

# The Global Cannabis Report



Growth & Trends Through 2025



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the Publisher

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# Letter from the Publisher

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When we released our first Global Cannabis Industry Report in 2019, it was clear that cannabis legalization would prove to be one of the most consequential socioeconomic movements of our time. In just two years' time, the number of countries having legalized some form of cannabis has increased from 50 to 70, and there are now 10 countries legalizing for adult use, almost a twofold increase from 2019. As legal markets across the globe continue to evolve, we have found that regulatory structures and societal norms vary greatly, and each country, region and market require a nuanced approach to quantifying, qualifying and understanding them.

It is therefore important to recall that in the world's legal cannabis markets, illegal sales still represent the majority of consumer demand, and that failure to incorporate the impact of the illicit market

on any global study is a shortcut likely to result in rudimentary and inaccurate projections. ***The Global Cannabis Report: Growth & Trends Through 2025***, breaks ground as a first-of-its-kind study addressing and incorporating illicit market sales and other unique forces at work to size 24 countries offering legal access to high-THC cannabis for medical or adult-use today, 22 of which being sized for the very first time.

As is the case with all our reports, available through New Frontier Data's cannabis intelligence platform Equio<sup>®</sup>, we trust you will benefit from this fact-based, unbiased, and actionable analysis, and from our unwavering commitment to help you best understand, assess, engage, and transact with the cannabis industry and its consumers, responsibly and knowledgeably.

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**Giadha A. DeCarcner**

Founder, Publisher & Executive Chair  
New Frontier Data



**Strength in Knowledge<sup>®</sup>**

# About New Frontier Data

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**N**ew Frontier Data is the premier data, analytics and technology firm specializing in the global cannabis industry, delivering solutions that enable investors, operators, advertisers, brands, researchers and policy makers to assess, understand, engage and transact with the cannabis industry and its consumers. New Frontier Data's global reach and reputation is evidenced by research and analysis citations in more than 85 countries. Founded in 2014, New Frontier Data is headquartered in Washington, D.C. with a presence in Europe, Latin America and Africa.

## Mission

New Frontier Data's mission is to inform policy and commercial activity for the global legal cannabis industry. We maintain a neutral position on the merits of cannabis legalization through comprehensive and transparent data analysis and projections that shape industry trends, dynamics, demand and opportunity drivers.

## Core Values

- Honesty
- Respect
- Understanding

## Vision

To be the nexus of data for the global cannabis industry.

## Commitment to Our Clients

The trusted one-stop shop for cannabis business intelligence, New Frontier Data provides individuals and organizations operating, researching, or investing in the cannabis industry with unparalleled access to actionable industry intelligence and insight, helping them leverage the power of big data to succeed in a fast-paced and dynamic market. We are committed to the highest standards and most rigorous protocols in data collection, analysis, and reporting, protecting all IP and sources, as we continue to improve transparency into the global cannabis industry.

For more information about New Frontier Data, please visit: [NewFrontierData.com](https://NewFrontierData.com).



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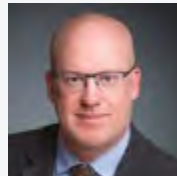


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## EXPERTS WITH IMPACT

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# Introduction

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**IN** the two years since New Frontier Data’s last global market outlook, cannabis has undergone a sea change in liberalization, normalization, and commercialization. Two broad themes have fueled the expansion of legal access to cannabis globally – growing acceptance of the plant’s therapeutic value, and recognition of the industry’s potential as a catalyst for economic growth.

In December 2020, the United Nations voted to reschedule cannabis, downgrading it by one level from the list of the world’s most dangerous drugs – those deemed to have no therapeutic value, and which require special governance protocols due to their uniquely high-risk profile. While cannabis is still classified as a highly dangerous drug, this move marked the most significant change to the body’s policy on the plant in 60 years. The vote was based on a series of cannabis liberalization proposals submitted by the World Health Organization (WHO), and although the UN rejected all the other WHO cannabis-related proposals (including to remove CBD entirely from the schedule of narcotic drugs), the vote was still an important milestone as a tacit acknowledgment by the global body that the dangers to cannabis had long been overstated, and that the plant has more therapeutic value than previously recognized in the longstanding global framework of blanket prohibition.

Even as the idea of legalization has enjoyed strong tailwinds, effecting change has not always been successful. A recreational-use legalization initiative in New Zealand narrowly failed despite strong backing by the country’s popular leader, Prime Minister Jacinda Ardern, and in the U.S., the most expansive proposal seen to federally reform cannabis policy received a tepid reception, in part due to the significant disruptions the proposed federal law was expected to create for existing state-based

legal markets. Morocco's legislature passed a cannabis legalization bill, but as of this report's printing the measure is still awaiting the king's endorsement.

As a growing proportion of global citizens support cannabis reform policies, the success of legalization efforts will continue to hinge on how effectively the advocates in each market can mobilize allies for the issue. The countries that have moved most smoothly toward more liberal cannabis policies have generally built strong and diverse coalitions across health care, law enforcement, finance, and law, engaged notable policymakers and influencers, and proposed frameworks that are well aligned with the respective local social, economic, and political contexts. Generally speaking, attempting to model a cannabis program from another market without local contextualization has resulted in less effective legalization efforts and underperforming regulated markets.

Despite cannabis remaining illegal in most parts of the world, self-reported usage rates are rising, driven by a variety of factors. Global connectivity is allowing people from around the world to share their experiences with cannabis, enabling science-based information and personal experience to overcome the prejudicial propaganda long-used by governments to justify prohibition. In almost every country for which updated consumption data was available, usage rates were higher than those reported in New Frontier Data's 2019 report. The trend toward increased use is expected to continue as science affirms that cannabis is comparatively safer than alcohol, and as young adults come of age in societies where cannabis is increasingly viewed as an analog or substitute to alcohol, rather than as a dangerous narcotic.

Innovation is also playing a crucial role in driving increased adoption. In illicit markets, consumers generally have access to a limited range of options, with smoking as the primary method of consumption. However, through capitalization of legal markets, the industry has had resources to develop novel delivery mechanisms which give consumers new and engaging ways to consume cannabis, leading to evolving consumer product preferences in all markets, both legal and illicit. Advancements in cannabis-infused ingestibles — specifically among edibles and beverages, which eliminate the need for combustion and can be dosed at very specific levels — have introduced important new options for consumers. Presenting a strong alternative to smoking enables consumption with far greater convenience and broader discretion, and allays a key barrier to consumers who either have never smoked or who are using cannabis medicinally, with no allowance for smoke inhalation.

The COVID-19 pandemic, too, has played a consequential role in driving increased usage rates. Amid historic economic and social disruptions, nearly half of U.S. cannabis consumers reported using cannabis to help manage stress and anxiety during the pandemic. Furthermore, the shift to working from home, coupled with constraints on social gatherings, encouraged higher levels of cannabis consumption than had been seen before the pandemic, driving retail cannabis sales 35% higher for the year than had been previously forecasted for legal U.S. markets.

As vaccine rollouts have begun to restore life to some semblance of pre-pandemic normalcy, New Frontier Data expects that at least some of the consumption behaviors adopted during the pan-



demic will be carried into social society, further hastening broader normalization of cannabis in a post-pandemic world.

North America is still the epicenter of the global cannabis economy, accounting for 97% of legal cannabis sales in 2020. While Canada beat the U.S. in establishing a fully legal national market, the 38 U.S. states having legalized either medical or adult-use are home to a population 6x the size of Canada's. In the next few years, the legal market opportunity in the U.S. alone will account for the lion's share of legal global demand. With key states (most notably New York) poised to begin adult-use sales in 2022, the U.S. seems bound to remain the driving force in retail product innovation, novel consumer experiences, and the cannabis culture globally.

Europe's historically laissez-faire attitude toward cannabis (epitomized by social clubs and cannabis cafés in Spain and the Netherlands, respectively, and in Portugal's decriminalization of all drugs) is slowly transitioning toward formalization and regulation of medical markets. Germany leads the continent with the largest medical cannabis program in Europe, while other markets (including the Netherlands and the U.K.) are working to lower traditional barriers to participation, and to increase their citizens' access to medical cannabis.

Notably, the debate to fully legalize cannabis for adult-use has been comparatively muted in Europe, absent the social justice issues (e.g., racial inequity in cannabis prohibition) that fueled legalization in North America. However, there too, small movements for legalization are taking place, with Germany positioned to take Europe's lead in cannabis liberalization. Four

of the six parties vying in the country's Bundestag – scheduled for September 2021 – support cannabis reform, making it the first time that cannabis reform will have broad-based support among the legislative body's candidates. The election is likely to be closely contested, and if no party secures a majority, the leading party will need to form a coalition government, providing the smaller parties with stronger negotiating positions vis-a-vis drug policy reform.

As the EU's largest economy, Germany's passage of major cannabis reform would have significant implications for European drug policy, and the outcome of the election will be closely watched by cannabis policy reform advocates across the continent and abroad. If Germans elect a wave of pro-reform candidates, it will likely encourage political candidates in other countries to leverage cannabis policy reform as a means to galvanize young voters, reform-minded voters in particular.



**North America is still the epicenter of the global cannabis economy, accounting for 97% of current legal demand.**



With investors across the world increasingly recognizing opportunities presented by the expansion of legal access, and the transition of consumers from illicit markets to legal ones, capital has begun to flow into the industry at unprecedented levels. The first half of 2021 saw a record \$7.9 billion in cannabis deals as investors plowed new capital into the industry. Virtually every sector of the industry saw blockbuster investments as companies raced to enter new markets, expand operational capacities, and acquire novel intellectual property.

The size of the average deal has also increased dramatically since 2017. The average equity deal is now 3x larger (i.e., \$24.2 million from \$7.4 million) while the average debt deal value has risen nearly tenfold (i.e., \$47.1 million from \$4.9 million).

Illustrating the growth was a record \$7.6 billion transaction in which Ireland-based biopharma company Jazz Pharmaceuticals acquired GW Pharmaceuticals, the most successful cannabis-derived drug development company, and the only producer to have secured cannabis drug approval from both the U.S. Food and Drug Administration (FDA) and the European Medicines Agency. Other notable deals included:

- **A megamerger between Tilray and Aphria**
  - two of Canada's largest licensed producers - forming the country's second-largest operator with a combined market capitalization of \$7.6 billion. Canopy Growth Corp. remained slightly larger, with an \$8.7 billion (USD) market cap (a position it secured with the April 2021 announcement of its \$435 million USD acquisition of Supreme Cannabis).

- **Trulieve's \$2.1 billion (USD) acquisition of Harvest Health & Recreation**, creating one of the largest U.S. multistate operators (MSOs) with operations in 11 states, including 22 cultivation facilities and 126 medical and adult-use dispensaries.<sup>1</sup>
- **Curaleaf acquired EMMAC Life Sciences** (an independent European operator with a presence in the U.K., Germany, Italy, Spain, and Portugal) for \$286 million in cash and stock. It marked the first foray of a large American player into Europe, and put other American operators on notice that the race for global reach has begun.

One notable deal that underscored the ongoing interest in cannabis among tobacco companies was British American Tobacco's \$177 million deal to acquire 20% of Canadian-licensed producer Organigram. While it was considerably smaller a transaction than the \$1.8 billion investment by rival Altria in Canadian LP Cronos Group in 2019, it served as an important signal of the ongoing ingress of large CPG companies into Canada's legal cannabis industry.

Taken together, the accelerating expansion of legal access, rising rates of consumption and social acceptance, and increased capitalization of commercial operations have positioned the cannabis industry for extremely strong growth over the coming decade. Critically, much of that growth will be driven first by consumers transitioning from illicit and unregulated markets to legal ones, followed later by adoption among new consumers who have no previous experience with cannabis.

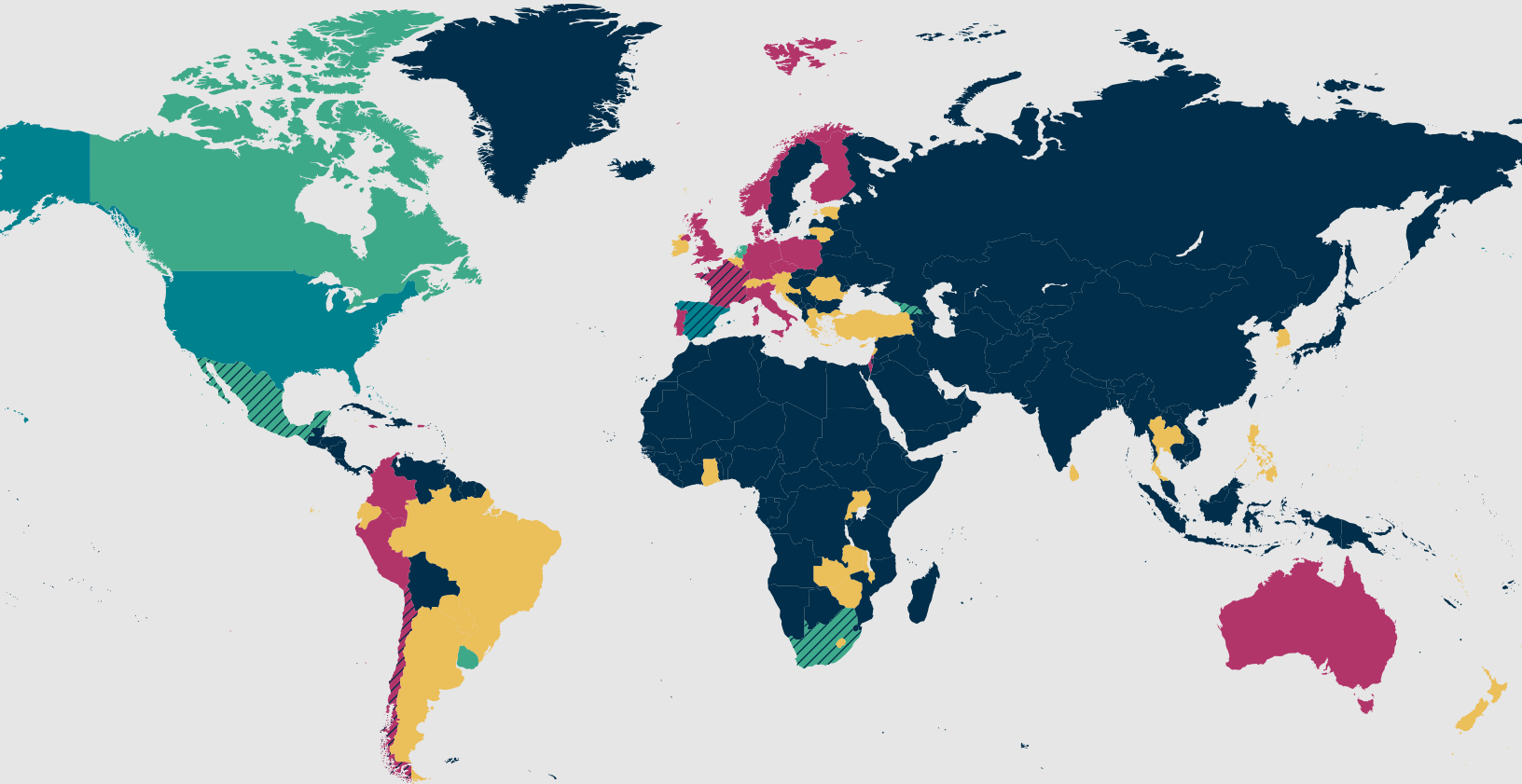
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1. As of the writing of this report.



# Global Overview

## Global Cannabis Access



Legal Access to High-THC Varies by Jurisdiction

Legal Access to High-THC for Adult-Use

Legal Access to High-THC for Medical Patients Only

Limited Access to Low-THC for Medical Patients

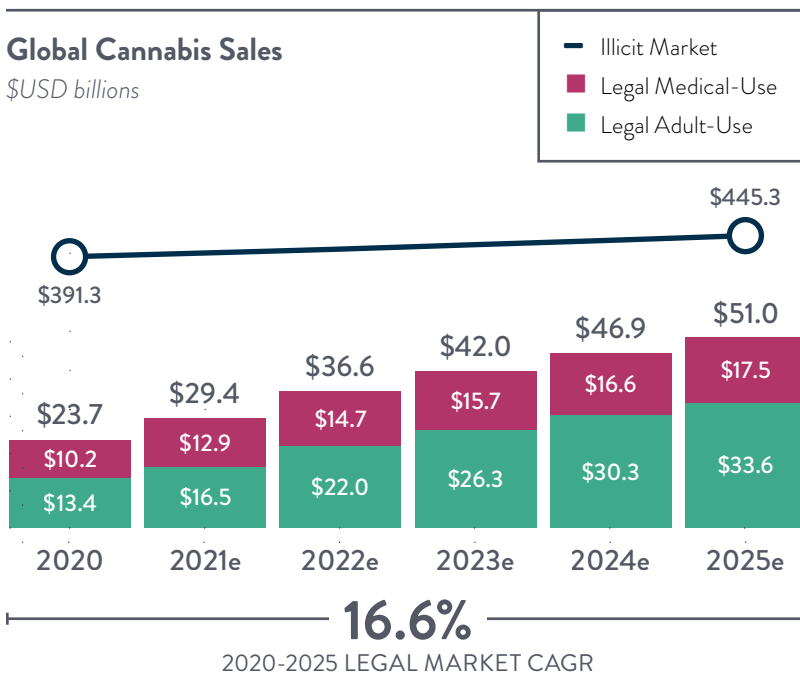
No Legal Access

No Regulated Market Sales



Seventy countries around the world have legalized some form of cannabis for medical use, with 26 of those providing medical patients with legal access to high-THC cannabis. Worldwide, 10 countries have legalized cannabis for adult-use, with six (6) adopting a system for regulated distribution. Cannabis regulations vary in the different regions across the world, with some countries developing fully regulated markets, complete with a taxed and regulated framework for retail distribution of a variety of cannabis products for all adults, (e.g., Canada and in U.S. legal adult-use states), and others instead opting for decriminalization, with allowances for home cultivation and possession but with no framework for legal sales, like Georgia and South Africa. A few countries – Spain and the Netherlands – have legalized their cannabis markets through businesses that permit social consumption on site. Most countries to legalize access to high-THC cannabis have done so, however, by adopting a framework to allow access only for qualified medical patients.

Note: In an effort to screen data from markets for inclusion in the legal market analysis, NFD developed a quantitative legalization index to score each country according to legality of use and access to high-THC cannabis and cannabis products for medical cannabis patients and adult-use consumers. Of the 70 countries to move some legislation on cannabis, 30 meet the NFD requirement for legalized high-THC cannabis possession and use, and 26 countries are providing access to legal high-THC cannabis sales.



Note: The analysis and quantification of global legal cannabis demand within this report refers to legal market projections for operational high-THC cannabis markets in the following countries:

	Adult-Use Markets
Canada	
Guam	
Mexico*	
Netherlands	
Northern Mariana Islands	
United States**	
Uruguay	
South Africa*	
Spain*	

	Medical Markets
Australia	
Canada	
Chile*	
Colombia	
Czech Republic	
Denmark	
Finland	
France*	
Germany	
Guam	
Israel	
Italy	
Jamaica	
Luxembourg	
Malta	
Netherlands	
Northern Mariana Islands	
Norway	
Peru	
Poland	
Portugal	
Puerto Rico	
United Kingdom	
United States	
Virgin Islands (U.S.)	

\*Legal access to high-THC cannabis, but no regulated market sales.

\*\*Legal access varies by state.

## Legal Market Growth

Sales of high-THC cannabis through legal regulated markets totaled \$23.7 billion in 2020, with the combined legalized medical and adult-use state markets in the United States alone accounting for \$20.3 billion (86%).

Legal regulated markets captured 6% of total global spending on cannabis in 2020. However, strong growth in the largest and most dominant markets (i.e., U.S. and Canada) is projected to push combined global legal sales to an estimated \$51 billion by 2025.

Despite the lack of national legal framework, medical and adult-use cannabis sales in legal U.S. state markets exceeded \$20 billion in 2020. This was 10x the amount of legal spending seen in any other legal country in the

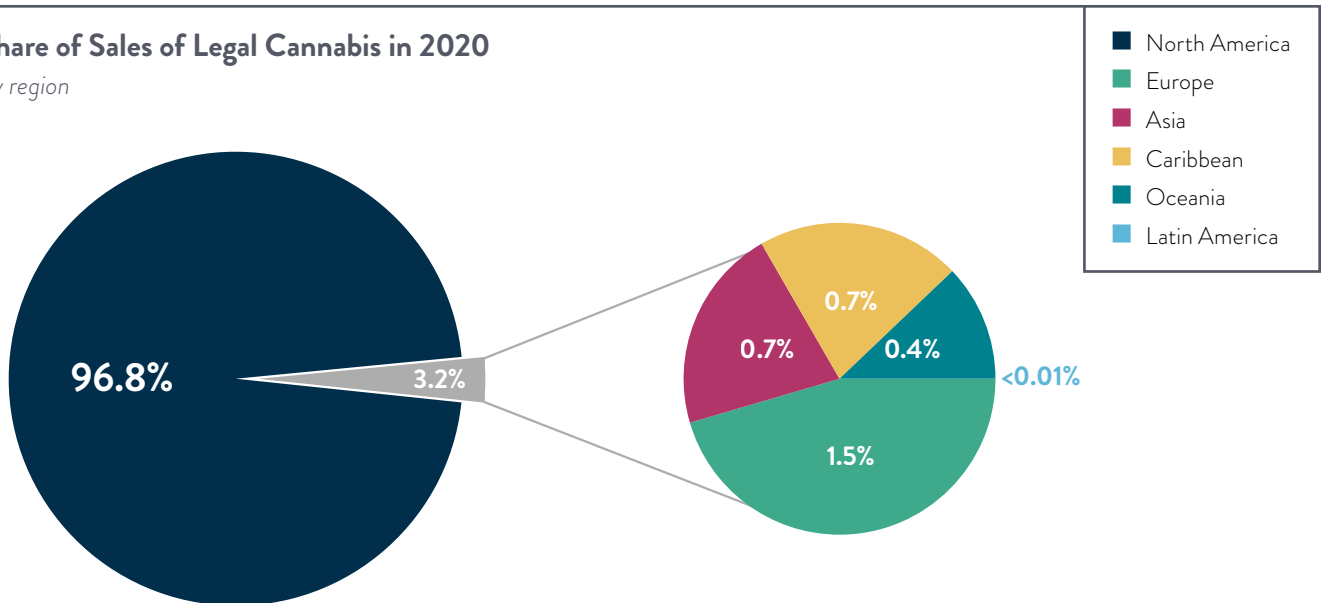
world. Canada, the world’s second country to federally legalize adult-use cannabis – and the first G7 nation to do so – saw over \$2 billion of high-THC cannabis sold through its growing national footprint of medical and adult-use dispensaries in 2020.

