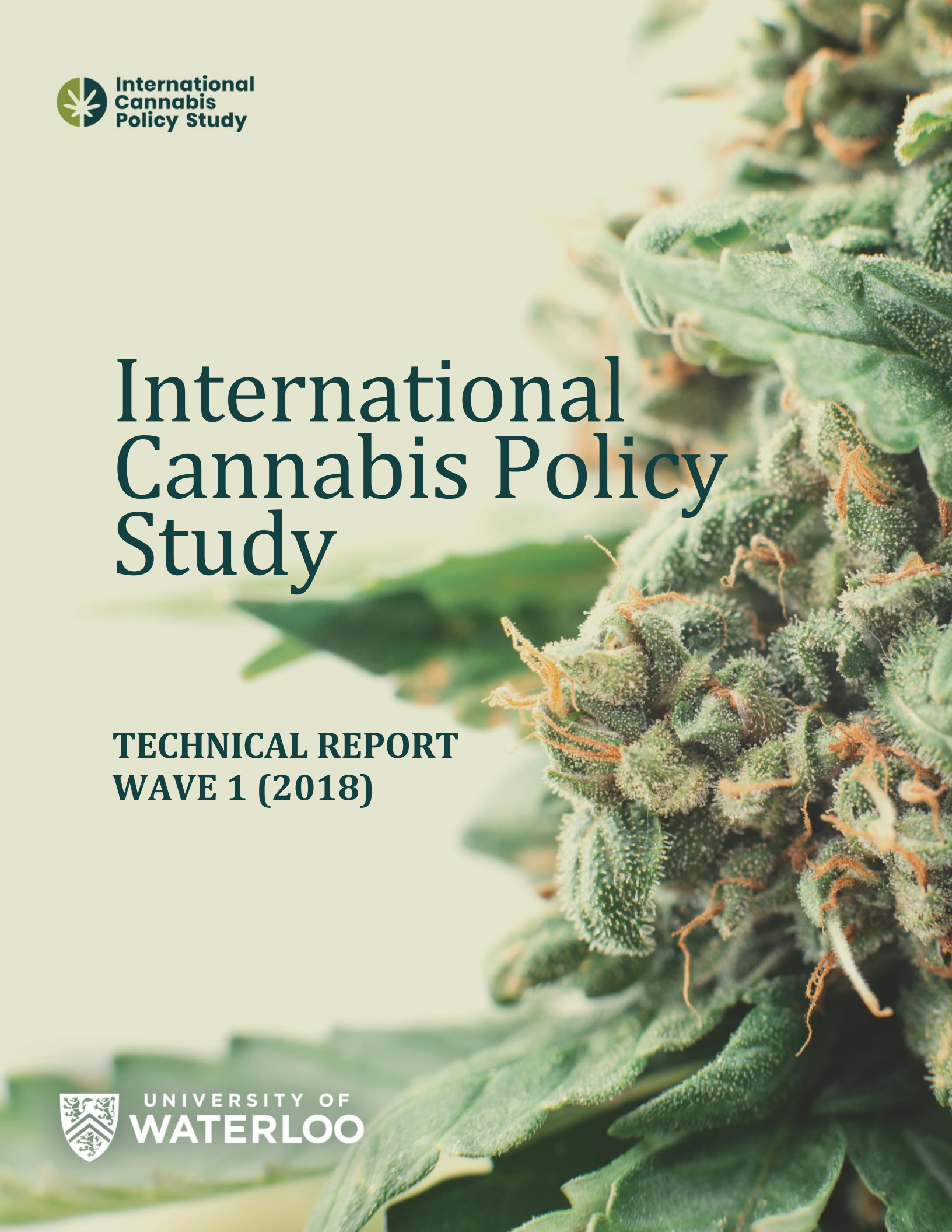
TECHNICAL REPORT
WAVE 1 (2018)



UNIVERSITY OF WATERLOO

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International Cannabis Policy Study

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INTRODUCTION

The primary objective of the International Cannabis Policy Study (ICPS) is to examine the impact of cannabis legalization. On October 17, Canada became the second country to legalize non-medical cannabis at the national level. An increasing number of US states have also legalized non-medical cannabis. The ICPS study seeks to evaluate the overall impact of legalization to examine the effectiveness of specific policy measures.

The study examined five primary research questions, including the extent to which legalization is associated with changes in:

- prevalence, consumption, and patterns of cannabis use;
- commercial retail environment, price and purchasing;
- risk behaviours, including driving after cannabis use and use in 'high risk' occupational settings;
- perceptions of risk and social norms; and
- effectiveness of specific regulatory policies, including advertising restrictions, product labelling and warnings, public education campaigns, and the use of cannabis in public spaces.

The ICPS study is a prospective cohort survey that will be conducted annually with participants aged 16–65 years living in Canada (n=10,057) and the USA (n=17,112). The survey will be repeated annually at 12-, 24- and 36-months follow-up to monitor changes over time, as well as key mediators and moderators of use, in each of three jurisdictions: Canada (all provinces); US states that have legalized non-medical cannabis (US 'legal' states) and those that have not (US 'illegal' states). Analyses will also examine changes between Canadian provinces over time to examine differences in policy implementation, particularly with respect to the retail market.

This technical report describes the methods for the first wave of the ICPS study conducted from August–October 2018.

STUDY PROTOCOL

OVERVIEW

Data were collected via a web-based survey between August 27, 2018 and October 7, 2018. Respondents completed an online survey in English or French. Median survey time was 19.9 minutes, including 22.8 minutes among 'ever' cannabis users and 16.6 minutes among 'never' cannabis users.

