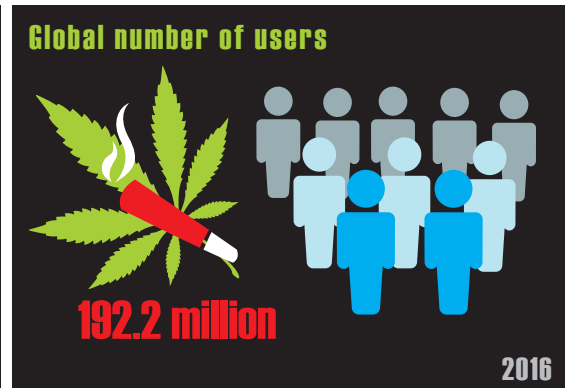
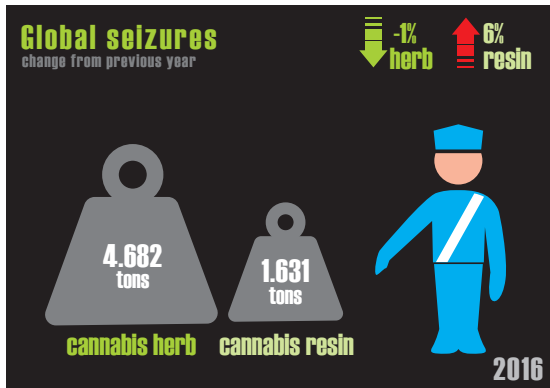


## C. CANNABIS



Note: Data refer to 2016.

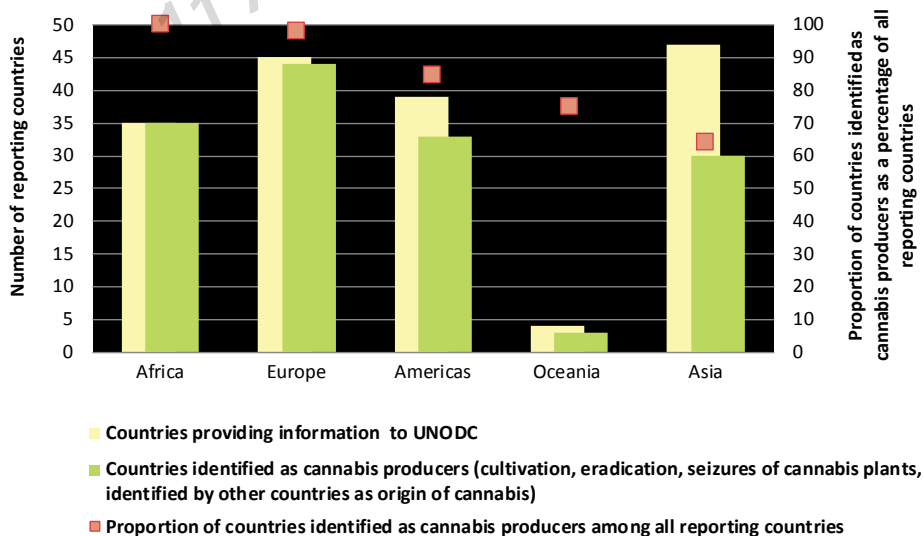
### Cannabis production continues to affect all regions worldwide

Cannabis plant cultivation was reported —through either direct indicators (cultivation or eradication of cannabis plants) or indirect indicators (seizures of cannabis plants, origin of cannabis seizures as reported by other Member States) — by 145 countries (or 85 per cent of countries reporting to UNODC) over the period 2010–2016, representing 94 per cent of the world’s total population.

### Global seizures of cannabis herb declined in 2016, while seizures of cannabis resin continued to rise

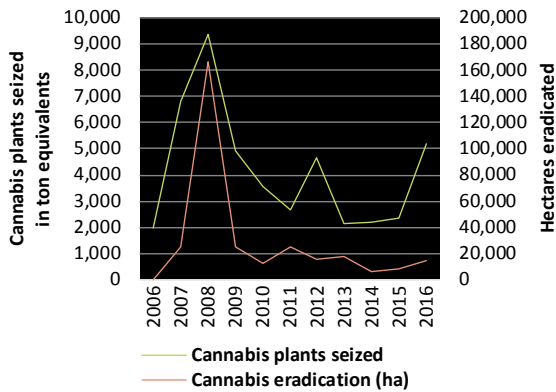
There is a lack of systematic and direct measurements of cannabis cultivation and production, which exist in only a few countries and are not carried out on a regular basis. However, a number of countries report on cannabis plants seized and on the eradication of cannabis; the data available suggest a peak in eradication activities in 2008 (reflecting the

**FIG. 1** | Number of countries affected by cannabis production and number of countries reporting drug-related information to the United Nations Office on Drugs and Crime, 2010–2016



Source: UNODC, responses to the annual report questionnaire.

**FIG. 2** Global quantity of cannabis plants seized and eradication of cannabis plants, 2006–2016



Source: UNODC, responses to the annual report questionnaire.

large amounts of cannabis plant seizures in Paraguay and large areas of cannabis eradication in Albania that year), and an increase in 2016, mainly a result of increases in cannabis plant seizures in Albania, Guatemala, the Philippines and Tajikistan and an increase in the area of cannabis cultivation eradicated in India.

### Cannabis herb

As in previous years, the largest quantity of cannabis herb seized in 2016, accounting for almost two thirds of the global total, was reported in the Americas. North America accounted for 39 per cent of the global total, and South America and Central America and the Caribbean for 23 per cent. The next largest seizure amounts reported for regions were those of Africa (17 per cent), Asia (14 per cent), Europe (6 per cent) and Oceania (0.2 per cent). Whereas the amounts of cannabis plants seized and area of eradication increased, the global quantity of cannabis herb seized decreased by 22 per cent from 2015 to 2016, to 4,682 tons, the lowest level since 2000. That decrease in the amount of cannabis herb seized in 2016 was mainly due to the 51 per cent decrease reported in Africa (partly a reflection of reporting issues) and the 25 per cent decrease in the Americas, whereas the quantity of cannabis herb seized increased in Europe (49 per cent), Asia (135 per cent) and Oceania (6 per cent). The total number of cannabis herb seizure cases worldwide increased slightly in 2016 (2 per cent increase). In 2016, the quantity of cannabis plants seized

increased in Africa (mainly in North Africa), Asia and Europe, and decreased in the Americas and Oceania.

While there is no evidence that the global cannabis market is shrinking (the global number of cannabis users continued to rise in 2016), the decline in the global quantity of cannabis herb seized may indicate a shift in the priorities of law enforcement authorities. This may be the case in North America in particular, where the availability of medical cannabis in many jurisdictions and new legal frameworks that allow the cultivation of cannabis for recreational use in some states of the United States may have played a role.

By contrast, the quantities of cannabis herb seized increased in Europe, Oceania and Asia from 2015 to 2016. Over the period 2006–2016, cannabis herb seizures doubled in Europe, almost tripled in Asia and quadrupled in Oceania.