Outside of North America – which has the highest rates of social acceptance for cannabis use and the most advanced consumer markets – legal sales of high-THC cannabis were markedly smaller. Germany<sup>1</sup>, which allows insurance reimbursements for medical cannabis patients, had the largest legal medical cannabis program in Europe in 2020 by a wide margin, with an estimated \$206 million in legal high-THC products sold to all patients.

Spain does not have a federally regulated program for legal cannabis, but its autonomous provinces

### Share of Sales of Legal Cannabis in 2020

By region



1. Germany’s figures include estimates for high-THC sales both by patients using insurance to reimburse products, as well as patients accessing products through private health market.)

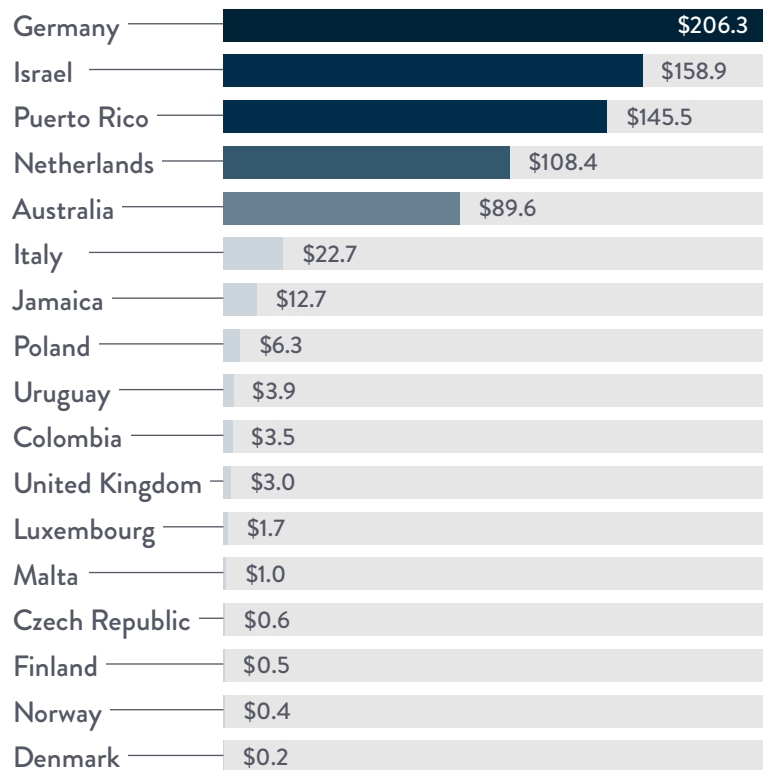




have permitted private spaces, which serve as clubs where members can buy and consume cannabis. There is no single authority or cannabis-licensing agency for the country, and without formal regulations, the popularity of cannabis clubs exploded over the past 10 years, particularly near Barcelona in Catalonia, where clubs have capitalized on legal loopholes to allow tourists to purchase and consume cannabis. The existing system is under review after a court ruling this year, and thus Spain is not included in the New Frontier Data Global Legal Market Projections. However, sales through clubs in Spain totaled an estimated \$431 million in 2019 (the year prior to COVID-19 closures and shutdowns), which would mark it close to third-largest national market behind the U.S. and Canada should it become fully legalized and regulated.

### Largest Legal Cannabis Markets Excluding U.S. & Canada

Legal sales in 2020, \$USD millions



### LEGAL MEDICAL MARKETS

Globally speaking, medical cannabis has been the main driver of legalization, but national medical programs have varied widely in their implementation practices. Some countries have chosen to restrict possession and use, granting only a small number of patients with access to a tightly controlled list of imported cannabis products, while others openly allow broad patient access with expansive lists of qualifying medical conditions and an established licensing framework for domestic production.

In Europe, many countries have taken a pharmaceutical approach to regulation (i.e., issuing products through pharmacies), with some covering the costs of medical cannabis under national health insurance systems. In Latin America, those countries that have best managed to get legal medical sales off the ground have done so via the expansion of private clinics with on-site physicians available to prescribe cannabis.

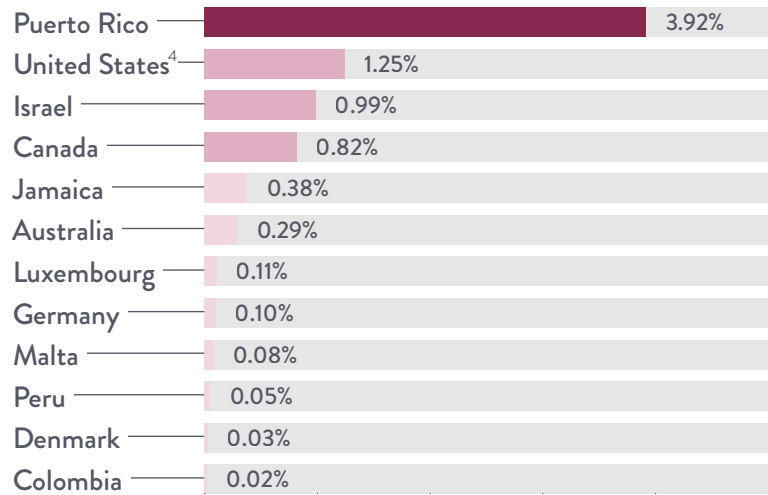
In 2020, there were an estimated 4.4 million active medical cannabis patients globally who accessed legalized, high-THC products (84% of those patients were Americans registered among 38 U.S. state medical cannabis programs in operation). The number of patients in those programs is projected to grow by more than 2 million over the next five years, to a combined 6.5 million worldwide by 2025.



When ranked by density or saturation (i.e., the number of registered medical cannabis patients expressed as a percentage of a population), the U.S. territory of Puerto Rico<sup>2</sup> registered the highest rate of patient participation, with 3.9% of its population enrolled as of July 31, 2021. Puerto Rico’s program is modeled after the more openly accessible medical cannabis programs in the U.S. Patients on the island can register for a range of qualifying conditions, including anxiety, depression, or chronic pain, and have access to a relatively wide variety of high-THC products at medical dispensaries. The island also operates a patient reciproc-

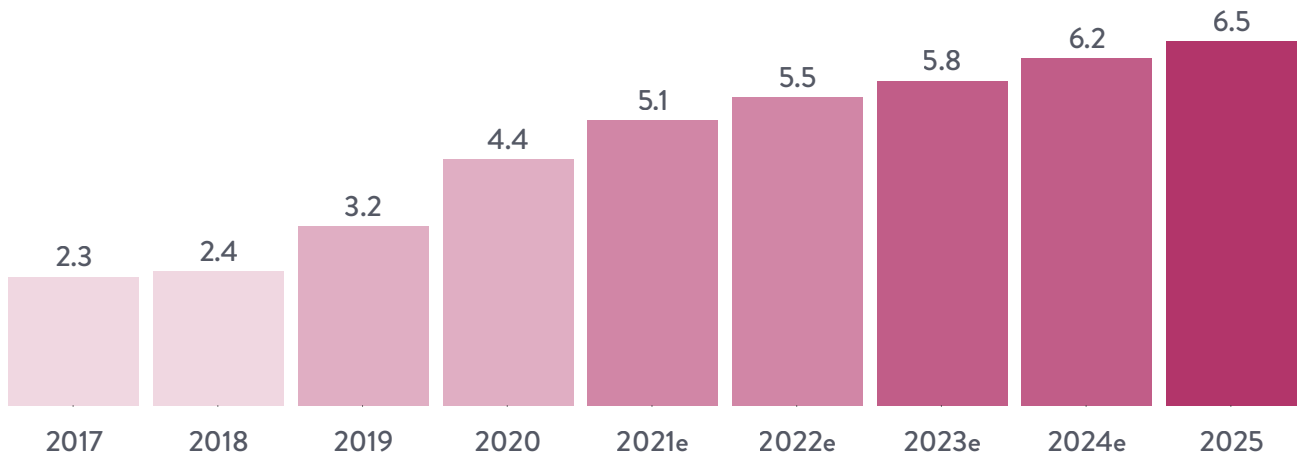
### Highest Rates of Patient Participation in Legal Medical Cannabis Programs<sup>3</sup>

As of July 2021



### Projected Growth in Global Medical Cannabis Patients Population<sup>5</sup>

In millions



2. For the purpose of this analysis, Puerto Rico is considered its own country, and density/saturation figures are based on population of Puerto Rico only.

3. Percent of total population participating the country’s medical cannabis program.

4. The saturation rate is based on the total summation of patient counts across the entire country, expressed as a percentage of that country’s total population. it is important to note that there are many states within the U.S. that, in isolation, have state program patient saturation rates over 4%.

5. Legal high-THC medical cannabis programs only.



ity program, allowing medical cannabis patients registered in other jurisdictions to purchase products at the island’s dispensaries. That policy has been key in driving participation among tourists visiting the island.

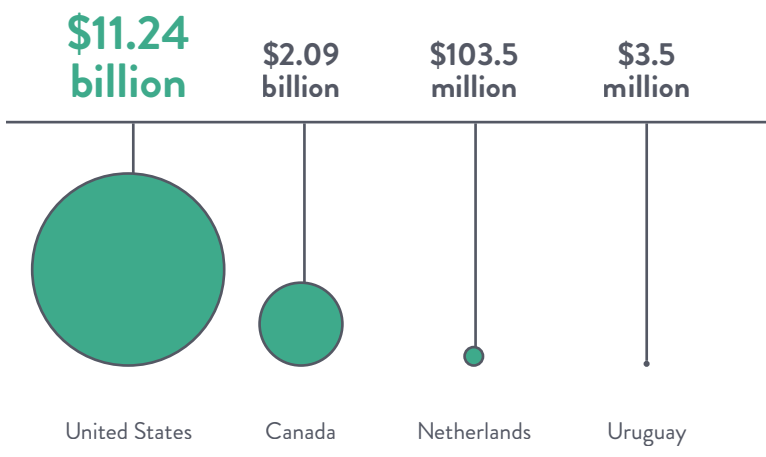
In countries with regulated medical cannabis sales, patient participation rates are primarily driven by the types of accepted qualifying conditions for program entry; the quality, variety, and availability of high-THC cannabis and cannabis products; and price competitiveness among legally regulated products relative to those found in the local illicit market. Some countries have enacted legal medical cannabis markets and adopted liberal regulations on patient qualifications, but failed to provide adequate varieties of products at reasonable prices, leading to high rates of patient registration but low rates of active participation via purchases from regulated sources. In those cases, cannabis consumers become medical cardholders, but continue to purchase cannabis from the illicit market at much lower prices.

## LEGAL ADULT-USE MARKETS

Annual global legal sales of adult-use cannabis are projected to be double those of legal medical sales by 2025, despite the higher number of medical markets globally.

While 10 countries in the world have approved cannabis for adult-use, only six have adopted systems for regulated distribution of high-THC cannabis products. The Netherlands and Spain have each adopted a decriminalized club/social-use model, and others (e.g., South Africa and Jamaica) have decriminalized cannabis for adult-use but only through restricted access for certain demographics or religions (e.g., the Rastafarian community), or legalized adult-use programs but without frameworks for distribution to consumers.

### 2020 Legal Domestic Sales of Adult-Use Cannabis



During calendar year 2020, there were a total of four legally operating adult-use cannabis markets with regulated retail sales, dominated by the U.S. and Canada. Uruguay, the world’s first country to fully legalize and regulate adult-use cannabis, sold roughly 1,700 kg of high-THC cannabis to registered adults, while the Netherlands sold an estimated \$104 million worth of high-THC cannabis through its network of retail coffee shops.



## Total Global Cannabis Demand

Based on New Frontier Data’s latest analysis, cannabis consumers globally spent an estimated \$415 billion on high-THC cannabis and cannabis products (i.e., illicit and legal spending combined) in 2020, with annual spending projected to climb to \$496 billion by 2025 (at a CAGR of 3.6%). As much of the world has not yet legalized cannabis in any form, nearly all the demand resides in illicit or unregulated markets — 94% of all 2020 spending on high-THC cannabis was in unregulated channels.

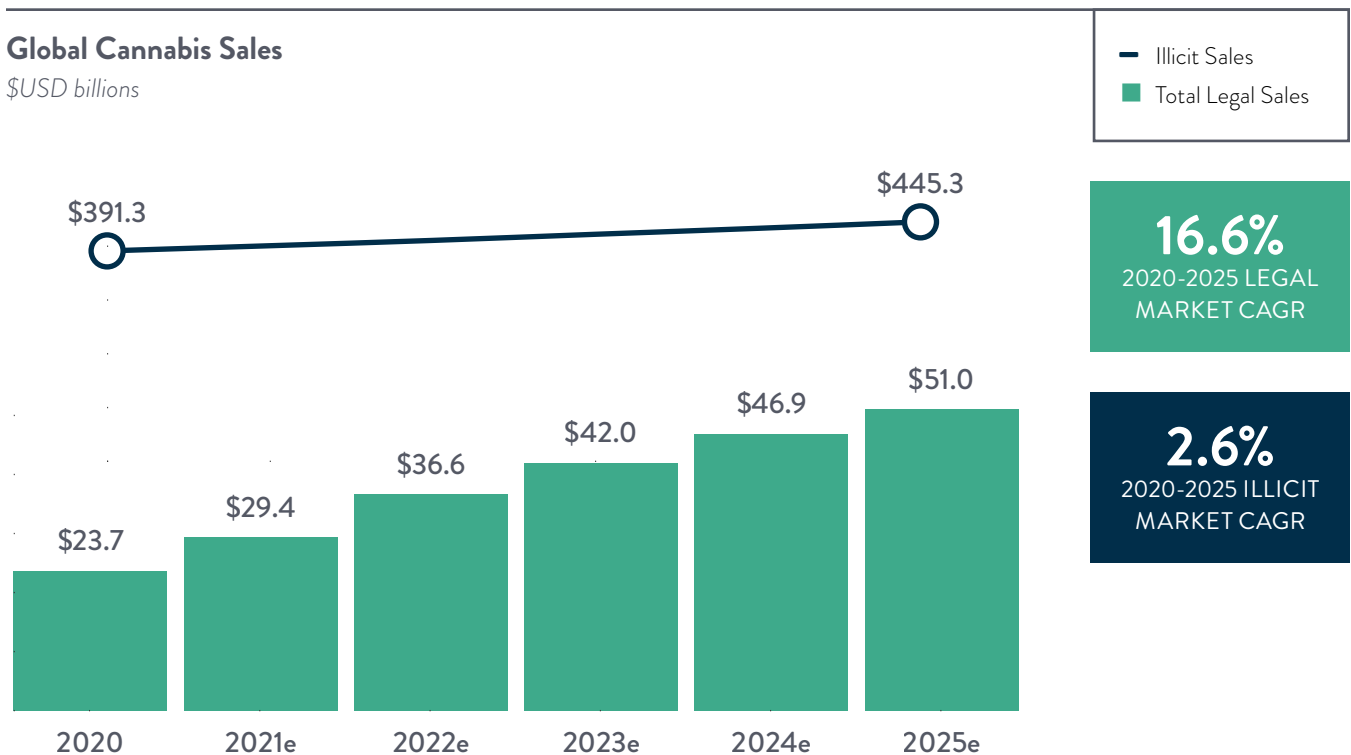
Asia (45%) is the world’s largest market, followed by North America (22%) and Europe (19%). Asia’s dominance is due to the overall size of the region,

home to nearly 60% of the world’s population. The wide variance in Asia between the average high and low price ranges, compounded by the region’s large population, result in that continent’s having the widest range in estimated spending.

All of the quantitative estimates presented in this report are initial estimates that New Frontier Data will continually refine as respective markets mature, and more data becomes available. While in-depth legal market analysis will be available through individual country reports by New Frontier Data, the initial estimates presented herein reveal a well-established consumer market of global consequence which presents significant growth opportunity as demand transitions from unregulated to legal markets.

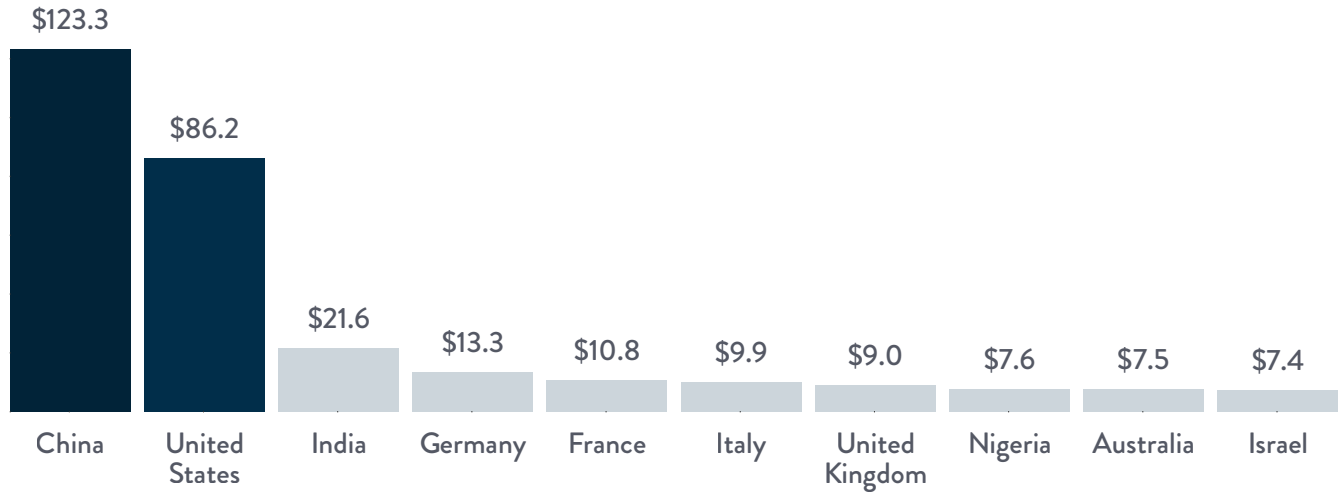
### Global Cannabis Sales

*\$USD billions*

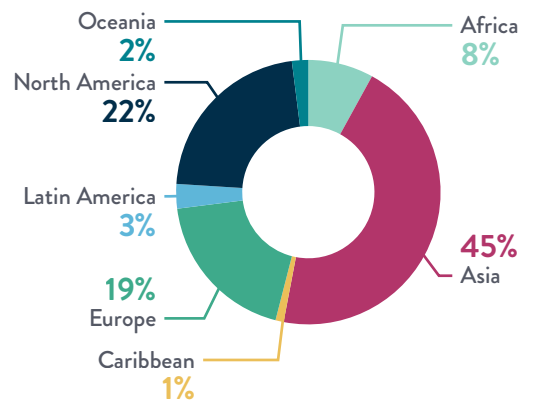
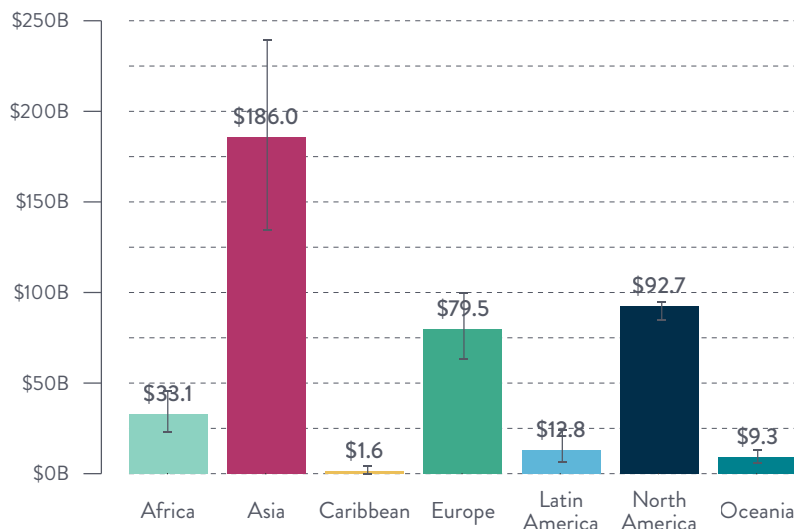


### Countries with the Highest Consumer Spending on High-THC Cannabis in 2020

All supply sources (legal & illicit), \$USD billions

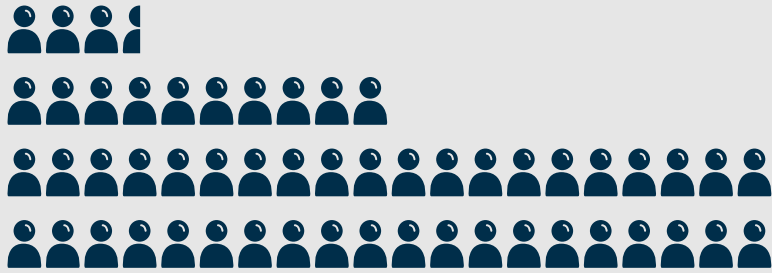


### Estimated Value of Cannabis Spending by All Consumers in 2020: \$415 Billion USD



Note: Wide price variances within a region increase levels of uncertainty when modeling the overall market demand. The above chart displays the estimated value of demand for cannabis, with error bars to indicate each the high, low, and midpoint estimates for the respective regions.