QUESTIONNAIRE DEVELOPMENT

Survey measures were drawn or adapted from national surveys or selected based on previous research. Development included focus groups and cognitive interviewing with youth and young adults, as well as an extensive pilot study conducted in October 2017 with 1,045 Canadians aged 16–30. Cognitive interviewing was also conducted with 10 cannabis users in January–February 2018 to evaluate and improve items tested in the pilot survey (Cannabis Purchasing and Consumption Tool, October 2017), available at: http://davidhammond.ca/wp-content/uploads/2018/07/2017-Cannabis-Purchasing-Consumption-Tool-Survey-Document.pdf.

LANGUAGE

The survey was written in English and translated to French by *Parisella, Etc. Inc.* By default, panel participants were shown the survey in their preferred language and were able to switch to French or English if desired. Overall, 2.8% of participants completed the survey in French (n=761).

SURVEY CONTENT

The survey document is available at: http://cannabisproject.ca/methods/. The survey includes models on the following content areas:

- prevalence and patterns of cannabis use
- cannabis purchasing and price
- cannabis consumption and modes of use
- commercial retail environment
- risk behaviours
- cannabis knowledge, perceptions of risk and social norms
- exposure to health warnings and public educational campaigns
- exposure to cannabis marketing and branding
- substance use and other risk behaviours
- socio-demographics, postal code, and socio-economic status

SAMPLE RECRUITMENT

SAMPLE ELIGIBILITY

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.

RECRUITMENT AND CONSENT

Respondents from Canadian provinces and US states were recruited using the *Nielsen Consumer Insights Global Panel*, which maintains panels in Canada and the US (http://www.nielsen.com/ca/en/about-us.html). The Nielsen panels are recruited using both probability and nonprobability sampling methods in each country. For the current project, Nielsen drew stratified random samples from the online panels in each country, based on known proportions in each age group. To account for differential response rates, Nielsen modified these sampling proportions to place greater weight on sub-groups with lower response rates. Comparisons between the sample profile and national estimates from benchmark population-based surveys are provided herein.

RESPONSE RATES

In total, 1,428,857 respondents were sent an email invitation to the main survey. Table 1 shows outcomes for respondents sent the email invitation, in terms of completion of the survey. Overall, 44,364 respondents accessed the survey link, of whom 6,722 (15.2%) partially completed the survey and 28,471 (64.2%) completed the survey.

As shown in Table 1, 4,059 participants terminated the survey. Reasons included 'forced' termination due ineligibility, including residence in countries other than Canada or the US (n=133), age <16 or >65 (n=550), as well as self-termination at initial screens: smartphone warning (n=423) and consent

page (n=1,679); mandatory survey questions: sex at birth (n=13), province or state (n=3), 'Have you ever tried marijuana?' (n=67), 'When was the last time you used marijuana?' (n=50), and 'How often do you use marijuana?' (n=12); because of data quality issues flagged by Nielsen (n=963); or because the respondent opted out of the commercial panel after the invitation was sent (n=166).

Participants were discouraged from attempting to complete the main survey via a mobile device, but were not restricted from doing so. The smaller screen size of smartphones can alter the way online surveys are rendered in ways that require greater 'scrolling' and smaller rendering of images in ways that may degrade data quality. Two participants who were suspected to have used a smartphone were removed from the main analytic sample due to concerns about screen size (see Table 1). It was estimated that an additional 12.7% (n=3,615) of respondents completed the survey using a tablet.

PARTICIPANT COMPENSATION

Monetary incentives have been shown to increase response rates and to decrease response bias among sub-groups commonly under-represented in surveys, including disadvantaged subgroups. Respondents from Canadian provinces and US states were provided with incentives according to Nielsen's regular remuneration structure.

DATA INTEGRITY CHECK

Due to the sensitive nature of the subject matter (cannabis was classified as an illegal substance federally in Canada and the USA at the time of the survey), at the end of the survey, respondents were asked whether they felt they were able to answer the questions honestly. The 208 respondents who selected 'no' were excluded from the analytic sample. Towards the end of the main survey, respondents were also asked to select the current month from a list. The month selected by the respondent was compared to the month the respondent completed the survey. Respondents with discrepant responses were excluded from the analytic sample, unless the selected month was within 2 days of the date the survey was submitted (e.g., survey completed on September 30 but respondent selected October). A total of 1,071 respondents were excluded from the analytic sample due to discrepancies with the month selected. The final analytic sample included 27,169 respondents.

DATA CLEANING

The survey asked respondents about their current frequency of use in two ways: as a categorical variable (less than once per month, 1+ times per month, 1+ times per week, every day/almost every day) and also as an open-ended variable where the respondent entered the number of days they use cannabis per week/month/in the past 12 months. Where large discrepancies between responses to these two variables existed (e.g., respondent selected "less than once per month" but indicated that they used cannabis on 365 days in the past 12 months), the current frequency of cannabis use was reclassified. This affected 3% (n=203) of past 12-month cannabis users. We took similar steps to rectify inconsistencies in reporting for dried herb; the total (gram and joint) amounts of 319 dried herb users (6% of past 12-month users) were marked as missing due to inconsistent reporting.

ETHICS CLEARANCE

The project has been reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE#22392).

Table 1: Dispositions of potential respondents, by country, in the International Cannabis Policy Study (ICPS) 2018

Disposition	Total		Canada		USA	
	n	%	n	%	n	%
Total invitations	1,428,857	--	821,414	--	607,443	--
Accessed survey[a]	44,364	3.1%	17,157	1.2%	24,503	1.7%
Survey terminated[a]	4,059	0.3%	1,186	0.1%	2,574	0.2%
Over quota[b]	5,112	0.4%	3,688	0.4%	1,424	0.2%
Survey partially completed	6,722	0.5%	1,637	0.2%	2,680	0.4%
Qualified completes	**28,471**	**2.0%**	**10,646**	**1.3%**	**17,825**	**2.9%**
Excluded - ineligible location[c]	5	<0.1%	5	<0.1%	0	0%
Excluded - dishonesty[d]	208	0.7%	77	0.7%	131	0.7%
Excluded - smartphone use	2	<0.1%	0	0%	2	<0.1%
Excluded - data quality[e]	1,073	3.8%	507	4.8%	566	3.2%
Excluded - DC residents[f]	14	<0.1%	0	0%	14	<0.1%
Final analytic sample	**27,169**	**1.9%**	**10,057**	**1.2%**	**17,112**	**2.8%**

