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**WORLD
2020 DRUG
REPORT**

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Comments on the report are welcome and can be sent to:

Division for Policy Analysis and Public Affairs
United Nations Office on Drugs and Crime
PO Box 500
1400 Vienna
Austria
Tel: (+43) 1 26060 0
Fax: (+43) 1 26060 5827

E-mail: wdr@un.org

Website: www.unodc.org/wdr2020

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Content overview

Chloé Carpentier
Angela Me

Administrative support

Andrada-Maria Filip
Iulia Lazar

Analysis and drafting

Kamran Niaz

Editing

Jonathan Gibbons

Graphic design and production

Anja Korenblik
Suzanne Kunnen
Kristina Kuttinig
Federica Martinelli

Review and comments

The *World Drug Report 2020* benefited from the expertise of and invaluable contributions from UNODC colleagues in all divisions.

The Research and Trend Analysis Branch acknowledges the invaluable contributions and advice provided by the *World Drug Report* Scientific Advisory Committee:

Jonathan Caulkins

Paul Griffiths

Marya Hynes

Vicknasingam B. Kasinather

Charles Parry

Afarin Rahimi-Movaghar

Peter Reuter

Alison Ritter

Francisco Thoumi

EXPLANATORY NOTES

The designations employed and the presentation of the material in the World Drug Report do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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Since there is some scientific and legal ambiguity about the distinctions between “drug use”, “drug misuse” and “drug abuse”, the neutral term “drug use” is used in the World Drug Report. The term “misuse” is used only to denote the non-medical use of prescription drugs.

All uses of the word “drug” and the term “drug use” in the World Drug Report refer to substances controlled under the international drug control conventions, and their non-medical use.

All analysis contained in the World Drug Report is based on the official data submitted by Member States to the UNODC through the annual report questionnaire unless indicated otherwise.

The data on population used in the World Drug Report are taken from: World Population Prospects: The 2019 Revision (United Nations, Department of Economic and Social Affairs, Population Division).

References to dollars (\$) are to United States dollars, unless otherwise stated.

References to tons are to metric tons, unless otherwise stated.

The following abbreviations have been used in the present booklet:

alpha-PVP	<i>alpha</i> -pyrrolidinovalerophenone
APAAN	<i>alpha</i> -phenylacetoacetonitrile
ATS	amphetamine-type stimulants
CBD	cannabidiol
DEA	Drug Enforcement Administration
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
Europol	European Union Agency for Law Enforcement Cooperation
GDP	gross domestic product
INCB	International Narcotics Control Board
INTERPOL	International Criminal Police Organization
LSD	lysergic acid diethylamide
MAPA	methyl <i>alpha</i> -phenylacetoacetate
MDA	methylenedioxyamphetamine
MDMA	3,4-methylenedioxymethamphetamine
MDPV	methylenedioxypropylvalerone
4-MEC	4-methylethcathinone
3-MMC	3-methylmethcathinone
4-MMC	4-methylmethcathinone
NPS	new psychoactive substances
PCP	phencyclidine
P-2-P	1-phenyl-2-propanone
PMK	piperonyl methyl ketone
S-DDD	defined daily doses for statistical purposes
THC	Δ -9 – tetrahydrocannabinol
UNODC	United Nations Office on Drugs and Crime

DEVELOPMENTS IN JURISDICTIONS WITH MEASURES REGULATING THE NON-MEDICAL USE OF CANNABIS

As at December 2019, legal provisions had been approved in Canada, Uruguay and in 11 jurisdictions in the United States, including the District of Columbia and the Northern Mariana Islands, to allow the production and sale of cannabis products for non-medical use. The common feature of the legislation in Canada and in the jurisdictions in the United States is that most of them allow for-profit industry to produce and sell cannabis products for non-medical use. There are some differences in the level of regulation, its implementation and the control of the non-medical use of cannabis (see tables 3, 4 and 5 for details on cannabis regulations in each jurisdiction in Canada, the United States and Uruguay). Moreover, those regulations are implemented in different local contexts and influenced by different dynamics, which is likely to have a different impact on the development of cannabis markets within each jurisdiction, on the extent of the non-medical use of cannabis and on other indicators relating to public health and safety and criminal justice. It may take years of regular monitoring of different indicators to fully assess the outcome and impact of the legislation. The sections below therefore do not represent an attempt to assess the impact of cannabis legalization, but rather to describe the outcome of one year of implementation of different features of the legislation, the status of legislation and the regulation of the non-medical use of cannabis in Canada, as well as the developments in Uruguay and selected jurisdictions in the United States.

Legalization of the non-medical use of cannabis in Canada

In 2018, the Government of Canada passed the Cannabis Act, which permits the commercial production and sale of cannabis products for non-medical use by people aged 18 and older. The new legislation and its supporting regulations came into effect on 17 October 2018, although the use

of cannabis products for medical purposes had already been allowed in Canada as early as 1999. The objectives of the current cannabis legislation in Canada are to keep cannabis away from young people (under 18 years of age), to prevent criminals from profiting from the distribution and sale of cannabis and to safeguard public health and safety by allowing adults (aged 18 and older) legal access to cannabis.³²² Under the constitutional division of powers in Canada, the federal Government and provincial governments have different responsibilities.³²³ As the provinces historically developed their own systems to regulate the sale of alcohol, a similar approach has been applied to regulate the non-medical use of cannabis products.

To monitor the outcome of the new cannabis regulations, the Government of Canada has invested in a formal system that may eventually help to evaluate their impact and support the further development of policies and programmes. One of the main measures taken to that end is a cannabis survey that established a baseline in 2018 and is repeated every quarter in order to provide objective information on trends in the use of cannabis products, both medical and non-medical, as well as on how the legal cannabis market has evolved over time.

Following an initial increase in 2018, cannabis use appears to have stabilized

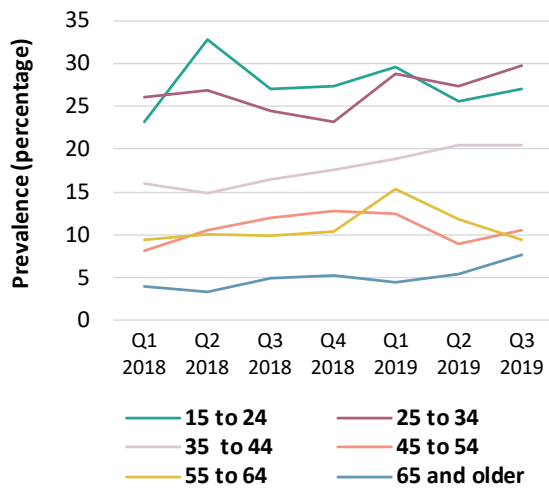
At the baseline, in the first quarter of 2018, nearly 14 per cent of Canadians (12.2 per cent of women and 15.8 per cent of men) reported that they had used cannabis, including cannabis products for medical purposes, in the past three months.³²⁴ The highest prevalence rates were reported among those aged 25–34 (26 per cent) and 15–24 (23 per cent). By the beginning of 2019, the prevalence of use in the past three months had increased to 17.5 per cent, and it remained close to that level until the third quarter of 2019 (17.1 per cent). While the

³²² Canada, Ministry of Justice, “Cannabis legalization and regulation”. Available at www.justice.gc.ca/eng/cj-jp/cannabis.

³²³ See table at the end of the present chapter.

³²⁴ It should be noted that prevalence of use in the past three months is not a measure generally used in the *World Drug Report*. The information on past-three-month prevalence is presented here only because it is the period of monitoring and reporting established by Statistics Canada.

FIG. 1 Use of cannabis in the past three months in Canada, 2018–2019



Source: Statistics Canada, “National cannabis survey 2018 and 2019”.

Note: The quarters on the horizontal axis refer to the times at which the survey was conducted. Data refer to cannabis use for medical and non-medical purposes in the past three months.

prevalence of cannabis use in the past three months rose in most age groups in 2019, the most marked increase was observed in the oldest age group (65 and older), for which the prevalence nearly doubled in comparison with 2018. There also seems to be a larger proportion of new users among older adults than in other age groups: while 10 per cent of new cannabis users were aged 25–44 in the second and third quarters of 2019, more than one quarter were aged 65 and older.³²⁵

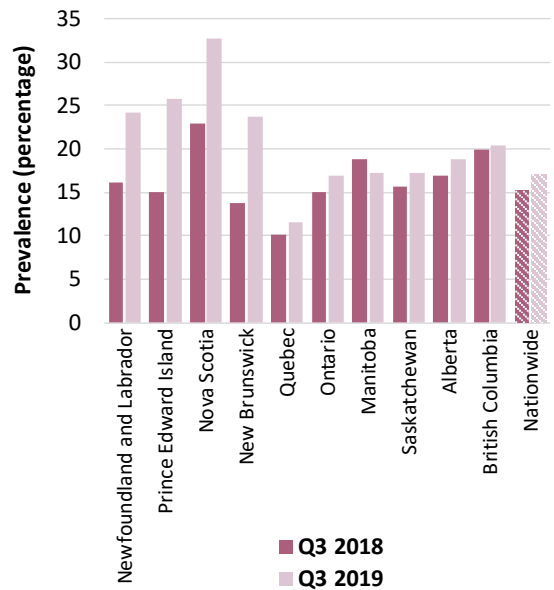
Cannabis use has increased in all provinces but Manitoba. In most provinces, the increase between 2018 and 2019 was rather modest. In four provinces, however, cannabis use increased considerably (Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick).

Most young people are using cannabis for non-medical purposes

There is a considerable level of overlap between the medical and non-medical use of cannabis products in Canada, although the proportion varies by age group. In the second and third quarters of 2019, 52

325 Statistics Canada, “National cannabis survey: third quarter 2019”, 30 October 2019.

FIG. 2 Use of cannabis in the past three months across provinces in Canada, third quarter of 2018 and third quarter of 2019



Source: Statistics Canada, “National cannabis survey: third quarter 2018 and 2019”.

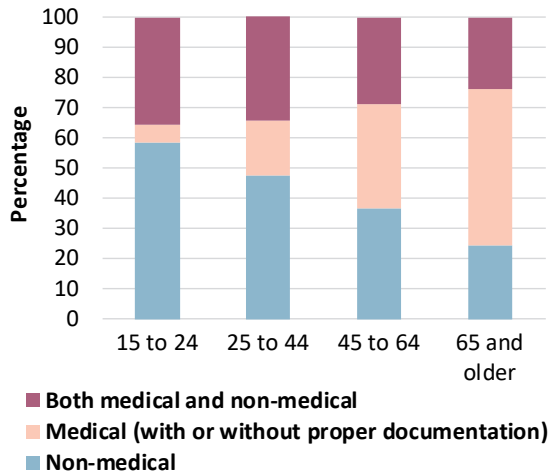
Note: Data refer to cannabis use for medical and non-medical purposes in the past three months.

per cent of cannabis users aged 65 and older reported using cannabis for medical purposes (with or without proper documentation for such use). On the other hand, nearly 60 per cent of cannabis users aged 15–24 reported the use of cannabis products for non-medical purposes, and one third of respondents in that age group reported using those products for both medical and non-medical reasons.

Along with the increase in prevalence, the frequency of cannabis use also increased marginally. At the beginning of 2018, some 5 per cent of the population aged 15 and older were daily users of cannabis products; by the third quarter of 2019, this proportion had increased to 6 per cent. Increases in the proportion of daily users of cannabis were observed mainly among males, young people aged 18–24 and those aged 65 and older.

Daily or near-daily use of cannabis is more frequent in younger users than in older ones. Nearly 8 per cent of people aged 15–24 and 9 per cent of those aged 25–44 were daily or near-daily users of

FIG. 3 Distribution of reported reasons for cannabis use among people who used cannabis in the past three months, by age group, Canada, second and third quarter of 2019



Source: Statistics Canada, "Cannabis survey 2019".
 Note: The proportion of people between 15 and 24 using cannabis medically was considered unreliable.

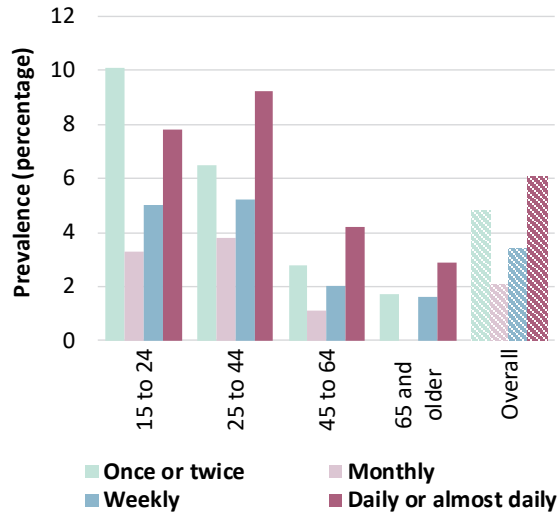
cannabis, compared with 4 per cent of people aged 45–64 and nearly 3 per cent of those aged 65 and older. Men were twice as likely as women to be daily or near-daily cannabis users. A commonly observed pattern of use is that regular and frequent users of cannabis, such as daily or near-daily users, represent a small proportion of all cannabis users, but they account for the bulk of cannabis products consumed. It is estimated that in 2018, for example, around half a million people in Canada consumed some 810 tons of cannabis, of which half (426 tons) were consumed by daily or near-daily users and another 355 tons by those who reportedly used cannabis at least once a week.³²⁶

Many cannabis users continue to purchase cannabis from illegal sources

The transition from the illegal market to legal sources of cannabis has been a gradual one. The proportion of cannabis users sourcing their products from the legal market increased from around 25 per cent in the second and third quarters of 2018 to

326 Statistics Canada, "Prevalence of cannabis consumption in Canada", table 36-10-0597-01.

FIG. 4 Use of cannabis in the past three months, by frequency of use and age group, Canada, second and third quarter of 2019



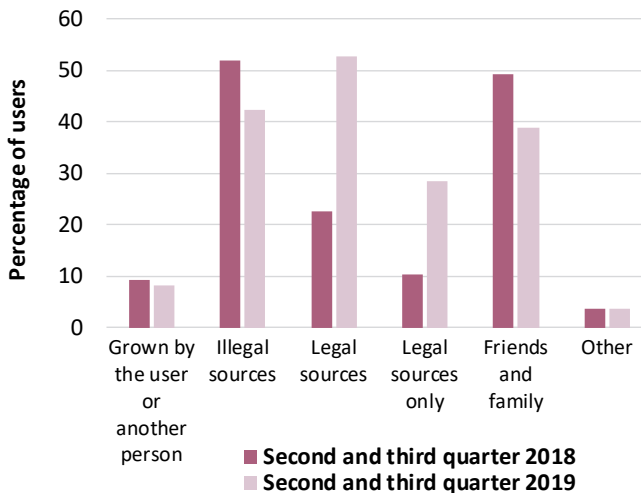
Source: Statistics Canada, "Cannabis survey 2019".
 Note: Data refer to cannabis use for medical and non-medical purposes in the past three months.

about 50 per cent one year later, and in 2019 nearly 30 per cent relied solely on the legal market for their cannabis (compared with 10 per cent in 2018). Many users relied on multiple sources to obtain their cannabis, with about 40 per cent of cannabis users still getting their product from illegal sources.