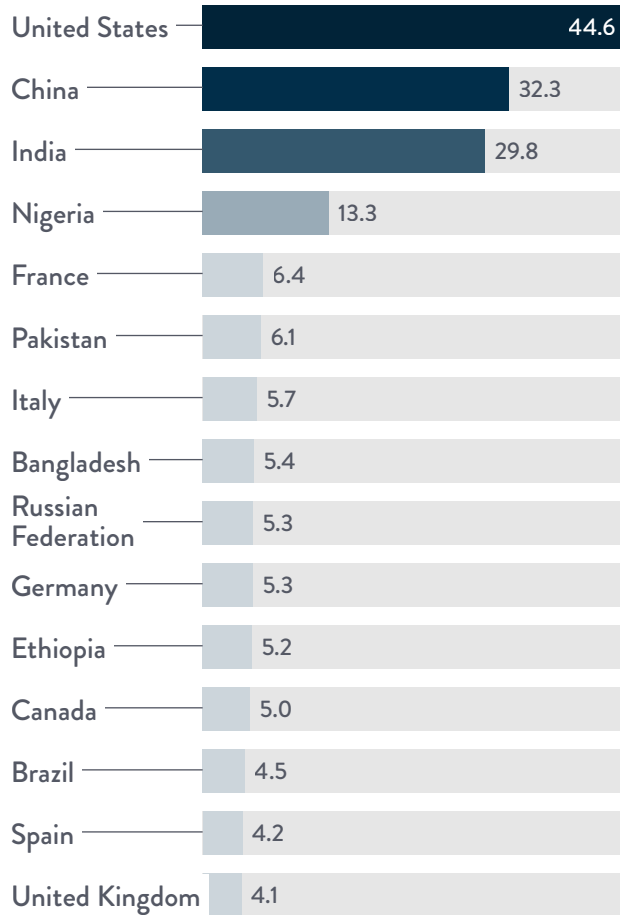
= 5 million consumers

# 268 million

Global estimated number of people who consumed cannabis at least once in 2020.

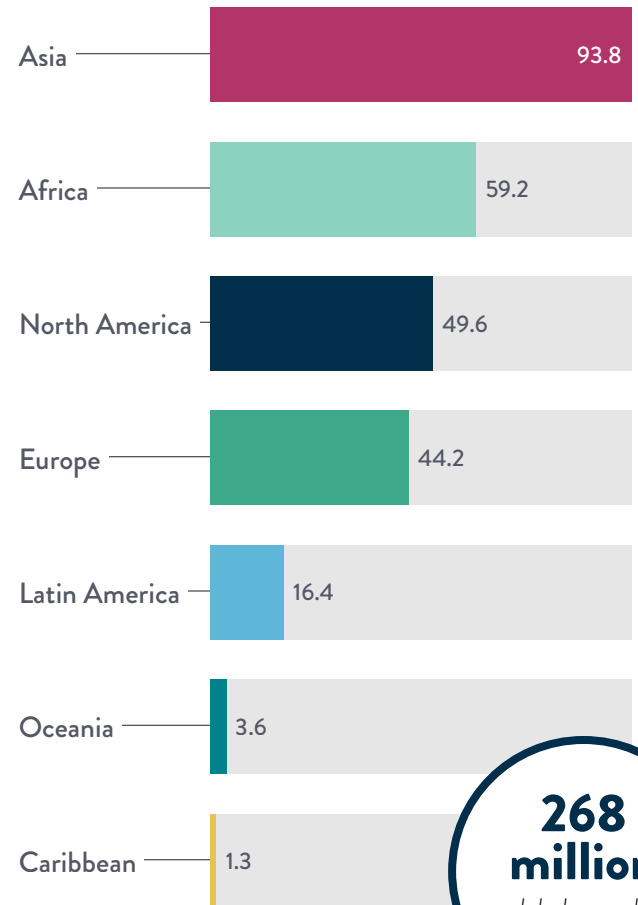
### Countries with Largest Cannabis Consumer Populations

In millions



### Number of Cannabis Consumers by Region

In millions



**268 million**  
global cannabis consumers

Note: Cannabis consumer is defined as having consumed cannabis at least once in 2020.



## USAGE RATES

Across the world’s adult populations (i.e., ages 15+), the regions of North America, Oceania, and Africa respectively have the highest rates of cannabis use.

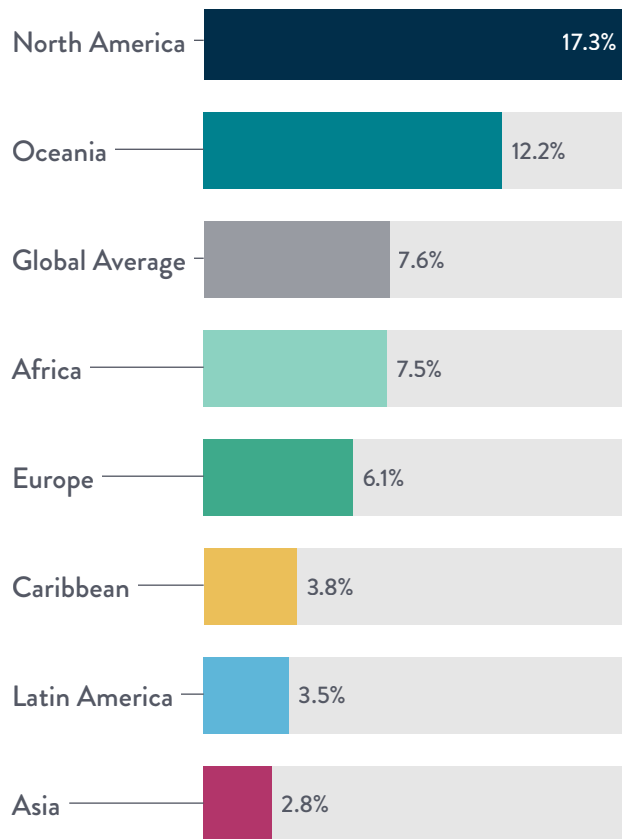
Israel has the world’s highest rate of national cannabis use, with 27% of its population aged 15+ reporting consumption of high-THC cannabis in

the past year. That rate is significantly higher than any other country’s, well outpacing both Jamaica and the United States as the nearest runners-up.

The high rates of use in Canada and the United States, accommodated by liberal social policies, have supported the advancement of legalization and establishment of robust regulated markets in both countries.

### Regional Average Annual Cannabis Usage Rate

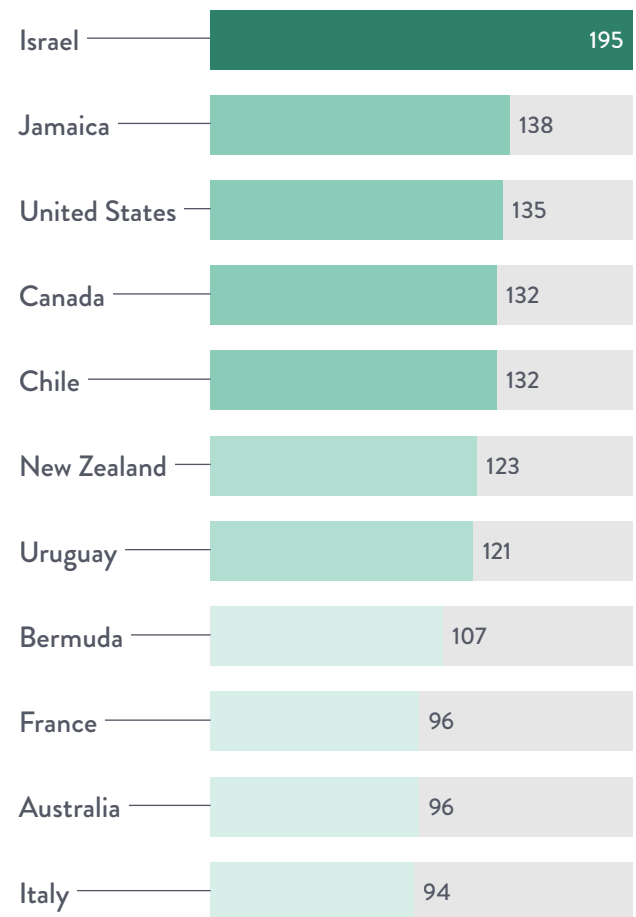
For 2020, on annual basis, population weighted



Source: New Frontier Data, UNODC, and EMCDDA

### Countries with Highest Density of Cannabis Consumers

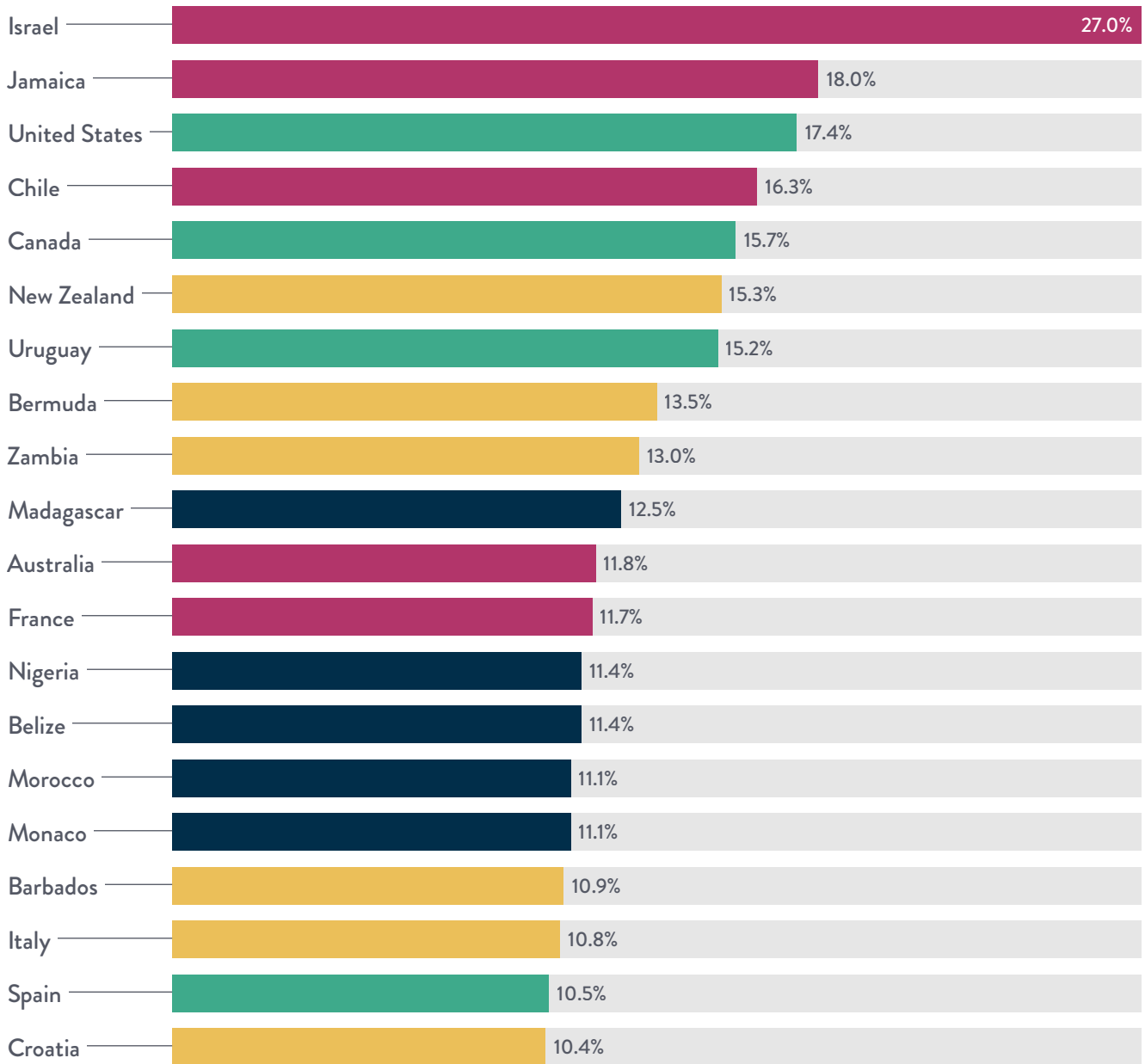
Consumers per 1,000



### Prevalence of Cannabis Use Among Adults in 2020

Top 20 highest reporting countries

- Legal Adult-Use Access to High-THC
- Legal Medical Only Access to High-THC
- Limited Medical Access to Low-THC
- No Legal Access



Note: Past-year cannabis use (weighted on a population basis by region across countries where data sources were available). New Frontier Data estimates for usage in 2020 are based on historical usage rate data inputs from UNODC, EMCDDA, and survey data conducted by NFD in regions where applicable.





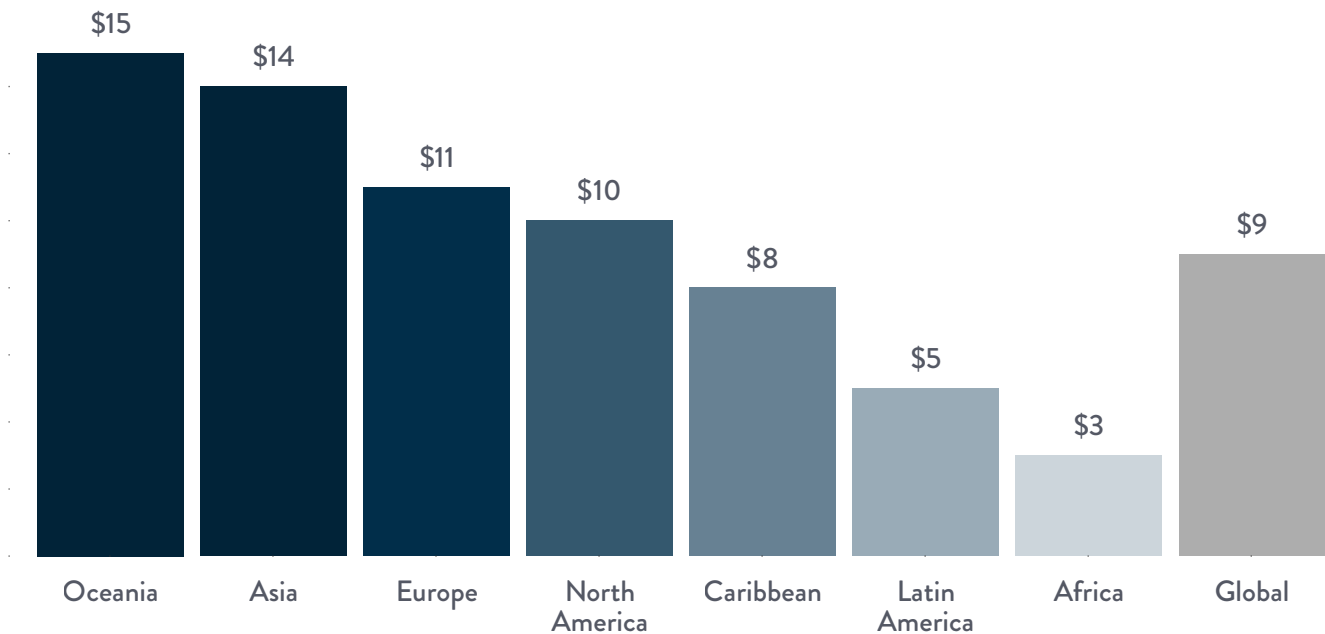
## PRICING

Price analyses from illicit cannabis markets across the globe revealed the lowest prices to be in Africa and Latin America, where the average price-per-gram of cannabis is close to \$3, due to lower relative-wealth per capita levels across the populations. The highest prices are in Oceania and Asia, where harsh penalties for possession, use, or sale (coupled with lower levels of social acceptance) lead to higher-risk premiums on products. Of the six countries with the world’s highest reported prices, five are in Asia (i.e., South Korea, Japan, United Arab Emirates, Israel, and Thailand).

In regions featuring access to legal cannabis (e.g., the United States and Canada), legal products compete for sales with the illicit market, resulting in falling prices in the latter. In North America, the difference between the average high price and average low price for a gram of cannabis flower is about \$3, while ranges for prices paid across restricted and illicit countries are much wider. In the UAE, prices paid for a gram of flower range between \$15 and \$40 (USD).

### Average Price per Gram for High-THC Cannabis Flower

By region



Prices shown represent the regional average price for a gram of high-THC cannabis flower across all countries and markets, both legal and illicit.

Source: New Frontier Data



# Regional Analysis

Region	Countries Included in Regional Analysis	Countries in Region with Some Form of Legalized Cannabis	Countries in Region Meeting NFD Legal Score Access Threshold	Countries in Region Meeting NFD Medical Use Score Access Threshold	Countries in Region Meeting NFD Adult-Use Score Access Threshold
Africa	54	8	1	0	1
Asia	44	6	1	1	0
Caribbean	23	7	3	3	0
Europe	54	32	15	13	3
Latin America	20	9	5	4	2
North America	3	2	2	2	2
Oceania	19	6	3	3	2
<b>Total</b>	<b>217</b>	<b>70</b>	<b>30</b>	<b>26</b>	<b>10</b>

*In an effort to screen data from markets for inclusion in the legal market analysis, NFD developed a quantitative legalization index to score each country according to legality of use and permissive access to high-THC cannabis and cannabis products for medical cannabis patients and adult-use consumers, respectively.*



Of the 1.05 billion people living across the 70 countries with legal access to high-THC cannabis products, nearly one-third live in North America (35%) and Europe (33%), followed by Latin America (22%).

Region	Total Number of Cannabis Consumers (in millions)
Africa	59
Asia	94
Caribbean	1
Europe	44
Latin America	16
North America	50
Oceania	4
<b>Global</b>	<b>268</b>

Region	Total Population	Population of 70 Countries to Legalize Some Form of Cannabis Use	Population of 30 Countries That Meet NFD Legal Threshold Score	% of NFD Legal Market Universe by Region
Africa	1.3 B	204 MM	59 MM	6%
Asia	4.5 B	270 MM	9 MM	1%
Caribbean	43 M	7 MM	6 MM	1%
Europe	869 MM	586 MM	345 MM	33%
Latin America	610 MM	519 MM	235 MM	22%
North America	368 MM	368 MM	368 MM	35%
Oceania	43 MM	31 MM	26 MM	2%
<b>Global</b>	<b>7.7 B</b>	<b>2.0 B</b>	<b>1.0 B</b>	<b>100%</b>

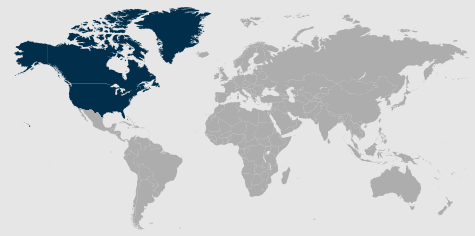
Note: In the United States, cannabis is illegal at the federal level. However, more than 38 states have legalized cannabis for medical use, and 18 have legalized adult-use programs.

Multiple countries (including Spain and Chile) do not have federally licensed distribution structures in place, but allow for either medical or recreational cannabis through private spaces, or social clubs.

Sources: World Bank Group Data, New Frontier Data



# North America



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.



## POPULATION

368 million



## CANNABIS CONSUMERS

49.6 million



## TOTAL CANNABIS SPENDING

\$92.7 billion



## AVG. ANNUAL USAGE RATE

17.3%



## AVG. PRICE PER GRAM (Flower)

\$9.72



## MEDICAL CANNABIS PATIENTS

4.4 million\*



\*Estimated registered patients as of Q2 2021.

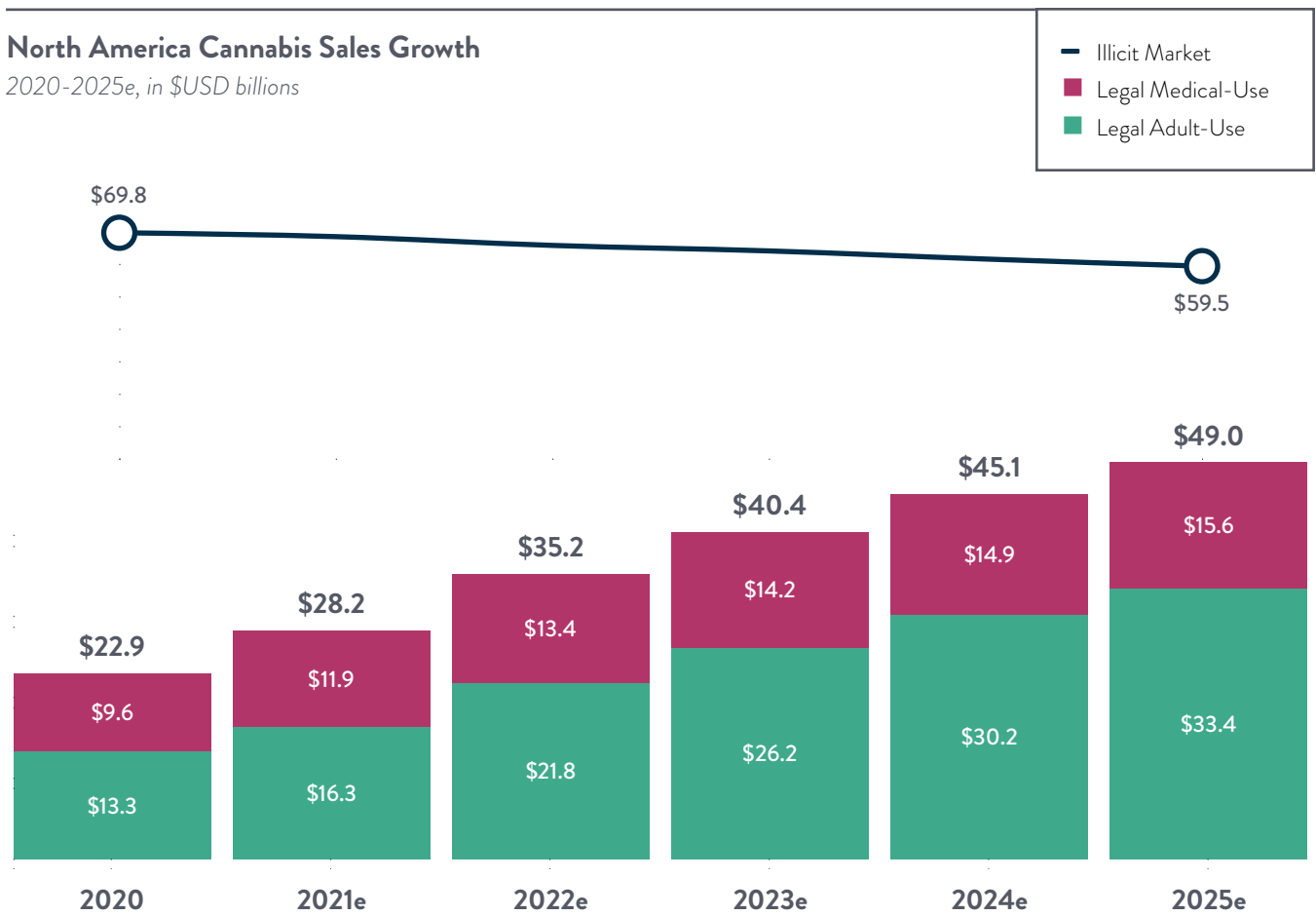


Home to the world’s largest federally legal adult-use cannabis program in Canada, and a patchwork of legalized U.S. states, North America is laying the foundation for a global industry. With total cannabis demand valued at \$93 billion in 2020, the demand for cannabis in North America is second only to Asia (\$186 billion), and is 20% larger than

in the European market. Both the United States and Canada have been at the forefront of the legal cannabis movement, influencing how governments and legislative bodies across the world are approaching potential legalization of cannabis in their own countries.