Even with the decline in cannabis herb seized in North America, the United States continued to be the country reporting the largest quantity of cannabis herb seized worldwide in 2016 (21 per cent of all cannabis herb seized), followed by Mexico (18 per cent). Cannabis herb seizures in the United States were, however, at 978 tons, at their lowest level since 2000, and cannabis herb seizures made in Mexico were, at 841 tons, at their lowest level since 1995. The next largest portions of the global quantity of cannabis herb seized were reported by Paraguay (9 per cent) — one of the largest cannabis-exporting countries in South America — followed by India (6 per cent), Brazil (5 per cent) and Egypt (4 per cent).

### Cannabis resin

Trafficking in cannabis resin continues to be far more geographically concentrated than trafficking in cannabis herb. Some 50 per cent of the total quantity of cannabis resin seized worldwide in 2016 was intercepted in the Near and Middle East/South-West Asia, 23 per cent in North Africa, and 23 per cent in Western and Central Europe. Those three subregions thus accounted for 97 per cent of all cannabis resin seized worldwide in 2016.

The quantity of cannabis resin seized worldwide in 2016 was the second largest annual amount ever reported. The 6 per cent rise from 2015 to 2016,

## Trafficking of cannabis herb continues to be predominantly intraregional in nature

Most trafficking of cannabis herb takes place in the region where it was produced, a phenomenon that has become even more pronounced since the spread of indoor cannabis cultivation.<sup>a</sup> The countries most frequently reported in the period 2012–2016 as countries of origin of cannabis herb by region and subregion are as follows.

### Americas

The most frequently reported source country for transnational shipments of cannabis herb in North America was Mexico, followed by Canada. Cannabis is grown in Mexico (notably in the state of Sinaloa and neighbouring states),<sup>b</sup> in Canada, and all 50 states of the United States, mostly on the West Coast, in particular California.<sup>c</sup> While ongoing increases in the domestic cultivation of cannabis were reported in the United States in 2016, Mexico remained the most important foreign source of cannabis herb,<sup>c</sup> while lesser volumes were also smuggled from the Caribbean.<sup>c</sup> The importance of Mexico as a source country for the United States cannabis market appears to be declining, and that decline seems to be mostly due to perceived differences in the quality of marijuana.<sup>c</sup> While there are indications that some drug trafficking organizations in Mexico, in order to compete with cannabis produced in the United States, have started to produce higher-potency cannabis,<sup>c</sup> other organized crime groups have allegedly prompted Mexican farmers to increase cultivation of opium poppy.<sup>b</sup> In South America, the Caribbean and Central America, the most frequently reported source countries of cannabis herb were Colombia and Paraguay, followed by Jamaica. The vast majority of the cannabis produced in South America, the Caribbean and Central America is for consumption within the Americas.

### Africa

In Africa, only 17 countries reported on the origin, transit and departure of cannabis herb over the period 2012–2016, suggesting a low level of transnational trafficking in the region. The most frequently mentioned countries of origin or transit of cannabis herb in the region were Ghana (reported by 5 countries), followed by Nigeria (3 countries), Mozambique (3 countries) and Swaziland (3 countries). Although most of the cannabis produced in Africa is for consumption within the region, a number of African countries (Nigeria, Ghana, South Africa and Zambia) have identified European countries as the final destination, notably the United Kingdom, the Netherlands and Italy.

### Asia

In Asia, 26 countries reported on the origin, transit and departure of cannabis herb over the period 2012–2016. Most of the cannabis herb trafficking in the region seems to be at the national level. Only a handful of countries were identified by other countries as countries of origin or transit of cannabis herb: India (4 countries), Islamic Republic of Iran

(reported by 4 countries) and Afghanistan (3 countries). As in other regions, most of the cannabis produced in Asia is for consumption within the region. One major exception is cannabis herb produced in Central Asia, which is often destined for Eastern Europe, particularly for the Russian Federation.<sup>b</sup> In addition, there are also some shipments of cannabis herb from North America (Canada and United States) to East Asia, notably Japan, the Republic of Korea and Hong Kong, China.<sup>b</sup>

### Europe

Cannabis herb is produced in practically all European countries. The most frequently mentioned source countries for cross-border trafficking of cannabis herb were the Netherlands and Albania, followed at some distance by Czechia. Albania and the Netherlands reported the largest eradication of cannabis plant in Europe in recent years (Albania reported the eradication of 5,205 outdoor sites with a total of 2,536,288 cannabis plants in 2016; and Netherlands reported the eradication of 5,856 indoor sites with a total of 994,068 cannabis plants).<sup>b</sup> Cannabis herb shipments from outside Europe seem to be of only minor importance and are limited to Central Asia (mostly for Eastern Europe), as well as some countries in Africa, the Americas, South-West Asia and South-East Asia. The overwhelming proportion (99 per cent of all mentions) of cannabis produced or imported into Europe was destined for final consumption in Europe.

### Oceania

Most of the cannabis found in Oceania is locally grown and locally trafficked. Nevertheless, in Australia, the largest cannabis market in Oceania, a total of 38 “embarkation countries” for illegal cannabis imports were detected in the period 2015–2016, with most quantities smuggled by air cargo.<sup>d</sup> In Oceania as a whole, cannabis herb sourced from abroad mainly originates in or transits the United States, followed by Canada, the Netherlands and South Africa, while Australia is reported as a source by New Zealand.<sup>b</sup>

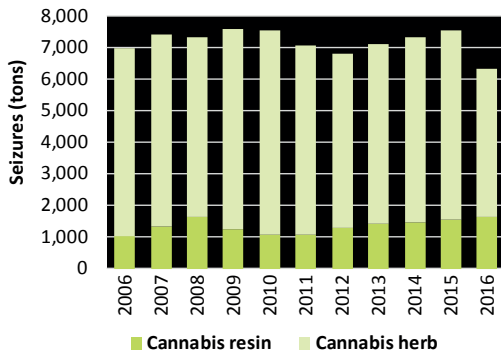
<sup>a</sup> European Drug Report 2017: Trends and Developments (EMCDDA, Luxembourg, Publications Office of the European Union, 2017) and previous years.

<sup>b</sup> UNODC, responses to the annual report questionnaire

<sup>c</sup> United States, Department of Justice, Drug Enforcement Administration, 2017 National Drug Threat Assessment (October 2017).