[a]Because 2,571 individuals who accessed the survey did not indicate their country and 133 respondents who indicated they resided in 'other' countries were terminated, frequencies for Canada and the US do not sum to 'totals' who accessed and terminated the survey. [b]Respondents screened ineligible for exceeding the designated quota for their sub-population (i.e., age group, sex, province, or state). [c]Respondents screened ineligible due to residence outside the 10 Canadian provinces or 51 US states. The 5 respondents excluded from the main sample lived in the Canadian Territories. [d]Respondents answered 'no' to the question, "Were you able to provide 'honest' answers about your marijuana use during the survey?" [e]A total of 1,071 respondents incorrectly answered the data quality check question, "What is the current month?" Note that respondents who indicated a month ≤2 days of the correct month (i.e., respondents who completed the survey on September 30 but selected October) were retained. Two respondents from Canada who correctly answered the data quality question were also excluded: one who completed the survey twice, and one with poor-quality responses. [f]Respondents who resided in District of Columbia (n=14) were excluded as the cells were too small for weighting.

SAMPLE PROFILE

SURVEY WEIGHTS

Post-stratification sample weights were constructed based on the Canadian and US Census estimates. Respondents from Canada were classified into age-by-sex-by-province and education groups. Respondents from the US legal states were classified into age-by-sex-by-legal state, education, and region-by-race groups, while those from the illegal states were classified into age-by-sex, education, and region-by-race groups. Correspondingly grouped population count and proportion estimates were obtained from Statistics Canada[1,2] and the U.S. Census Bureau.[3,4] Separately for Canada, US legal states, and US illegal states, a raking algorithm was applied to the full analytic sample (n=27,169) to compute weights that were calibrated to these groupings. Weights were rescaled to the sample size for Canada, US legal states and US illegal states.

SAMPLE CHARACTERISTICS

The demographic characteristics of the sample are shown in Tables 2 and 3; indicators of cannabis use are displayed in Table 4.

Table 2: International Cannabis Policy Study (ICPS) 2018 sample characteristics by study condition[a] (n=27,169)

	Canada n=10,057		US 'illegal' states n=9,714		US 'legal' states n=7,398	
Characteristic	**Unweighted** % (n)	**Weighted[b]** % (n)	**Unweighted**	**Weighted[b]**	**Unweighted**	**Weighted[b]**
Sex						
Female	58.1% (5,845)	49.8% (5,012)	61.4% (5,968)	50.3% (4,887)	66.1% (4,887)	49.7% (3,677)
Male	41.9% (4,212)	50.2% (5,045)	38.6% (3,746)	49.7% (4,827)	33.9% (2,511)	50.3% (3,721)
Age (years)						
mean (SD)	45.9 (14.8)	40.6 (14.9)	41.9 (16.6)	40.0 (15.1)	45.9 (14.3)	40.0 (14.8)
Age group						
16-25	13.2% (1,325)	18.9% (1,902)	22.7% (2,209)	19.9% (1,938)	10.3% (762)	19.6% (1,448)
26-35	14.2% (1,424)	20.7% (2,087)	13.6% (1,317)	21.4% (2,080)	17.2% (1,270)	23.0% (1,702)
36-45	15.3% (1,538)	19.6% (1,969)	15.3% (1,484)	18.9% (1,840)	17.1% (1,268)	17.3% (1,279)
46-55	21.7% (2,185)	20.8% (2,088)	19.4% (1,883)	20.1% (1,956)	21.2% (1,570)	21.7% (1,608)
56-65	35.6% (3,585)	20.0% (2,011)	29.0% (2,821)	19.6% (1,900)	34.2% (2,528)	18.4% (1,361)
Visible minority						
Yes	10.3% (1,035)	12.8% (1,289)	8.5% (828)	14.0% (1,360)	7.9% (583)	12.8% (944)
No	88.1% (8,864)	84.9% (8,543)	88.6% (8,604)	81.5% (7,918)	89.3% (6,610)	82.3% (6,089)
Unstated	1.6% (158)	2.2% (225)	2.9% (282)	4.5% (436)	2.8% (205)	4.9% (366)

SD, standard deviation. [a]The 9 states that had legalized non-medical cannabis as of August 2018 were considered 'legal' states. [b]Data weighted using variable WEIGHT_RESC, which are the inflation weights scaled back to the sample size of Canada and the sample size in the legal states as a group and separately in the illegal states as a group.

Table 3: Proportion of International Cannabis Policy Study (ICPS) 2018 respondents by province or state of residence[a] (n=27,169)

Jurisdiction	Unweighted % (n)	Weighted[b] % (n)
Canada (n=10,057)		
British Columbia	9.4% (947)	13.2% (1,329)
Alberta	9.3% (931)	12.0% (1,209)
Saskatchewan	8.5% (858)	3.1% (312)
Manitoba	9.2% (923)	3.6% (360)
Ontario	27.0% (2,713)	39.0% (3,926)
Quebec	9.8% (984)	22.6% (2,272)
New Brunswick	8.7% (871)	2.0% (204)
Nova Scotia	9.1% (913)	2.6% (260)
Prince Edward Island	2.1% (212)	0.4% (41)
Newfoundland & Labrador	7.0% (705)	1.4% (144)
USA (n=17,112)		
Alaska	0.9% (155)	0.5% (80)
California	6.9% (1,180)	24.7% (4,230)
Colorado	6.8% (1,165)	3.5% (605)
Maine	2.8% (486)	0.8% (139)
Massachusetts	6.7% (1,143)	4.3% (741)
Nevada	5.0% (850)	1.8% (315)
Oregon	6.1% (1,041)	2.5% (435)
Vermont	1.3% (221)	0.4% (66)
Washington State	6.8% (1,157)	4.6% (787)
'Illegal' states	56.7% (9,714)	56.8% (9,714)

[a] US states (51) were classified as 'legal' (9) or 'illegal' (41), based on the legal status of recreational cannabis at the time of the study (August 2018). The 9 US 'legal' states were oversampled compared to US 'illegal' states to ensure sufficient representation; Ontario was also oversampled. [b]Data are weighted to the national population using the variable WEIGHT_RESC, which are the inflation weights scaled back to the sample size of Canada, US legal states as a group, and US illegal states as a group. Note that using the variable WEIGHT_RESC_REGION would provide identical sample sizes (%, n) for unweighted and weighted data.