### North America Cannabis Sales Growth

2020-2025e, in \$USD billions



**16.4%**

2020-2025 LEGAL MARKET CAGR





# Canada



## POPULATION

38 million



## CANNABIS CONSUMERS

5 million



## TOTAL CANNABIS SPENDING

\$6.4 billion



## AVG. ANNUAL USAGE RATE

15.7%



## AVG. PRICE PER GRAM (Flower)

\$8.97



## MEDICAL CANNABIS PATIENTS

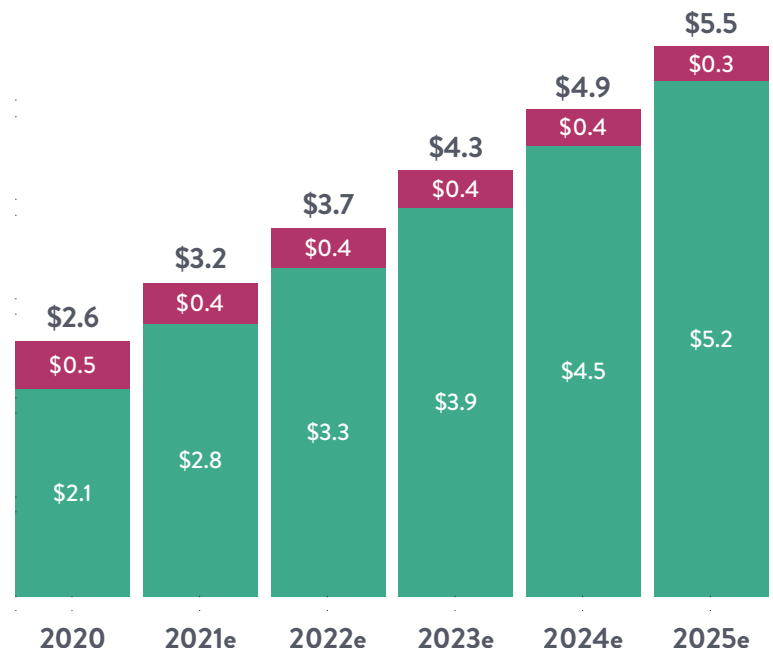
313,273

Canada leads the global cannabis market: In 2018, it became the first G-7 nation to fully legalize cannabis for medical, adult-use, and industrial purposes, acting as a catalyst in the development of the international cannabis marketplace. While still deploying its domestic markets, its licensed producers (LPs, companies authorized to grow and sell cannabis) are currently the world's largest cannabis companies, with multi-billion-dollar valuations. Those companies are leveraging deep financial pockets to fund supply-chain and infrastructure investments into cannabis companies worldwide as they seek

### Canada Legal Cannabis Sales Growth

2020-2025e, in \$USD billions

■ Legal Medical-Use  
■ Legal Adult-Use



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

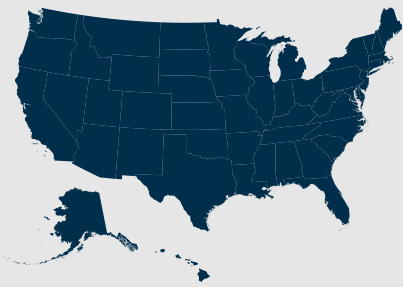
to establish production in lower-cost regions and capitalize on newly legal markets. Canadian LPs have agreements for exporting to over 20 different countries, giving the country a significant head start in the emerging global cannabis market, though companies in the Netherlands and Latin America are also seeking entry to establish themselves for global cannabis exports.

Domestic sales of legal cannabis through regulated outlets totaled \$2.57 billion for 2020; with recent expansion of footprints for adult-use retail outlets across the country, total legal sales from both licensed medical and adult-use retailers are projected to total \$5.5 billion by 2025.

While Canada will trail the U.S. in terms of its total domestic retail sales of cannabis, Canada will remain the world’s leading cannabis exporter through 2025, with its LPs holding in place among over 20 countries worldwide.

<b>Largest Public Cannabis Companies in Canada (by market cap)</b>	
<b>Canadian Company</b>	<b>Market Capitalization (August 2021, \$USD)</b>
Canopy Growth Corp	\$6.7 billion
Tilray	\$5.9 billion
Cronos Group	\$2.3 billion
Ayr Wellness Inc.	\$1.5 billion
Sundial Growers	\$1.5 billion
Aurora Cannabis	\$1.4 billion
Terrascend	\$1.2 billion
Village Farms International Inc.	\$800 million
OrganiGram Holdings	\$745 million
The Valens Company	\$435 million
HEXO	\$385 million
Fire & Flower Holdings Corp	\$250 million





# United States



## POPULATION

330 million



## CANNABIS CONSUMERS

44.6 million



## TOTAL CANNABIS SPENDING

\$86.2 billion



## AVG. ANNUAL USAGE RATE

17.4%



## AVG. PRICE PER GRAM (Flower)

\$10.48



## MEDICAL CANNABIS PATIENTS

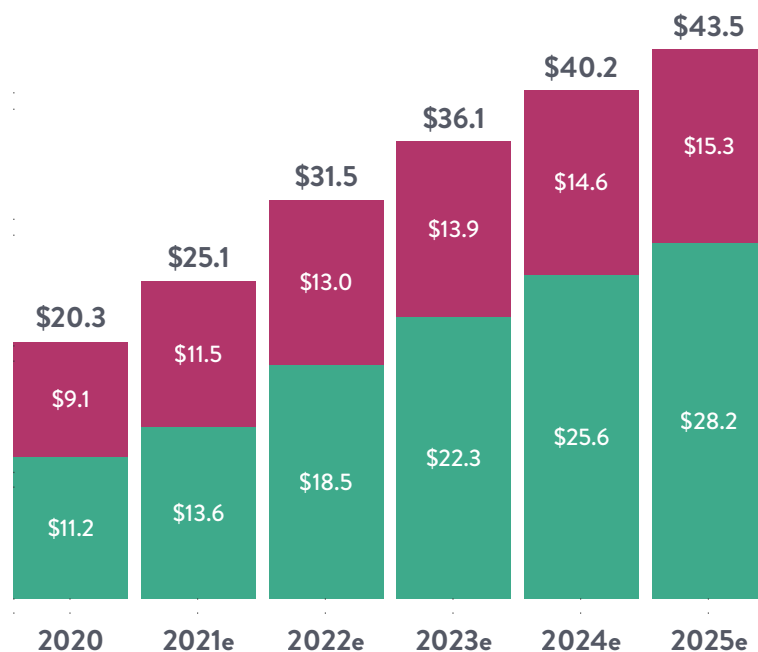
4.1 million

While the U.S. has not federally legalized cannabis either for medical or recreational use, 38 states (and D.C.) have enacted laws legalizing it in some form for medical use, with 18 states (and D.C.) having done so for adult-use. With a combined 145 million Americans living across those 18 adult-use states, and 236 million living across the 38 medical-use states, 44% of American adults now have access for adult-use, and nearly three-quarters (71%) have access to legalized medical cannabis in some form.

## U.S. Legal Cannabis Sales Growth

2020-2025e, in \$USD billions

Legal Medical Use  
Legal Adult-Use



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.



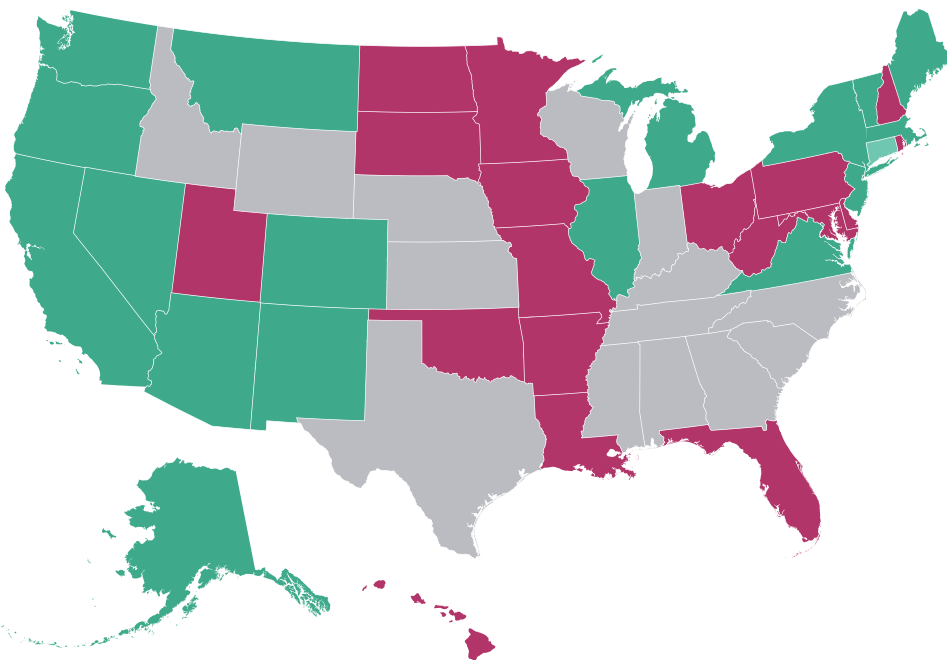
Despite federal prohibition, cannabis legalization at the state level has been growing in momentum, and cannabis use in the U.S. is so widespread at the municipal level that it is increasingly becoming decriminalized for personal possession or use. As a result, not only do Americans hold recently liberalized views on cannabis legalization – a Gallup poll found 68% nationwide believe that it should be legal – the country has also led the world in cannabis innovation as states have developed independent markets, with the creation of new genetics, cultivation techniques, derivative products, ingestion and distribution methods, and curated consumer experiences.

While federal prohibition restricts the ability for U.S. operators to participate in global markets, American companies will have access to the world’s most lucrative cannabis market due to the large domestic population of high-spending cannabis consumers.

States where cannabis is legal are generating significant revenues from legal sales. New Frontier Data estimates that in 2021 the legal U.S. state markets will generate over \$25 billion in sales, growing to over \$43 billion by 2025.

### Legalized States

- Legal Medical & Adult-Use
- Legal Medical Use Only
- No Legal High-THC Market



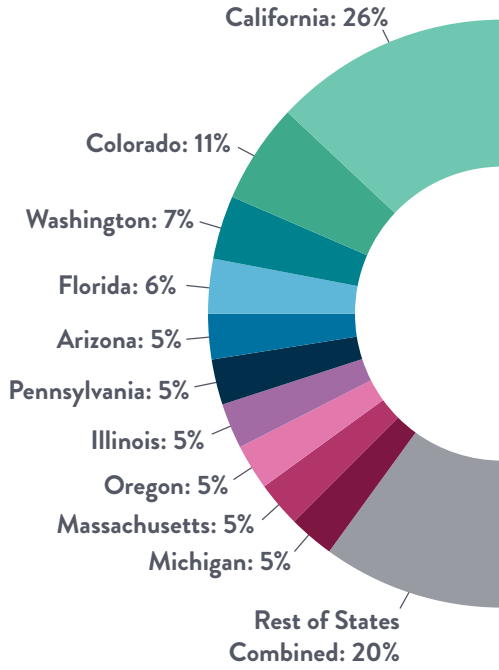
# 236 million

U.S. POPULATION LIVING IN A STATE WITH SOME FORM OF LEGALIZED ACCESS TO HIGH-THC CANNABIS



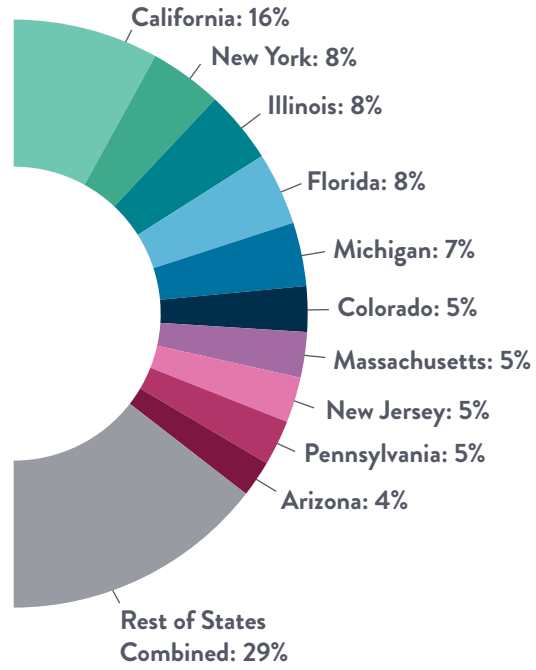
### Top 10 Largest Legal U.S. State Markets: 2020

2020 Annual Sales, Legal Medical & Adult-Use Combined





### Top 10 Largest Legal U.S. State Markets: 2025

2025 Projected Annual Sales, Legal Medical & Adult-Use Combined



### Potential New Legal U.S. State Markets

	MEDICAL	ESTIMATED CANNABIS CONSUMER POPULATION		ADULT-USE	ESTIMATED CANNABIS CONSUMER POPULATION
	Alabama	559K		Florida	3M
	Georgia	1.2M		Maryland	840K
	Idaho	226K		Minnesota	792K
	Kansas	358K		New Hampshire	263K
	Kentucky	539K		Ohio	1.5M
	Nebraska	225K		Pennsylvania	1.7K
	North Carolina	1.1M		Rhode Island	189K
	South Carolina	632K			
	Tennessee	843K			
	Texas	2.6M			
	<b>TOTAL</b>	<b>8.4 million</b>		<b>TOTAL</b>	<b>8.3 million</b>



## Strong Outlook for Additional State Activation in Coming Years

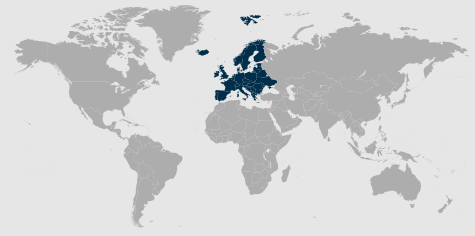
Over the next two years, the position of the U.S. as a global leader of cannabis consumer markets will continue to strengthen as states that were stymied in efforts for legalization amid the COVID-19 pandemic have regained momentum. There are seven additional states demonstrating strong likelihoods to legalize adult-use measures in the next 48 months, and 10 states with strong likelihoods to legalize cannabis for medical use. Passage of medical-use programs in those 10 markets would for the first time bring legal medical cannabis access to an additional population of nearly 80 million Americans, among whom an estimated 8.4 million already consume cannabis on a regular basis.

Legalization in those additional states would not only annually add an additional \$13 billion to retail sales for the country overall, but would likely serve as a catalyst for federal action from the strength of the demographic argument alone, as the passage of new markets would bring the percentage of Americans living in states with some form of legal cannabis access to 96%, and that of Americans living in legal adult-use states to 60%.

While it is difficult to predict when federal legalization may occur and what form it might take, it seems clear that the changing tides of public opinion have been driving the momentum for legalization forward, and if two-thirds of the country live in fully legalized adult-use markets, the pressure for cannabis reform at the federal level will inexorably grow.



# Europe



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.



## POPULATION

869 million



## CANNABIS CONSUMERS

44.2 million



## TOTAL CANNABIS SPENDING

\$79.5 billion



## AVG. ANNUAL USAGE RATE

6.1%



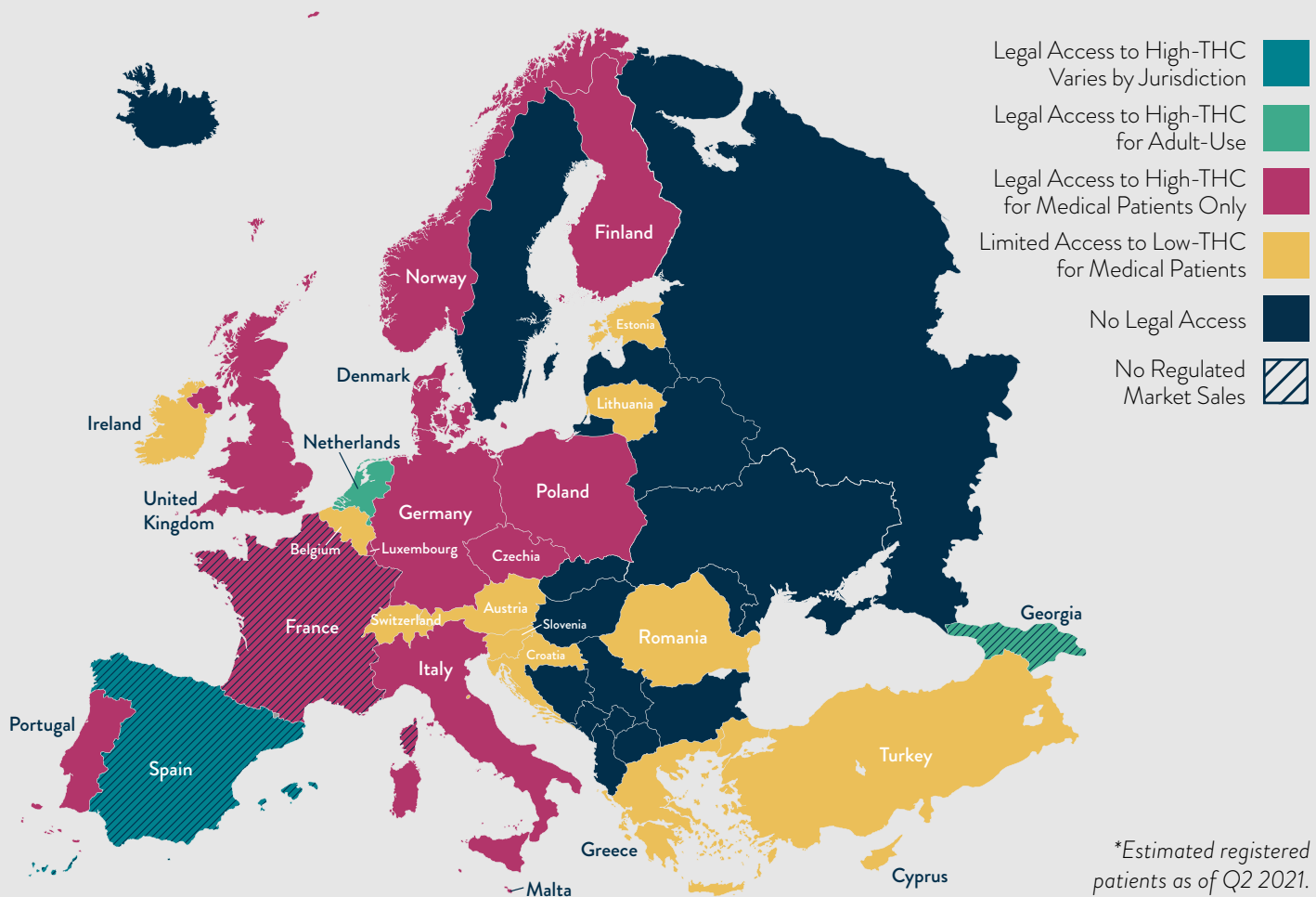
## AVG. PRICE PER GRAM (Flower)

\$11.35



## MEDICAL CANNABIS PATIENTS

107,356\*

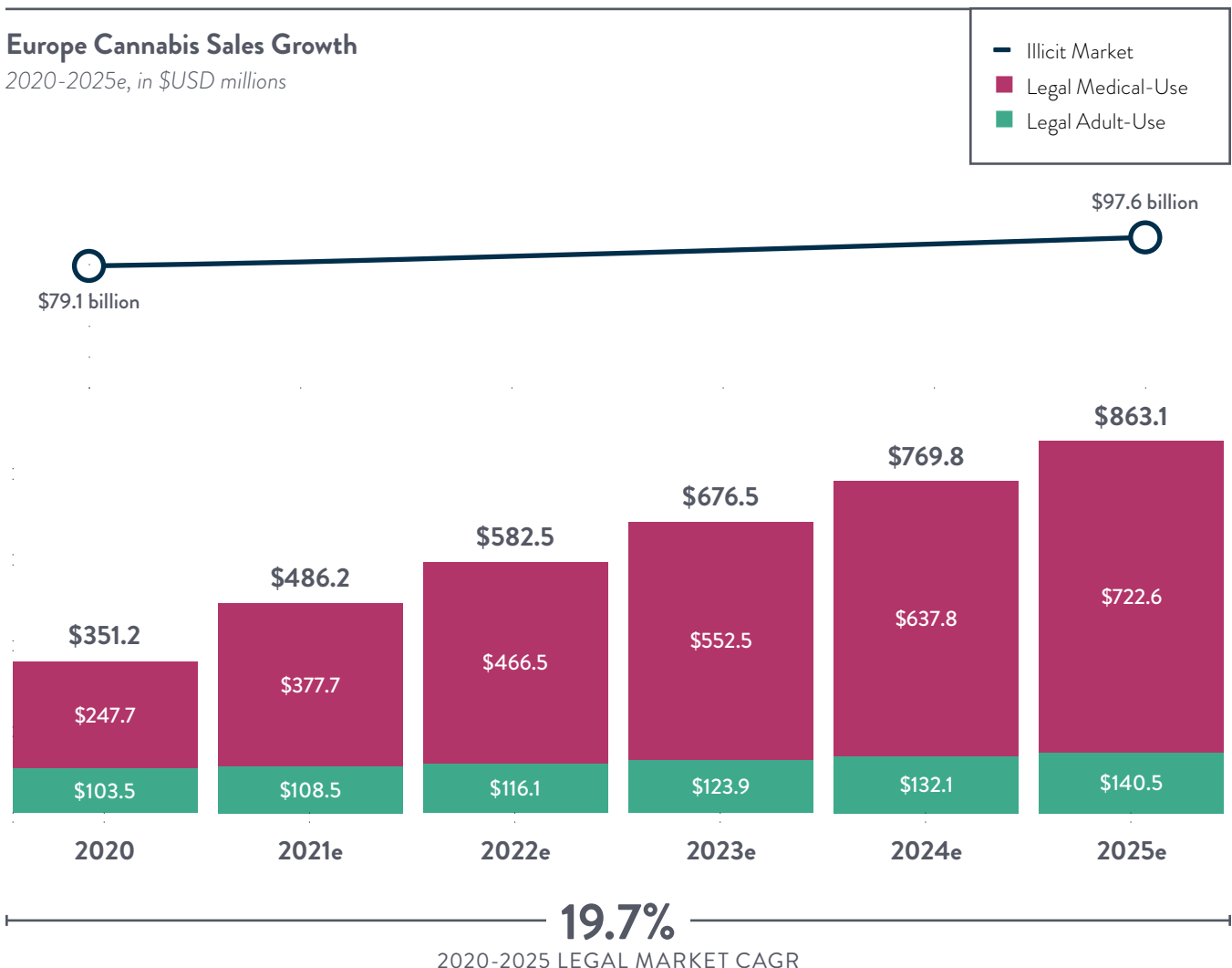


Europe has been at the forefront of cannabis reform, with nearly 30 countries in the continent providing patients with access to some form of legalized medical cannabis. While most of those have been granted through a limited, case-by-case issuance of compassionate-use licenses by health officials, three countries have legalized cannabis for adults. The Netherlands provides high-THC cannabis through a network of coffee shops, in addition to operating a

domestic medical cannabis cultivation program. The country also serves as global headquarters for Bedrocan — the company whose high-THC products are most frequently cited on short lists of approved products in restrictive medical markets across the world. Many, if not most, of the remaining countries in Europe are actively reviewing draft legislation or assigning committees to review aspects of cannabis legalization in the coming year.