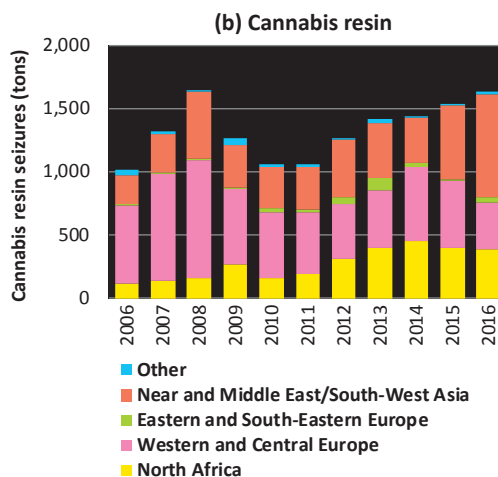
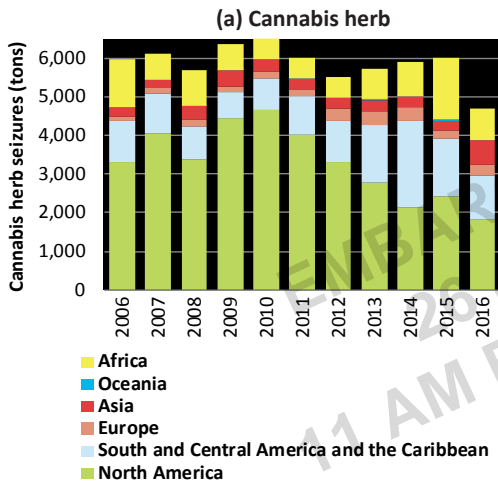
<sup>d</sup> Australian Criminal Intelligence Commission, Illicit Drug Data Report 2015–16 (Canberra, 2017), pp. 60–71.

**FIG. 3** Global quantities of main cannabis products seized, 2006–2016



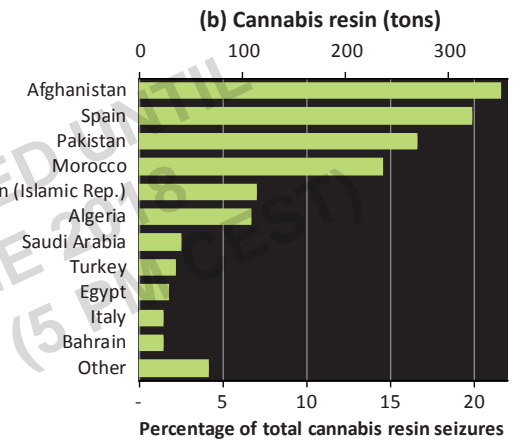
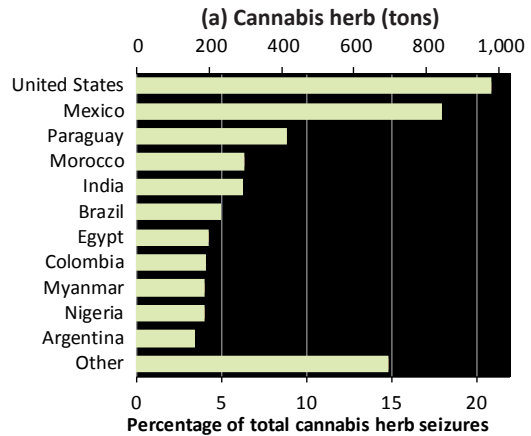
Source: UNODC, responses to the annual report questionnaire.

**FIG. 4** Quantities of cannabis seized, by region, 2006–2016



Source: UNODC, responses to the annual report questionnaire.

**FIG. 5** Quantities of cannabis seized, by country, 2016



Source: UNODC, responses to the annual report questionnaire.

to 1,631 tons, in the quantity of cannabis resin seized was primarily due to the 41 per cent increase in the quantity of cannabis resin seized in the Near and Middle East/South-West Asia, which more than tripled over the period 2006–2016. The quantity of cannabis resin seized in North Africa, by contrast, decreased by 3 per cent, while in Western and Central Europe — which for years was the main cannabis resin market — it fell by more than 30 per cent from 2015 to 2016. This seems to reflect an underlying shift away from the use of cannabis resin to the use of cannabis herb grown in Europe. For the first time ever, the largest quantity of cannabis resin seized in 2016 was reported by Afghanistan (22 per cent of the global total), followed by Spain (20 per cent), Pakistan (17 per cent) and Morocco (15 per cent).

### *Cannabis resin continues to be trafficked mostly from Morocco and Afghanistan to key destination markets*

While the trafficking of cannabis herb — in contrast to the trafficking of other plant-based drugs — mostly takes place within the region of production (see box), there is substantial interregional trafficking of cannabis resin, most notably between North Africa and Western and Central Europe, between Central Asia and Eastern Europe and between the Near and Middle East/South-West Asia and Europe.

However, while cannabis herb has a global reach, cannabis resin has a more restricted market mainly confined to the Near and Middle East/South-West Asia, North Africa and Europe. Cannabis resin that is consumed within this smaller market mainly originates in Afghanistan and Morocco, although some also originates in other countries such as Lebanon and Pakistan.

Over the period 2012–2016, Morocco was reported as a source of cannabis resin by a large share of countries in North Africa (80 per cent of all mentions by countries in that subregion that reported the source of cannabis resin seized) and Western and Central Europe (41 per cent of mentions in that subregion). Some cannabis resin of Moroccan origin was also reportedly trafficked to Eastern Europe (27 per cent of all mentions in that subregion) and South-Eastern Europe (11 per cent of mentions). The largest quantities of cannabis resin seized in North Africa continues to be reported in Morocco and Algeria.<sup>1</sup> For years, Spain has been identified by other European countries as the principal country of departure and transit of cannabis resin in the region, accounting for 19 per cent of all such mentions in the period 2012–2016, followed by the Netherlands (14 per cent of all mentions), another important hub for cannabis trafficking in Europe.

Afghanistan is also an important source country of cannabis resin, with 19 per cent of all mentions by countries that reported the source of cannabis resin in the period 2012–2016. Cannabis resin originating in Afghanistan has been identified in countries in Central Asia and Transcaucasia, in Eastern Europe (most notably in the Russian Federation) and in

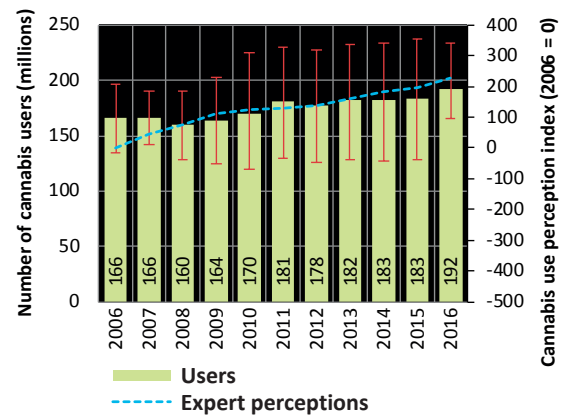
Western and Central Europe (13 per cent of all mentions in that subregion). Lebanon was also mentioned as the source country by 7 per cent of reporting countries and Pakistan by 5 per cent. Those two countries supply cannabis resin to the neighbouring countries in the Near and Middle East/South-West Asia.

### Estimated global number of cannabis users higher in 2016

Cannabis continues to be the most widely used drug worldwide. UNODC estimates that roughly 3.9 per cent (range: 3.4–4.8 per cent) of the global population aged 15–64 years used cannabis at least once in 2016: some 192.2 million people (range: 165.8 million–234.1 million). The number of cannabis users estimated for 2016 is 16 per cent higher than the number estimated for 2006. As some large countries do not report hard data on cannabis use, this change may mask undetected changes, but qualitative assessments by national experts, as reported by an average of 77 Member States per year, confirm the trend of increasing cannabis use over the period 2006–2016.