In 2019, young people aged 15–24 were more likely than those in older age groups to obtain cannabis from illegal sources, whereas a larger share of older cannabis users relied solely on legal sources; 41 per cent of cannabis users aged 65 or older reported using only legal sources to obtain cannabis, compared with roughly one quarter of the other age groups.

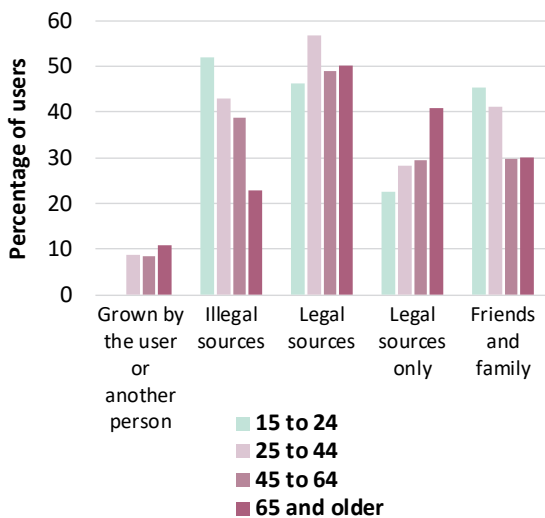
While most cannabis users had used more than one product, over three quarters of users purchased and consumed dried cannabis flower or leaf for smoking. Although the sale of edibles and extracts started only at the end of 2019, a substantial share of cannabis users reported using edible cannabis products (26 per cent), cannabis oil or vape pens (19 per cent), hashish (16 per cent) and solid cannabis concentrates (14 per cent) during the same year.

FIG. 5 Sources of cannabis among those who reported cannabis use in the past three months, Canada, 2018 and 2019



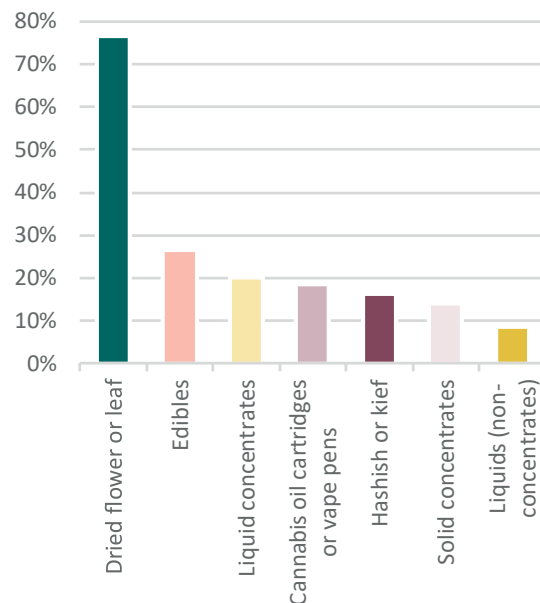
Source: Statistics Canada, "Cannabis survey 2018 and 2019".
 Note: Multiple responses could be provided by each respondent. Data refer to people who used cannabis for medical and non-medical purposes in the past three months.

FIG. 6 Sources of cannabis among those who reported cannabis use in the past three months, by age group, Canada, 2019



Source: Statistics Canada, "Cannabis survey 2019".
 Note: Combined data for the second and third quarters of 2019. Multiple responses could be provided by each respondent. Data refers to people who used cannabis for medical and non-medical purposes in the past three months.

FIG. 7 Proportion of cannabis users consuming different products, 2019



Source: Statistics Canada, "Cannabis survey 2019".

Implementation of cannabis regulations differs across provinces

According to the new cannabis regulations, the federal Government of Canada is responsible for setting the requirements for those who grow and produce cannabis, including the types of cannabis products available for sale. For example, the regulations were amended in October 2019 to allow the production and sale of edible cannabis, cannabis extracts and topicals, and the sale of those products began gradually from December 2019.³²⁷ The provincial and territorial governments, for their part, are responsible for developing, implementing, maintaining and enforcing systems to oversee the distribution and sale of cannabis.

In most provinces, the retail licensing regime is similar to that regulating the sale of liquor, and cannabis is sold through licensed retailers (private sector),

³²⁷ On 14 June 2019, the Government of Canada announced new regulations for edible cannabis, cannabis extracts and cannabis topicals. Those regulations were published in the *Canada Gazette*, Part II, vol. 153, No. 13, on 26 June 2019 and came into force on 17 October 2019.

provincial retail stores (public sector) and online. Many provinces have adopted a hybrid model that allows either public or private physical retail outlets together with online retail controlled by regulatory authorities, or a combination of all three. With the exception of the Nunavut territory, all the provinces and territories allow retail sales of cannabis products online. British Columbia and Yukon are the only

TABLE 2 Models of cannabis sales in Canada, by province and territory

	Physical retail		Online retail
	Public	Private	
Newfoundland and Labrador		√	√
Prince Edward Island	√		√
Nova Scotia	√		√
New Brunswick	√		√
Quebec	√		√
Ontario		√	√
Manitoba		√	√
Saskatchewan		√	√
Alberta		√	√
British Columbia	√	√	√
Yukon	√	√	√
Northwest Territories	√		√
Nunavut	Not allowed	Not allowed	Not allowed

Source: Statistics Canada, "The retail cannabis market in Canada: a portrait of the first year", 12 December 2019.

province and territory that allow all three modes, while Alberta, Manitoba, Newfoundland and Labrador, Ontario and Saskatchewan have allowed private bricks-and-mortar retail stores.

By the end of July 2019, about 400 retail outlets had been opened across Canada. The opening of retail outlets has been slower in some places than in others. Ontario, the most populous province in Canada, with a population of 14 million, began with a retail system in which licences were issued to operators by way of a lottery. At the end of July 2019, the province thus had only 24 outlets, fewer than 2 outlets per 1 million population, whereas Newfoundland and Labrador had the same number of outlets per 500,000 population. The province of Alberta permitted the opening of the largest number of retail outlets, with 176 private retail outlets for a population of 4 million.

After the cannabis regulations were adopted and sales began in October 2018, retail sales of non-medical cannabis online and in cannabis stores up to September 2019 totalled some 908 million Canadian dollars,³²⁸ or an average of Can\$24 (approximately \$18) per capita. Although Ontario had the smallest number of retail outlets, it had the highest retail sales (Can\$216 million), followed by Alberta (Can\$196 million) and Quebec (Can\$195 million), by the end of September 2019. Out of the

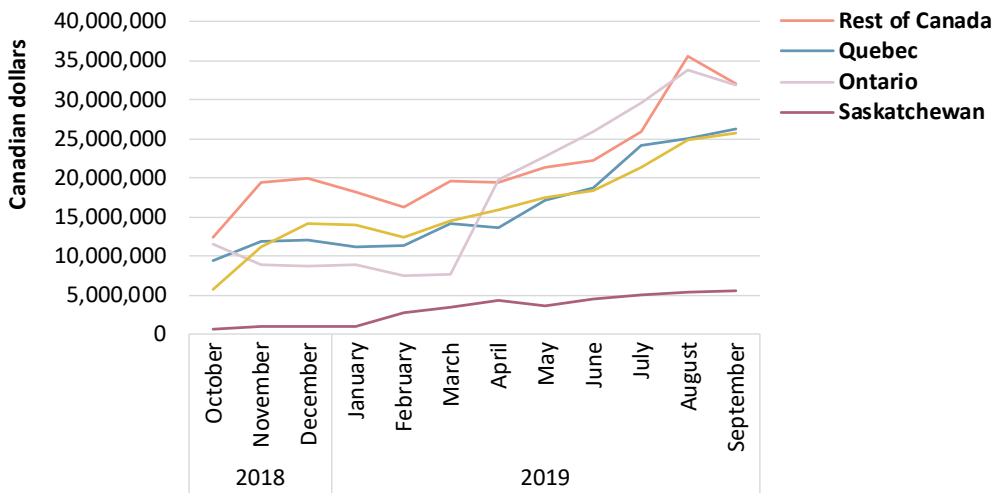
TABLE 3 Number of retail cannabis outlets in Canada, by province and territory, July 2019

	Population	March	May	July
		Number of outlets		
Canada	36,540,268	217	285	407
Newfoundland and Labrador	528,567	26	26	26
Prince Edward Island	150,566	4	4	4
Nova Scotia	950,680	13	13	13
New Brunswick	766,852	21	21	21
Quebec	8,297,717	14	16	18
Ontario	14,071,445	NA	20	24
Manitoba	1,335,396	21	23	23
Saskatchewan	1,150,782	19	26	35
Alberta	4,243,995	75	101	176
British Columbia	4,922,152	16	27	57
Yukon	39,628	2	2	4
Northwest Territories	44,936	6	6	6
Nunavut	37,552	-	-	-

Source: Statistics Canada, "The retail cannabis market in Canada".

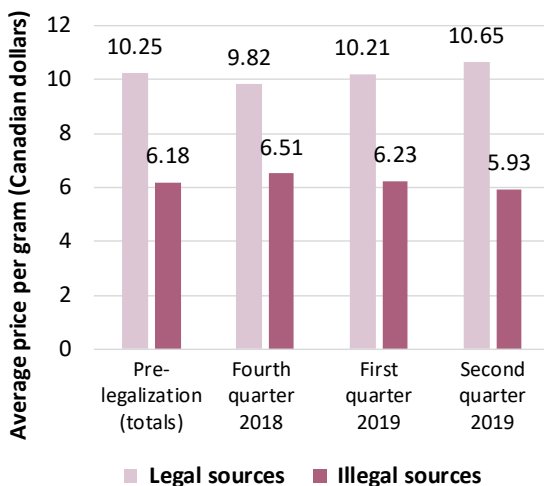
328 At an exchange rate of 1 Canadian dollar to \$0.75, this figure would equal \$681 million.

FIG. 8 Retail sales of non-medical cannabis, by provinces, in Canada, October 2018–September 2019



Source: Statistics Canada, “Retail trade sales by province and territory”, table 20-10-0008-01.

FIG. 9 Price of cannabis on the legal and illegal markets, Canada, 2018–2019



Source: Statistics Canada, “Quarterly cannabis prices, 2019”.

total of Can\$908 million, most sales were made through bricks-and-mortar stores (Can\$788 million), while online retail sales (Can\$120 million) accounted for 13 per cent. Direct-to-consumer trade by wholesalers, which includes retail sales by public sector stores classified as wholesalers, accounted for 1.9 per cent over the same period.

The sale of non-medical cannabis through legal sources represents only a portion of the cannabis market, as it appears that a substantial proportion of users still rely on illegal sources to obtain cannabis (42 per cent in 2019). Moreover, cannabis prices on the illegal market have remained considerably lower (and have been declining) compared with the prices on the legal market. In the second quarter of 2019, based on 236 submissions, the average price per gram of cannabis on the legal market was Can\$10.65, compared with Can\$5.93 per gram on the illegal market.

Large corporations are investing in the cannabis market in Canada

Although the Cannabis Act introduced a variety of classes of cannabis licences, including for smaller producers, the federal Government requires that a potential supplier have a production facility in place, meaning that the supplier will have already made a substantial investment prior to applying for a licence.^{329, 330} Some have speculated that this has contributed to deterring small entrepreneurs from applying for licences and may have favoured the

329 Canada, “Cannabis duty: apply for a cannabis licence from the CRA” (24 February 2020).

330 Transform Drug Policy Foundation, “Cannabis legalisation in Canada: one year on” (n.p., n.d.).

emergence of a market dominated or even monopolized by a relatively small number of large, multi-billion-dollar businesses.³³¹ There have also been reports of the alcohol, tobacco and finance industries investing in companies involved in non-medical cannabis production. For instance, according to media sources, in October 2017 Constellation Brands, a major international producer of wine, beer and spirits, invested \$4 billion to acquire a 9.9 per cent stake in Canopy Growth, the leading Canadian producer, to develop cannabis-based beverages. By the end of December 2019, Constellation owned a 35 per cent stake in Canopy.³³² In December 2018, the tobacco company Altria made a \$1.8 million investment in Cronos Group, a cannabis production company, giving Altria a 45 per cent interest in Cronos.³³³ Earlier in the year, Molson Coors Brewing, another multinational alcohol company, signed a joint venture with Quebec-based HEXO to develop and market cannabis-infused beverages. Market analysts have predicted that the alcohol industry will also invest in companies that plan to produce beverages that combine cannabis and beer and, in particular, they predicted that by the end of 2019 two of the largest cannabis companies in the world would be owned by two of the largest alcohol and tobacco companies.^{334, 335, 336}

The retail cannabis market in Canada is likely to continue to evolve as jurisdictions adapt their regulatory approaches, as supply chains develop and as cannabis product offerings are diversified. Overall, the implementation of laws permitting the non-medical use of cannabis in Canada is still in its nascent stages, and it may take several years of monitoring to clarify how the cannabis market has evolved and

to identify its dynamics and the impact of legalization on public health and safety, among other outcome measures. Differences in the implementation of federal legislation in the provinces may also vary in impact and thus require contextual analysis at the provincial and territorial levels.

Latest trends in the cannabis market in jurisdictions in the United States allowing the non-medical use of cannabis

In the United States, a total of 33 states, as well as the District of Columbia, Guam, Puerto Rico and the U.S. Virgin Islands, had approved or had in place a comprehensive programme for medical cannabis by the end of 2019.³³⁷ As at December 2019, 11 state-level jurisdictions in the United States,³³⁸ plus the District of Columbia, allowed the non-medical use of cannabis, and most also allowed commercial production by for-profit industry.³³⁹ It is worth noting that all the states that have legalized the non-medical use of cannabis previously had measures in place permitting the medical use of cannabis.

In addition to Vermont, Illinois is another state in which measures allowing the non-medical use of cannabis were passed through the state legislature rather than through voters' initiatives, as was the case in the other states that have legalized the non-medical use of cannabis. In May 2019, the Illinois General Assembly passed the Cannabis Regulation and Tax Act, which was signed by the state Governor

331 Ibid.

332 Ezequiel Minaya, "Pot company Canopy Growth picks new CEO", *Forbes*, 9 December 2019.

333 Sean Williams, "Cronos Group's \$1.8 billion investment from Altria has closed. Now what?", *The Motley Fool*, 17 March 2019.

334 Craig Giammona, "The next big thing is weed beer", *Bloomberg Businessweek*, 10 October 2018.

335 Sean Williams, "Altria grossly overpaid for its equity stake in pot stock Cronos Group", *The Motley Fool*, 11 December 2018.