### Europe Cannabis Sales Growth

2020-2025e, in \$USD millions





**POPULATION**

17.4 million



**CANNABIS CONSUMERS**

1.4 million



**TOTAL CANNABIS SPENDING**

\$1.9 billion



**AVG. ANNUAL USAGE RATE**

9.5%



**AVG. PRICE PER GRAM (Flower)**

\$7.12



**MEDICAL CANNABIS PATIENTS**

2,572

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

# Netherlands

Legal regulated cannabis is accessible in the Netherlands for qualified medical patients via pharmacies, and to adult consumers via unregulated coffee shops where the sale and consumption of cannabis is tolerated by local law enforcement.

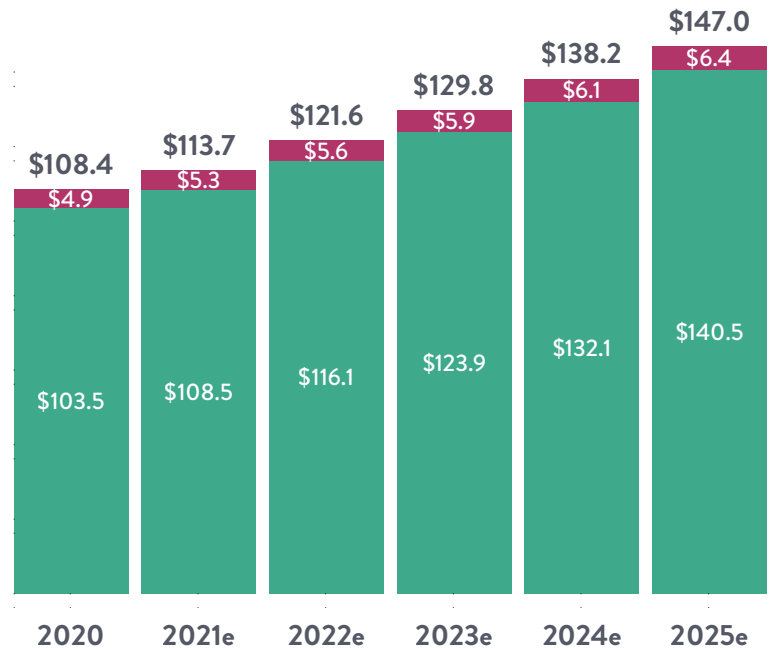
## Medical Patient Access

Doctors are permitted to prescribe medical cannabis for any condition if they deem it more beneficial than previous treatments – but the national Office of Medicinal Cannabis (OMC

### Netherlands Legal Cannabis Sales Growth

2020-2025e, in \$USD millions

Legal Medical Use  
Legal Adult-Use



Note: Roughly 5% of sales are for low-THC Bedrolite®

or BMC) provides an official list of indications for which it recognizes cannabis as having enough scientific efficacy to warrant a prescription. Those conditions include:

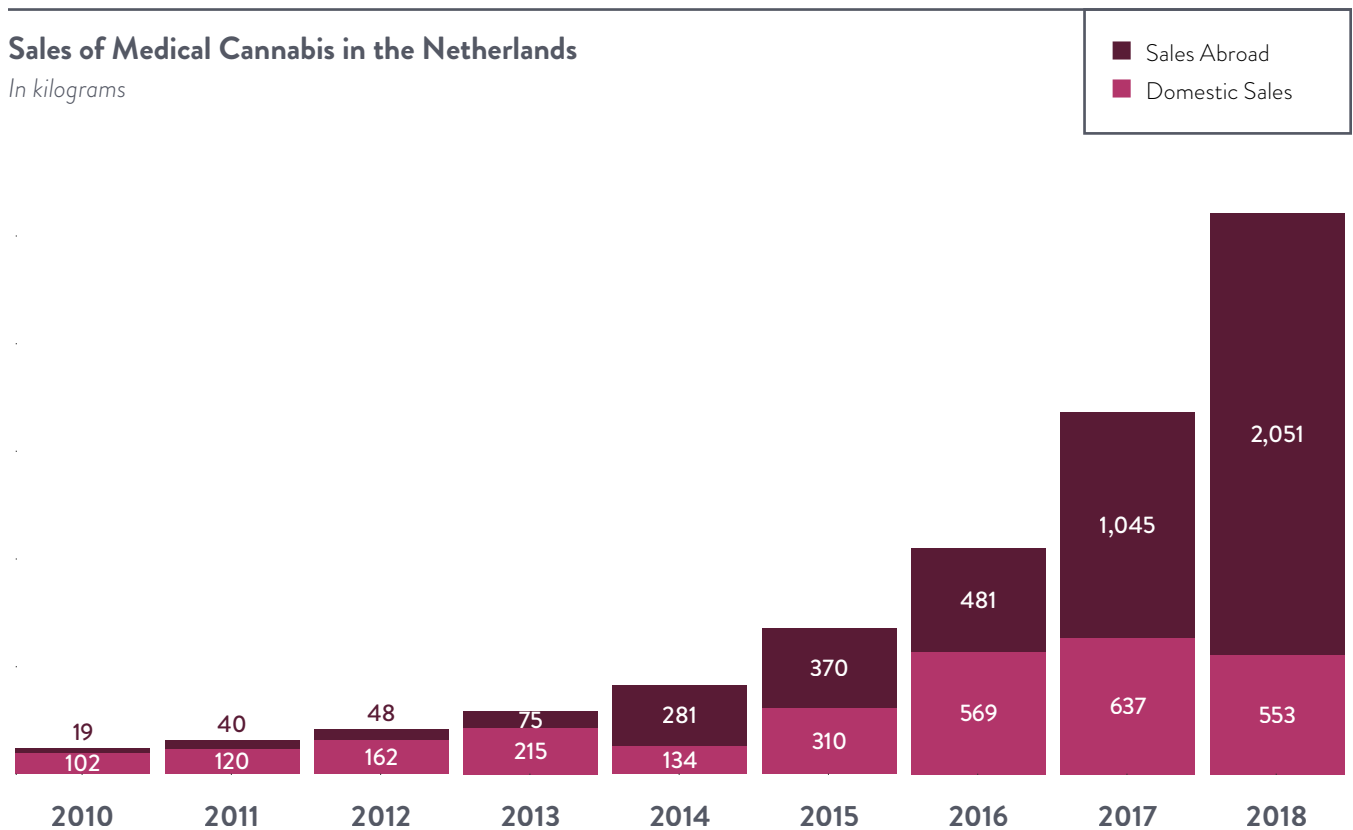
- Pain and muscle spasms caused by multiple sclerosis;
- Nausea, appetite issues, weight loss and debilitation from cancer or AIDS;
- Nausea and vomiting from chemotherapy, other treatments for cancer and HIV/AIDS;
- Chronic neuropathic pain; or
- Tics related to Tourette’s syndrome.

Product Name	Sales National*	Product THC % Content
Bedrobinol	5%	~ 13.5
Bedrocan®	65%	~ 22
Bedica®	14%	~ 14
Bediol®	11%	~ 6.3
Bedrolite®	5%	< 1

\*Represents 2018 sales as provided by the Bureau of Medicinal Cannabis (BMC).

### Sales of Medical Cannabis in the Netherlands

In kilograms



Source: The Bureau of Medicinal Cannabis (BMC)



Patients are not required to join a government program to receive medical cannabis. Instead, patients receive a prescription as they might for any other regulated medication, and fill it at a pharmacy. According to the International Association for Cannabinoid Medicines, about 2,500 patients receive medical cannabis through pharmacies, but expectations are that the numbers of people using cannabis for medicinal purposes but purchasing it either from coffee shops or illicit sources are much higher.

Available products in pharmacies are limited to Bedrocan. Without competition, prices in pharmacies are generally higher than prices for products available in either the illicit market or through coffee shops. Pharmacies offer five products from their sole supplier, with flower (having the highest THC percentage) representing nearly two-thirds (65%) of the bulk of medical cannabis sales as reported by the Bureau of Medical Cannabis (BMC).

Growth in domestic sales of Bedrocan products has slowed in recent years, and the OMC is expected to tender up to two additional licenses to medical cannabis producers in the country this year, a move likely to end Bedrocan's monopoly on the country's medical cannabis supply.

## Illicit Market

Although the Netherlands technically considers cannabis illegal for adult-use, possession in small amounts is generally tolerated, with adults over age 18 able to make purchases and consume in coffee shops. The marijuana available at coffee shops tends to be cheaper than medical cannabis from a pharmacy, in part because the products sold in coffee shops are sourced from unregulated suppliers.







# Spain



## POPULATION

47 million



## CANNABIS CONSUMERS

4.2 million



## TOTAL CANNABIS SPENDING

\$5.4 billion



## AVG. ANNUAL USAGE RATE

10.5%



## AVG. PRICE PER GRAM (Flower)

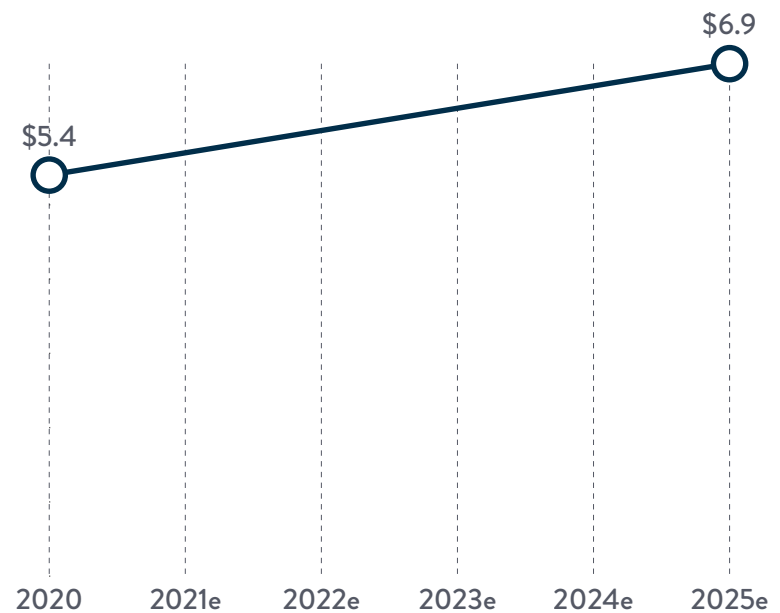
\$5.73

Cannabis remains federally illegal in Spain, with the country's 4.2 million cannabis consumers acquiring their cannabis from illicit sources or through the unregulated patchwork of cannabis social clubs.

Following a series of 1970s rulings by the Supreme Court of Spain, personal possession of small amounts of cannabis was no longer considered a criminal offense, leading to a rise of social clubs across the country (i.e., private clubs permitted to grow and distribute cannabis to their members for medical and personal use). Though there are laws governing the operations of such clubs (including rules prohibiting profit-making),

## Spain Illicit Cannabis Sales Growth

2020-2025e, in \$USD billions



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

a lack of oversight has resulted in their operating outside of the legally intended scope. Given strong consumer demand and lax enforcement of governance, some clubs (particularly those in Barcelona) have grown sufficiently popular to include tens of thousands of members.

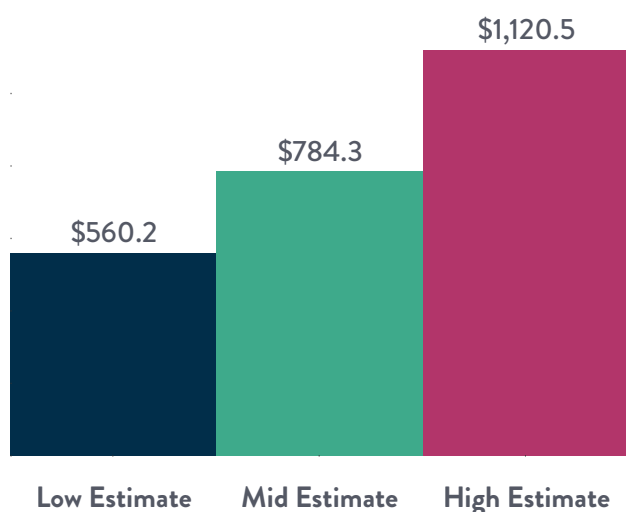
## Social Clubs

The legal status of existing social clubs is ambiguous, with clubs currently operating in semi-regulated environments. Nevertheless, there are several criteria that clubs are expected to meet to comply with precedents set in case law. These include:

- Must operate on a nonprofit basis;
- Must be closed to the public;

### Estimated Sales of Cannabis in Social Clubs

2019 annual sales, in \$USD millions



Note: Estimates for the number of clubs vary across New Frontier Data’s sources, but fall generally below 600 clubs. The government does not formally track the number of clubs, nor the number of members in each.

- Must observe limits on the quantity of cannabis consumed; and
- Cannabis distributed by the clubs must be for immediate/on-site consumption.

Though they must operate in line with those criteria, the clubs have been self-regulating; with many finding ways to operate outside the precedents, and growth has accelerated as they have loosened membership policies (i.e., straying from initial guidelines providing for medical use only, and admitting tourists as rotating “guests” of existing members).

Note: The European Coalition has also created a Europe-wide code of practice for Just and Effective Drug Policies, but most clubs in Spain are still self-regulating or following locally developed practices.

## Tourism

Spain generally leads Europe in social and cultural acceptance of cannabis, and due to the largely unregulated nature of the social clubs, it unsurprisingly also leads in tourist participation regarding the country’s high-THC cannabis economy.

- Spain is the Europe’s second-most visited country (after France), with 82 million tourists visiting the country every year. Tourism accounts for around 11% of the nation’s economy, and is a driving force in its cannabis industry.
- Of the 126 million visitors to Spain in 2019, an estimated 5.6 million consume cannabis during their visits.<sup>1</sup>

1. Canna-tourism figures are proprietary NFD estimates.

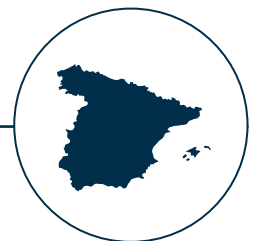


- Tourists comprise as much as 80% of the membership at some clubs, and the majority of members in all of the clubs surveyed. However, most tourists are likely one-time or limited-time visitors.

There are an estimated 250–550 social clubs operating across the country, with a large portion concentrated in urban areas with large tourist populations. The clubs range in size, from smaller clubs in rural areas serving as few as 50-100 members, to larger clubs in popular tourist cities with annual membership numbers over 30,000. The reported membership numbers are cumulative, however, with larger membership rosters often reflecting

clubs with open-door policies towards tourists (e.g., tourists represent roughly 60%-90% of club membership in some of the Barcelona's larger clubs).

The year 2020 saw a large spike in illicit market sales in 2020, with cannabis clubs in Barcelona losing not only their tourism spending (which accounted for a large portion of sales in clubs that promoted an open door policy to tourists), but also revenue from domestic consumers following national lockdowns. In the year prior to 2020, New Frontier Data estimates the clubs across Spain sold \$785 million (mid-estimate) worth of cannabis and cannabis products through clubs.





# Georgia



## POPULATION

3.7 million



## CANNABIS CONSUMERS

112 thousand



## TOTAL CANNABIS SPENDING

\$136.5 million



## AVG. ANNUAL USAGE RATE

3.8%



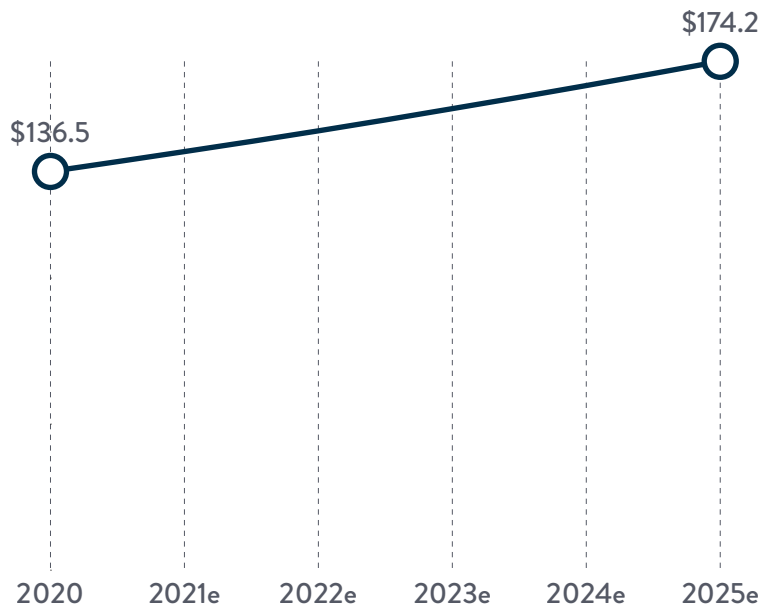
## AVG. PRICE PER GRAM (Flower)

\$6.79

Georgia effectively legalized possession and use of cannabis in July 2018 when the country’s constitutional court ruled it unconstitutional to punish a person for using cannabis since it poses no threat to anyone else, effectively claiming that punishing its use is a restriction of personal freedoms. However, the country has subsequently neglected to make any movement either to implement regulated distribution or to legalize cultivation or sales, leaving the country labeled with a “legalized” cannabis country status, though no structured or regulated framework to support a functioning market, and no laws yet in motion to support one.

## Georgia Illicit Cannabis Sales Growth

2020-2025e, in \$USD millions



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.



# Czech Republic



## POPULATION

10.7 million



## CANNABIS CONSUMERS

864 thousand



## TOTAL CANNABIS SPENDING

\$1.6 billion



## AVG. ANNUAL USAGE RATE

9.6%



## AVG. PRICE PER GRAM (Flower)

\$10.27



## MEDICAL CANNABIS PATIENTS

1,402

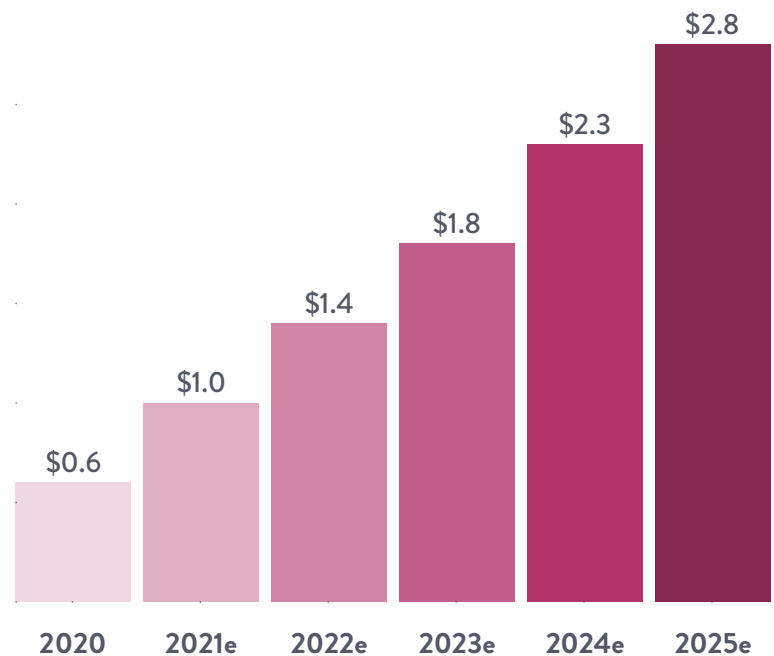
The Czech Republic first legalized cannabis in 2013, establishing it among the earliest medical cannabis programs in Europe. It was the second country on the continent (after the Netherlands) to authorize domestic cultivation, yet the market remains comparatively small given the time since legalization.

## Patient Participation

The government defined a list of qualifying medical conditions for a medical cannabis prescription, including chronic pain,

### Czech Republic Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

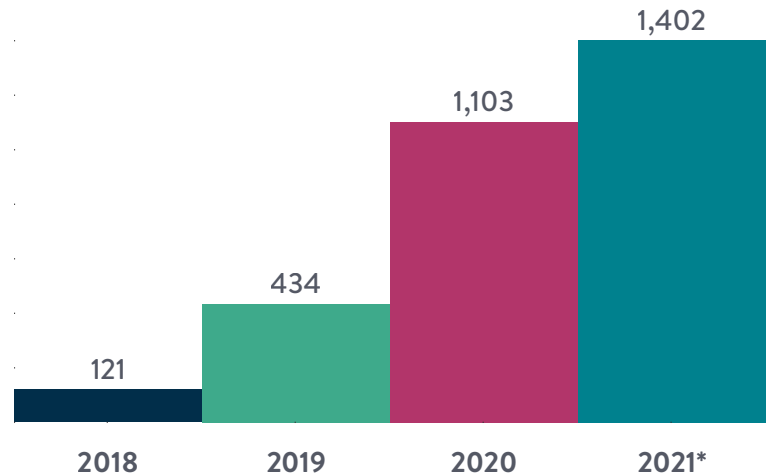
Patient counts are estimated registered patients as of Q2 2021.

glaucoma, multiple sclerosis (MS), Parkinson’s disease, spinal or brain injury, and Tourette’s Syndrome. The numbers of active patients and total monthly prescriptions written for medical cannabis in the Czech Republic have increased steadily, with an estimated 1,400 patients active in June 2021. Still, a percentage of those patients are expected to keep making some of their overall cannabis purchases from the illicit market, as supply restrictions have caused lapses in the sufficient availability of products on legal shelves

## Insurance Coverage Boosting Patient Participation

Since January 2020, medical cannabis patients in the Czech Republic have been eligible for insurance coverage for up to 90% of their medical cannabis (similar to insurance reimbursement benefits offered to patients in Germany’s program), though coverage is limited to 30 grams per month. While the insurance coverage change has proven to afford a small boost to the medical cannabis program over the past year and a half, it is unclear whether the combination of product limitations and supply restrictions on the legal market will keep medical patients fulfilling a portion of their demand with lower-priced, illicit products.