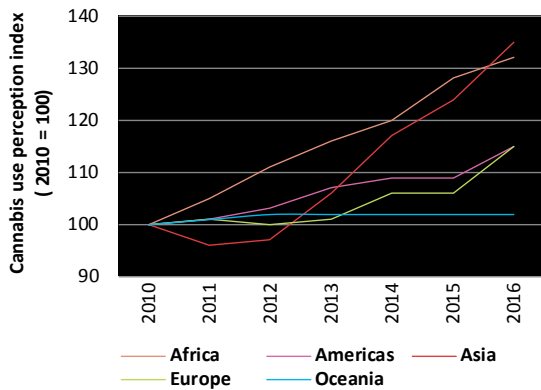
According to the cannabis use perception index, the increase in cannabis use over the period 2010–2016 appears to have been greatest in countries in Asia and Africa, followed by increases in countries in the Americas and Europe. In Oceania, by contrast,

**FIG. 6** Trends in the number of annual cannabis users and cannabis use perception index, 2006–2016



Source: UNODC, responses to the annual report questionnaire.  
Note: For details on the perception index calculations, refer to the online methodological annex.

<sup>1</sup> UNODC, responses to the annual report questionnaire.

**FIG. 7** Trends in cannabis use perception index, by region (2010 = 100)

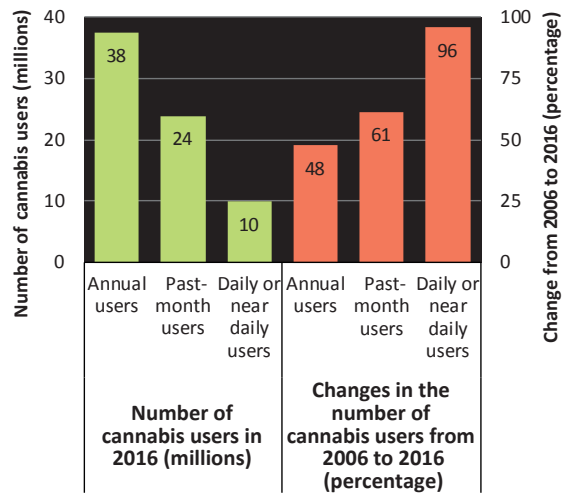
Source: UNODC, responses to the annual report questionnaire.  
 Note: For further information on the calculations of drug use perception indexes, see the online methodological annex.

hardly any change has been reported in the past decade.

### Cannabis use is still on the increase in North America

Cannabis use increased in the Americas in the past decade from 40.5 million people who used cannabis in the past year, or 6.9 per cent of the population aged 15–64 years, in 2006,<sup>2</sup> to 52.9 million, or 8.0 per cent of the population aged 15–64 years, in 2016. The increase was most pronounced in the United States where, after some minor decreases at the beginning of the 2000s, up until 2007, annual prevalence of cannabis use grew significantly thereafter to 13.5 per cent of the population aged 12 years and older in 2015, and 13.9 per cent in 2016.<sup>3</sup> These increases are taking place at a time when there is a decrease in risk perceptions<sup>4</sup> regarding the use of cannabis<sup>5</sup> and discussions in some individual

- World Drug Report 2008 (United Nations publication, Sales No. E.08.XI.11), p. 112.
- United States, SAMHSA, Center for Behavioral Health Statistics and Quality, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2016 National Survey on Drug Use and Health*, HHS Publication No. SMA 17-5044, NSDUH Series H-52, (Rockville, Maryland, 2016).
- Lloyd D. Johnston and others, , 2017 overview, (Ann Arbor, Michigan, University of Michigan Institute for Social Research, 2018).
- Naji Salloum and others, “A reciprocal effects analysis of cannabis use and perceptions of risk”, *Addiction*, vol. 113, No. 6 (2018), pp. 1077–1085; Eldon Spackman and others,

**FIG. 8** Cannabis users in the United States, 2006–2016

Source: United States, SAMHSA, Center for Behavioral Health Statistics and Quality, (Rockville, Maryland, September 2017).

states on the legalization of cannabis for recreational use. The growth in cannabis use in the United States exacerbated problematic patterns of consumption, as the number of daily or almost daily cannabis users almost doubled over the period 2006–2016, while the number of past-month users increased by 60 per cent and that of past-year users by almost half.<sup>6</sup>

In North America, comparatively high levels of cannabis use have also been reported in Canada, where cannabis use in the past year was reported by 14.7 per cent<sup>7</sup> of the population aged 15 years and older in 2015, up from 10.7 per cent in 2013,<sup>8</sup> and 9.1 per cent in 2011.<sup>9</sup>

“Marijuana use and perceptions of risk and harm: a survey among Canadians in 2016”, *Healthcare Policy*, vol. 13, No. 1 (2017), pp. 17–27; Jason Kilmer and others, “Marijuana use, risk perception, and consequences: is perceived risk congruent with reality?”, *Addictive Behaviors*, vol. 32, No. 12 (2007), pp. 3026–3033.

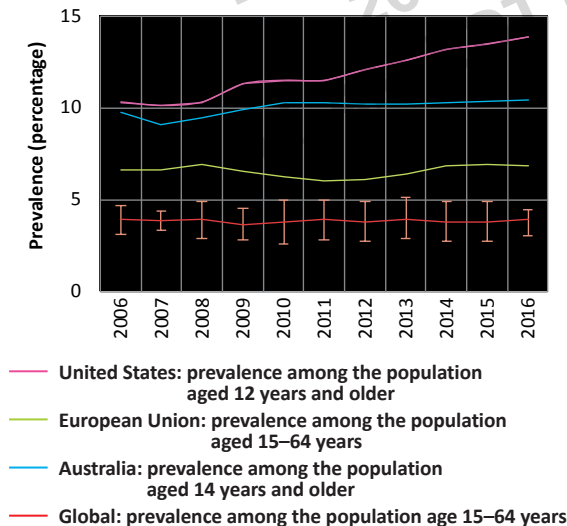
- United States, SAMHSA, Center for Behavioral Health Statistics and Quality, *Results from the 2016 National Survey on Drug Use and Health: Detailed Tables* (Rockville, Maryland, September 2017).
- UNODC, responses to the annual report questionnaire, drawing on data from the Canadian Tobacco, Alcohol and Drugs Survey 2015.
- Canada, Canadian Tobacco, Alcohol and Drugs Survey: summary of results for 2015.
- Canada, Canadian Alcohol and Drug Use Monitoring Survey: summary of results for 2011.

### Cannabis use remains quite stable in Europe and in Oceania

Annual prevalence rates of cannabis use in Oceania, most notably Australia, were substantially higher than in the United States in the 1990s, but the annual prevalence of cannabis use in Australia decreased dramatically, from almost 18 per cent of the population aged 14 years and older in 1998 to roughly 10 per cent a decade later, and has remained at that lower level throughout the past decade.