336 As presented in Wayne Hall and others, "Public health implications of legalising the production and sale of cannabis for medicinal and recreational use", *Lancet*, vol. 394, No. 10208 (October 2019).

337 According to the National Conference of State Legislatures, a medical cannabis programme is considered to be comprehensive if it has the following measures in place: (1) protection from criminal penalties for using cannabis for a medical purpose; (2) access to cannabis through home cultivation, dispensaries or some other system that is likely to be implemented; (3) it allows a variety of strains or products, including those with more than "low THC"; (4) it allows either smoking or vaporization of some kind of cannabis products, plant material or extract; (5) it is not a limited trial programme. For instance, South Dakota and Nebraska have limited trial programmes that are not open to the public.

338 In the United States, cannabis is federally prohibited as a substance listed in schedule I of the Controlled Substances Act.

339 Home cultivation is not allowed in the state of Washington. The number of plants allowed in each state varies.

340 National Conference of State Legislatures, "Marijuana overview", 17 October 2019.

in June. The sale of cannabis for non-medical use began on 1 January 2020. Under the law, adults aged 21 and older are allowed to purchase and possess up to 30 g of cannabis flower, edibles with a maximum of 500 mg of THC, or 5 g of cannabis concentrates. Non-residents of Illinois will be allowed to purchase half of those amounts. As in some other states, individual cities, villages and municipalities have the option to decide whether to allow the non-medical use of cannabis in their jurisdictions by passing ordinances. Nonetheless, local governments may neither prohibit home cultivation of cannabis nor “unreasonably prohibit” its non-medical use.

Developments in Colorado and Washington

Colorado and Washington were the first two states in the United States to legalize the production of cannabis for non-medical use, in 2012. However, prior to legalization, those states and others, such as California, had various regimes in place that permitted or tolerated the production and sale of cannabis for medical use, which allowed people with a range of conditions that were not well-defined to gain access to cannabis. The states of Colorado and Washington, for which more long-term trend data are available, are interesting case studies for examining the public health and public safety outcomes that have emerged in the years since the production of cannabis for non-medical use was legalized.

Extent of adult non-medical use of cannabis in Colorado and Washington

Colorado and Washington are among the states that have had a higher prevalence of cannabis use than the national average, even prior to the legalization of the non-medical use of cannabis. An increase in cannabis use in Colorado can be observed from 2008–2009 onwards, when some of the main increases in cannabis use in Colorado came with the proliferation of bricks-and-mortar “dispensaries” that openly sold medical cannabis before the legalization of non-medical cannabis.^{341, 342} Nonetheless,

341 Jonathan P Caulkins and Beau Kilmer, “Considering marijuana legalization carefully: insights for other jurisdictions from analysis for Vermont”, *Addiction*, vol. 111, No. 12 (December 2016).

342 Rosalie L Pacula and others, “Assessing the effects of medical marijuana laws on marijuana use: the devil is in the details”, *Journal of the Association for Public Policy Analysis and Man-*

since 2009, past-month cannabis use (as an indicator of recent cannabis use) among adults aged 18 and older in both states has increased far more drastically than the national average – by some 86 per cent in Colorado and more than doubled in Washington, as compared to a 50 per cent increase across the entire country. This also holds true for other states that have legalized the non-medical use of cannabis.³⁴³

A similar pattern is seen in the daily or near-daily use of cannabis. In Colorado, for instance, 7.6 per cent of adults used cannabis for non-medical purposes on a daily or near-daily basis in 2017,³⁴⁴ compared with the national figure of 4.7 per cent in the population aged 18 and older. In the 2012–2013 period, 5.6 per cent of the population aged 12 and older reported daily or near-daily use in Colorado, compared with about 3 per cent nationwide. While past-month prevalence continues to be higher among those aged 18–25, the prevalence among people aged 26 and older has more than doubled since 2008/09 in both states.

In Colorado, while the majority of cannabis users (84 per cent) reported smoking in the past 30 days, half of those users also reported using multiple consumption methods and cannabis products, including taking edibles and vaporizing and “dabbing” cannabis concentrates in 2017.

Extent of non-medical use of cannabis among adolescents

One concern about legalizing the non-medical use of cannabis for adults (21 years and older) is that its use could also increase access to cannabis and its use among adolescents.^{345, 346} Based on national data, cannabis use among high-school students

agement, vol. 34 (2015), pp. 7-31.

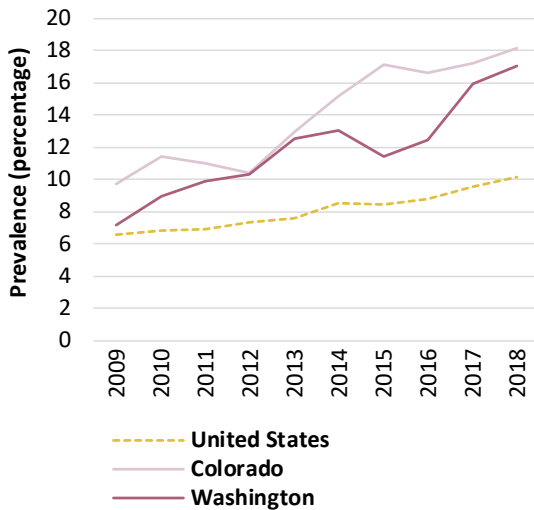
343 United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the National Survey on Drug Use and Health*; and state-level estimates.

344 United States, Colorado Department of Public Health and Environment, “Monitoring health concerns related to marijuana in Colorado: 2018” (2018).

345 Brendan Saloner, Emma E. McGinty and Colleen L. Barry, “Policy strategies to reduce youth recreational marijuana use”, *Pediatrics*, vol. 135, No. 6 (June 2015), pp. 955–957.

346 Christian Hopfer, “Implications of marijuana legalization for adolescent substance use”, *Substance Abuse*, vol. 35, No. 4 (August 2014), pp. 331–335.

FIG. 10 Use of cannabis in the past month in Colorado, Washington and the United States, 2009–2018



Source: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the National Survey on Drug Use and Health*; and state-level estimates.

Note: The prevalence refers to the population aged 18 and older; the prevalence estimates for Colorado and Washington per year are based on a two-year average (e.g., 2015/16, 2016/17, 2017/18).

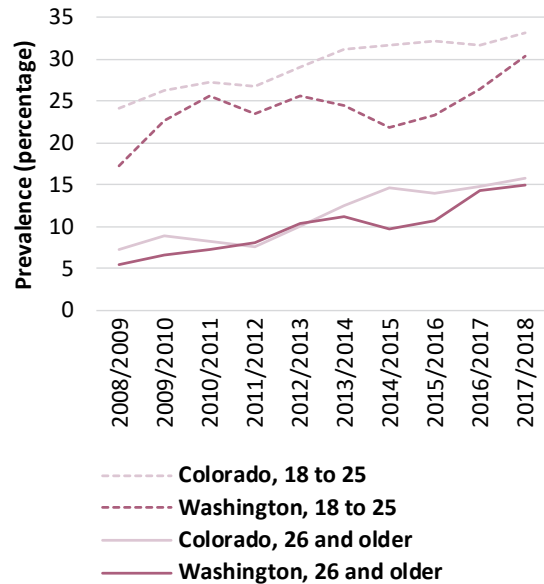
remained stable overall, whereas the risk perception of the occasional use of cannabis declined in the United States over the period 2012–2018.^{347, 348} In Colorado, although there has been a decline in daily or near-daily use of cannabis among high-school students, they are now consuming and exposed to cannabis products with far higher THC content than was available or used earlier. In 2017, about 20 per cent of high-school students in Colorado reported non-medical use of cannabis in the past month; that rate is comparable to the national average among high-school students.³⁴⁹ The non-medical use of cannabis increases in higher grades. It is esti-

³⁴⁷ United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the National Survey on Drug Use and Health*.

³⁴⁸ Lloyd D Johnston and others, *Monitoring the Future, National Survey Results on Drug Use 1975–2018: Overview, Key findings on Adolescent Drug Use* (Ann Arbor, Institute for Social Research, University of Michigan, 2019).

³⁴⁹ The data on high-school students in Colorado is taken from the “Healthy Kids Colorado Survey” and the national data from the “Youth Risk Behaviour Survey”.

FIG. 11 Use of cannabis in the past month, by age group, Colorado and Washington, United States, 2009–2018

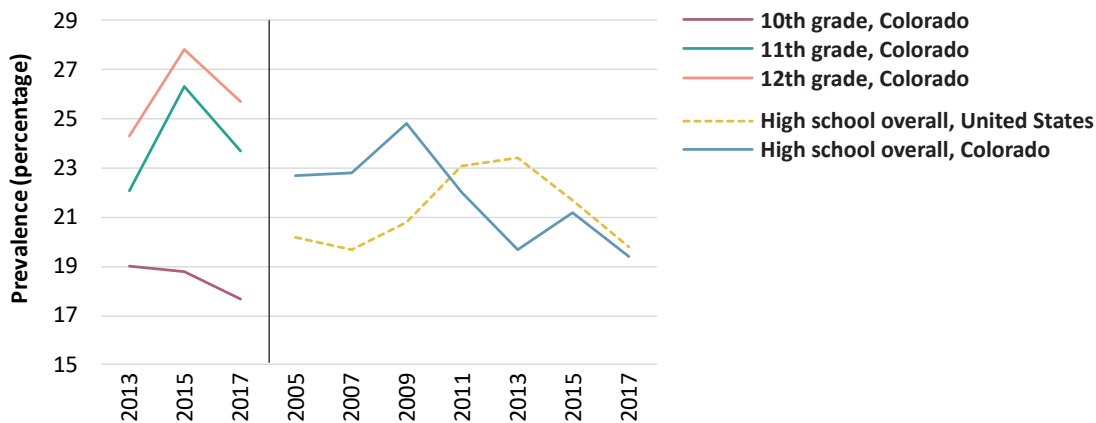


Sources: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the National Survey on Drug Use and Health*; and state-level estimates.

mated to be the highest among twelfth grade students, with one in four students in that grade reporting non-medical cannabis use in the past month. The past-month use of cannabis among eleventh and twelfth grade students in Colorado increased from the first round of the survey in 2013 but then declined from 2015; however, it remained higher in 2017 than in 2013. The risk perception of the use of cannabis also remained stable over the same period among high school students in Colorado.

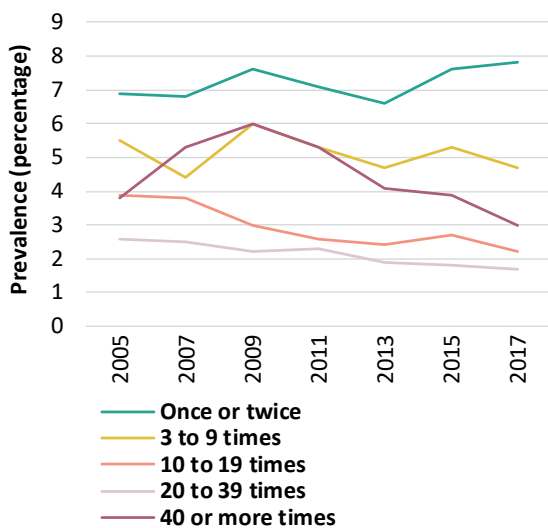
While the daily or near-daily use of cannabis among high-school students in Colorado has declined, the prevalence of occasional users, that is, those who report having used cannabis one or two times in the past month, has increased since legalization. Nevertheless, 4.7 per cent of high-school students reported using cannabis daily or nearly daily (20 or more times in the past 30 days) in 2017. Moreover, although the share of high-school students smoking cannabis declined from 92 per cent in 2015 to 84 per cent in 2017, there was an increase in the share

FIG. 12 Colorado: trends in past-month use of cannabis among high-school students, United States, 2005–2017



Sources: Colorado Department of Public Health and Environment, “Healthy Kids Colorado Survey, 2005–2017”; and Centers for Disease Control and Prevention, “Youth Risk Behaviour Survey”.

FIG. 13 Colorado: trends in past-month use of cannabis, by frequency of use among high-school students, United States, 2005–2017



Source: Colorado Department of Public Health and Environment, “Healthy Kids Colorado Survey, 2005–2017”.

of those who reported using edibles with high THC content (from 28 per cent in 2015 to 36 per cent in 2017) or “dabbing” cannabis extracts and concentrates (from 28 per cent in 2015 to 34 per cent in 2017) in the past month.

In Washington state, the past-month use of cannabis among high-school students of different grades has generally remained stable, although it increases by grade, with the highest past-month prevalence found among twelfth grade students, as in Colorado. The perception of risk relating to cannabis use among high-school students has also declined since the non-medical use of cannabis was legalized, with nearly three quarters of twelfth grade students seeing no or low risk in trying cannabis a few times and less than half perceiving no or low risk in the regular use of cannabis in 2018.³⁵⁰ Similarly, some 38 per cent of twelfth grade students considered that it was fairly easy to get cannabis. Over half of high-school students reported getting cannabis from a friend, and about 15 per cent reported giving money to someone to buy it for them.³⁵¹ One alarming finding is that more than half of the twelfth grade students who had used cannabis in the past month in 2018 reported that they had driven a motor vehicle within three hours of using cannabis on at least one occasion in the past month.

The onset of cannabis use at an early age and regular cannabis use among adolescents has been associated with deficits in learning, memory, reading skills and

350 United States, Washington State Department of Health, “Healthy Youth Survey 2018”.

351 Ibid.

FIG. 14 Washington: trends in cannabis use in the past month among high-school students, United States, 2006–2018



Source: United States, Washington State Department of Health, “Healthy Youth Survey 2018”.

mathematics.³⁵² Similarly, scientific literature shows that the cannabis users who are most at risk of developing cannabis dependence have a history of poor academic achievement, deviant behaviour in childhood and adolescence, rebelliousness, poor parental relationships and a parental history of drug and alcohol problems.^{353, 354} In Washington state, for example, 40 per cent of twelfth grade students who reported cannabis use in the past month had lower marks³⁵⁵ than those who had not used cannabis, although the role of other factors in mediating cannabis use and poor marks cannot be ruled out.³⁵⁶

Public health outcomes: emergency department visits and hospitalization in Colorado

One public health measure used to assess the outcome of legalizing the non-medical use of cannabis

352 Mary Becker and others, “Longitudinal changes in cognition in young adult cannabis users”, *Journal of Clinical and Experimental Neuropsychology*, vol. 40, No. 6 (August 2018), pp. 529–543.