Table 4: Indicators of cannabis use among International Cannabis Policy Study (ICPS) 2018 respondents by condition, weighted (n=27,169)

Indicator	Total sample (n=27,169)			Past 12-month cannabis users (n=7,608)		
% (n)	Canada (n=10,057)	US 'illegal' state (n=9,714)	US 'legal' state (n=7,398)	Canada (n=2,768)	US 'illegal' state (n=2,308)	US 'legal' state (n=2,532)
Ever tried cannabis						
Yes	56.5% (5,682)	54.6% (5,308)	61.5% (4,549)	100% (2,768)	100% (2,308)	100% (2,532)
Cannabis use status						
Never user	43.5% (4,375)	45.4% (4,406)	38.5% (2,849)	--	--	--
Used >12 months ago	29.0% (2,914)	30.9% (3,000)	27.3% (2,017)	--	--	--
Past 12-month user	8.6% (863)	7.0% (676)	9.4% (693)	31.2% (863)	29.3% (676)	27.4% (693)
At least monthly user	4.9% (491)	5.2% (507)	6.8% (500)	17.7% (491)	22.0% (507)	19.8% (500)
At least weekly user	5.2% (522)	4.1% (403)	6.8% (505)	18.8% (522)	17.4% (403)	19.9% (505)
Daily/almost daily user	8.9% (893)	7.4% (722)	11.3% (834)	32.2% (893)	31.3% (722)	32.9% (834)

SD, standard deviation

SAMPLE COMPARISON

The weighted International Cannabis Policy Study sample was compared with national Canadian and US estimates (see Tables 5–12).

Socio-demographic factors

The Canadian sample aligned quite well with national estimates for education, on which the sample was weighted. In the US sample, the proportion of respondents with a bachelor's degree or higher aligned with national estimates; however, considerably more respondents had a college or associate's degree and fewer had a high school education or less. The proportions of individuals identifying as 'White/Caucasian' (Canada and US) and 'Black or African American' (US) corresponded closely with those of national surveys. In both countries, the proportions of other ethnicities were within 3% of national estimates. The ICPS sample had poorer self-reported general health compared to the national populations in both countries, which is a feature of many non-probability samples,[5] and may be partly due to the use of web surveys, which provide greater perceived anonymity than the in-person or telephone-assisted interviews often used in national surveys.[6]

Cannabis use

In terms of cannabis use in Canada, ICPS estimates for lifetime, monthly, and daily cannabis use in Canada were between the range of estimates from Canada's two national surveys, the Canadian Cannabis Survey, and the National Cannabis Survey (NCS), although much closer to the NCS estimates for comparable age ranges. Mean age of first trying cannabis ('age of initiation', 19.3 years) was close to national estimates (18.6–18.9 years).

Estimates of prevalence for modes of cannabis use that were directly comparable to those measured in national surveys (e.g., dried flower, hash, edibles, concentrates) aligned quite well with national estimates, and any differences were likely due to differences in response options.

In the US, prevalence estimates for cannabis use were higher than those reported by the National Survey on Drug Use and Health (NSDUH). Reasons for the higher estimates in the ICPS may be due to sampling or differences in survey modes: whereas the NSDUH is a household survey completed with in-person interviews, the ICPS is conducted online, which provides greater anonymity and promotes more truthful reporting for sensitive topics such as substance use.[7,8] It should also be noted that the different national surveys also provide different prevalence estimates for cannabis and other substance uses. For example, the National Health and Nutrition Examination Survey (NHANES) provides estimates 20-30% higher than NSDUH, similar to the current study. Therefore, while the ICPS estimates of cannabis use are higher than those of NSDUH, they are within the range of variability across benchmark surveys.

In the USA, proportions of lifetime, past 12-month and past 30-day cannabis use were higher than reported in national surveys. This is likely due to the fact that the ICPS sampled individuals aged 16–65 years whereas the national surveys had no upper age limit, and thus included older adults who may have had lower rates of cannabis use. When examining study conditions, ICPS (2018) estimates for 18-25-year-olds from 'illegal' states aligned more closely with national estimates from 2017 than did those from 'legal' states. This may reflect a change in cannabis use trends among young people from 2017 to 2018 in states that have recently legalized cannabis (this is also indicated in Table 11, which shows the ICPS (2018) cannabis use prevalence estimates in the 9 'legal' states compared to a national survey conducted in 2016-2017).

Use of other substances

Overall past 12-month alcohol use aligned with national estimates in all three jurisdictions. In Canada, past 30-day and lifetime tobacco cigarette use were about 4-7% higher than national estimates, whereas e-cigarette use was similar to national estimates. In the US, cigarette use was lower than national estimates, with the exception of past 30-day use among young people aged 18-25 years. This is likely due to differences in question wording: while NSDUH asked explicitly about cigarette use ('Have you ever smoked all or part of a cigarette?'), lifetime cigarette use in the ICPS was based on the question, 'Have you ever used any of the following drugs?' (followed by a list of drugs, including 'tobacco cigarettes'). ICPS respondents may therefore have failed to report cigarette use if they had not used other drugs on the list.