### Active Medical Cannabis Patients in Czech Republic

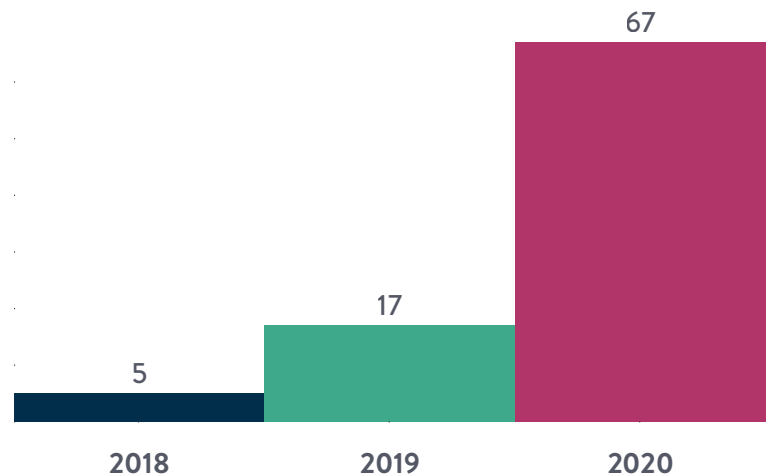


*\*Patient counts shown for 2021 are as of June, all others are as of year-end, December 31.*

*The agency noted that nearly 80% of cannabis prescriptions last year were to treat chronic pain – a ratio in line with patient condition participation rates in developed legal cannabis markets worldwide.*

### Medical Cannabis Sold to Patients in Czech Republic

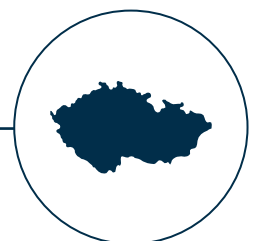
*In kilograms*



## Supply Limitations Hindering Market Growth

From the onset of the program, the supply of medical cannabis for patient prescriptions was imported from Bedrocan in the Netherlands, and despite the county commencing domestic cultivation in 2016, the legal product landscape did not expand in tandem with the additional production capacity.

The overall growth of the program is yet held back by supply-chain restrictions and product variety limitations. The state-tendered producer, Elkoplast Slušovice, and leading distributor Alliance Healthcare, maintain a near monopoly, with supplementary exports coming from Canadian LPs Aurora Cannabis and Canopy Growth.





**POPULATION**

5.8 million



**CANNABIS CONSUMERS**

332 thousand



**TOTAL CANNABIS SPENDING**

\$924 million



**AVG. ANNUAL USAGE RATE**

6.8%



**AVG. PRICE PER GRAM (Flower)**

\$15.53



**MEDICAL CANNABIS PATIENTS**

1,674

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

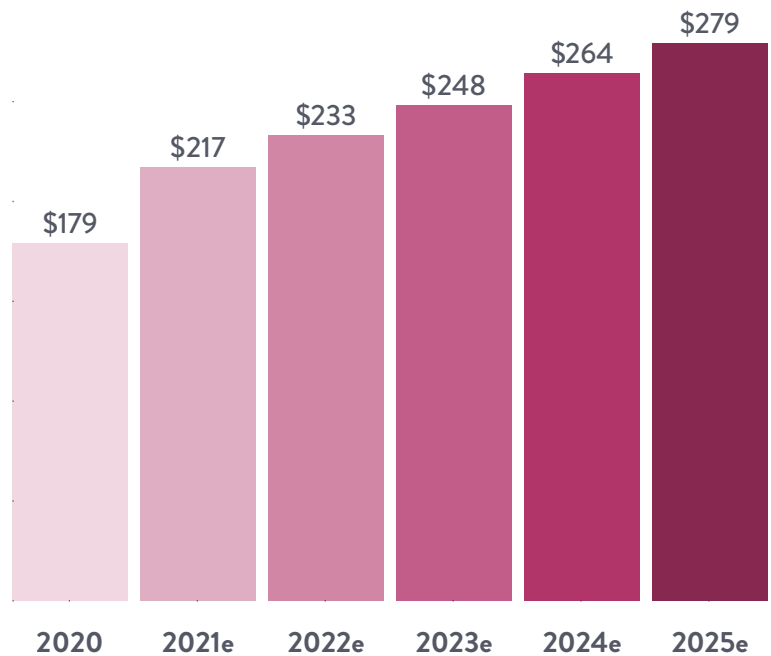
# Denmark

Denmark legalized medical cannabis through a four-year pilot program initiated in January 2018, with the Ministry of Health announcing an additional four-year extension as of 2021.

While three types of cannabis derivatives - Sativex, Marinol and Nabilone - were approved by the Danish Medicines Agency in 2011 for medical use (prescribed primarily for pain and nausea in cancer patients, and to alleviate muscle stiffness in multiple sclerosis [MS] patients), and Dronabinol has been made acces-

## Denmark Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD thousands

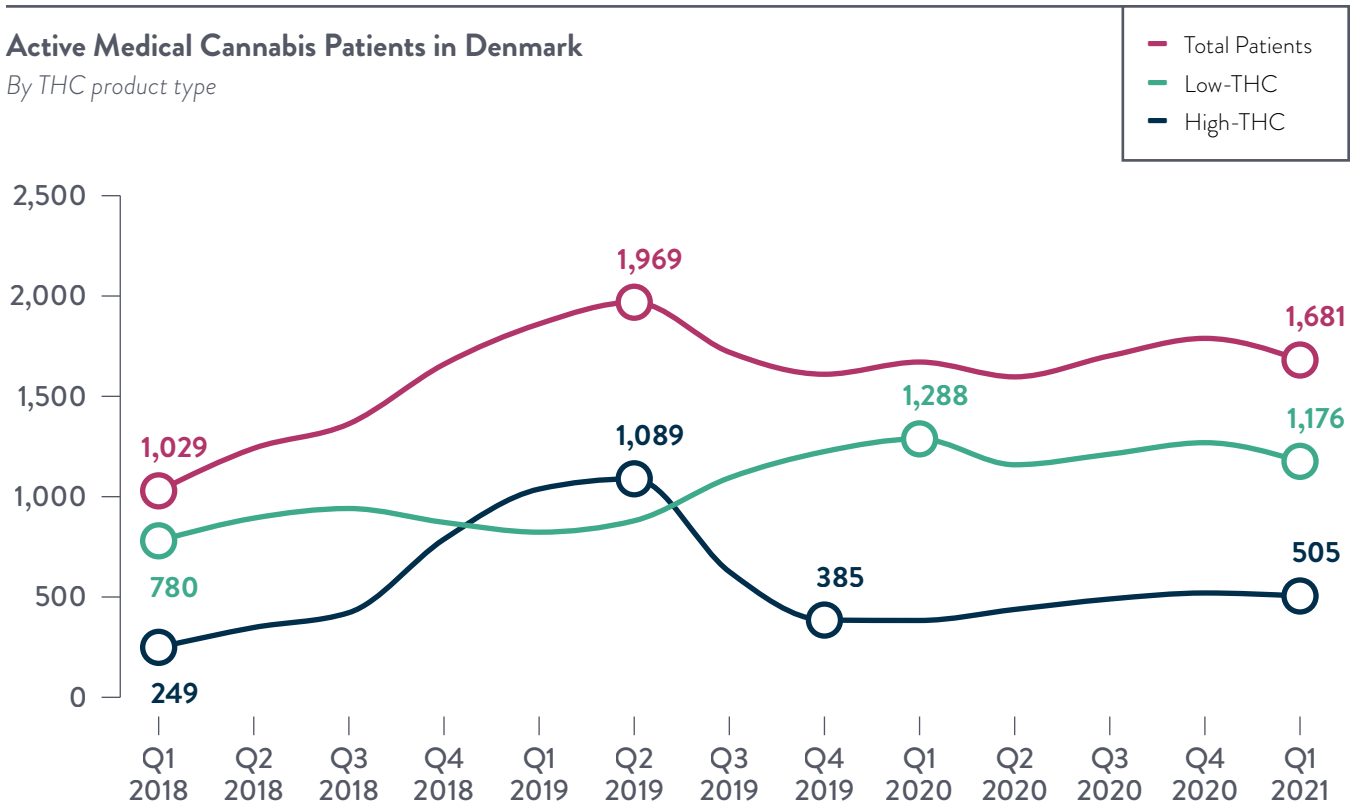




sible through magistral preparations, whole-plant high-THC cannabis first became available under the 2018 pilot program.

The program enjoyed rapid growth in its initial years, but active participation on the high-THC side has fallen, with 505 patients accessing cannabis through the program in Q4-2020 (less than half the number of patients accessing the market at its maximal participation during Q2-2019).

Similar to other early programs across Europe, maintaining active cannabis patient participation in Denmark’s has proven difficult because of supply restrictions and limited product variety and availability. Those issues are compounded by the illicit market, which has grown more sophisticated in recent years amid advances through global legalization, mirroring the legal market’s evolution of new product types and higher levels of quality standards, plus a competitive price point.



Note: The number of patients declined in the second half of 2019 following removal of the only full-spectrum oils from the market.



While the overall volume of legal medical cannabis sold in Denmark has been growing - 7.1 kg sold in Q1-2021, up from 2.2 kg in Q1-2020 - growth has been largely due to a rapid uptick in sales of Sativex and other low-THC products, isolated compounds, and pharmaceuticals. Legal sales of high-THC products have remained relatively flat, with just 2.4 kg of whole-plant, high-THC sold in Q1-2021.

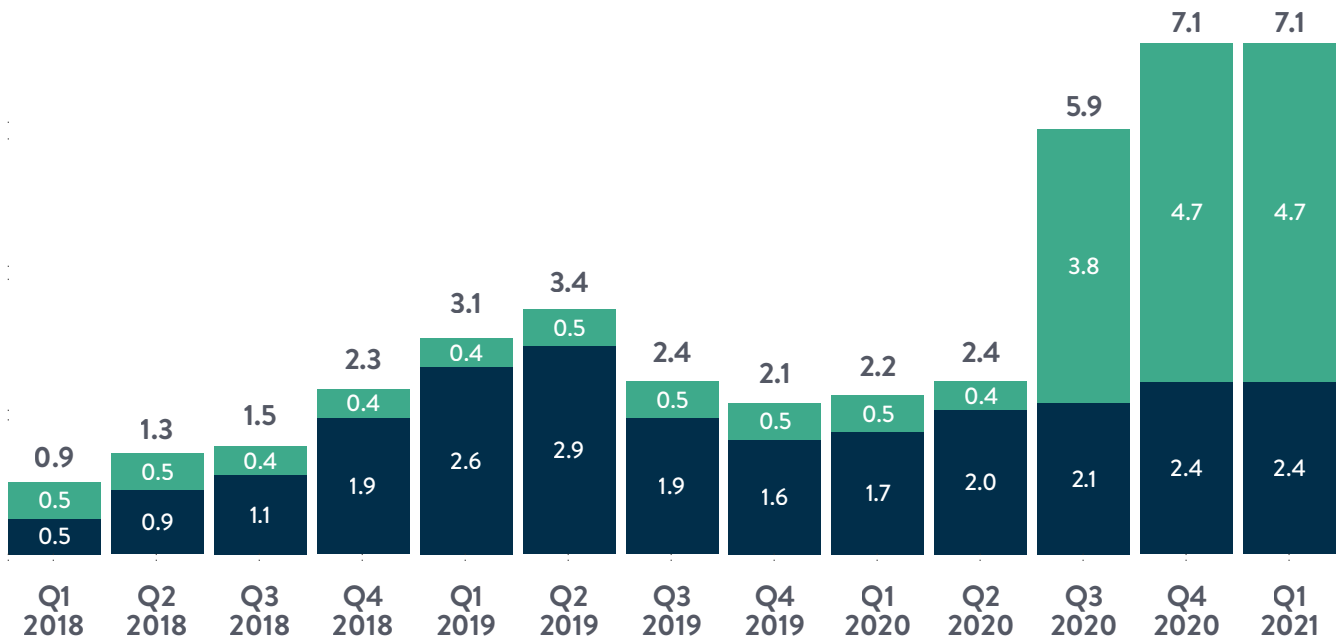
Recently it was announced that Danish farmers would be allowed to grow cannabis under secured conditions with special permits. With expanded domestic production expected in the future, several Canadian companies scaled back ambitious expansion plans into the country amid rising capital expenditures.

In late 2019, Aurora halted construction at its large second-phase facility in Denmark, and in June 2021 Canadian cannabis producer Canopy Growth announced the sale of its Danish facility to Australia-based Little Green Pharma Ltd.

### Quarterly Sales of Legal Medical Cannabis in Denmark

High-THC vs. low-THC product sales, in kilograms

- Low-THC Cannabis Sales
- High-THC Cannabis Sales



Note: Sales volumes figures do not include Magistrel Preparations with isolated cannabinoids.





**POPULATION**

5.5 million



**CANNABIS CONSUMERS**

396 thousand



**TOTAL CANNABIS SPENDING**

\$1.3 billion



**AVG. ANNUAL USAGE RATE**

8.5%



**AVG. PRICE PER GRAM (Flower)**

\$18.70



**MEDICAL CANNABIS PATIENTS**

230

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

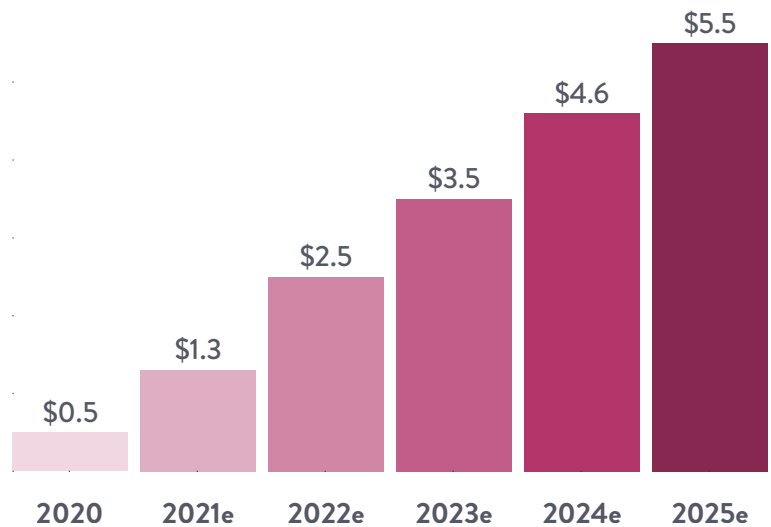
Patient counts are estimated registered patients as of Q2 2021.

# Finland

In Finland, access to legal, high-THC medical cannabis products is limited. Patients can access imported high-THC cannabis by working with a specialist (not a general practitioner) to apply with the Finnish Medicines Agency (Fimea) for a special, compassionate-use permit. With no formalized domestic medical cannabis program, no official restrictions exist on the types of qualifying conditions eligible for medical cannabis. Instead, patients and their physicians determine together whether cannabis is an ideal treatment option for their conditions or symptoms. Common conditions that may qualify for medical cannabis include cancer, HIV/AIDS, spinal cord injury, and epilepsy. Medications like Sativex, however, are only approved for select conditions, such as multiple sclerosis (MS). Only three types of high-THC medical cannabis have been made available to patients, through limited compassionate-use permits for Bediol, Bedica, or Bedrocan.

## Finland Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions





**POPULATION**

83.6 million



**CANNABIS CONSUMERS**

5.3 million



**TOTAL CANNABIS SPENDING**

\$13.3 billion



**AVG. ANNUAL USAGE RATE**

7.4%



**AVG. PRICE PER GRAM (Flower)**

\$11.02



**MEDICAL CANNABIS PATIENTS**

84,237

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

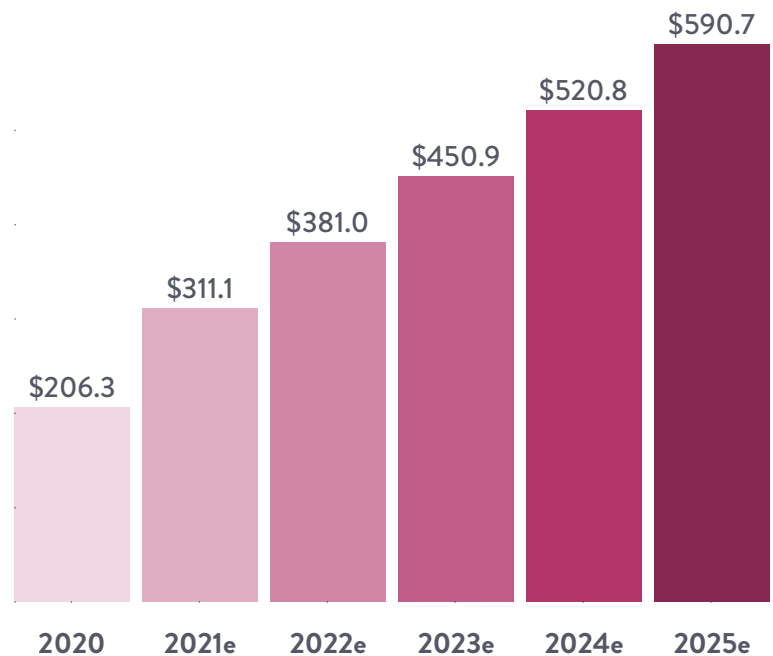
# Germany

As the EU’s most densely populated country, Germany has been the focal point of the continent’s cannabis industry since it first legalized medical use in 2017. The program allows insurance reimbursements for medical cannabis, and statutory health insurers cover about 90% of the German population.

As of Q1-2021, there are an estimated 90,000 patients participating in Germany’s legal market (i.e., roughly 0.11% of the total national population), and that number is projected to climb to

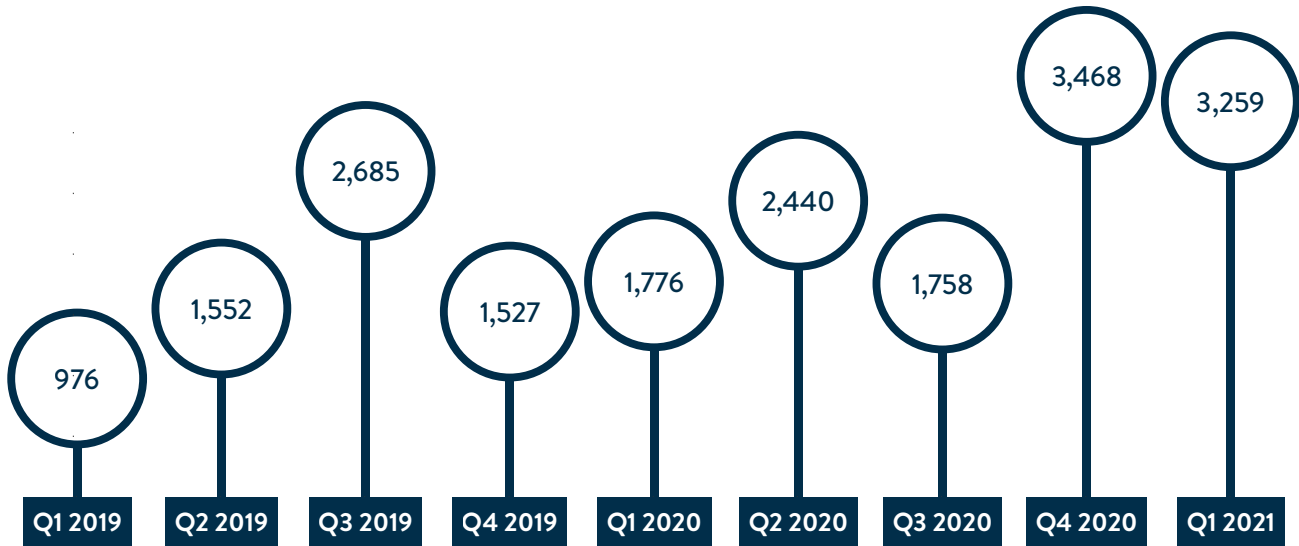
## Germany Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



### Quantities of Medicinal Cannabis Flower Imported Into Germany From Abroad

In kilograms

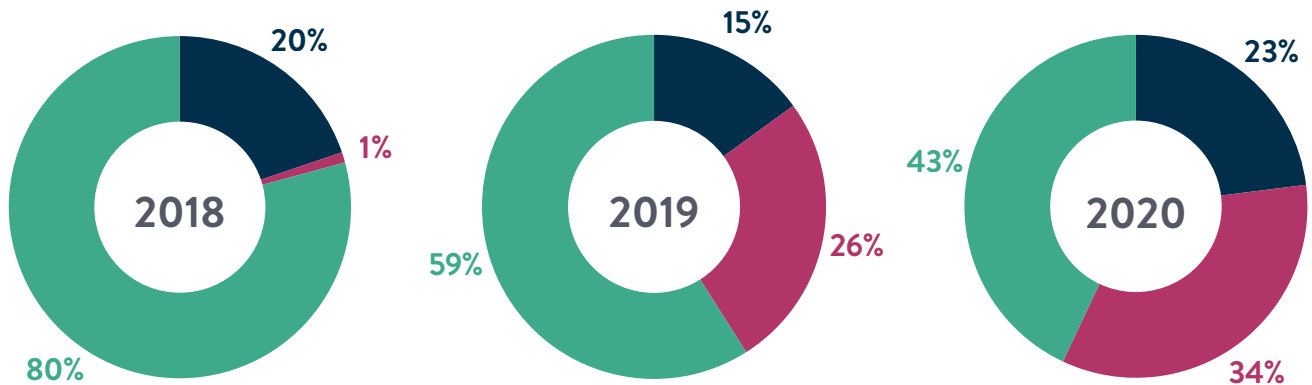


Source: The Federal Institute for Drugs and Medical Devices (Bundesinstitut für Arzneimittel und Medizinprodukte, i.e., BfArM)

### Germany Medical Cannabis Market Share\*

By product

- Sativex, Epidyolex, Canemes
- Extracts
- Flower



\*Represents share of statutory health agency reimbursements, which do not include medical cannabis products purchased by patients with private insurance.