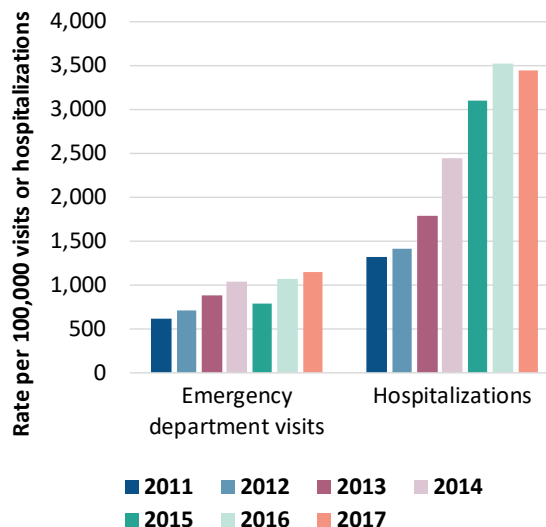
353 As presented in Hall and others, “Public health implications of legalising the production and sale of cannabis”.

354 Michael Lynskey and Wayne Hall, “The effects of adolescent cannabis use on educational attainment: a review”, *Addiction*, vol. 95, No. 11 (November 2000), pp. 1621–1630.

355 Lower grades were considered to be as follows: C – average grade; D – between 59 and 69 per cent, or below average; and F – failing grade.

356 Washington State Department of Health, “Healthy Youth Survey 2018”.

FIG. 15 Colorado: cannabis-related emergency department visits and hospitalizations, United States, 2011–2017



Source: Colorado Department of Public Health and Environment, “Colorado Hospital Association data”.

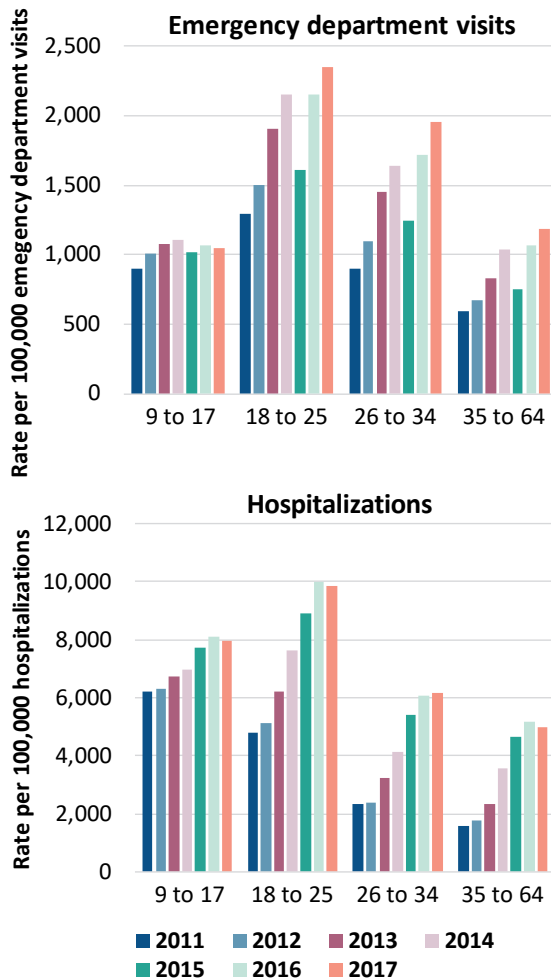
is the monitoring of the adverse health consequences of increased exposure to cannabis resulting in emergency room visits and hospitalization and the development of cannabis use disorders. Emergency room visits may be due to acute intoxication, which is seen more among novice users. Patients may present with anxiety, panic attacks, public intoxication, vomiting and other non-specific symptoms that could be precipitated by the use of cannabis products with varying THC content. This is especially the case with high-THC edible cannabis products, which delay the onset of severe psychoactive effects that a person is unable to regulate.^{357, 358} Cannabis-related hospitalizations can arise from acute intoxication but are mainly a result of cannabis use disorders.³⁵⁹ In 2017, there were 1,139 cannabis-

357 Andrew A. Monte and others, “Acute illness associated with cannabis use, by route of exposure: an observational study”, *Annals of Internal Medicine*, vol. 170, No. 8 (April 2019), pp. 531–537.

358 George Sam Wang and others, “Marijuana and acute health care contacts in Colorado”, *Preventive Medicine*, vol. 104 (November 2017), pp. 24–30.

359 The Colorado Department of Public Health and Environment has three definitions of cannabis-related hospitalization and emergency department visits that include at least one cannabis-related billing code in up to 30 billing codes

FIG. 16 Colorado: cannabis-related emergency department visits and hospitalizations, by age group, United States, 2011–2017



Source: Colorado Department of Public Health and Environment, “Colorado Hospital Association data”.

related emergency department visits per 100,000 such visits in Colorado, an increase by 60 per cent since 2012. Similarly, 3,439 cannabis-related hospitalizations per 100,000 hospitalizations were reported in the same year, a rate that has more than doubled since 2012. It is important to note,

listed for each visit. These codes include accidental poisoning by psychodysleptics, poisoning by psychodysleptics, poisoning, adverse effects and underdosing by cannabis, cannabis abuse, cannabis dependence and cannabis use.

however, that figures for emergency room visits and hospitalizations also include those for the treatment of cannabis use disorders. Nevertheless, emergency department visits and hospitalizations are based on billing records in which cannabis use is mentioned. The increase in hospitalizations therefore not only reflects the increased exposure of the population to cannabis products with high THC content but also increased patient comfort with reporting cannabis use. This is likely to increase the chance that a cannabis billing code is included in the diagnosis of patients.^{360, 361, 362}

The highest rates of emergency department visits and hospitalizations are reported among young adults aged 18–25, and the past-month prevalence of cannabis use is also highest in that age group. The rates of cannabis-related hospitalizations doubled and emergency room visits increased by more than 50 per cent for young adults aged 18–25 between 2012 and 2017. Moreover, the rates of cannabis-related emergency department visits and hospitalizations among older adults (aged 26–34 and 35–64) have also increased substantially since the legalization of the non-medical use of cannabis in 2012.

Public health outcomes: cannabis-related poisoning incidents in Colorado and Washington state

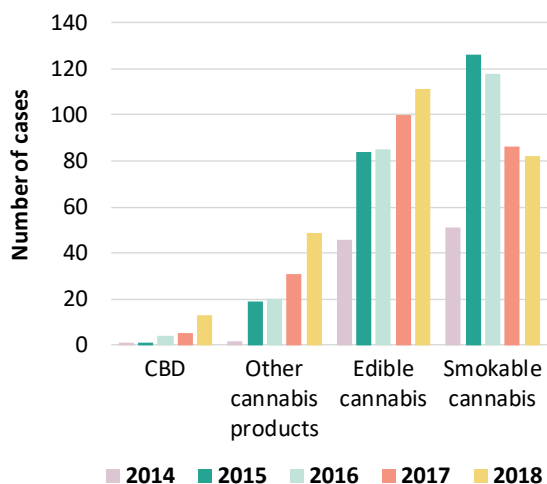
In Colorado, the number of cases reported to poison centres owing to intoxication or adverse effects relating to cannabis exposure is low in absolute terms, but has been increasing since 2014. In 2018, there were a total of 255 such exposure cases. As with the changes in consumption patterns for different cannabis products in Colorado, between 2014 and 2018 there was a 2.4-fold increase in the number of cannabis exposure cases related to edibles, mostly among children aged 8 and younger and among children and adolescents aged 9–17. The increase in reported cannabis exposure cases involving children is likely

360 Sam Wang and others, “Marijuana and acute health care contacts in Colorado”.

361 Colorado Department of Health and Environment, “Monitoring health concerns related to marijuana in Colorado: 2018”.

362 Brad A. Roberts, “Legalized cannabis in Colorado Emergency Departments: a cautionary review of negative health and safety effects”, *Western Journal of Emergency Medicine*, vol. 20, No. 4 (July 2019), pp. 557–572.

FIG. 17 Colorado: cannabis exposure cases reported to poison centres, United States, 2014–2018



Source: Colorado Department of Public Health and Environment, “Rocky Mountain Poison and Drug Safety data”.

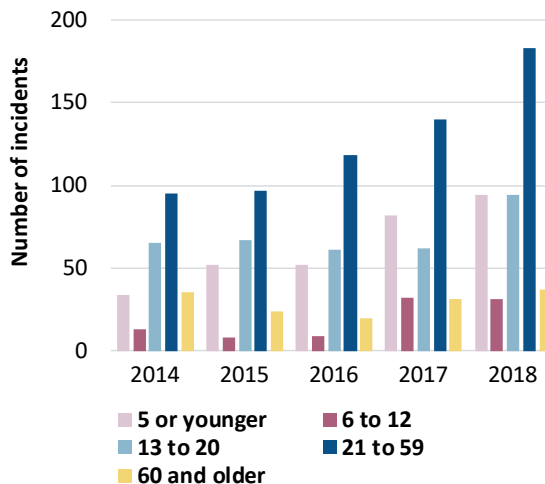
to be related to the increasing presence of cannabis inside the house (5.5 per cent in 2017) and in or around the house (11.2 per cent in 2017) among families with children since 2014.³⁶³ Furthermore, it is estimated that in the period 2016–2017 approximately 32,800 families with children aged 1–14 exposed them to second-hand cannabis smoke or cannabis vapor.³⁶⁴ Cannabis exposure cases related to smoking cannabis, although declining since 2016, were reported mainly among young adults (aged 18–24) or adults aged 25 and older.

Since 2014, the number of calls to the Washington Poison Center regarding cannabis-related incidents has also increased considerably. In 2018, 497 cannabis exposure cases were reported, as compared to 245 cases in 2014. While calls to the poison centre have increased for nearly all age groups, the largest increase in cannabis-related cases was related to children aged 12 and younger (a 2.6-fold increase), as well as adults aged 21–59 (a twofold increase) from 2014 to 2018. Since the reporting of exposure cases is voluntary, it is likely that those reported exposures

³⁶³ Colorado Department of Health and Environment, “Monitoring health concerns related to marijuana in Colorado: 2018”.

³⁶⁴ Ibid.

FIG. 18 Washington: cannabis-related incidents reported to the Washington Poison Center, United States, 2014–2018



Source: Washington Poison Center, “2018 annual data report: cannabis” (Seattle, 2019).

underrepresent the actual extent of occurrence of such cases in Washington.³⁶⁵

In Washington, three fifths of the cases of exposure to cannabis reported in 2018 were related to exposure to cannabis alone, while the remainder involved exposure to cannabis together with other substances, including alcohol. In addition, among the total cases of cannabis exposure, nearly one third were due to the ingestion of cannabis edibles, for which the number of cases doubled from 216 in 2015 to 420 in 2018. The remaining cases involved exposure to cannabis due to smoking or the use of concentrates.³⁶⁶

Public health outcomes: cannabis use before and during pregnancy and in the post-partum stage

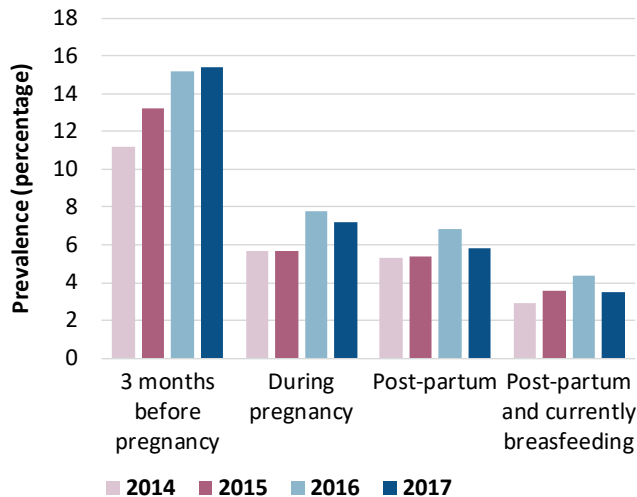
Cannabis use among young women may affect their menstrual cycle and their ability to become pregnant.³⁶⁷ Cannabis use during pregnancy is also associated with low birth weight, low alertness and

³⁶⁵ Washington Poison Center, “2018 annual data report: cannabis” (Seattle, 2019).

³⁶⁶ Ibid.

³⁶⁷ Public Health Agency of Canada, *Thinking about Using Cannabis Before or During Pregnancy?* (October 2018).

FIG. 19 Colorado: cannabis use among pregnant, post-partum and breastfeeding women, United States, 2014–2017



Source: Colorado Department of Public Health and Environment, “Pregnancy Risk Assessment Monitoring System (PRAMS)”, data 2014–2017.

other neurodevelopmental effects on newborns. In addition, cannabis use by the mother in the post-partum and breastfeeding stages may impact the infant’s growth and health.^{368, 369, 370, 371}

National data in the United States suggest an increase during the 2002–2017 period in past-month cannabis use, daily or near-daily use of cannabis and the number of days of cannabis use among women aged 12–44, including those who were pregnant. The past-month use of cannabis

368 Mohammad R. Hayatbaksh and others, “Birth outcomes associated with cannabis use before and during pregnancy”, *Pediatric Research*, vol. 71 (February 2012), pp. 215–219.

369 Sheryl A. Ryan and others, “Marijuana use during pregnancy and breastfeeding: implications for neonatal and childhood outcomes”, *American Academy of Pediatrics*, vol. 142, No. 3 (September 2018).

370 Kimberly S. Grant and others, “Cannabis use during pregnancy: pharmacokinetic and effects on child development”, *Pharmacology and Therapeutics*, vol. 182 (February 2018), pp. 133–151.

371 See, for example, the advisory issued in August 2019 by the United States Surgeon General on the use of cannabis, its effect on the developing brain and cannabis use during pregnancy. Available at www.hhs.gov/surgeongeneral/reports-and-publications/addiction-and-substance-misuse/advisory-on-marijuana-use-and-developing-brain/index.html#use-pregnancy.

doubled, while daily or near-daily cannabis use nearly quadrupled among pregnant women from 2002 to 2017.³⁷²

While data on cannabis use among pregnant women are not available for Washington, cannabis use among women in Colorado before and during pregnancy and in the post-partum and breastfeeding stages increased in the 2014–2017 period, and the increase in cannabis use in the three months before pregnancy was statistically significant. Cannabis use during pregnancy was also reported by 7.2 per cent of expectant women in 2017. The combined data from the 2014–2017 period showed that cannabis use during pregnancy was significantly higher among women aged 15–19 (15.9 per cent) than among women aged 20 and older, as well as among mothers with less than 12 years of education (13.6 per cent) than among those who had had 12 years of education (9.3 per cent) or more (4.8 per cent).³⁷³

Public safety outcomes: cannabis-related driving under the influence and traffic fatalities

Research has shown that people driving under the influence of cannabis are likely to experience impairment of key driving skills, including reaction time, tracking ability and target detection.^{374, 375} There may also be impairment of cognitive skills, such as judgment, anticipation and divided attention, as well as of executive functions, such as route-planning and risk-taking.³⁷⁶ Other research has also shown that, compared with a sober person, a driver who is under the influence of cannabis is likely to overestimate his or her impairment and tends to compensate by typically driving more slowly and following other cars at greater distances, although

372 Nora D. Volkow and others, “Self-reported medical and non-medical cannabis use among pregnant women in the United States”, *JAMA*, vol. 322, No. 2 (July 2019), pp. 167–169.