SAMPLE COMPARISON TABLES: CANADA

Table 5: Education and ethnicity among respondents from Canada from the International Cannabis Policy Study (ICPS) 2018 and national surveys

	Census 2016[a], age ≥15 **%**	**ICPS 2018, Canada, age 16-65** (n=10,057) **Unweighted % (n)**	**Weighted[d] % (n)**
Education (age 15+)			
Less than high school	18.3%	8.7% (873)	15.6% (1,552)
High school diploma or equivalent	26.5%	15.5% (1,548)	26.8% (2,671)
Some college or technical training	32.0%	42.7% (4,268)	32.7% (3,264)
Bachelor's degree or higher	23.3%	33.1% (3,309)	24.9% (2,489)
	CCHS 2015[b], age ≥12 (n=20,176) **%**	**ICPS 2018, Canada, age 16-65** (n=10,057) **Unweighted % (n)**	**Weighted[d] % (n)**
Ethnicity			
White only	77.0%	81.5% (8,195)	77.3% (7,776)
Chinese only	3.3%	4.5% (453)	6.0% (604)
South Asian only	3.4%	2.2% (224)	3.1% (312)
Black only	2.0%	1.2% (118)	1.6% (161)
Indigenous inclusive	4.7%	4.1% (411)	3.8% (379)
Mixed/other/unstated/missing	9.6%	6.5% (656)	8.2% (825)
	CCHS 2017[c], age ≥12 (n=65,000) **(reporting ages 18-64 only) % (n)**	**ICPS 2018, Canada, age 16-65** (n=10,057) **Unweighted % (n)**	**Weighted[d] % (n)**
Perceived health			
Excellent or Very good			
18-34	70.9% (5,794,800)	50.5% (1,003)	47.9% (1,269)
35-49	64.1% (4,555,900)	48.2% (1,174)	46.5% (1,330)
50-64	54.2% (4,089,700)	43.5% (2,045)	39.3% (1,285)
Fair or Poor			
18-34	6.1% (496,600)	14.4% (286)	15.3% (406)
35-49	8.0% (568.200)	15.1% (368)	16.6% (475)
50-64	14.9% (1,128,500)	20.1% (946)	22.2% (724)

[a]Data obtained from the Canada Census 2016; [b]data obtained from the 2015 Canadian Community Health Survey (CCHS); [c]data obtained from the 2017 Canadian Community Health Survey (CCHS). [d]Data weighted using the variable WEIGHT_RESC, which are the inflation weights scaled back to the sample size of Canada. Sources: Education: Statistics Canada. Census 2016 – Education Highlight Tables: Highest level of educational attainment (general), age groups 15 years and over, both sexes, 2016. Available at: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/edu-sco/Table.cfm?Lang=E&T=11&Geo=00&SP=1&view=2&age=1&sex=1. Ethnicity: Statistics Canada. 2015 Canadian Community Health Survey (CCHS): Ethnic origin, 2015.

http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3226. Perceived health: Statistics Canada. Canadian Community Health Survey (CCHS) 2017 Annual Component. Table 13-10-0096-02 Perceived health, by age group. Available at: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310009602

Table 6: Cannabis and alcohol use among respondents from Canada from the International Cannabis Policy Study (ICPS) 2018 and national surveys

	CCS 2018[a], age ≥16 (n=12,958) % (95% CI)	CTADS 2017[b], age ≥15 (n=16,349) % (95% CI)	NCS 2018[c], age ≥15 (n=5,798) % (95% CI)	ICPS 2018, Canada, age 16-65 (n=10,057) Unweighted % (n)	Weighted[d] % (n)
Cannabis use (full sample)					
Lifetime (ever) use	58.8% (57.9-59.7)	46.6% (44.3-48.8)	--	58.2% (5,852)	56.5% (5,682)
Past 12-month use	21.9% (21.1-22.6)	14.8% (13.2-16.4)	--	24.0% (2,413)	27.5% (2,768)
Age 16-19 (CTADS: 15-19)	36.5% (32.1-41.1)	19.4% (17.4-21.4)	--	27.1% (209)	25.9% (363)
Age 20-24	43.8% (40.3-47.3)	33.2% (30.3-36.2)	--	40.1% (174)	40.5% (161)
Age ≥25 (ICPS: 25-65)	18.9% (18.2-19.7)	12.7% (10.9-14.6)	--	22.9% (2,030)	27.2% (2,244)
Past 30-day use	15.0% (14.3-15.6)	--	--	15.9% (1,597)	18.7% (1,881)
Age 16-19	23.0% (19.3-27.2)	--	--	15.7% (121)	15.1% (211)
Age 20-24	30.1% (26.9-33.5)	--	--	15.9% (1,597)	18.7% (1,881)
Age ≥25 (ICPS: 25-65)	13.1% (12.5-13.7)	--	--	15.4% (1,363)	19.0% (1,568)
Cannabis use (past 12-month users)					
Past 3-month use	--	75%	--	78.4% (1,891)	79.2% (2,190)
Age 16-24 (NCS: 15-24)			27.0% (20-7-34.4)	23.6% (284)	21.2% (382)
Frequency of cannabis use					
Age 16-24 (NCS: 15-24)					
Daily/almost daily use	--	32%	8.3%	8.0% (96)	6.7% (121)
Age 25-44					
Monthly use			14.7%	15.5% (1,563)	18.9% (1,906)
Weekly use			12.3%	11.5% (1,156)	14.1% (1,415)
Daily/almost daily use			9.1%	7.4% (749)	8.9% (893)
Initiation to cannabis use					
Mean age (years)	18.9 (18.7-19.1)	18.6 (18.1-19.1)	--	19.8 (SD=8.6)	19.3 (SD=7.9)
Mode of cannabis used in past 12 months (past 12-month users)					
Dried flower/leaf	81.9% (80.3-83.5)	--	--	78.5% (1,894)	80.7% (2,232)
Hash/kief	26.0% (24.2-27.8)	--	--	22.3% (537)	25.0% (693)