Although above the global average, cannabis use in the European Union has fluctuated over the last decade, during which between 6 and 7 per cent of the population aged 15–64 years reported having used cannabis in the past year. The highest annual prevalence rates of cannabis use in Europe in recent years have been reported by countries in Western and Central Europe, notably France (11.1 per cent in 2015), Spain (9.5 per cent in 2015), Czechia (9.4 per cent in 2015), Italy (9.2 per cent in 2013/2014), Switzerland (9.1 per cent in 2016) and the Netherlands (8.7 per cent in 2015).<sup>10</sup>

**FIG. 9** Annual cannabis use in the United States, the European Union, Australia and at the global level, 2006–2016



Source: UNODC, responses to the annual report questionnaire, SAMHSA, EMCDDA and the Australian Institute of Health and Welfare.

<sup>10</sup> UNODC, responses to the annual report questionnaire.

The prevalence of cannabis use among students aged 15–16 years in Europe has remained largely stable over the past decade<sup>11</sup> — about twice the rate of the general population.

### Developments in measures regulating non-medical use of cannabis

Since 2017, eight state-level jurisdictions in the United States have allowed non-medical use<sup>12</sup> of cannabis, as well as the District of Columbia.<sup>13, 14</sup> All those jurisdictions, except for the District of Columbia, are now licensing for-profit companies to produce, market and sell a wide range of cannabis products. All of the states that have legalized the production and sale of cannabis had prior measures allowing the medical use of cannabis.

The *World Drug Report 2017* looked at developments in cannabis legislation in the United States, in particular, the extent of exposure of the adult and youth populations to cannabis, as well as the interplay between the use of cannabis for recreational purposes and use for medical purposes. The present section focuses on the evidence that has become available in the State of Colorado, as it was among the first adopters of measures to allow non-medical use of cannabis in the United States. The outcomes of the legislation in terms of public health and public safety measures in Colorado are starting to emerge from the available information and are presented below, although the results have been mixed and outcomes are inconclusive. It should be pointed out that the cannabis legislation in Colorado has not been applied homogeneously across the state because the regulation allows counties and cities to opt out. Only 25 of the 64 counties in Colorado have chosen to allow some elements of recreational cannabis legislation in their jurisdictions.

The present section also provides a brief update on the status of implementation of cannabis regulation

<sup>11</sup> EMCDDA and European School Survey Project on Alcohol and Other Drugs, *ESPAD Report 2015: Results from the European School Survey Project on Alcohol and Other Drugs* (Luxembourg, Publication Office of the European Union, 2016).

<sup>12</sup> In this section, the terms “non-medical use” and “recreational use” of cannabis have been used interchangeably.

<sup>13</sup> Home cultivation is not allowed in the State of Washington. The number of plants allowed in each state varies.

<sup>14</sup> National Conference of State Legislatures ([www.ncsl.org](http://www.ncsl.org)).

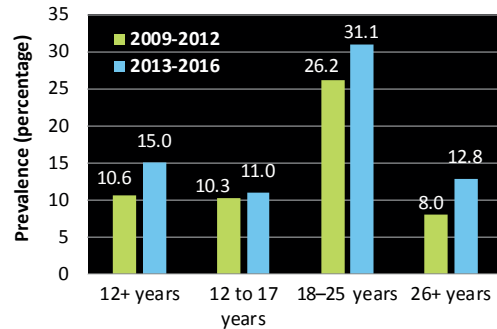
in Uruguay, where cannabis regulation is being implemented gradually, and only limited information is available on the outcomes.

### Extent of cannabis use in Colorado

In 2016, Colorado was among the states with the highest annual and past-month prevalence of cannabis use in the United States. Annual and past-month prevalence of cannabis use in 2016 were, respectively, 13.7 and 8.6 per cent per cent at the national level, whereas they were 23.1 per cent and 15.9 per cent in Colorado. Since past-month use of any substance indicates the extent of more recent use, data on past-month use of cannabis have been used to present the trends in cannabis use in Colorado. According to the National Survey on Drug Use and Health, with the exception of 2015–2016, prevalence of past-month cannabis use in Colorado has increased every year since 2009–2010. While the comparison of the periods prior to legalization (2009–2012) and after legalization (2013–2016) is not enough in itself to evaluate the impact of the new regulation, the past-month prevalence of cannabis use mainly increased among people aged 18–25 years and 26 years and older. Among the population aged 26 years and older, past-month cannabis use increased by more than half while it increased by 18 per cent among young adults aged 18–25 years from one period to the other.

Different surveys at both the national and state levels provide information on alcohol and drug use among high school students. There are three main national surveys and those conducted by single state authorities. The National Survey on Drug Use and Health reports data on the extent of drug use among the population aged 12–17 years at national and state levels. The Monitoring the Future survey presents national level results for eighth, tenth and twelfth grade students, but the sample size remains relatively small for yielding valid state-level results. The Centers for Disease Control and Prevention conduct the Youth Risk Behaviors Survey, which also looks at substance use among high school students, although the state-level participation in the survey is not consistent every year. In 2015, the latest year for which Youth Risk Behaviors Survey results are reported, weighted data for Colorado fell short of the required 60 per cent response rate to generate state-level

**FIG. 10** Past-month use of cannabis in Colorado prior to and following legalization of non-medical use of cannabis, by age group, 2009–2012 and 2013–2016



Source: UNODC elaboration based on results from the national survey on drug use and health: state-level estimates (SAMHSA) for 2009–2010 to 2011–2012 and from 2013–2014 to 2015–2016.

representative data.<sup>15</sup> Among state-specific surveys, Colorado has conducted the Healthy Kids Colorado Survey, for which the latest results available are for 2015. As the sample size and methodology of those national and state surveys differ, they have yielded different results as to whether there has been an increase in youth cannabis use in Colorado. This has become a cause of significant debate in Colorado and the United States as a whole.

The National Survey on Drug Use and Health and the Colorado Healthy Kids Survey both show that past-month cannabis use among high school students has remained rather stable since the legalization of cannabis use. On average, past-month cannabis use among young people aged 12–17 years remained relatively stable, at between 10 and 11 per cent, over the periods 2009–2012 and 2013–2016. While they should be interpreted with caution, trends in past-month cannabis use reported in the Colorado Healthy Kids Survey generally follow those seen in the past-month use of alcohol and tobacco, although the past-month use of cannabis among high school students increased slightly in the survey years 2013 and 2015.

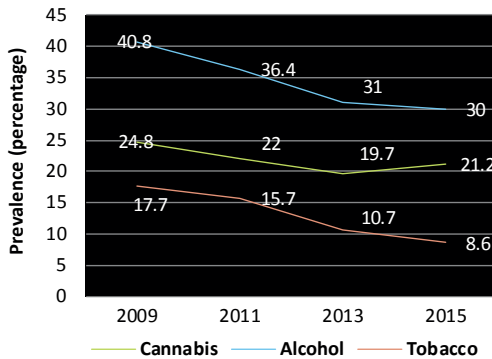
### Public health outcomes

One public health measure used for looking at the possible adverse effects of cannabis use is emergency room visits and hospitalization related to cannabis

15 Centers for Disease Control and Prevention, “YRBS participation maps and history”. Available at [www.cdc.gov](http://www.cdc.gov).