373 Colorado Department of Public Health and Environment, “Pregnancy Risk Assessment Monitoring System (PRAMS)”, data 2014–2017.

374 Rebecca L. Hartman and others, “Cannabis effects on driving lateral control with and without alcohol”, *Drug and Alcohol Dependence*, vol. 154 (September 2015), pp. 25–37.

375 Richard P. Compton, “Marijuana-impaired driving: a report to Congress” (Washington D.C., National Highway Traffic Safety Administration, 2017).

376 Ibid.

they may still be a hazard on the road.³⁷⁷ A driver under the influence of alcohol, by contrast, is more likely to underestimate the impairment and take more risks while driving. Moreover, cannabis can have an additive effect with alcohol to increase the driver's impairment and thus cause even more lane weaving and increase the likelihood of accidents.³⁷⁸

A contentious issue between people who are for and against the legalization of cannabis remains whether it has had an impact on driving under the influence of cannabis and caused fatal car crashes. The evidence remains inconclusive, as within the United States there have been no differences in cannabis- or alcohol-related traffic fatalities between states that have and have not legalized the non-medical use of cannabis.³⁷⁹ As different research contributions have also shown, it is difficult to quantify the effects of cannabis on road accidents, as cannabis is often used in combination with alcohol, which increases the challenge of determining the influence of cannabis itself on road traffic accidents.³⁸⁰ Moreover, studies on THC levels and degrees of impairment have found that the level of THC in the blood and the degree of impairment do not appear to be closely related; peak impairment does not occur when THC concentration in the blood is at or near peak levels. In addition, when a blood sample is collected from a driver suspected of cannabis-impaired driving, the collection may not occur until hours after the ingestion of cannabis, whereas THC levels in the blood decline exponentially.³⁸¹ As there are currently no evidence-based methods to detect cannabis-impaired driving,³⁸² those factors and other issues related to the roadside testing of people under the influence of cannabis, as compared with testing for alcohol, make it challenging to determine the extent and trends of driving under the influence of cannabis and its involvement in fatal traffic crashes.

377 Ibid.

378 Hartman and others, "Cannabis effects on driving lateral control with and without alcohol".

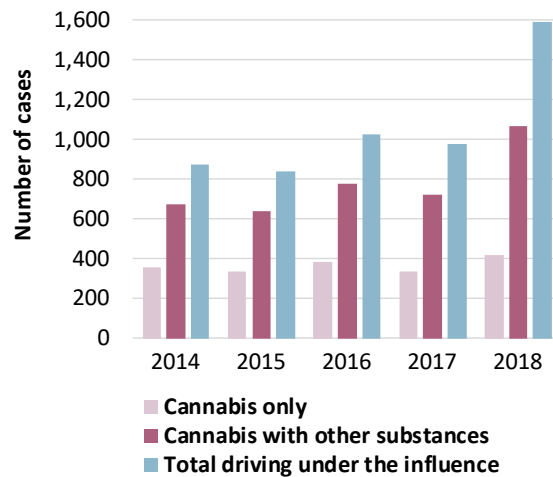
379 Hall and others, "Public health implications of legalising the production and sale of cannabis".

380 Ibid.

381 Compton, "Marijuana-impaired driving".

382 Ibid.

FIG. 20 Colorado: driving under the influence of drugs, United States, 2014–2018

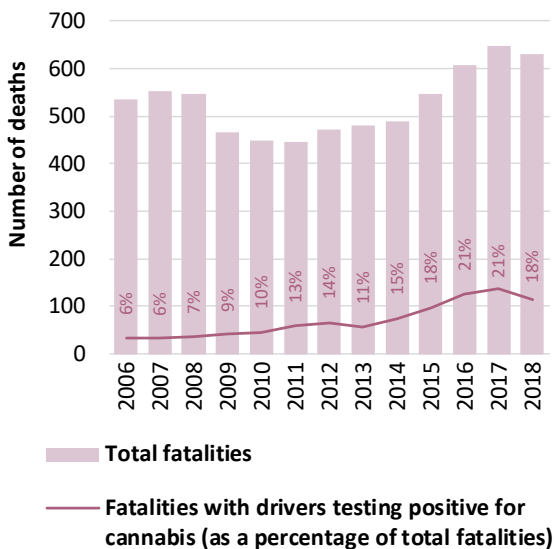


Source: Data from the Colorado State Patrol, as reported in Rocky Mountain High Intensity Drug Trafficking Area, *The Legalization of Marijuana in Colorado: The Impact*, vol. 6 (September 2019).

Driving under the influence of cannabis was not tracked in Colorado prior to 2014. Notwithstanding all the caveats discussed above, the total number of cases of driving under the influence of drugs nearly doubled in Colorado between 2014 and 2018. During that period, the number of cases in which drivers were under the influence of cannabis alone or in combination with other drugs and/or alcohol also increased by 50 per cent. Nearly one quarter of the cases of driving under the influence reported in 2018 involved cannabis alone, and three fifths of cases involved cannabis in combination with other substances (especially alcohol).

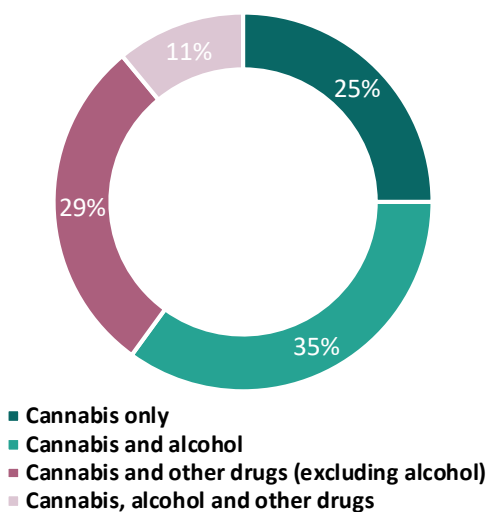
Starting in 2014, data on traffic fatalities in Colorado showed a marked increase in the number of traffic deaths in which the driver tested positive for cannabis use. Over the period 2009–2013, there were 53 traffic deaths on average per year in which the driver tested positive for cannabis, a figure that increased to an average of 110 such deaths in the period 2014–2018, and the proportion of fatalities with drivers testing positive for cannabis doubled over the period 2009–2018. However, toxicology analysis has shown that car crashes in which the driver was found to be under the influence of cannabis frequently involved other drugs, in particular alcohol.

FIG. 21 Colorado: traffic deaths related to cannabis, United States, 2006–2018



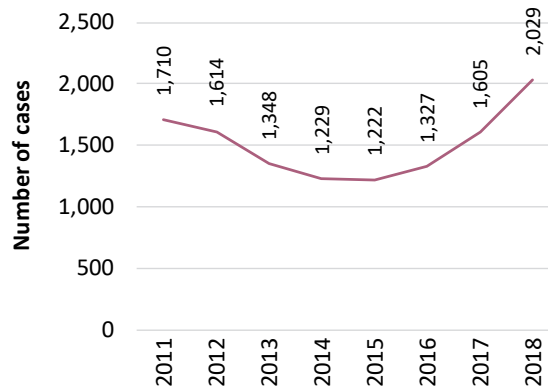
Sources: Data from the National Highway Traffic Safety Administration, Fatality Analysis Reporting System, 2006–2018; and Colorado Department of Transportation, 2012–2018, as reported in Rocky Mountain High Intensity Drug Trafficking Area, *The Legalization of Marijuana in Colorado*.

FIG. 22 Colorado: toxicological results for other drugs found in drivers involved in fatal crashes who tested positive for cannabis, 2018



Source: Rocky Mountain High Intensity Drug Trafficking Area, *The Legalization of Marijuana in Colorado*.

FIG. 23 Washington: number of cases of driving under the influence of drugs and alcohol, United States, 2011–2018



Source: Washington State Patrol, as cited in “Monitoring impacts of recreational marijuana legalization: 2019 update report”.

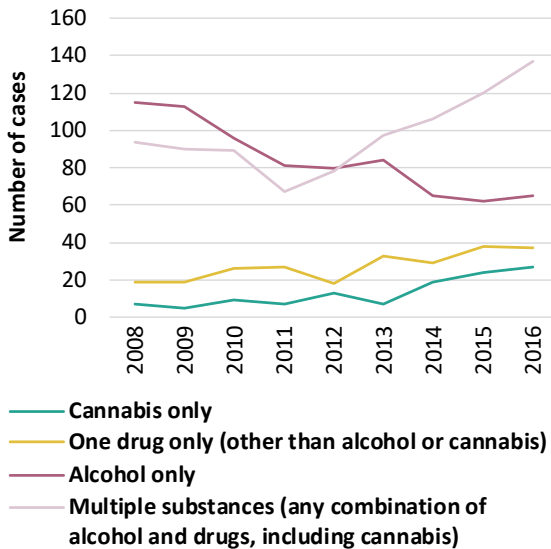
In Washington, driving under the influence of drugs and alcohol is considered the number one contributing factor in fatal crashes and is involved in nearly half of all traffic fatalities. However, in that state, reporting on such cases does not differentiate between cannabis and other drugs.³⁸³ The number of reported cases of driving under the influence of drugs has increased by more than 60 per cent in Washington since 2014.

Although not so recent, data on drivers involved in fatal crashes who tested positive for alcohol or drugs in Washington during the period 2008–2016 show that 44 per cent tested positive for two or more substances.³⁸⁴ Of those substances, the most common one was alcohol, followed by THC, while alcohol and THC formed the most common poly-drug combination involved in fatal crashes during that period.

³⁸³ Washington State, Statistical Analysis Center, “Monitoring impacts of recreational marijuana legalization: 2019 update report” (July 2019).

³⁸⁴ Washington Traffic Safety Commission, “Marijuana use, alcohol use, and driving in Washington State: emerging issues with poly-drug use on Washington roadways” (April 2018).

FIG. 24 Washington: fatal crashes involving alcohol, cannabis and other drugs, United States, 2008–2016



Source: “Marijuana use, alcohol use, and driving in Washington state: emerging issues with poly-drug use on Washington roadways”, Washington Traffic Safety Commission (April 2018).

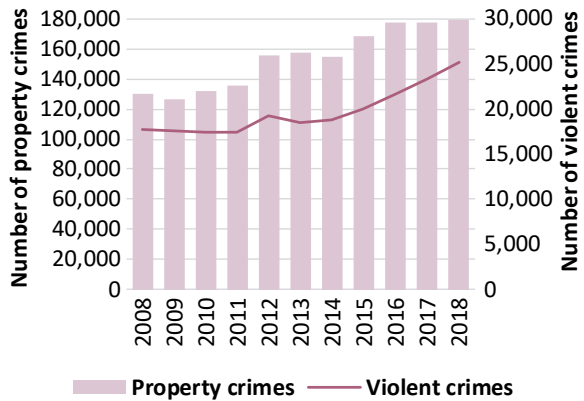
Crime and the non-medical use of cannabis in Washington and Colorado

Two diverging paradigms have emerged with regard to the impact of cannabis legalization on crime. One suggests that cannabis users are more likely to commit violent and property crimes than those who do not use cannabis, and that legalizing the non-medical use of cannabis would result in an increase in the number of regular cannabis users, thereby increasing the risk of young people engaging in violence and delinquency.³⁸⁵ In the other paradigm, it is believed that legalizing the non-medical use of cannabis will lead to a decrease in violent crime rates, as individuals’ violent tendencies may be suppressed by the consumption of cannabis.³⁸⁶ Nevertheless in addition, the vulnerability of the cannabis trade, as a cash-based business, could also create incentives for crimes such as burglary, shoplifting and robbery.

385 Ruibin Lu and others, “The cannabis effect on crime: time-series analysis of crime in Colorado and Washington State”, Justice Quarterly (October 2019).

386 Ibid.

FIG. 25 Colorado: reported property and violent crimes, United States, 2008–2018



Source: Colorado Bureau of Investigation.

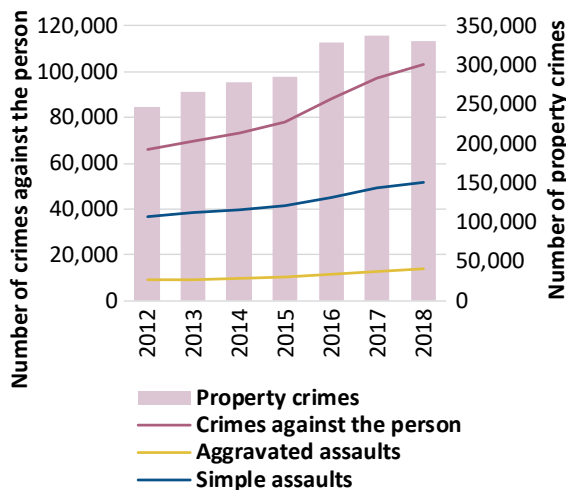
In empirical terms, there have been increases in some types of crime in both Colorado and Washington in the past few years. In particular, Colorado has seen an increase in property crimes since 2015, and crimes against the person and aggravated assaults have increased in Washington since 2016, but it is difficult to attribute those increases to the legalization of the non-medical use of cannabis.

In Colorado, the number of reported property crimes rose by 16 per cent in the 2014–2018 period, while the number of reported violent crimes increased by one third.

In 2018, more than half of the violent crimes reported in Colorado involved assault, followed by non-consensual sex offences (28 per cent) and robbery (15 per cent), whereas 60 per cent of the property crimes involved larceny.³⁸⁷ Similarly, in Washington there was a 19 per cent increase in property crimes, of which half involved larceny or theft in the 2014–2018 period, while the number of simple assaults and aggravated assaults increased more sharply (by 20 per cent and 47 per cent, respectively).

387 Colorado Bureau of Investigation data 2018.

FIG. 26 Washington: reported property crimes and crimes against the person (including assault), United States, 2012–2018



Source: Washington Association of Sheriffs and Police Chiefs, annual reports 2012–2018.

Has legalization led to substitution between cannabis and alcohol?

One of the claims made with regard to the outcome of legalizing the non-medical use of cannabis at the state level has been that it would substitute for, and therefore reduce, alcohol consumption and would thus have a positive impact on the substantial harms caused by alcohol. Most of the research on whether cannabis and alcohol are substitutes for, or complements to, one another has comprised econometric analyses of the effects that small changes in alcohol and cannabis prices have had on the consumption of either substance.³⁸⁸ All of the studies conducted on the topic have generated mixed results.