Solid concentrates	18.7% (17.2-20.4)	--	--	14.8% (357)	16.8% (464)
Edibles	41.1% (39.1-43.2)	38%[e]		42.0% (1,014)	37.6% (1,039)
Liquids/beverages	4.3% (3.5-5.3)	--	--	7.0% (169)	8.1% (224)
Alcohol use					
Past 12-month use	--	78.2% (76.5-79.9)	--	82.5% (8,101)	80.6% (7,836)
Smoking status					
Tobacco cigarettes					
Lifetime use	--	40.8%	--	50.7% (5,103)	47.3% (4,759)
Past 30-day use	--	15.3% (13.8-16.8)	--	17.8% (1,782)	19.5% (1,947)
E-cigarettes					
Lifetime use	--	15.4%	--	13.5% (1,353)	15.6% (1,571)
Past 30-day use	--	2.9% (2.3-3.5)	--	4.7% (467)	5.5% (554)

[a]Data obtained from the 2018 Canadian Cannabis Survey (CCS) in which cannabis users may have been more likely to complete the study compared to other surveys such as CSTADS; [b]data obtained from the 2017 Canadian Tobacco, Alcohol and Drugs Survey (CTADS); [c]data obtained from the National Cannabis Survey (NCS), third quarter 2018. Note that estimates for frequency of use are to be used with caution; [d]Data weighted using inflation weights scaled back to the sample size of Canada. [e]Because CTADS categorized methods of cannabis use in a different manner (smoking, vaporizing, chasing, mixing with tobacco, consuming edibles), only edibles (which correspond directly) have been reported here. Sources: Cannabis use and Mode of use: Canadian Cannabis Survey, 2018 Summary. Available at: https://www.canada.ca/en/services/health/publications/drugs-health-products/canadian-cannabis-survey-2018-summary.html as well as 2018 Canadian Cannabis Survey (CCS) Detailed Tables (requested from Health Canada, 2019). Cannabis use: Government of Canada. Canadian Tobacco, Alcohol and Drugs Survey (CTADS): summary of results for 2017. Available at: https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey/2017-summary.html. Cannabis use, age of initiation, and alcohol use: CTADS 2017. Available at: https://www.canada.ca/en/health-canada/services/canadian-student-tobacco-alcohol-drugs-survey/2016-2017-supplementary-tables.html and https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey/2017-summary/2017-detailed-tables.html#t17. Frequency of cannabis use: Statistics Canada. National Cannabis Survey, third quarter 2018. *The Daily*, 11 October 2018. Available at: https://www150.statcan.gc.ca/n1/daily-quotidien/181011/dq181011b-eng.htm Smoking status: CTADS 2017. Available at: https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey/2017-summary/2017-detailed-tables.html#t9

SAMPLE COMPARISON TABLES: UNITED STATES

Table 7: Education among US respondents from the International Cannabis Policy Study (ICPS) 2018 and national surveys

	CPS 2017[a], age 18-64	ICPS 2018 US total age 18-65, weighted[b] (n=14,716)[c]	ICPS 2018 'illegal' states age 18-65 (n=8,281)		ICPS 2018 'legal states' age 18-65 (n=6,562)	
Education	**%**	**% (n)**	**Unweighted % (n)**	**Weighted[d] % (n)**	**Unweighted % (n)**	**Weighted[d] % (n)**
9th grade or lower	4.3%	0.4% (64)	1.1% (106)	0.4% (36)	0.4% (32)	0.4% (29)
10th grade	1.6%	0.6% (86)	5.9% (572)	0.6% (54)	1.4% (104)	0.3% (23)
11th grade or 12th grade, no diploma	4.4%	1.9% (278)	10.0% (968)	1.9% (158)	3.0% (222)	1.8% (119)
High school graduate	28.1%	20.6% (3,032)	16.2% (1,567)	21.7% (1,795)	13.6% (1,003)	16.9% (1,108)
Associate's degree or some college, no degree	29.7%	45.0% (6,618)	30.1% (2,925)	44.4% (3,675)	34.8% (2,567)	47.1% (3,090)
Bachelor's degree or more	31.9%	31.5% (4,638)	36.6% (3,551)	31.0% (2,565)	46.8% (3,456)	33.4% (2,192)

[a]Data obtained from the 2017 Current Population Survey (CPS). [b]National data weighted using WEIGHT_INFL_US_NATIONAL, which are the inflation weights scaled back to the US sample size as a whole. [c]Sample sizes exclude those with missing data. [d] Illegal and legal state data weighted using variable WEIGHT_RESC, which are the inflation weights scaled back to the sample size in the legal states as a group and separately in the illegal states as a group. Source: CPS: Annual Social and Economic Supplement, 2017. Available at: https://www2.census.gov/programs-surveys/demo/tables/educational-attainment/2017/cps-detailed-tables/table-1-1.xlsx.

Table 8: Perceived health among US respondents from the International Cannabis Policy Study (ICPS) 2018 and national surveys

	NHIS 2017[a], age ≥18, age-adjusted (n= ~33,000,000)	ICPS 2018 US total age 18-64, weighted[b] (n=14,693)[c]	ICPS 2018 'illegal' states age 18-65 (n=8,266)		ICPS 2018 'legal states' age 18-65 (n=6,558)	
	% (SE)	**% (n)**	**Unweighted % (n)**	**Weighted[d] % (n)**	**Unweighted % (n)**	**Weighted[d] % (n)**
Perceived health						
Excellent/Very good	61.9% (0.42)	44.7% (6,573)	51.2% (4,960)	43.9% (3,631)	50.9% (3,754)	47.6% (3,119)
Good	26.2% (0.36)	34.9% (5,134)	31.7% (3,073)	35.3% (2,918)	32.7% (2,411)	33.% (2,211)
Fair/Poor	11.9% (0.26)	20.3% (2,985)	17.1% (1,659)	20.8% (1,717)	16.5% (1,216)	18.7% (1,228)