**FIG. 11** Trends in alcohol, tobacco and cannabis use in the past month among high school students (grades 9 to 12) in Colorado

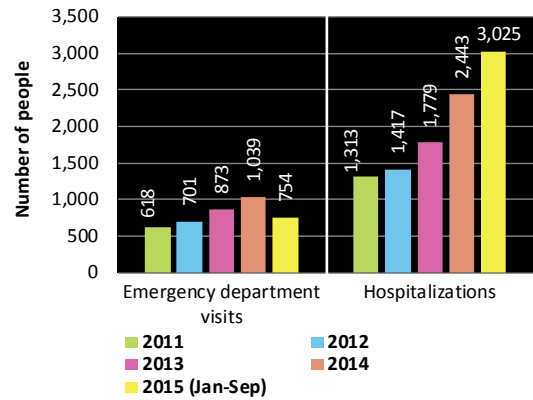


Source: Healthy Kids Colorado Survey, 2015.

use, especially due to acute intoxication. People suffering from acute intoxication from cannabis use may present themselves in emergency departments with anxiety, panic attacks, public intoxication, vomiting and other non-specific symptoms that could be precipitated by cannabis use.<sup>16</sup> It is difficult to fully quantify a trend in health-care utilization as cannabis use could be a causal, contributing or co-existing factor depending on how it was noted by the physician on duty.<sup>17</sup>

In the period 2013–2014, the total number of emergency department visits related to cannabis use increased by 20 per cent. Since only partial data for health-care utilization is available for 2015, it is difficult to ascertain the trend beyond 2014 in emergency department visits related to cannabis use. Nevertheless, as reported by the Colorado Department of Public Health and Environment, hospitalizations attributed to cannabis use increased significantly each year up to September 2015.<sup>18</sup> The number of people in treatment for cannabis as the primary substance of abuse was reported as 6,120 in 2016, a figure that had remained stable overall since 2012.

**FIG. 12** Health-care utilization related to cannabis use in Colorado



Source: Colorado Department of Public Health and Environment, (Denver, United States, 2017).

Note: The 2015 data on emergency department visits and hospitalizations that are publicly available are for the period January–September only.

The number of calls to the poison and drug centre in Colorado in the years subsequent to the introduction of medical cannabis in 2010 and measures allowing the non-medical use of cannabis in 2013 also increased significantly. Over the period 2013–2014, calls about cannabis exposure increased by 75 per cent and remained relatively stable from 2014 to 2016.<sup>19</sup> While the overall numbers are small, one important health outcome reported with respect to emergency room visits data is the increasing number of children admitted due to unintentional ingestion of edible cannabis products. Over the period 2013–2016, an average of 37 cannabis exposure cases among children aged 5 years or younger were reported by the poison and drug centre in Colorado, compared with 13 cases over the prior period 2009–2012.<sup>20</sup> Over the period 2014–2015, the rate of cannabis-related hospitalizations among children aged 9 years and under was 14 per 100,000 population, and the rate of cannabis-related emergency department visits was 9 per 100,000 population. Those rates over the prior

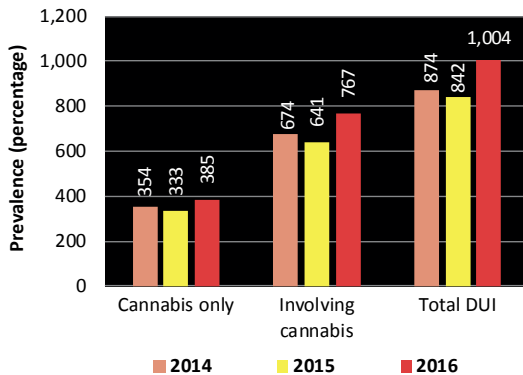
16 Andrew A. Monte, Richard D. Zane and Kennon J. Heard, “The implications of marijuana legalization in Colorado”, *JAMA*, vol. 313, No. 3 (20 January 2015), pp. 241–242.

17 Ibid.

18 Colorado Department of Public Health and Environment, *Monitoring Health Concerns Related to Marijuana in Colorado: 2016* (Denver, United States, 2017).

19 Based on information of the Rocky Mountain Poison and Drug Centre, as reported in Santhi Chilukri, “The impact of recreational marijuana legalization on Colorado policy analysis on Amendment 64”, Master’s thesis, University of Kentucky, 2017.

20 Rocky Mountain High Intensity Drug Trafficking Area, *The Legalization of Marijuana in Colorado: The Impact*, vol. 5 (October 2017).

**FIG. 13** Driving under the influence of drugs in Colorado

Source: Data from the Colorado State Patrol, as reported through Rocky Mountain High Intensity Drug Trafficking Area, vol. 5 (October 2017).

period 2010–2013 had been, respectively, 6 and 8 per 100,000 population.<sup>21</sup>

### Public safety and criminal justice

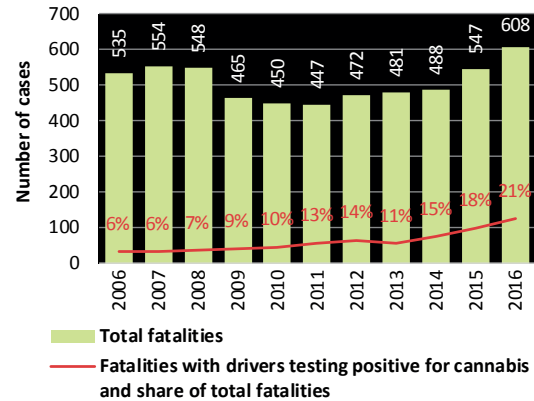
Driving under the influence of drugs can pose a threat not only to the driver but also to other people in a vehicle or at the roadside. Driving under the influence of cannabis was not tracked in Colorado prior to 2014. Between 2014 and 2016, the data show an increase in the number of cases of driving under the influence of cannabis only, and in the number of cases where cannabis and other substances were involved.

According to data on traffic fatalities, in Colorado there has been a steady year-on-year increase in the number of traffic deaths in which a driver tested positive for cannabis use. On average, in the period 2009–2012, there were 53 traffic deaths in which the driver tested positive for cannabis, a figure that increased to an average of 88 such deaths in the period 2013–2016, although the proportion actually doubled over that period.

In 2016, 163 investigations by Colorado Bureau of Investigations of individuals and organizations involved in the illegal sale of cannabis within and outside the State of Colorado were completed and approximately 3.5 tons of cannabis were seized.<sup>22</sup>

21 Colorado Department of Public Health and Environment, *Monitoring Health Concerns Related to Marijuana in Colorado: 2016*.