A small proportion of studies have shown that alcohol and cannabis are complementary to each other – that is, the increased use of cannabis also leads to increased use of alcohol and vice versa – while other studies have found no relationship between the two substances. Studies of trends in alcohol sales data in states that have and have not legalized the non-medical use of cannabis have found no evidence of a greater increase in alcohol use in states that have

³⁸⁸ Hall and others, “Public health implications of legalising the production and sale of cannabis”.

legalized the non-medical use of cannabis.³⁸⁹ More than half of the studies, however, have shown that cannabis and alcohol are substitutes, meaning that the increased use of one substance reduces the use of the other.^{390, 391} Other researchers have also suggested that cannabis, especially cannabis for medical use, may serve as a substitute for alcohol, tobacco and other drugs, including prescription drugs.^{392, 393}

A study on the impact of cannabis legalization on alcohol sales in Colorado, Oregon and Washington, the three states with the longest history of legal non-medical use of cannabis, showed that there was no evidence that legalization had had any impact on the sale of spirits or on total alcohol sales, which are generally considered a good proxy for alcohol consumption in the United States. The study showed that the per capita sale of spirits had increased by 3.6 per cent in Oregon, 5.4 per cent in Washington and 7.6 per cent in Colorado in 2018, after the measures allowing the non-medical use of cannabis were implemented in those states. Consistent with national trends, per capita sales of beer had declined by 3.6 per cent in Colorado, 2.3 per cent in Washington and 3.6 per cent in Oregon. The sale of wine increased by 0.7 per cent in Oregon, declined by 3.1 per cent in Washington and increased by 3.2 per cent in Colorado. Overall, per capita sales of alcoholic beverages were fairly stable, as they increased by 1.7 per cent in Colorado, declined by 0.2 per cent in Washington and declined by 0.5 per cent in Oregon.³⁹⁴

³⁸⁹ Ibid.

³⁹⁰ Ibid.

³⁹¹ Meenakshi Sabina Subbraman, “Substitution and complementarity of alcohol and cannabis: a review of the literature”, *Substance Use and Misuse*, vol. 51, No.11 (September 2016), pp. 1399–1414.

³⁹² Philippe Lucas and others, “Cannabis as a substitute for alcohol and other drugs: a dispensary-based survey of substitution effect in Canadian medical cannabis patients”, *Addiction Research and Theory*, vol. 21, No. 5 (November 2012), pp. 435–442.

³⁹³ Amanda Reiman, “Cannabis as a substitute for alcohol and other drugs”, *Harm Reduction Journal*, vol. 6, No. 35 (December 2009).

³⁹⁴ David Ozgo, “Impact of retail marijuana legalization on alcohol sales in Colorado, Washington state and Oregon” (January 2019).

Can medical cannabis help to address the opioid epidemic in the United States?

In the face of the opioid epidemic in the United States, it has been suggested that medical cannabis products can help to address the high rates of opioid use for pain management and thus to reduce the prevalence of opioid use disorders and opioid overdose deaths.^{395, 396}

A substantial number of randomized control trials have shown that medical cannabis products could be an effective alternative to opioids for pain management. However, one major shortcoming of those clinical trials is that they were conducted with cannabis products that differed from the medical cannabis products currently available in different jurisdictions in the United States, thus limiting the applicability of the findings to the general population.³⁹⁷ In addition, only limited information is available on the efficacy, doses, routes of administration or side effects of commonly used and commercially available cannabis products in the United States.³⁹⁸

With regard to cannabis products substituting for opioids as pain relief medication, it is considered that the analgesic effects of cannabis are not sufficiently powerful to palliate acute pain or to manage chronic pain. For example, only in very specific cases have preparations containing THC, such as dronabinol and nabiximols, been shown to be effective in the management of neuropathic pain in patients suffering from multiple sclerosis. A long-term longitudinal study among people who were prescribed opioids showed greater pain severity and pain interference (pain effects on sleep, working ability, daily

living, social interactions, lower pain self-efficacy and higher levels of generalized anxiety disorder) among the 24 per cent who also used cannabis daily or less frequently than among those who did not use cannabis. Moreover, individuals who used cannabis on a near-daily basis were less likely to discontinue opioid use than participants who abstained from cannabis use.³⁹⁹

In many studies and reports, individual testimonies have been taken as evidence of the effectiveness of cannabis for pain relief. In the debate surrounding the medical use of cannabis, different cannabis products (smokable, edible or concentrates) for which the dosages and contents are not standardized are often confused with medical cannabis products, such as synthetic THC (dronabinol) or nabiximols containing synthetic THC and CBD, which have gone through the manufacturing and processing safety protocols that pharmaceutical companies must follow when mass-producing pharmaceutical products.⁴⁰⁰

Nevertheless, using an Internet-based survey conducted in 2017, one study examined opioid substitution among respondents with a history of ever using cannabis who self-reported the use of opioids in the past 12 months. Out of the nearly 9,000 respondents, 5 per cent reported ever using cannabis and had used opioids in the past year, among whom 43 per cent had used opioids daily and 23 per cent had used cannabis in the past 30 days. Although the results are based on a small number of respondents, of the 450 who reported ever using cannabis and past-year opioid use, 41 per cent reported a decrease or cessation of opioid use as a result of cannabis use, 46 per cent reported no change in opioid use and 8 per cent reported an increase in opioid use.⁴⁰¹

Similarly, ecological studies have shown that states with legislation in place regarding medical cannabis had lower rates of opioid overdose deaths than states that did not have such laws. One such study looked at mortality rates in California, Colorado and Washington from 1999 to 2010, and the results suggested

395 Hall and others, "Public health implications of legalising the production and sale of cannabis".

396 Paul J. Larkin Jr., and Bertha K. Madras, "Opioids, overdoses, and cannabis: is marijuana an effective therapeutic response to the opioid abuse epidemic?", *Georgetown Journal of Law and Public Policy*, vol. 17, No. 2 (August 2019).

397 Bia Carlini, "Role of medicinal cannabis as substitute for opioids in control of chronic pain: separating popular myth from science and medicine" (Seattle, United States, Alcohol and Drug Abuse Institute, University of Washington, February 2018).

398 National Academies of Sciences, Engineering, and Medicine, *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research* (Washington, D.C., National Academies Press, 2017).

399 Larkin Jr., and Madras, "Opioids, overdoses, and cannabis".

400 Ibid.

401 Julie H. Ishida and others, "Substitution of marijuana for opioids in a national survey of US adults", *PLoS ONE*, vol. 14, No. 10 (October 2019).

that there was an association between medical cannabis laws and low rates of opioid overdose mortality in those states.⁴⁰² However, another study in which the same data and methods were used as the earlier study and the analysis was extended through 2017 found that the original analysis and conclusions were not valid for the period beyond 2010. In fact, the association between state medical cannabis laws and opioid overdose mortality reversed direction, from minus 21 per cent to plus 23 per cent, and remained positive even after accounting for recreational cannabis laws in those states. The authors concluded that the analysis of the data did not support the interpretation that broader access to cannabis, either for medical or non-medical purposes, was associated with lower opioid overdose mortality.^{403, 404}

As summarized in a recent paper,⁴⁰⁵ the ecological studies that have shown an association between cannabis use and reduced opioid use (substitution) or low rates of opioid overdose mortality have major limitations: the opioid overdose deaths in a state may not reflect the behaviour of individuals who use medical cannabis; it is difficult to control for confounding factors when state-level data on opioid overdoses is used; and the studies do not control for differences in state policies and programmes that are likely to increase or decrease opioid overdose deaths. Moreover, many of the studies have overlooked the proliferation of fentanyl as a driver of opioid overdose mortality in the United States, which may negate any potential effect of medical cannabis on overdose deaths.⁴⁰⁶ It can only be concluded that additional research might help to identify a range of alternative non-opioid medications and non-pharmacological treatments that

could be effective in pain management.⁴⁰⁷ The issue of whether increased accessibility of cannabis could reduce the medical and non-medical use of pharmaceutical opioids and their negative impact remains inconclusive.⁴⁰⁸

Developments in the regulation of the non-medical use of cannabis in Uruguay

In 2013, the Government of Uruguay approved legislation (Law No. 19.172) regulating the cultivation, production, dispensing and use of cannabis for different purposes, including non-medical use. In accordance with the legislation, Uruguayan citizens or foreigners with permanent residence aged 18 and older can obtain cannabis for non-medical purposes by registering with the national Institute for the Regulation and Control of Cannabis and by choosing one of three options: (a) purchase in authorized pharmacies; (b) membership of a club; or (c) domestic cultivation.⁴⁰⁹ The quantity of cannabis permitted per person, obtained through any of the three mechanisms, cannot exceed 480 g per year. Initially, the Government of Uruguay set THC content at 2 per cent and CBD content at 6–7 per cent. In 2017, the Government introduced two new varieties, with a maximum THC content of 9 per cent and CBD content of no less than 3 per cent.⁴¹⁰

Overall, the implementation of the law has been gradual; as at January 2020, five companies had been granted licences to cultivate, produce and distribute cannabis products for non-medical use in the country. However, those products only include dried flower, since psychoactive edibles and extracts are not allowed in Uruguay. Seventeen pharmacies had been licensed to dispense cannabis for non-medical use, and 39,423 people had registered to acquire cannabis from those pharmacies. In the period July 2017–October 2019, out of over

402 For instance, see Marcus A. Bachhuber and others, “Medical cannabis laws and opioid analgesic overdose mortality in the United States 1999–2010”, *JAMA Internal Medicine*, vol. 174, No. 10 (October 2014), pp. 1668–1673.

403 Chelsea L. Shover and others, “Association between medical cannabis laws and opioid overdose mortality has reversed over time”, *Proceedings of the National Academy of Science of the United States of America*, vol. 116, No. 26 (June 2019), pp. 12624–12626.

404 Another study that arrived at similar results is Gregory Schuster, “Medical marijuana laws and opioid overdose deaths in the United States” (2019).

405 Hall and others, “Public health implications of legalising the production and sale of cannabis”.

406 Schuster, “Medical marijuana laws and opioid overdose deaths in the United States”.

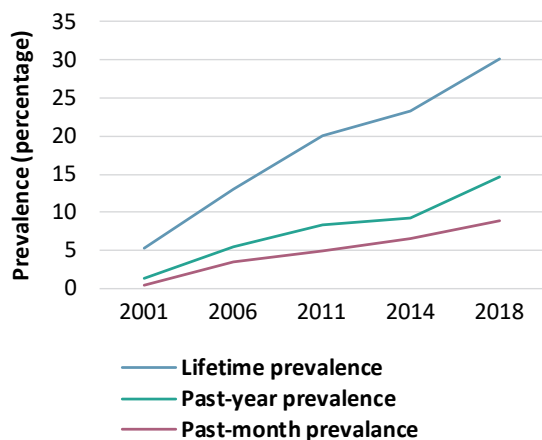
407 Larkin Jr., and Madras, “Opioids, overdoses, and cannabis”.

408 Hall and others, “Public health implications of legalising the production and sale of cannabis”.

409 See also *World Drug Report 2018: Analysis of Drug Markets—Opiates, Cocaine, Cannabis, Synthetic Drugs* (United Nations publication, Sales No. E.18.XI.9 (Booklet 3)).

410 John Hudak, Geoff Ramsey and John Walsh, “Uruguay’s cannabis law: pioneering a new paradigm” (Washington D.C., Centre for Effective Public Management, Brookings Institution, March 2018).

FIG. 27 Non-medical use of cannabis, Uruguay, 2001–2018



Source: Uruguay, Junta Nacional de Drogas, Observatorio Uruguayo de Drogas, Encuesta Nacional en Hogares sobre Consumo de Drogas, 2016 and 2018.

670,000 cannabis transactions, around 3,350 took place in pharmacies, with 60 per cent of those sales in urban centres.⁴¹¹ It is estimated that out of the total number of cannabis users registered with the pharmacies, some 89 per cent had purchased cannabis at least once, with monthly purchases ranging between 15 and 17 g by October 2019.⁴¹² However, it would seem that the pharmacies currently do not cover the demand of registered users, especially in parts of the country where there is a greater concentration of registered cannabis users.⁴¹³

By January 2020, a total of 7,834 people had registered for domestic cultivation of cannabis, and 145 cannabis clubs with a total membership of 4,298 people had been registered. Thus, a total of approximately 51,555 people had access to the regulated cannabis market in Uruguay at that time,⁴¹⁴ which is still a relatively small share of the overall population of cannabis users in the country.

In the 2018 survey on drug use in Uruguay, it was estimated that around 12 per cent of men and 5.8 per cent of women had used cannabis in the past month, with a total past-month prevalence of 8.9 per cent among the population aged 15–65, or about 158,000 users.⁴¹⁵ This reflects an increase in the past-month use of cannabis by more than one third since 2014, while use of cannabis in the past year increased by more than 50 per cent over the same period.

In 2019, the highest past-month prevalence of cannabis use was reported among young people aged 19–25 (20.8 per cent), followed by those aged 26–35 (16.4 per cent). According to the survey, about 25,500 people were estimated to be daily or near-daily users of cannabis – 9.9 per cent of those who reported cannabis use in the past year (13.1 per cent of males, 5.2 per cent of females) – whereas more than one third of regular cannabis users were considered dependent.⁴¹⁶

However, the impact of the provisions regulating the non-medical use of cannabis in Uruguay will become evident only in the coming years, once more information on the outcome measures related to public health and public safety are made available.

411 Uruguay, Instituto de Regulación y Control del Cannabis, “Mercado regulado del cannabis: informe VIII”, 31 October 2019.