[a]Data obtained from the National Health Interview Survey, 2017. [b]National data weighted using WEIGHT_INFL_US_NATIONAL, which are the inflation weights scaled back to the US sample size as a whole. [c]Sample sizes exclude those with missing data. [d] Illegal and legal state data weighted using variable WEIGHT_RESC, which are the inflation weights scaled back to the sample size in the legal states as a group and separately in the illegal states as a group. Source: Blackwell DL, Villarroel MA. Tables of Summary Health Statistics for U.S. Adults: 2017 National Health Interview Survey. National Center for Health Statistics. Table A-11a. Age-adjusted percent distribution (with standard errors) of respondent-assessed health status among adults aged 18 and over, by selected characteristics: United States, 2017. https://ftp.cdc.gov/pub/Health_Statistics/NCHS/NHIS/SHS/2017_SHS_Table_A-11.pdf

Table 9: Ethnicity among US respondents from the International Cannabis Policy Study (ICPS) 2018 and national surveys

	CPS 2018[a] age 18-64	CPS 2016[b] Age 15-64	ICPS 2018 US total age 18-65, weighted[c] (n=14,754)	ICPS 2018 'illegal' states age 18-65 (n=8,299)		ICPS 2018 'legal states' age 18-65 (n=6,589)	
Ethnicity	**%**	**%**	**% (n)**	**Unweighted % (n)**	**Weighted[d] % (n)**	**Unweighted % (n)**	**Weighted[d] % (n)**
American Indian or Alaskan Native	1.2%	--	0.8% (125)	0.5% (50)	0.6% (50)	1.0% (73)	1.7% (113)
Asian	6.6%	--	3.8% (556)	2.2% (216)	2.5% (206)	5.2% (385)	8.2% (541)
Black or African American	13.5%	--	13.3% (1,963)	7.4% (717)	15.4% (1,275)	2.9% (216)	6.2% (407)
Native Hawaiian or Pacific Islander	0.4%	--	0.2% (29)	0.1% (12)	0.1% (11)	0.3% (19)	0.4% (27)
White	76.3%		77.0% (11,361)	85.4% (8,301)	77.1% (6,399)	85.3% (6,304)	76.7% (5,049)
Other/≥2 races/unstated	2.0%	--	4.9% (720)	4.3% (418)	4.3% (358)	5.4% (401)	6.9% (451)
Hispanic origin							
16-65[b]	20.0%	8.1% (1,191)	5.6% (449)	6.9% (567)	6.3% (443)	12.4% (567)	

[a]Data obtained from the 2018 Current Population Survey (CPS); [b]CPS estimate for Hispanic origin based on age 15-64 whereas ICPS based on 16-65; [c]National data weighted using inflation weights scaled back to the US sample size as a whole; [d]Illegal and legal state data weighted using inflation weights scaled back to the sample size in the legal states as a group and separately in the illegal states as a group. Sources: Ethnicity: US Census Bureau. CPS: Annual Social and Economic Supplement, 2018. Available at: https://www.census.gov/cps/data/cpstablecreator.html?#. Hispanic origin: US Census Bureau. US Current Population Survey: Table 1. Population by Age, Sex, and Race: 2018. Available at: https://www.census.gov/data/tables/2018/demo/hispanic-origin/2018-cps.html

Table 10: Cannabis use among US respondents from the International Cannabis Policy Study (ICPS) 2018 and national surveys

	NSDUH 2018[a] age 18-64 (n=67,791)	ICPS 2018 US total age 18-65, weighted[b] (n=14,754)	ICPS 2018 'illegal' states age 18-65 (n=8,299)		ICPS 2018 'legal states' age 18-65 (n=6,589)	
Cannabis use	**%**	**% (n)**	**Unweighted % (n)**	**Weighted[c] % (n)**	**Unweighted % (n)**	**Weighted[c] % (n)**
Ever (lifetime) use	53.1%	60.2% (8,884)	57.9% (4,660)	58.9% (4,886)	67.2% (4,778)	64.9% (4,273)
Age 18-25	51.5%	49.8% (518)	47.4% (260)	51.1% (267)	57.1% (268)	51.6% (330)
Age 26-64	53.4%	60.8% (8,103)	58.4% (4,187)	59.4% (4,483)	67.8% (4,280)	65.9% (3,824)
Past 12-month use	19.4%	26.2% (3,864)	20.6% (1,997)	23.7% (1,966)	31.7% (2,344)	34.8% (2,294)
Age 18-25	34.8%	37.1% (387)	33.8% (185)	35.6% (186)	42.2% (198)	40.5% (258)
Age 26-64	16.2%	25.7% (3,421)	19.2% (1,378)	23.2% (1,755)	31.4% (1,982)	34.4% (1,993)
Past 30-day use	12.5%	16.9% (2,492)	12.1% (1,172)	15.0% (1,246)	21.1% (1,564)	23.4% (1,542)
Age 18-25	22.1%	21.3% (221)	19.0% (104)	21.0% (110)	26.0% (122)	21.7% (139)
Age 26-64	10.5%	16.7% (2,227)	12.0% (861)	14.8% (1,117)	21.2% (1,336)	23.6% (1,367)

[a]Data obtained from the 2018 National Survey on Drug Use and Health (NSDUH); [b]National data weighted using inflation weights scaled back to the US sample size as a whole. [c]Illegal and legal state data weighted using inflation weights scaled back to the sample size in the legal states as a group and separately in the illegal states as a group. Source: Cannabis use: Substance Abuse and Mental Health Services Administration (SAMHSA). NSDUH 2018. Available at: https://www.samhsa.gov/data/nsduh/reports-detailed-tables-2018-NSDUH