22 Rocky Mountain High Intensity Drug Trafficking Area, *The*

**FIG. 14** Traffic deaths with one driver testing positive for cannabis in Colorado, United States

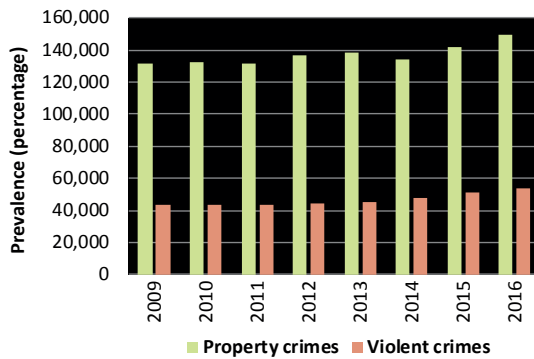
Source: Rocky Mountain High Intensity Drug Trafficking Area, vol. 5 (October 2017).

Such seizures are considered to have increased by 50 per cent since 2013, when the non-medical use of cannabis was legalized in Colorado. There was also a fivefold increase in the number of parcels containing cannabis that were mailed from Colorado to other states. Since the legalization of cannabis, as reported by the Colorado Bureau of Investigation, there has been an increase in both property and violent crimes in the state. The average number of property crimes increased by 9 per cent from the period 2009–2012 to the period 2013–2016, while the average number of violent crimes increased by 14 per cent.

The analysis of data since 2014, when the non-medical use of cannabis was legalized in Colorado, shows that cannabis use has increased significantly among the older population while it has remained relatively stable among the younger population (12–17 years). On the other hand, there has been a significant increase in health-care visits, hospital admissions, traffic deaths and driving under the influence of cannabis in the state.<sup>23</sup> As noted in the *World Drug Report 2017*, evaluation of the impact of measures allowing the commercial production, sale and recreational use of cannabis on health, criminal justice and other outcomes requires regular

*Legalization of Marijuana in Colorado: The Impact*, vol. 5 (October 2017).

23 Chilukri, “The impact of recreational marijuana legalization on Colorado policy analysis on Amendment 64”.

**FIG. 15** | Property and violent crimes in Colorado

Source: Colorado Bureau of Investigation as reported through Rocky Mountain High Intensity Drug Trafficking Area, , vol. 5 (October 2017).

monitoring over time, and it may take years to determine their long-term effect on cannabis use and associated harm among adults, as well as their influence on cannabis use among adolescents.

### *Cannabis regulation in Uruguay: provisions and recent developments*

In 2013, the Government of Uruguay approved legislation (Law No. 19.172) regulating the cultivation, production, dispensing and use of cannabis for recreational purposes.<sup>24</sup> In accordance with Uruguayan legislation, cannabis for recreational use can be obtained via registration with the national Institute for the Regulation and Control of Cannabis by choosing one of the three options: purchase in authorized pharmacies, membership of a club or domestic cultivation.<sup>25</sup> The quantity of cannabis permitted per person, obtained through any of the three mechanisms, cannot exceed 480 grams per year.

#### *Domestic cultivation*

Uruguayan legislation allows domestic cultivation for personal or shared use in a household, up to a maximum of six cannabis plants per household for personal consumption. At the time that the legislation was adopted in 2013, those who had already been cultivating cannabis had a period of up to six months to register with the Institute for the

Regulation and Control of Cannabis. As of the end of February 2018, 8,125 individuals had been registered for domestic cultivation, of whom 2,178 were authorized to grow cannabis in the period March 2017–February 2018. Cannabis production from domestic cultivation in that period is estimated to have reached 3,900 kg.

#### *Cannabis clubs*

Cannabis clubs are accredited as “civil associations” by the Ministry of Education and Culture and registered with the Institute for the Regulation and Control of Cannabis for the purpose of collective cultivation, production and use of cannabis among their members. Each club can have a minimum of 15 and a maximum of 45 members and is allowed 99 plants in a flowering state. Up to the end of February 2018, 78 clubs had been registered, 20 of which in the 12-month period March 2017–February 2018. At the end of February 2018, the membership of cannabis clubs stood at 2,049 adults, suggesting a maximum production of cannabis of 984 kg in 2017; 122 kg of cannabis were declared to the Institute for the Regulation and Control of Cannabis in 2016. Each club and its facilities are subject to the control of the Institute for the Regulation and Control of Cannabis

#### *Sale through pharmacies*

Adults who are registered in the system can opt to buy quantities of cannabis from pharmacies of up to 10 g per person per week or 40 g per month, provided they hold Uruguayan citizenship or permanent residency in Uruguay. Since July 2017, when the process of registering the pharmacies began, 16 pharmacies have been registered in the network of cannabis dispensing pharmacies. In the meantime, due to transaction issues with certain banks, six pharmacies have rescinded their registration, while another six are being evaluated for inclusion in the network. In order to increase the geographical coverage of cannabis dispensing outlets under the control of the Institute for the Regulation and Control of Cannabis, the Uruguayan Government is considering the evaluation and subsequent granting of licences to new commercial establishments that will sell cannabis to registered users. The cannabis price is evaluated every six months and was raised by 6 per cent in February 2018 to 200 pesos per 5 g package

<sup>24</sup> The main elements of regulation are given in table 1 and 2 in Annex C. Cannabis.

<sup>25</sup> The information in this section is taken from the Institute for the Regulation and Control of Cannabis.



(approximately \$1.40 per gram). Between July 2017 and February 2018, 20,900 individuals were registered to obtain cannabis through pharmacies. Some 150,000 transactions have been made to date.

#### ***Limits on tetrahydrocannabinol and cannabidiol content***

The cannabis varieties distributed by the Institute for the Regulation and Control of Cannabis allow a minimum of 3 per cent of the cannabidiol content and maximum of 9 per cent the tetrahydrocannabinol content.

#### ***Limited scale of legal supply to date***

As of February 2018, in Uruguay 8,125 individuals and 78 cannabis clubs with a total of 2,049 members were registered in addition to the 20,900 people registered through pharmacy sales for cannabis. The system potentially provides cannabis to around 30,000 of the 140,000 past-month cannabis users estimated in Uruguay in 2014. The impact of the provisions regulating the non-medical use of cannabis in Uruguay will only become evident, however, in the coming years once more information on the outcome measures related to public health and public safety is made available.