Source: The Federal Institute for Drugs and Medical Devices (Bundesinstitut für Arzneimittel und Medizinprodukte, i.e., BfArM)



260,000 by 2025. Patient demand for legal medical cannabis has been growing steadily, with nearly 3,300 kg imported in Q1-'21.

Flower accounted for 43% of the total medical cannabis product reimbursements for patients in 2020 (down from 59% in 2019), while extracts accounted for 34% (up from 26% in 2019). It is important to note that those data on product share only cover the statutory health reimbursements, and not product sales for private patients or carriers.

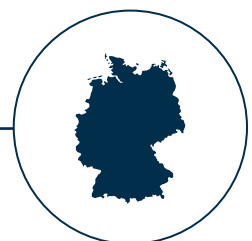
For the first few years of the program, patients relied entirely on imports, but in July 2021 for the first time the country had domestically produced cannabis available on shelves, allowing pharmacies to purchase medical cannabis from one of three contracted cultivators: either Germany-based Demecan, or from subsidiaries of Canadian producers Aurora and Tilray.

Domestic producers are permitted to sell only at the price offered during the application process (which on average was 2.3 euros per gram); new regulations have fixed the price on products sold to pharmacies at 9.52 euros per gram, and limit the surcharge or markup to:

1g to 15g	100% surcharge
15g to 30g	39% surcharge
Over 30g	27% surcharge

Until March 2020, German pharmacies were allowed to mark-up their prices from distributors by 100%.

While expected expansion of domestic production will help pharmacies meet growing demand, the country is still expected to rely on imports for the next few years. In addition to Canadian producers, cannabis producers based in Australia, Colombia, Denmark will likely also help meet demand.





**POPULATION**

60.2 million



**CANNABIS CONSUMERS**

5.7 million



**TOTAL CANNABIS SPENDING**

\$9.9 billion



**AVG. ANNUAL USAGE RATE**

10.8%



**AVG. PRICE PER GRAM (Flower)**

\$9.70



**MEDICAL CANNABIS PATIENTS**

7,767

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

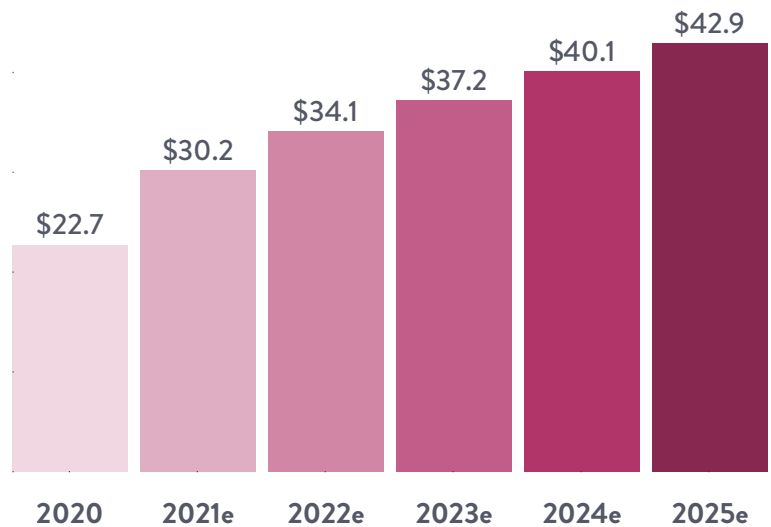
Patient counts are estimated registered patients as of Q2 2021.

# Italy

Italy's Department of Health began allowing doctors to prescribe cannabis in 2007, but from the onset the Italian Parliament failed to adopt comprehensive national regulations, and the country has but one domestic producer. Patients can access imported products, and sales volumes have grown steadily every year; nevertheless, the current regulatory environment and limitations on supply have rendered the program insufficient for meeting the country's total estimated demand for cannabis.

## Italy Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



Note: Italy has 19 regions and two autonomous provinces, each of which hold local legislative power and maintain individual health systems (i.e., health services and insurance) for their residents. Each region has the authority to adopt and adapt medical cannabis law and decide on terms of availability and reimbursement. While the local governments have legalized medical cannabis, there could be some key differences across health systems, such as: the availability of products, the types of conditions eligible for treatment, and levels of government subsidy.

## Medical Market

Italy has followed the approach of many countries having legalized medical cannabis in the region, i.e., by designating a set of qualifying conditions for medical cannabis prescriptions, and relying on licensed pharmacies to fulfill orders of (largely imported) medical cannabis. To be eligible for medical cannabis in Italy, patients must have one of the following conditions or symptoms<sup>1</sup>:

- Multiple sclerosis (MS)
- Chronic pain
- Glaucoma
- Tourette's syndrome
- Nausea
- Spinal cord injury
- Anorexia, or
- Cachexia

Pharmacists in Italy have the following options to fill supply:

- Private pharmaceutical wholesalers who import from the Netherlands;
- Direct imports from the Netherlands by hospital pharmacies; or
- SCFM distribution to pharmacies with its own production + supplements from Aurora<sup>2</sup>.

More than 1,000 kg of legal cannabis was sold to medical patients in Italy during 2020, up 30% from the volume sold in 2019. Private pharmacy wholesalers importing medical cannabis from the Netherlands (i.e., Bedrocan) drove the majority of growth (59% YoY) over the previous year, while sales of cannabis produced by Stabilimento Chimico Farmaceutico Militare (SCFM) independently grew by 25%.

The country has no mandated patient registry, so the total number of active participating patients is unconfirmed, though the agency does provide annual data on volumes of cannabis sold through each channel.

Sales volumes suggest active<sup>3</sup> patient participation by roughly 7,300 patients, or 0.01% of the total country population<sup>4</sup>. Total eligible patient counts are likely higher, though restrictions on supply have forced patients to rely on sources for cannabis outside of domestically produced SCFM or expensive, imported, and scarcely available products from the Netherlands.

Supply issues still plague the county in 2021, but with proper supply channels Italy's patient population will grow, and increasingly acquire more of their total cannabis purchases from the legal, regulated market. As active patient participation grows, so will the quantity of medical cannabis needed to meet demand. Currently, the military production of medical cannabis is slightly over 700 lbs. per year; even

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1. The government requires most of the qualifying patients to have tried previous treatments before trying medical cannabis, and some symptoms (like nausea) must stem from another ailment or treatment, such as HIV/AIDS, chemotherapy, or radiation treatments.  
 2. Aurora is the only Canadian company from which the SCFM currently imports.  
 3. Active patients are those making 100% of their cannabis purchases from the legal regulated market.  
 4. In other legal markets that accept chronic pain as a qualifying medical condition for medical cannabis, patient saturation (the percentage of registered medical cannabis patients among the total applicable population) can exceed 3.5%.





with plans to increase production, there will not be enough to meet the total estimated patient demand, forcing patients to continue sourcing some or all of their cannabis from:

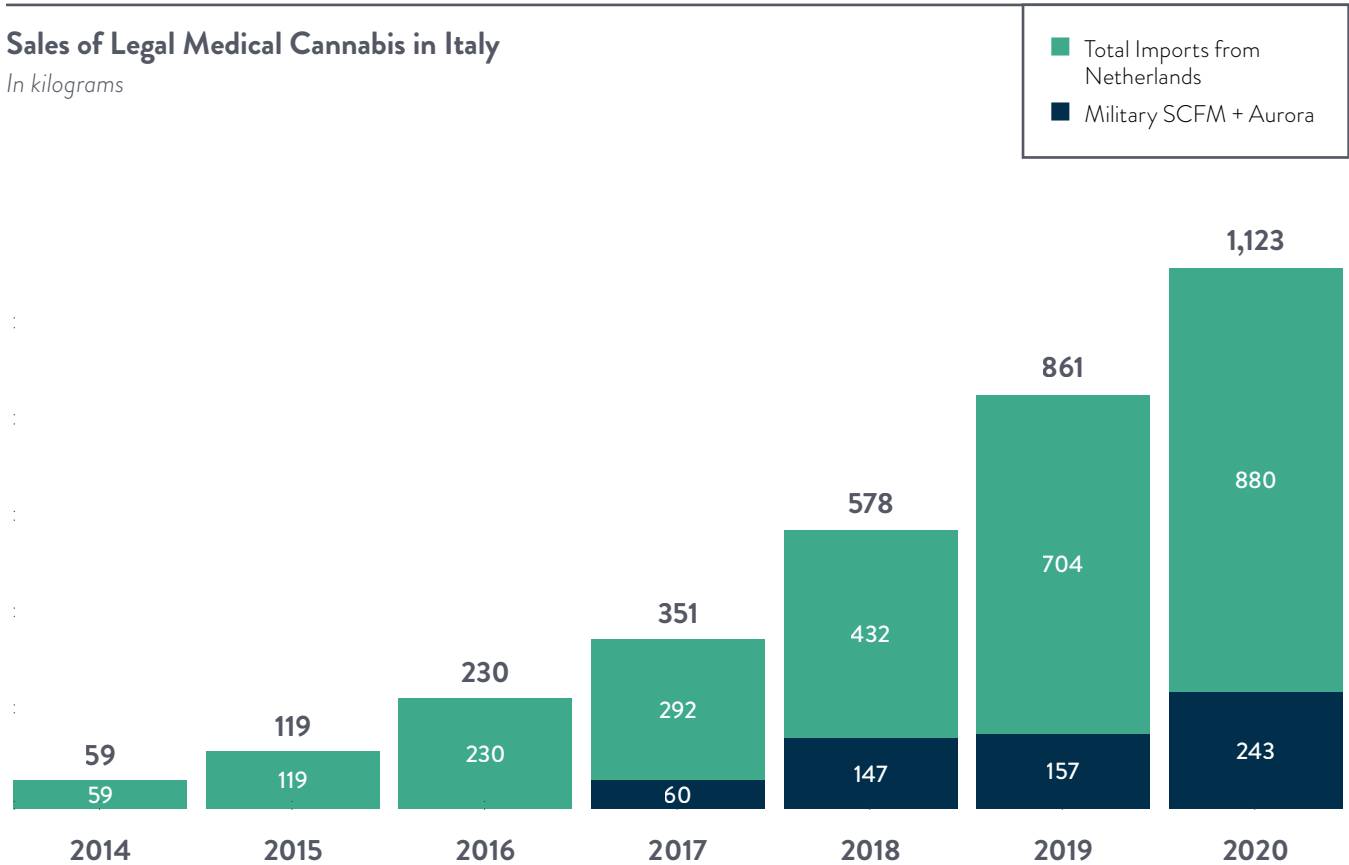
- The expensive import market (seven companies are licensed to import) where products can be 10x the cost of locally produced medical cannabis;
- The illicit market; or
- Relying on low-THC products sold as “cannabis light” novelties in the largely unregulated low-THC market.

## THC Light

The market for low-THC cannabis flowers in Italy took off after a December 2016 law regulating hemp production went into effect with certified production of 64 varieties of industrial hemp. In the years since, dozens of companies packaging low-THC cannabis have appeared, marketing the flowers as “collector’s items, not to be eaten or smoked”. However, thousands of pounds of flowers have been sold through the channel, and it is inadvertently satisfying some of Italy’s unmet demand for cannabis.

### Sales of Legal Medical Cannabis in Italy

*In kilograms*





# Luxembourg



## POPULATION

633,458



## CANNABIS CONSUMERS

29 thousand



## TOTAL CANNABIS SPENDING

\$65.8 million



## AVG. ANNUAL USAGE RATE

5.5%



## AVG. PRICE PER GRAM (Flower)

\$12.29



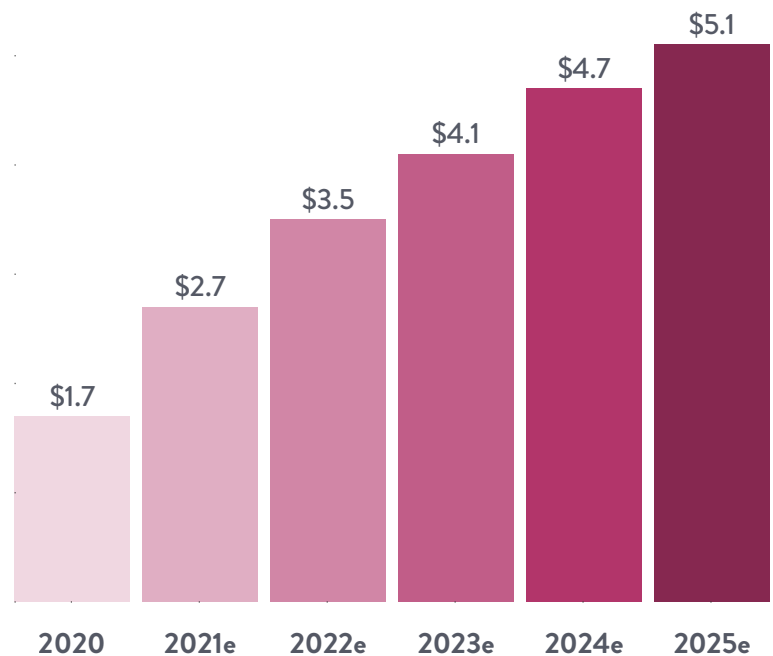
## MEDICAL CANNABIS PATIENTS

691

While Luxembourg is a relatively small country, it boasts the world's highest per capita GDP, and has recently been pushing the conversation around adult-use cannabis legalization. Cannabis possession and use has been decriminalized in the country since 2001, and a pilot program for medical cannabis began in 2018 to allow qualified patients access to high-THC cannabis products from a limited number of hospital pharmacies. So far, all of the legal medical cannabis sold in the tiny country is imported, and only in the form of dried flowers, though product variety will be expanded this year to include oils and extracts.

## Luxembourg Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

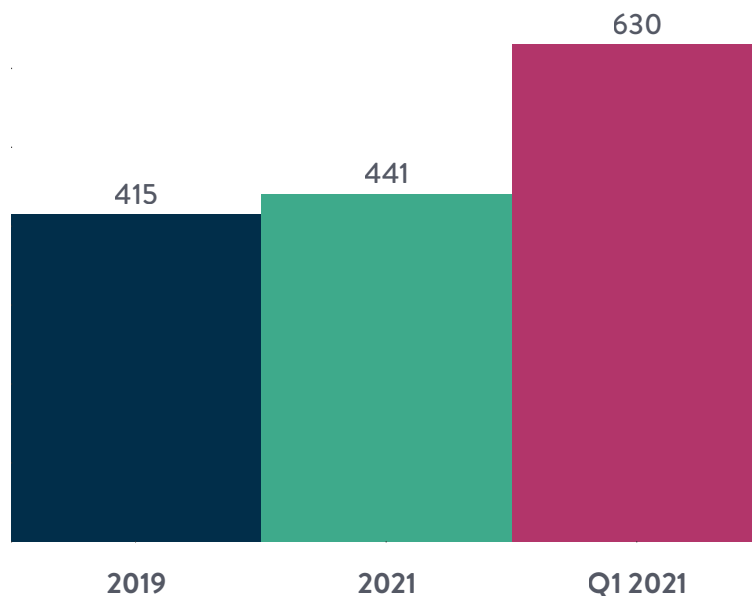
Patient counts are estimated registered patients as of Q2 2021.

Doctors in Luxembourg prescribed 140 kg of cannabis for medical use last year – almost 3x more than in 2019, as data from the Health Ministry showed. In the first four months of 2021 year, doctors prescribed almost 70 kg of medical cannabis, or half of 2020’s total. Since February 2019, when prescriptions began, some 630 people have been treated with cannabis, averaging 40 g of product per person.

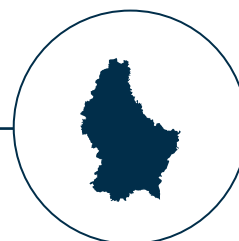
### Potential Adult-Use Market on the Horizon

Luxembourg created enthusiasm in the industry at the end of 2018, when the current government promised in its coalition agreement to fully legalize cannabis for adult-use, possibly becoming the first European country to do so.

Medical Cannabis Patients in Luxembourg



*Note: At the onset of the program, the Grand Duchy requested 183 kg from the International Steering Point Control Body for annual volume to meet demand, but that threshold has since been raised to 270 kg in 2020 to support expected continued increase in patient demand.*





**POPULATION**

518 thousand



**CANNABIS CONSUMERS**

5 thousand



**TOTAL CANNABIS SPENDING**

\$16.6 million



**AVG. ANNUAL USAGE RATE**

1.0%



**AVG. PRICE PER GRAM (Flower)**

\$20.00



**MEDICAL CANNABIS PATIENTS**

435

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

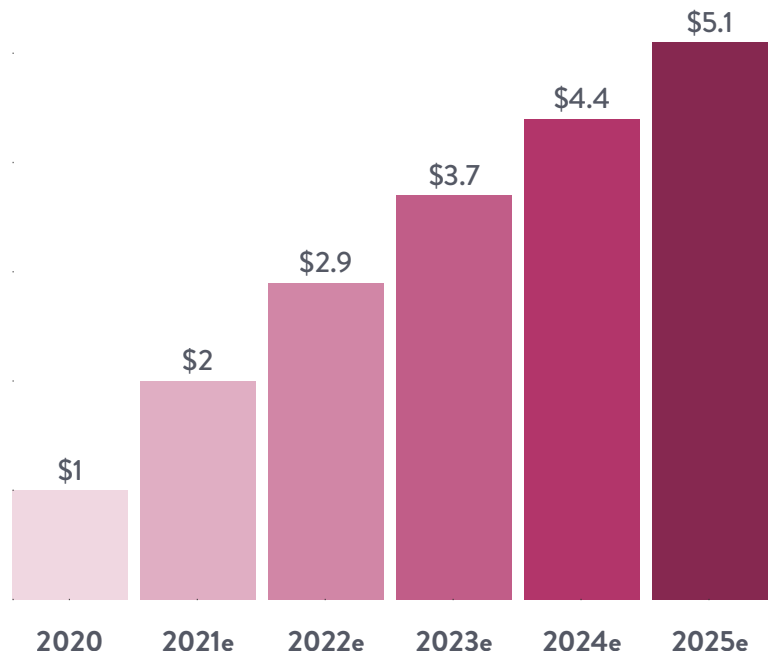
Patient counts are estimated registered patients as of Q2 2021.

# Malta

Medical cannabis was first legalized and available to Malta’s medical patients in 2018, though market growth has been limited due to limited product variety, frequent product shortages, and comparatively lower illicit market prices for similar quality cannabis.

## Malta Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions





# Norway



## POPULATION

5.4 million



## CANNABIS CONSUMERS

232 thousand



## TOTAL CANNABIS SPENDING

\$803.2 million



## AVG. ANNUAL USAGE RATE

5.2%



## AVG. PRICE PER GRAM (Flower)

\$19.27



## MEDICAL CANNABIS PATIENTS

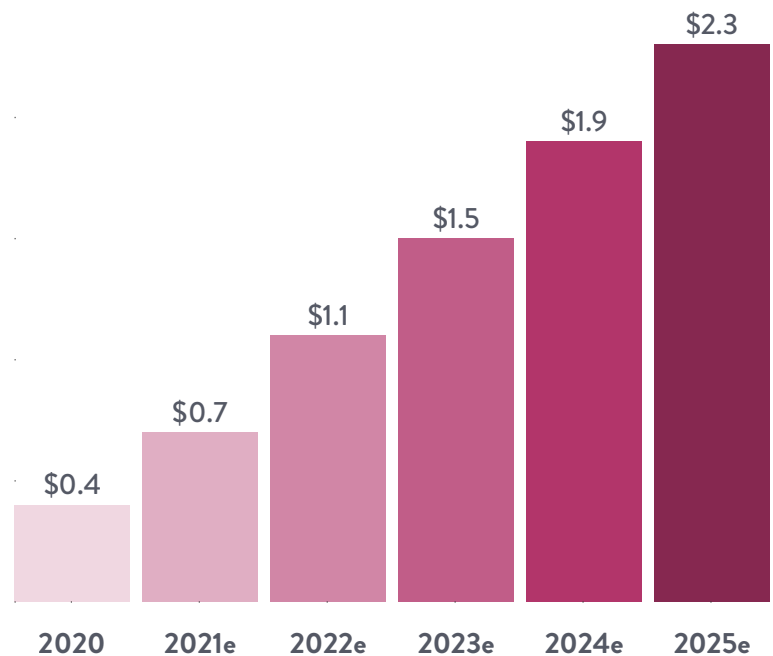
185

Medical cannabis access was first granted in Norway in 2016, allowing patients to legally acquire Sativex and products from Bedrocan through a prescription. The regulations are strict, however, and without any official national medical cannabis program or regulated authority, participation has been dismal, with legal access barely quantifiable.

Among other restrictions, doctors must be specialists in a hospital, and gain approval from the Norwegian Ministry of

## Norway Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



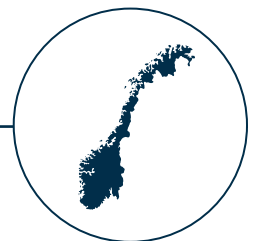
2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

Health to prescribe cannabis products with THC concentration higher than 1.0%. Doctors must also prove that all other forms of treatment have been attempted without success.

Norway does not maintain a list of qualifying health conditions describing eligibility for cannabis treatments, so doctors have the liberty to choose when to prescribe. Cannabis-based treatments are usually prescribed to patients who suffer from multiple sclerosis (MS) or who are going through cancer treatments, and variety is limited to just a few Bed-

rocan products. In other legal markets (e.g., U.S. state medical markets), the freedom for physicians to prescribe for any condition that they see fit promotes strong growth in patient participation. Yet, Norway's limited engagement in patient or physician education - along with a lack of a functional framework for the program - have instead worked against overall program participation, resulting in reports of a nationwide total of just 128 patients having access to high-THC products among a population of more than 5.4 million in 2020.