Table 11. Cannabis use among US respondents from the International Cannabis Policy Study (ICPS) 2018 and national estimates, by 'legal' state[a]

	NSDUH 2016-2017[b] age ≥18		ICPS 2018 'legal' states, weighted[c] age 18-65	
State	**Past-year cannabis use % (n)**	**Past-month cannabis use % (n)**	**Past-year cannabis use % (n)**	**Past-month cannabis use % (n)**
Alaska				
18-25	39.4% (30,000)	26.3% (20,000)	--	--
≥18	23.4% (123,000)	16.6% (87,000)	40.9% (60)	26.2% (39)
California				
18-25	36.5% (1,579,000)	24.1% (1,041,000)	41.6% (39)	18.6% (17)
≥18	17.8% (5,309,000	11.8% (3,513,000)	32.5% (327)	20.7% (208)
Colorado				
18-25	48.8% (289,000)	31.7% (188,000)	42.0% (40)	28.0% (27)
≥18	25.7% (1,083,000)	17.2% (725,000)	38.8% (420)	27.7% (299)
Maine				
18-25	45.7% (57,000)	34.4% (43,000)	50.2% (22)	41.0% (18)
≥18	22.5% (239,000)	16.3% (174,000)	39.6% (184)	29.9% (139)
Massachusetts				
18-25	44.9% (356,000)	30.3% (240,000)	36.3% (53)	17.9% (26)
≥18	20.3% (1,093,000)	13.8% (743,000)	34.7% (375)	23.1% (249)
Nevada				
18-25	35.8% (102,000)	25.9% (74,000)	45.4% (31)	24.0% (17)
≥18	17.1% (384,000)	12.1% (272,000)	38.1% (310)	27.0% (220)
Oregon				
18-25	47.6% (199,000)	33.2% (139,000)	42.1% (42)	29.1% (29)
≥18	27.4% (879,000)	20.0% (643,000)	39.7% (394)	30.3% (301)
Vermont				
18-25	50.1% (37,000)	38.8% (29,000)	33.6% (10)	33.6% (10)
≥18	24.3% (122,000)	19.3% (97,000)	36.0% (78)	27.3% (59)
Washington				
18-25	42.1% (312,000)	26.5% (196,000)	37.9% (35)	28.0% (26)
≥18	23.2% (1,298,000)	15.9% (890,000)	37.4% (405)	26.6% (288)

Dashed lines indicate cell size too small to generate a comparison (n<10).

[a]'Legal' states are those that had legalized non-medical cannabis as of Aug 2018. [b]Data obtained from the 2016-2017 National Survey on Drug Use and Health (NSDUH). [c]Legal state data weighted using variable WEIGHT_RESC_REGION, which are the US inflation weights scaled back to the sample size of each legal state. Source: 2016-2017 NSDUH State-Specific Tables. Available at: https://www.samhsa.gov/data/report/2016-2017-nsduh-state-specific-tables

Table 12: Alcohol and cigarette use among US respondents from the International Cannabis Policy Study (ICPS) 2018 and national surveys

	NSDUH 2018[a] age 18-64 (n=67,791)	ICPS 2018 US total age 18-65, weighted[b] (n=14,754)	ICPS 2018 'illegal' states age 18-65 (n=8,299)		ICPS 2018 'legal' states age 18-65 (n=6,589)	
Other substance use	**%**	**% (n)**	**Unweighted % (n)**	**Weighted[c] % (n)**	**Unweighted % (n)**	**Weighted[c] % (n)**
Alcohol use		(n=14,197)		(n=7,979)		(n=6,357)
Past 12-month use	73.5%	72.5% (10,299)	72.4% (5,665)	72.0% (5,749)	78.3% (5,438)	74.3% (4,721)
Age 18-25	73.1%	67.9% (652)	67.2% (346)	68.3% (325)	73.2% (330)	67.1% (407)
Age 26-64	73.6%	73.2% (9,406)	73.1% (5,103)	72.6% (5,285)	78.7% (4,861)	75.3% (4,219)
Tobacco cigarettes						
Lifetime	60.2%	47.5% (7,013)	47.6% (3,830)	48.0% (3,985)	46.2% (3,280)	45.9% (3,023)
Age 18-25	45.9%	24.6% (256)	25.2% (138)	25.3% (133)	26.4% (124)	22.9% (146)
Age 26-64	63.1%	49.1% (6,537)	49.0% (3,511)	49.3% (3,724)	47.4% (2,994)	48.1% (2,791)
Past 12-month use	25.7%	23.7% (3,496)	21.3% (1,714)	24.0% (1,990)	18.4% (1,305)	22.8% (1,497)
Age 18-25	27.9%	15.4% (160)	14.1% (77)	15.2% (79)	18.6 % (87)	15.7% (100)
Age 26-64	25.2%	24.5% (3,253)	21.9% (1,569)	24.7% (1,861)	18.8% (1,182)	23.7% (1,367)
Past month	21.1%	20.0% (2,949)	18.2% (1,465)	20.3% (1,685)	15.4% (1,091)	18.9% (1,243)
Age 18-25	19.1%	8.6% (90)	7.5% (41)	8.3% (43)	11.5% (54)	9.7% (62)
Age 26-64	21.4%	20.8% (2,778)	19.0% (1,359)	21.1% (1,594)	15.9% (1,004)	19.9% (1,152)

[a]Data obtained from the 2018 National Survey on Drug Use and Health (NSDUH); [b]National data weighted using inflation weights scaled back to the US sample size as a whole. [c]Illegal and legal state data weighted using inflation weights scaled back to the sample size in the legal states as a group and separately in the illegal states as a group. Sources: Alcohol and cigarette use: Substance Abuse and Mental Health Services Administration (SAMHSA). National Survey on Drug Use and Health (NSDUH), 2018. Available at: https://www.samhsa.gov/data/nsduh/reports-detailed-tables-2018-NSDUH

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