EMBARGOED UNTIL  
26 JUNE 2018  
11 AM EDT (5 PM CEST)

**TABLE 1** | Regulations for legalizing the use of cannabis within jurisdictions in the United States of America

	Alaska	California	Colorado	District of Columbia	Maine
<b>Legal Process</b>	Voter initiative, state statute	Voter initiative	Voter initiative, amendment to state constitution	Voter initiative	Voter initiative
<b>Title</b>	Ballot Measure 2	Proposition 64	Amendment 64	Initiative 71	Question 1
<b>Date passed</b>	November 2014	November 2016	November 2012	November 2014	November 2016
<b>Date implemented/required date of rule adoption</b>	February 2015: Personal possession, consumption, cultivation October 2016: Retail sales	Not stated, but 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
<b>Regulatory authority</b>	Marijuana Control Board (Alcoholic Beverage Control Board)	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
<b>Minimum age</b>	21	21	21	21	21
<b>Residency requirement</b>	None	Not specified	None	None	Not specified
<b>Personal possession quantity</b>	28.5 g	1 oz flower 8 g concentrate	28.5 g	57 g	2.5 oz (70.8 g) 5g concentrate
<b>Home cultivation</b>	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
<b>Interpersonal sharing</b>	28.5 g	Yes	28.5 g	28.5 g	Yes for home grow. Not permitted for retail marijuana
<b>Retail transaction limit</b>	28.5 g	Not specified, presumably same limits for personal possession	Residents: 28.5 g Non-residents: 7 g	Not applicable	2.5 oz. of marijuana Twelve seedlings
<b>Retail pricing structure</b>	Market	Market/commercial	Market	Market	Market/commercial
<b>Average retail price per gram after tax</b>	Average price \$20	Low quality \$10 High quality \$14	Medium quality \$15.5	Not applicable	Medium quality \$14
<b>Maximum THC content</b>	Not set initially	Not set initially	Not set initially	Not set initially	Not set initially
<b>Registration requirements</b>	None	Not specified	None	None	Not specified

	Alaska	California	Colorado	District of Columbia	Maine
<b>Commercial production</b>	Licensed cannabis producers	Licensed cultivators and manufacturers, varying types	Licensed cannabis cultivation facilities	None	Licensed cultivators; two types based on size
<b>Commercial distribution</b>	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
<b>Restrictions on edibles</b>	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
<b>Advertising</b>	Final advertising regulations to be determined by the Alaska Department of Health and Social Services Division of Public Health	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 per cent 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
<b>Taxation</b>	\$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 per cent excise on retail, \$9.25 per dry weight ounce on flower after harvest. \$2.75 per drug weight ounces on leaves	15 per cent excise tax on cultivation; 10 per cent retail marijuana sales tax to be decreased to 8 per cent in July 2017. 2.9 per cent state sales tax. Up to 3.5 per cent local sales taxes	Not applicable, no commercial market	10 per cent excise on retail
<b>Cannabis clubs</b>	Not explicitly allowed or prohibited. Earlier ban on in-store consumption repealed in November 2015	Not specified though they may exist in the form of microbusiness that allow on site consumption	Not allowed	Not allowed; currently under investigation by city task force.	Allowed
<b>Medical cannabis</b>	1998: Patient registry, no dispensaries registration; out-of-state patients recognized for approved conditions but not for dispensary purchases; possession, home cultivation	1996 and 2003; Patient registry - voluntary registration; cooperatives and collectives; State-wide licensing of dispensaries will begin 2018	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

**TABLE 2** | Regulations for legalizing the use of cannabis within jurisdictions in the United States of America and Uruguay (continued)

	Massachusetts	Nevada	Oregon	Washington	Uruguay
<b>Legal Process</b>	Voter initiative	Voter initiative	Voter initiative, state statute	Voter initiative, state statute	Government initiative, national law
<b>Title</b>	Question 4	Question 2	Measure 91	Initiative 502	Law No. 19.172
<b>Date passed</b>	November 2016	November 2016	November 2014	November 2012	December 2013
<b>Date implemented/ required date of rule adoption</b>	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	December 2012: Personal possession, consumption July 2014: Retail sales	August 2014: Personal cultivation October 2014: Grower clubs Mid-2017: pharmacy sales
<b>Regulatory authority</b>	1) Cannabis Control Commission, and Cannabis Advisory Board 2)	Department of Taxation	Oregon Liquor Control Commission	Liquor and Cannabis Board (formerly the Liquor Control Board)	Institute for the Regulation and Control of Cannabis (IRCCA)
<b>Minimum age</b>	21	21	21	21	18
<b>Residency requirement</b>	Not specified	Not specified	None	None	Uruguayan citizenship or permanent Uruguayan residency required
<b>Personal possession quantity</b>	1 oz. flower (28.5 g) 5g concentrate	1 oz. flower 3.5g concentrate 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	In public: 28.5 g At home: 228 g	28.5 g	40 g per month
<b>Home cultivation</b>	6 plants, 12 in a single residence away from view, 10 oz. of dried marijuana permitted at home	Yes	Four plants in flower	Not allowed	Six plants in flower
<b>Interpersonal sharing</b>	Yes	Yes	28.5 g	Not allowed	Allowed within the home
<b>Retail transaction limit</b>	Not specified, presumably same limits as for personal possession	Not specified, presumably same limits as for personal possession	7 g	28.5 g	40 g per month, 10 g per week (sale through pharmacies to registered users)
<b>Retail pricing structure</b>	Market/commercial	Market/commercial	Market	Market	Government price control
<b>Average retail price per gram after tax</b>	Medium quality \$16	Medium quality \$20	Medium quality \$10	Medium quality \$11.6	200 pesos per 5 grams (approx. \$1.4 per gram)
<b>Maximum THC content</b>	Not set initially	Not set initially	Not set initially	Not set initially	15 per cent maximum THC content (suggested criterion not fixed by law)
<b>Registration requirements</b>	Personal data collection not required	Personal data collection not required	None	None	Yes, with IRCCA for any of the three modes of access

	Massachusetts	Nevada	Oregon	Washington	Uruguay
<b>Commercial production</b>	Licensed establishments	Licensed establishment	Licensed cannabis producers	Licensed cannabis producers	Licensed marijuana producers
<b>Commercial distribution</b>	Licensed establishments; localities can regulate, limit or prohibit the operation of businesses	Limits on market concentration by population	Licensed retail cannabis stores	Licensed retailers	Licensed pharmacies
<b>Restrictions on edibles</b>	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 labeling; marijuana-infused products, packages and labels be approved by the State Liquor Control Board before sale.	
<b>Advertising</b>	Restrictions on marketing to children to be developed in regulations	Restrictions to be developed in regulations	Entry sign required on exterior of dispensaries; Oregon Liquor Control Commission has authority to further regulate or prohibit advertising	Limited to one sign for retailers at business location	Prohibited
<b>Taxation</b>	3.75 per cent excise on retail	15 per cent excise on retail	No tax on retail sales from October 2015 to December 2015 25 per cent sales tax after 5 January 2016 17 per cent sales tax 2017 with options for local communities to establish local tax up to 3 per cent	July 2014-June 2015: 25 per cent tax at each stage (production, processing, retail) July 2015: 37 per cent sales tax	No tax, although IRCCA can impose tax in the future.
<b>Cannabis clubs</b>	Not allowed although they may exist in establishments that allow on-site-consumption	Not specified	Not allowed	Not allowed	Clubs with 15-45 members allowed to cultivate up to 99 plants, maximum 480 g of dried product per member per year
<b>Medical cannabis</b>	2012/2013; patient registry or identification cards; dispensaries, out-of-state patients not recognized	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	1998: Patient registry, dispensaries already existed but not clearly authorized by law or regulated; possession, home cultivation work	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	2014: Passed, but not yet effective