412 Ibid.

413 Ibid.

414 Uruguay, Institute for the Regulation and Control of Cannabis website, January 2020.

415 Uruguay, Seventh national household survey on drug use (National Drug Observatory and National Drug Council, 2018).

416 Ibid.

TABLE 4 Regulations for the legalization of the non-medical use of cannabis in Canada

	Federal law	Alberta	British Columbia	Manitoba
Legal process	Government legislation			
Title	Cannabis Act	Gaming, Liquor and Cannabis Act and Gaming, Liquor and Cannabis regulation	Cannabis control and licensing Act (CCLA) Cannabis distribution Act (CDA)	Safe and Responsible Retailing of Cannabis Act
Date implemented	October 17, 2018			
Regulatory authority		Alberta Gaming Liquor and Cannabis (AGLC)	Liquor and cannabis regulation branch	Liquor, Gaming and Cannabis Authority of Manitoba (LGCA) Manitoba Liquor and Lotteries (MBLL)
Minimum age	18	19	19	19
Personal possession quantity	30 g dried or equivalent i.e., 150 g of fresh cannabis 450 g of edible product 2100 g of liquid product 7.5 g of concentrates (solid or liquid) 30 cannabis plant seeds	30 g or equivalent	30 g or equivalent	30 g or equivalent
Home cultivation	Grow from licensed seeds four cannabis plants per residence for personal use Cannabis products such as food and drink at home if organic solvents are not used	Yes	Adults can grow up to four cannabis plants per household, but the plants must not be visible from public spaces	Home growing is not permitted
Interpersonal sharing	30 g or equivalent of legal cannabis product			
Retail transaction limit		30 g or equivalent		
Average retail price per gram (2019 average, Cannabis Stats Hub (13-61-X))		Can\$10.96	Can\$9.32	Can\$10.56

	Federal law	Alberta	British Columbia	Manitoba
Maximum THC content	Dried cannabis to be consumed by inhalations must not exceed 1 g in each discrete unit of cannabis product Products intended to be "administered orally, rectally, vaginally or topically" must not exceed a maximum yield quantity of 10 mg of THC Cannabis oil must not exceed a maximum yield of 30 mg of THC per ml of the oil			
Commercial production	Licensed producers. Each province has an Excise stamp that needs to be fixed on the cannabis products			
Commercial distribution		Licensed retailers Private retail stores, provincial online sales	Private and provincial retail stores, online sales Retail licensing regime similar as for liquor	Private retail stores and online sales
Restrictions on edibles	Cannabis edible products and concentrates legal for sale October 2019	Edibles as yet not allowed	Edibles to be allowed within a year	
Advertising	No promotion, packaging or labelling that could be considered appealing to young people, and ensuring that important product information is presented clearly	No promotion, packaging or labelling that could be considered appealing to young people, and ensuring that important product information is presented clearly Advertising allowed inside cannabis stores	Same as Federal Law	
Taxation Cannabis excise duty rates in provinces and territories (Department of Finance, Canada)	Flower \$0.25/g Trim \$0.75/g Seed \$0.25/seed Seedling \$0.25/seedling Federal Ad Valorem Rate 2.5% of dutiable amount of cannabis product when delivered to purchaser	Flower: \$ 0.75/g plus 16.8% of base amount Trim: \$0.225/g plus 17.8% of base amount Seed: \$0.75/seed plus 16.8% of base amount Ad Valorem Additional Rate 7.5% plus 16.8% of deductible amount when delivered (total applicable rate 24.3%)	Flower \$0.75/g Trim \$0.22/g Seed and seedling : \$0.75/seed or seedling 7.5% provincial sale tax in addition to Federal taxes	Wholesale mark-up on non-medical cannabis, a \$0.75 per gram mark-up plus 9% per cent mark-up applied on top of the \$0.75 per gram
Restrictions on use		In cars, areas frequented by children, or tobacco-restricted areas	In cars, areas frequented by children, or tobacco restricted areas	Smoking and vaping cannabis is illegal in public places (including enclosed public places)

	New Brunswick	Newfoundland and Labrador	Northwest Territories
Legal process			
Title	Cannabis Control Act Cannabis Management Corporation Act	Newfoundland and Labrador Cannabis Regulations Control and Sale of Cannabis Act	Cannabis Legalization and Regulation Implementation Act
Date implemented			
Regulatory authority	Cannabis Management Corporation	Newfoundland and Labrador Liquor Corporation (NLC)	North West Territories Liquor & Cannabis Commission (NTLCC)
Minimum age	19	19	19
Personal possession quantity	30 g or equivalent	30 g or equivalent	30 g or equivalent
Home cultivation	Can grow up to four plants at primary residence. Plants must be kept in a separate locked space Outdoor plants must be located behind a locked enclosure at least 1.52 metres high	A private dwelling can contain up to four cannabis plants	Grow up to four cannabis plants per household
Interpersonal sharing			
Retail transaction limit			
Average retail price per gram after tax	Can\$11.36	Can\$10.61	Can\$14.45
Maximum THC content			
Commercial production			
Commercial distribution	Cannabis NB retail stores and online sales	Private retail stores, provincial online sales	NWT Liquor Stores, provincial online sales
Restrictions on edibles			
Advertising			

	New Brunswick	Newfoundland and Labrador	Northwest Territories
Taxation Cannabis excise duty rates in provinces and territories (Department of Finance, Canada)	Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5% of the dutiable amount when delivered to purchaser	Flower: \$0.75 /gm Trim: \$0.225 /gm Seed/seedlings \$0.75 7.5% of the dutiable amount when delivered to purchaser	Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5% of the dutiable amount when delivered to purchaser
Restrictions on use	Illegal to smoke everywhere except private property or residence	Illegal to smoke everywhere except private property or residence	Illegal to smoke everywhere except private property or residence
	Nova Scotia	Nunavut	Ontario
Legal process			
Title	Cannabis Control Act	Cannabis Act Cannabis Statutes Amendments Act	Cannabis, Smoke-Free Ontario, and Road Safety Statute Law Amendment Act, 2017 Cannabis Statute Law Amendment Act, 2018
Date implemented			
Regulatory authority	Nova Scotia Liquor Corporation	Nunavut Liquor and Cannabis Commission	Provincial cannabis committee Cannabis management corporation
Minimum age	19	19	19
Personal possession quantity	30 g or equivalent No limit on home storage for personal use	30 g or equivalent	30 g or equivalent
Home cultivation	Adults can grow up to four cannabis plants per household	Territorial government can regulate whether plants can be grown at home	Adults can grow up to four plants per residence A household is permitted to have four cannabis plants
Interpersonal sharing			
Retail transaction limit			
	Prince Edward Island		

	Nova Scotia	Nunavut	Ontario	Prince Edward Island
Average retail price per gram after tax	Can\$10.93	Can\$13.71 * not for 2019	Can\$10.53	Can\$11.19
Maximum THC content				
Commercial production				
Commercial distribution	Designated NSLC stores or online	Currently through government-operated online store or by phone	Government retail stores and online sales	Four dedicated government-owned retail stores and online sales
Restrictions on edibles	Sale of edibles illegal under Federal law Edibles can be produced at home for personal use			
Advertising				
Taxation Cannabis excise duty rates in provinces and territories (Department of Finance, Canada)	Flower: \$0.75/ g Trim: \$0.225/g Seed/seedlings \$0.75 7.5 % of the dutiable amount when delivered to purchaser	Flower: \$0.75/g plus 19.3% of base amount Trim: \$0.225/g plus 19.3% of base amount Seed/seedling: \$0.75 seed plus 19.3% of base amount 7.5% plus 19.3% of the dutiable amount of a cannabis product when delivered to a purchaser (total applicable rate of 26.8%)	Flower: \$0.75/g plus 3.9% of base amount Trim: \$0.225/g plus 19.3% of base amount Seed/seedling: \$0.75 seed plus 19.3% of base amount 7.5% plus 19.3 % of the dutiable amount of a cannabis product when delivered to a purchaser (total applicable rate of 26.8 %)	Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5 % of the dutiable amount when delivered to purchaser
Restrictions on use	Illegal everywhere except for areas where tobacco may be smoked	Illegal everywhere except for areas where tobacco may be smoked	Illegal to smoke everywhere except private property	Illegal to smoke everywhere except private property, some exceptions for certain public spaces

	Prince Edward Island	Quebec	Saskatchewan	Yukon
Legal process				
Title	Cannabis Control Act Cannabis Management Corporation Act	Cannabis Regulation Act Act to constitute the Société québécoise du cannabis	The cannabis control (Saskatchewan) Act The cannabis control (Saskatchewan) regulations	Cannabis control and regulation act
Date implemented				
Regulatory authority	Provincial cannabis committee Cannabis management corporation	Société québécoise du cannabis	Cannabis Authority under the Saskatchewan Liquor and Gaming Authority	Yukon Liquor Corporation Cannabis Licensing Board (2019)
Minimum age	19	18	19	19
Personal possession quantity	30 g or equivalent	30 g in a public place 150 g in a private residence	30 g of dried cannabis or equivalent	30 g of dried cannabis or equivalent
Home cultivation	A household is permitted to have four cannabis plants.	Prohibited to cultivate cannabis for personal use	Limit of four cannabis plants grown per household	Four plants per household
Interpersonal sharing				
Retail transaction limit		30 g per visit at Société québécoise du cannabis		30 g per purchase
Average retail price per gram after tax	Can\$11.19	Can\$7.88	Can\$10.68	Can\$10.36
Maximum THC content				
Commercial production		Licensed producers		
Commercial distribution	Four dedicated government-owned retail stores and online sales	Government retail stores and online sales	Private retail stores, provincial online sales	Government retail stores and online sales Cannabis Yukon retail store
Restrictions on edibles				
Advertising				

	Prince Edward Island	Quebec	Saskatchewan	Yukon
<p>Taxation Cannabis excise duty rates in provinces and territories (Department of Finance, Canada)</p>	<p>Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5 % of the dutiable amount when delivered to purchaser</p>	<p>Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5 % of the dutiable amount when delivered to purchaser</p>	<p>Flower: \$0.75/g plus 6.45% of base amount Trim: \$0.225/g plus 6.45% of base amount Seed/seedling: \$0.75 seed plus 6.45% of base amount 7.5% plus 6.45 per cent of the dutiable amount of a cannabis product when delivered to a purchaser (total applicable rate of 13.95%)</p>	<p>Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5% of the dutiable amount when delivered to purchaser</p>
<p>Restrictions on use</p>	<p>Illegal to smoke everywhere except private property, some exceptions for certain public spaces</p>	<p>Illegal to smoke everywhere except for areas where tobacco may be smoked, excluding university and CEGEP campuses</p>	<p>Illegal to smoke everywhere except private property or residence</p>	<p>Illegal to smoke everywhere except private property or residence</p>

TABLE 5 Regulations for the legalization of the non-medical use of cannabis in jurisdictions in the United States

	Alaska	California	Colorado	District of Columbia	Maine
Legal process	Voter initiative, state statute	Voter initiative	Voter initiative, amendment to state constitution	Voter initiative	Voter initiative
Title	Ballot Measure 2	Proposition 64	Amendment 64	Initiative 71	Question 1
Date passed	Nov-14	Nov-16	Nov-12	Nov-14	Nov-16
Date implemented/required date of rule adoption	February 2015: Personal possession, consumption, cultivation October 2016: Retail sales	Licences to be issued by 11 January 2018	December 2012: Personal possession, consumption, cultivation January 2014: Retail sales	February 2015: Personal possession, consumption, cultivation	Take effect on 7 January 2017; regulation for business to be in place August 2017
Regulatory authority	Alcohol and Marijuana Control Office	Bureau of Marijuana Control	Marijuana Enforcement Division (Department of Revenue)	Not applicable; considering separate legislation to regulate commercial production and sale to adults	Department of Agriculture, Conservation and Forestry
Minimum age	21	21	21	21	21
Residency requirement	None	Not specified	None	None	Not specified
Personal possession quantity	28.5 g	1 oz flower 8 g concentrate	28.5 g	2 oz (57 g)	2.5 oz (70.8 g) 5g concentrate
Home cultivation	Six plants, three of which can be flowering; not subject to public views; within property with lawful possession or with consent of the person in lawful possession	Six plants, away from view	Six plants, three of which can be flowering	Six plants per person; Twelve plants per household, six of which can be flowering	Six mature plants, twelve immature plants, unlimited amount of seedlings away from view and tagged with personal identification number. Property owners can prohibit home cultivation. Cultivation for medical purposes not subject to same restrictions
Interpersonal sharing	28.5 g	Yes	28.5 g	28.5 gm or less	Yes for home grow. Not permitted for retail marijuana
Retail transaction limit	28.5 g	Presumably same limits for personal possession	Residents: 28.5 g Non-residents: 7 g	Not applicable	2.5 oz. of marijuana Twelve seedlings
Retail pricing structure	Market	Market/commercial	Market	Market	Market/commercial
Average retail price per gram of medium quality	\$20.00	\$12.03	\$14.14	Not applicable	\$14.00
Source: budzu.com					
Maximum THC content	Not set initially	Not set initially	Not set initially	Not set initially	Not set initially
Registration requirements	None	Not specified	None	None	Not specified

	Alaska	California	Colorado	District of Columbia	Maine
Commercial production	Licensed cannabis producers	Licensed cultivators and manufacturers, varying types	Licensed cannabis cultivation facilities	None	Licensed cultivators; two types based on size
Commercial distribution	Licensed retail cannabis stores	Limits on market concentration	Licensed retail cannabis stores	None	State authority may not limit total number of stores; localities may regulate number and location of establishments
Restrictions on edibles	5 mg of THC for single serving, no more than 50 mg of homogenous THC allowed per package. Child-resistant packaging required. Separate warnings on risks, not appealing to children	10 mg THC per serving. Warning and potency labels. List of ingredients and cannabinoid content	Maximum of 10 mg of THC in each individually packed serving; warning labels "keep out of reach of children"; THC symbol on labels and not attractive to children	Currently not allowed	Serving size and potency limits to be developed in regulations. List of ingredients packing and labels; products and edibles may not contain additives designed to make product more appealing to children
Advertising	Logo or advertisement for licensed marijuana may not promote excessive consumption, depiction appealing to a person under 21 years. Restrictions on advertisements in school areas, public transport, and contrain prescribed warning	Restricted to those over 21. Restrictions on false advertisement or claims of untrue health benefits. Products cannot appeal to children	Restricted to media with no more than 30% of the audience under the age of 21	Not applicable, no commercial market	Restricted to those over 21. Restrictions on false advertisement or claims of untrue health benefits. Products cannot appeal to children
Taxation	\$50 excise tax per ounce on sales or transfers from cultivation facility to retail store or product manufacturer; other parts of plant, e.g., stems and leaves are taxed at \$15 per ounce	15% excise on retail, \$9.25 per dry weight ounce on flower after harvest. \$2.75 per drug weight ounces on leaves	15% excise tax on cultivation; 10% retail marijuana sales tax to be decreased to 8% in July 2017. Up to 2.9% state sales tax to 3.5% local sales taxes	Not applicable, no commercial market	10% excise on retail
Cannabis clubs	Not explicitly allowed or prohibited Earlier ban on in-store consumption repealed in November 2015	Not specified although they may exist in the form of microbusiness that allow on-site consumption	Not allowed	Not allowed; currently under investigation by city task force.	State-licensed clubs
Restrictions on use	Cannabis use in public is unlawful 1998: Patient registry, no dispensaries registration; out-of-state patients recognized for approved conditions but not for dispensary purchases; possession, home cultivation	Prohibit cannabis use in a public place unlicensed for such use, including near schools and other areas where children are present. 1996 and 2003; Patient registry - voluntary registration; cooperatives and collectives; State-wide licensing of dispensaries will begin 2018	Not permitted in public places	Not permitted in public places (use on private property)	Not permitted in public places (allowed use in private property or smoking in a state-licensed marijuana social club)
Medical cannabis			2000: Patient registry, dispensaries already existed; out-of-state patients not recognized; possession, consumption; 2010: commercial production and sales	1998/2010: Patient registry; dispensaries allowed	1999: Patient registry or identification card; dispensaries, recognizes patients from other states but not for dispensary purchases

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
Legal process	Voter initiative	Voter initiative	Voter initiative	Voter initiative, state statute	Legislative process	Voter initiative, state statute	Legislative process
Title	Proposal 18-1	Question 4	Question 2	Measure 91	No. 86 S.54 (initiated in Feb 2020 to be finalized)	Initiative 502	HB 1438
Date passed	6 December 2018	Nov-16	Nov-16	Nov-14	Jan-18	Nov-12	Jun-19
Date implemented/required date of rule adoption	Commercial licences application begin by 6 December 2019	15 September 2017. Licences issued starting 1 October 2017	Takes effect on 1 January 2017 and regulations to be in place by 1 January 2018	July 2015: Personal possession, consumption, cultivation October 2015 up to December 2016: Retail sales through medical dispensaries January 2017: retail sales through licensed retailers	01 July 2018	December 2012: Personal possession, consumption July 2014: Retail sales	1-Jan-20
Regulatory authority	Department of Licensing and Regulatory Affairs	1) Cannabis Control Commission, and 2) Cannabis Advisory Board	Department of Taxation	Oregon Liquor Control Commission	Cannabis Control Board (proposed under S.54)	Liquor and Cannabis Board (formerly the Liquor Control Board)	Department of Financial and Professional Regulation
Minimum age	21	21	21	21	21	21	21
Residency requirement		Not specified	Not specified	None		None	Non residents can acquire half the amount allowed for residents
Personal possession quantity	2.5 oz (70.8 g) on person and 10 oz (283 g) at home	1 oz flower (28.5 g) 5g concentrate	1 oz flower 3.5g concentrate	In public: 28.5 g At home: 228 g	1 oz or 5 g of cannabis	28.5 g	30 g of raw cannabis, 500 mg of THC in cannabis-infused product or 5 g of cannabis concentrate
Home cultivation	Up to 12 plants per household	6 plants, 12 in a single residence away from view; 10 oz. of dried marijuana permitted at home	Six plants, no more than twelve on property in indoor or in enclosed with permission of landlord and must be 25 miles away from retail cannabis store	Four plants in flower	2 mature plants or 4 immature plants	Not allowed	Medical cannabis patients can grow up to 5 plants per household. Plants need to be secured and out of view by public.

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
Interpersonal sharing	Yes (2.5 oz with a max of 15 mg of concentrate)	Yes	Yes	28.5 g	Same as personal possession limits	Not allowed	
Retail transaction limit		Not specified, presumably same limits as for personal possession	Not specified, presumably same limits as for personal possession	1 oz dried flower 16 oz edible form 72 oz cannabis in liquid form 10 cannabis seeds 4 immature cannabis plants		28.5 g	Not set but would be same as personal possession limit
Retail pricing structure	Market/commercial	Market/commercial	Market/commercial	Market	No provision for setting up a taxed-and-regulated retail marketplace	Market	Market
Average retail price per gram of medium quality Source: budzu.com	\$ 16.92	\$ 14.64	\$ 16.55	\$ 10.59	NA	\$ 10.55	\$ 11.95
Maximum THC content		Not set initially	Not set initially	Not set initially	Cannabis flower: not to exceed 30% THC. Solid concentrates: not exceed 60%. Oils — apart from cartridges for vape pens — not allowed.	Not set initially	Initially 100 mg of THC per package; Department of Agriculture may change maximum level of THC contained in each serving of cannabis-infused product
Registration requirements		Personal data collection not required	Personal data collection not required	None		None	None
Commercial production	Licensed establishments	Licensed establishments	Licensed establishment	Licensed cannabis producers	Not clarified in law	Licensed cannabis producers	Licensed marijuana producers
Commercial distribution	A municipality may completely prohibit or limit the number of establishments operating	Licensed establishments; localities can regulate, limit or prohibit the operation of businesses	Limits on market concentration by population	Licensed retail cannabis stores	Not clarified in law	Marijuana can only be sold and purchased at state-licensed retail stores	Dispensary provides products to adult consumers. Medical cannabis dispensary could also apply for adult sale.

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
Restrictions on edibles		Serving size and potency limits to be developed in regulations. List of ingredients	Not specified	Maximum of 10 mg of THC in each individually packed serving; edible products to undergo a preapproval process; not appealing to children		10 mg of THC in each individually packaged serving; child-proof packaging; THC labelling; marijuana-infused products, packages and labels to be approved by the State Liquor Control Board before sale	Allowed but with information and warning on consumption
Advertising	Restrictions on public signs related to cannabis establishments	Restrictions on marketing to children to be developed in regulations	A licensed marijuana establishment cannot engage in advertising that contains any false or misleading statements, promotes overconsumption, depicts actual consumption, or appeals to minors. Also applies 70/30 rule from Colorado	Entry sign required on exterior of dispensaries; Oregon Liquor Control Commission has authority to further regulate or prohibit advertising	Advertising could not be deceptive, promote overconsumption, offer free samples, or be appealing to minors. Advertising would only be allowed where the licensee can reasonably expect no more than 15% of viewers will be under 21	Cannabis business licensees are limited to two permanent signs on their licensed premises, and all other forms of outdoor ads on the premises are banned. New rules mandated that billboards and signs can no longer contain images of the cannabis plant or cannabis products. Cannot contain depictions of cartoon characters or any depictions that may be appealing to children	Businesses cannot place advertisements that have false or misleading claims; or advertisements that promote overconsumption; depict a person under 21 consuming; make health, medicinal or therapeutic claims; contain images that can be appealing to minors or children; advertisements are not allowed within 1,000 feet of school or playground, public park or public property; no sales promotions are allowed; similar restrictions apply on packaging and labelling. Health warnings to be legibly displayed

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
Taxation	10% excise tax	3.75% excise on retail	15% excise on wholesale sale 10% excise tax on retail sale	No tax on retail sales from October 2015 to December 2015 25% sales tax after 5 January 2016 17% sales tax in 2017 with options for local communities to establish local tax up to 3%		July 2014 to June 2015: 25% at each stage (production, processing, retail) July 2015: 37% sales tax	10% tax will apply to cannabis flower or products with less than a 35% THC concentration. 20% tax will apply to products infused with cannabis, such as edible products. 25% tax will apply to any product with a THC concentration higher than 35%. In addition, 6.25% sales tax, along with local taxes of up to 3.5%. Consumers may pay between 19.55% and 34.75% depending on a product's potency
Cannabis clubs		Not allowed, although they may exist in establishments that allow on-site consumption	Not specified	Not allowed		Not allowed	
Restrictions on use	Not permitted in public places or place where prohibited by person who owns, occupies or manages the property, allowed in designated public places that are not accessible to persons under 21 years of age	Cannot use cannabis in a place where smoking tobacco is prohibited	Cannabis consumption is for private use only. It is illegal to smoke in public, on federal land or in a vehicle without risking a fine	Smoking marijuana in public is illegal	Use is limited to individual dwellings. Prohibited in street, alley, park or sidewalk in addition to usual smoke free places	It is illegal to consume marijuana in view of the public	Smoking cannabis is not allowed in any place where smoking is prohibited under the Smoke Free Illinois Act

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
Medical cannabis	<p>2008: patient registry, dispensaries can be established with local ordinances; dispensation for specific conditions, recognize out of state patients only for legal protection of possession but not for dispensary purchases</p>	<p>2012/2013: patient registry or identification cards; dispensaries, out-of-state patients not recognized</p>	<p>2000: Patient registry or identification card; No dispensaries; recognize out of state patients if other state's programmes are substantially similar; patients must fill out Nevada paper work</p>	<p>1998: Patient registry, dispensaries already existed but not clearly authorized by law or regulated; possession, home cultivation</p>		<p>1999/2010/2011; no registration or identification card; dispensaries approved as of November 2012, first stores opened in July 2014; 1999 possession; 2012: Home cultivation</p>	<p>Compassionate use of medical cannabis pilot programme act, August 2013. Eligible patients with a doctor's recommendation, with a recognized debilitating condition, after registering with the state, may legally consume medical marijuana. Purchase limit is 2.5 ounces of cannabis flower every 14 days. New law also allows school nurses or administrators to give cannabis products to students who are registered medical patients and permits students to medicate under the supervision of those officials</p>

TABLE 6 Regulations for the legalization of the non-medical use of cannabis in Uruguay

Uruguay	
Legal process	Government initiative, national law
Title	Law No. 19.172
Date passed	Dec-13
Date implemented/ required date of rule adoption	August 2014: Personal cultivation October 2014: Grower clubs Mid-2017: pharmacy sales
Regulatory authority	Institute for the Regulation and Control of Cannabis (IRCCA)
Minimum age	18
Residency requirement	Uruguayan citizenship or permanent Uruguayan residency required
Personal possession quantity	40 g per month
Home cultivation	Six plants in flower
Interpersonal sharing	Allowed within the home
Retail transaction limit	40 g per month, 10 g per week (sale through pharmacies to registered users)
Retail pricing structure	Government price control
Average retail price per gram after tax	265 Uruguayan pesos per 5 g (approx \$1.2 per gram)
Maximum THC content	All products are required to indicate that CBD is equal to or more than 3% and THC is equal to or less than 9%
Registration requirements	Yes, with IRCCA for any of the three modes of access
Commercial production	Licensed marijuana producers
Commercial distribution	Licensed pharmacies
Advertising	Prohibited
Taxation	No tax, although IRCCA can impose tax in the future.
Cannabis clubs	Clubs with 15-45 members allowed to cultivate up to 99 plants, maximum 480 g of dried product per member per year
Medical cannabis	In 2013: Passed (Law 19.172). Decree N° 46/015. Oils under prescription (CBD) and cosmetics with CBD currently for sale in pharmacies.

GLOSSARY

amphetamine-type stimulants — a group of substances composed of synthetic stimulants controlled under the Convention on Psychotropic Substances of 1971 and from the group of substances called amphetamines, which includes amphetamine, methamphetamine, methcathinone and the “ecstasy”-group substances (3,4-methylenedioxyamphetamine (MDMA) and its analogues).

amphetamines — a group of amphetamine-type stimulants that includes amphetamine and methamphetamine.

annual prevalence — the total number of people of a given age range who have used a given drug at least once in the past year, divided by the number of people of the given age range, and expressed as a percentage.

coca paste (or coca base) — an extract of the leaves of the coca bush. Purification of coca paste yields cocaine (base and hydrochloride).

“crack” cocaine — cocaine base obtained from cocaine hydrochloride through conversion processes to make it suitable for smoking.

cocaine salt — cocaine hydrochloride.

drug use — use of controlled psychoactive substances for non-medical and non-scientific purposes, unless otherwise specified.

fentanyls - fentanyl and its analogues.

new psychoactive substances — substances of abuse, either in a pure form or a preparation, that are not controlled under the Single Convention on Narcotic Drugs of 1961 or the 1971 Convention, but that may pose a public health threat. In this context, the term “new” does not necessarily refer to new inventions but to substances that have recently become available.

opiates — a subset of opioids comprising the various products derived from the opium poppy plant, including opium, morphine and heroin.

opioids — a generic term that refers both to opiates and their synthetic analogues (mainly prescription or pharmaceutical opioids) and compounds synthesized in the body.

problem drug users — people who engage in the high-risk consumption of drugs. For example, people who inject drugs, people who use drugs on a daily basis and/or people diagnosed with drug use disorders (harmful use or drug dependence), based on clinical criteria as contained in the *Diagnostic and Statistical Manual of Mental Disorders* (fifth edition) of the American Psychiatric Association, or the *International Classification of Diseases and Related Health Problems* (tenth revision) of WHO.

people who suffer from drug use disorders/people with drug use disorders — a subset of people who use drugs. Harmful use of substances and dependence are features of drug use disorders. People with drug use disorders need treatment, health and social care and rehabilitation.

harmful use of substances — defined in the *International Statistical Classification of Diseases and Related Health Problems* (tenth revision) as a pattern of use that causes damage to physical or mental health.

dependence — defined in the *International Statistical Classification of Diseases and Related Health Problems* (tenth revision) as a cluster of physiological, behavioural and cognitive phenomena that develop after repeated substance use and that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state.

substance or drug use disorders — referred to in the *Diagnostic and Statistical Manual of Mental Disorders* (fifth edition) as patterns of symptoms resulting from the repeated use of a substance despite experiencing problems or impairment in daily life as a result of using substances. Depending on the number of symptoms identified, substance use disorder may be mild, moderate or severe.

prevention of drug use and treatment of drug use disorders — the aim of “prevention of drug use” is to prevent or delay the initiation of drug use, as well as the transition to drug use disorders. Once a person develops a drug use disorder, treatment, care and rehabilitation are needed.

REGIONAL GROUPINGS

The *World Drug Report* uses a number of regional and subregional designations. These are not official designations, and are defined as follows:

- East Africa: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, South Sudan, Uganda, United Republic of Tanzania and Mayotte
- North Africa: Algeria, Egypt, Libya, Morocco, Sudan and Tunisia
- Southern Africa: Angola, Botswana, Eswatini, Lesotho, Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe and Reunion
- West and Central Africa: Benin, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Togo and Saint Helena
- Caribbean: Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Anguilla, Aruba, Bonaire, Netherlands, British Virgin Islands, Cayman Islands, Curaçao, Guadeloupe, Martinique, Montserrat, Puerto Rico, Saba, Netherlands, Sint Eustatius, Netherlands, Sint Maarten, Turks and Caicos Islands and United States Virgin Islands
- Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama
- North America: Canada, Mexico and United States of America, Bermuda, Greenland and Saint-Pierre and Miquelon
- South America: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela (Bolivarian Republic of), Falkland Islands (Malvinas) and French Guiana
- Central Asia and Transcaucasia: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan
- East and South-East Asia: Brunei Darussalam, Cambodia, China, Democratic People's Republic

of Korea, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Singapore, Thailand, Timor-Leste, Viet Nam, Hong Kong, China, Macao, China, and Taiwan Province of China

- South-West Asia: Afghanistan, Iran (Islamic Republic of) and Pakistan
- Near and Middle East: Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, State of Palestine, Syrian Arab Republic, United Arab Emirates and Yemen
- South Asia: Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka
- Eastern Europe: Belarus, Republic of Moldova, Russian Federation and Ukraine
- South-Eastern Europe: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, North Macedonia, Romania, Serbia, Turkey and Kosovo⁴¹⁷
- Western and Central Europe: Andorra, Austria, Belgium, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland, Faroe Islands, Gibraltar and Holy See

Oceania (comprised of four sub-regions):

- Australia and New Zealand: Australia and New Zealand
- Polynesia: Cook Islands, Niue, Samoa, Tonga, Tuvalu, French Polynesia, Tokelau and Wallis and Futuna Islands
- Melanesia: Fiji, Papua New Guinea, Solomon Islands, Vanuatu and New Caledonia
- Micronesia: Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru, Palau, Guam and Northern Mariana Islands

⁴¹⁷ All references to Kosovo in the *World Drug Report* should be understood to be in compliance with Security Council resolution 1244 (1999).