**POPULATION**

38 million



**CANNABIS CONSUMERS**

1.3 million



**TOTAL CANNABIS SPENDING**

\$1.9 billion



**AVG. ANNUAL USAGE RATE**

4.0%



**AVG. PRICE PER GRAM (Flower)**

\$8.40



**MEDICAL CANNABIS PATIENTS**

4,122

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

# Poland

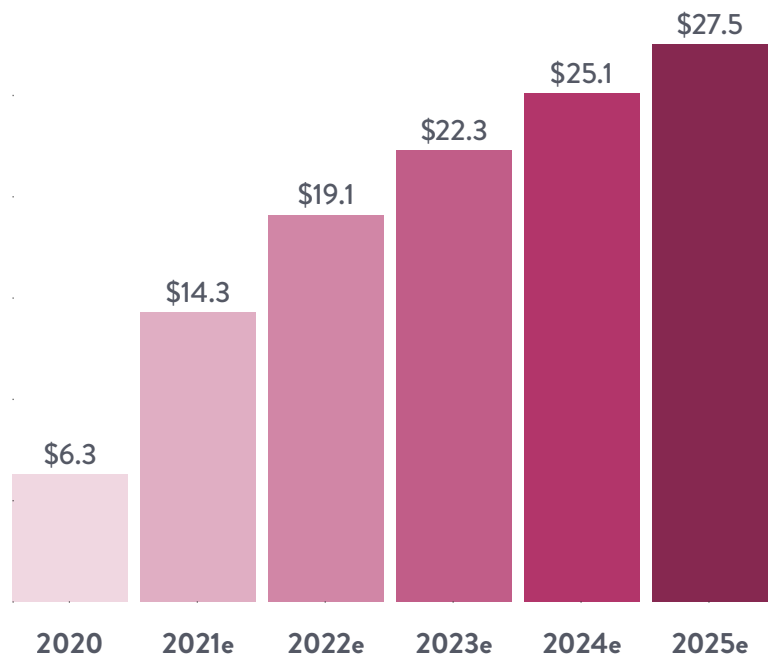
High-THC cannabis for medical use became legal in Poland in 2017, with the first products made available two years later through pharmacies for qualified patients with prescriptions. Like other import-based markets, program growth potential has been limited by product availability, variety, and rates of physician prescriptions.

## Medical Market

Poland maintains no set list of qualifying conditions for using legal medical cannabis. Physicians are free to prescribe it for any

### Poland Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



condition toward which other treatments have proven ineffective. In other developed legal medical cannabis markets where there is no set of conditions outlined by a regulatory agency, chronic pain tends to be the most common condition for patients seeking access to products. However, patient participation depends heavily on physicians' participation, which has been relatively low. Paired with high prices, no existing system for health insurance reimbursements for medical cannabis, and inconsistent supply levels, active patient participation in Poland's legal medical program has been off to a relatively slow start compared to its European neighbors.

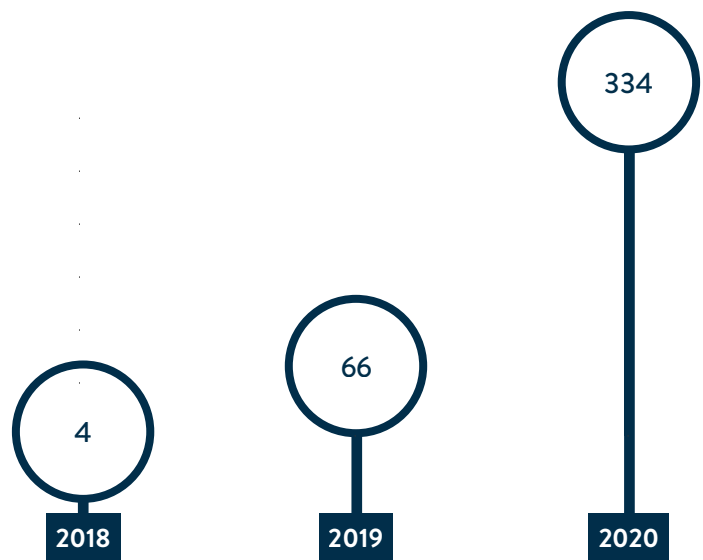
Approved products include flower from Aurora, Canopy Growth, and Tilray, with patients able to access some additional products from Bedrocan, though by the close of 2020 only one or two varieties had proven available on pharmacy shelves for patients.

Over 300 kg of cannabis products were imported to Poland in 2020 - up from 66 kg in 2019. Supply has thus far been unable to keep up with patient demand, despite regulatory hurdles restraining overall growth in patient prescriptions.

Variation of Approved Products by Supplier		
Supplier	THC Content	CBD Content
Aurora	1%	12%
Aurora	20%	1%
Aurora	22%	1%
Aurora	8%	8%
Canopy	10%	7%
Canopy	19%	1%

### Annual Legal Medical Cannabis Imports in Poland

*In kilograms*







# Portugal



## POPULATION

10.2 million



## CANNABIS CONSUMERS

490,332



## TOTAL CANNABIS SPENDING

\$708.6 million



## AVG. ANNUAL USAGE RATE

5.5%



## AVG. PRICE PER GRAM (Flower)

\$8.03



## MEDICAL CANNABIS PATIENTS

672

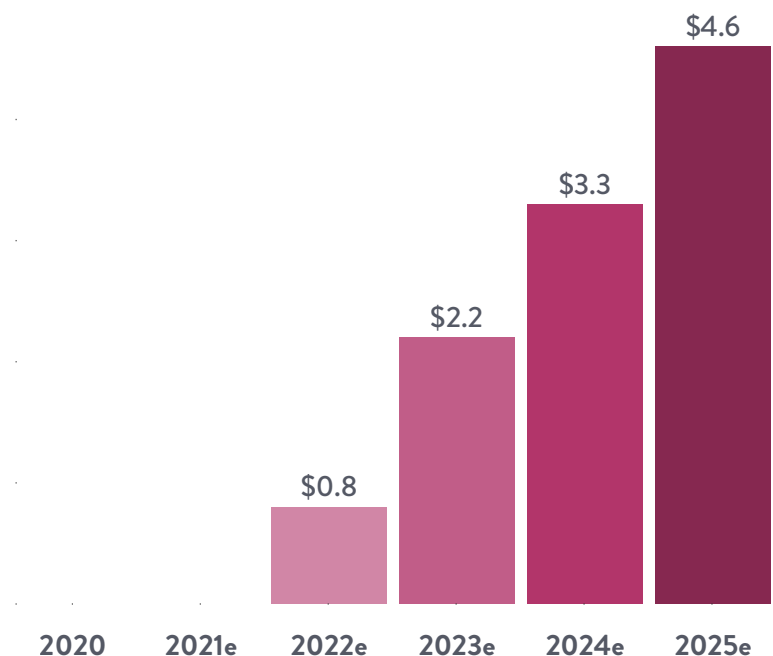
2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

Thanks in part to its temperate climate and natural light conditions, Portugal enjoys some of the lowest production costs in the world, and has some of the world's most relaxed laws on decriminalization of personal use of all drugs, including cannabis. In June 2018, Portugal passed a law to legalize cannabis for medical use, with plans to set up a regulated medical cannabis industry. Legalization and overall progress in the domestic legal medical market have subsequently been slow to materialize, with qualified patients able to access only a few high-THC products. Nevertheless, the country has significant growth opportunity as a future export market.

## Portugal Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD billions



## Medical Market

It has been two years since initial legalization, and while products are still not widely accessible, steps have been made to lay the groundwork for an operating legal market in the next year. The first authorization to sell medical cannabis products was given in 2020 to Tilray Portugal, a subsidiary of Canadian giant Tilray. The company had cultivation land approved by InFarmed in 2017, and has been GMP-certified and cleared for cultivation and production for the local market and for export. Last year, InFarmed created the Office of Cannabis for Medicinal Purposes to aid communication; additional licensing has since been underway, with reports of 150 existing applicants waiting in the pipeline for review.

In April 2021, InFarmed set a retail price ceiling for 15-gram bags of medical cannabis at €150 per bag (18% THC flower). That price is roughly in line with what insurers reimburse pharmacies for in Germany's medical cannabis program, and is less than what patients in other legal medical markets pay for that volume, suggesting that active participation by patients will be higher than in countries that operated expensive medical cannabis markets with high price differences from the illicit market.

While the country prioritized the legalization of production for exporting, the country is finally taking steps to operationalize high-THC cannabis sales for patients in Portugal.





# United Kingdom



## POPULATION

67.3 million



## CANNABIS CONSUMERS

4.1 million



## TOTAL CANNABIS SPENDING

\$9.0 billion



## AVG. ANNUAL USAGE RATE

7.4%



## AVG. PRICE PER GRAM (Flower)

\$12.16



## MEDICAL CANNABIS PATIENTS

3,370

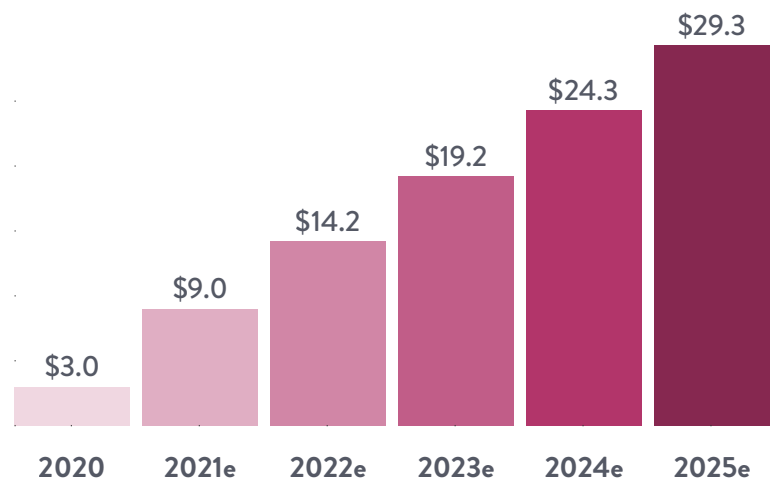
2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

Medical cannabis was legalized in the U.K. in November 2018, and its first medical cannabis clinic opened in 2019. Since then, the U.K. has risen as a global leader in manufacturing pharmaceutical preparations containing cannabis extracts, but the split structure of the medical cannabis market in the U.K. between public and private, and licensed vs. unlicensed, has resulted in a disjointed program for the country's patients, wherein only those with the means to secure private prescriptions can lawfully access high-THC products. That regulatory approach has acted as a significant barrier for patient access to high-THC products, and has severely limited overall growth for the legal market.

## United Kingdom Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



Note: Estimates and projections shown are for sales of high-THC products accessed through private prescriptions only. They do not include sales of low-THC licensed cannabis-based medicines (L-CBM) (Epidiolex, Sativex, Nabilone), investigational medicinal products, or noncontrolled, cannabis-wellness products.

## Legal Access to High-THC is Limited

There are four general routes of access to legal medical cannabis in the U.K.:

- 1) Licensed cannabis-based medicines (L-CBM);
- 2) Unlicensed cannabis-based ‘specials’ medicines (U-CBPM);
- 3) Cannabis-based investigational medicinal products; or
- 4) Noncontrolled, cannabis-based wellness products.

The category “U-CBPM” (unlicensed cannabis-based medical products) is the only means of access for high-THC flower and oil products imported from Canada and the Netherlands. Those can only be prescribed as “specials”, issued on a case-by-case basis by a consultant doctor listed on the General Medical Council’s specialist register.

Despite the fact that chronic pain (a condition normally associated with high rates of patient participation in legal medical cannabis markets) is accepted as a qualifying condition in the U.K., growth in both patient participation and overall sales has been hampered by product supply shortages and quality issues, as well as by bureaucratic red tape. A patient must show a medical history for their qualifying condition, and also

Examples of U-CBPM Products Available for Prescription as Special Medicine in the UK				
CBPM Formulation			Supplier	Country
Bedrocan Flos	22% THC	<1% CBD	Bedrocan	Netherlands
Bedrobinal Flos	13.5% THC	<1% CBD		
Bediol Flos	6.3% THC	8% CBD		
Bedica Flos	14% THC	<1% CBD		
Bedrolite Flos	<1% THC	9% CBD		
Oil	10% THC		Tilray	Canada
Oil	25% THC			
Oil	10% THC	10% CBD		
Oil	25% THC	25% CBD		
Cannabis Flower	22% THC			
Cannabis Flower	10% THC	10% CBD	Transvall Apotheek	Netherlands
Bedrocan Oil	2% THC			
Bediol Oil	1.3% THC	2% CBD		
Bedrocan/Bedrolite Oil	10% THC	5% CBD		

evidence of at least two previous prescription medications or treatments that proved ineffectual for treating their condition.

Even when given approval, patients have run into issues accessing quality high-THC products. Until March 2020, bulk importation of U-CBPM was not allowed by U.K. licensing authorities, and INCB (International Narcotics Control Board) import quotas for THC were restrictively low. The U.K. INCB assessment for THC has now been raised from 20 grams/year to 1,120 g/year, but those amounts are extremely low given the type of patient participation typically expected in a high-THC medical cannabis program that accepts chronic pain as a qualifying condition.



## Private Prescriptions Growing Amid Stagnation of Licensed Products

All of the U.K.'s combined market inefficiencies and restrictions have pushed medical cannabis patients seeking access to high-THC products to the private side of the market, and private cannabis clinics have been appearing to meet demand. There are now six registered by the nation's Care Quality Commission (CQC), with more on the way. Some clinics are tied to specific suppliers of cannabis products, while others have freedom to prescribe

a wider spectrum of products. New Frontier Data estimates there being close to 2,900 patients as of Q2-2021 actively purchasing high-THC cannabis (i.e., U-CBPM products) through private market prescriptions. For a country with a population of 67 million, and an existing cannabis consumer population of 4 million, that is an infinitesimal medical cannabis program participation rate.



# Latin America



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.



## POPULATION

609.8 million



## CANNABIS CONSUMERS

16.4 million



## TOTAL CANNABIS SPENDING

\$12.8 billion



## AVG. ANNUAL USAGE RATE

3.5%



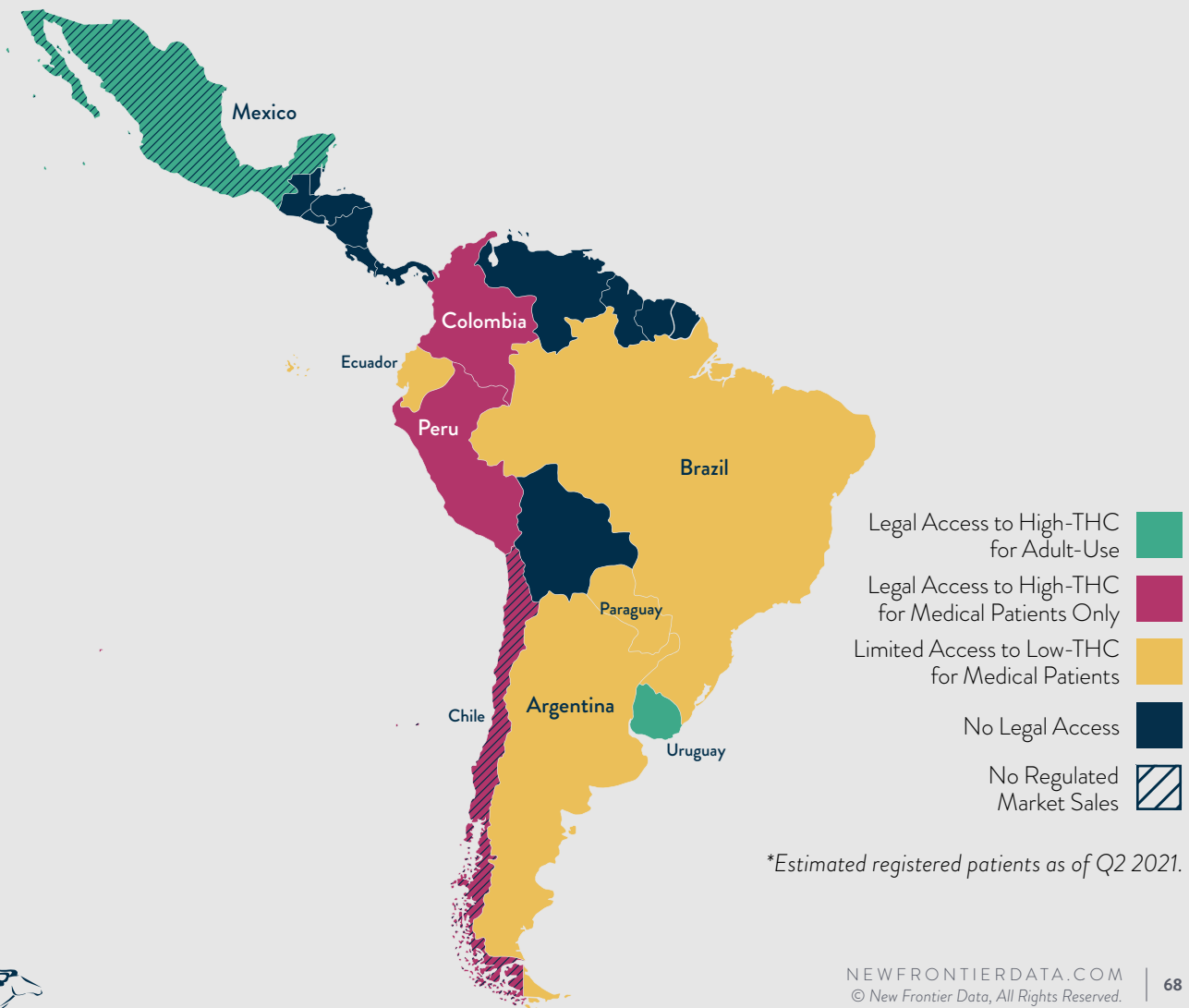
## AVG. PRICE PER GRAM (Flower)

\$4.69



## MEDICAL CANNABIS PATIENTS

27,538\*



\*Estimated registered patients as of Q2 2021.

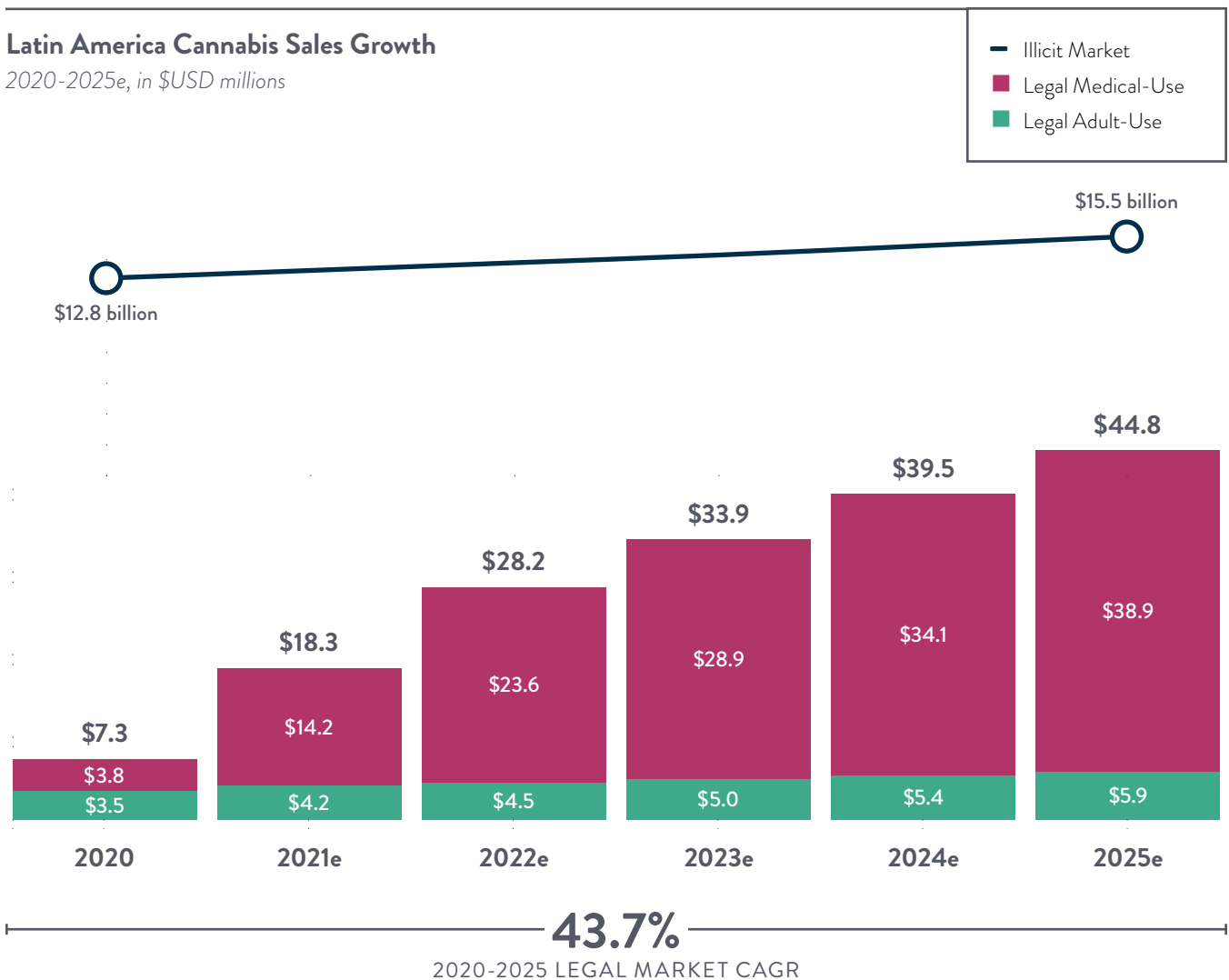


Recognizing the significant potential of a regulated industry, cannabis businesses within and outside Latin America are aggressively pursuing import and export opportunities in the region. It is home to two legal adult-use countries: Uruguay – the first country to nationally legalize and regulate a program for adult-use, and Mexico – the most recent country

to legalize adult-use. Patient access to high-THC products has been made available in Colombia and Peru via the expansion of private cannabis clinics. In Chile, the rates of cannabis use are significantly higher than among most other countries in the region, and there is widespread access to cannabis via the unregulated medical club market.

### Latin America Cannabis Sales Growth

2020-2025e, in \$USD millions





**POPULATION**

129.1 million



**CANNABIS CONSUMERS**

2.2 million



**TOTAL CANNABIS SPENDING**

\$3 billion



**AVG. ANNUAL USAGE RATE**

2.3%



**AVG. PRICE PER GRAM (Flower)**

\$7.59

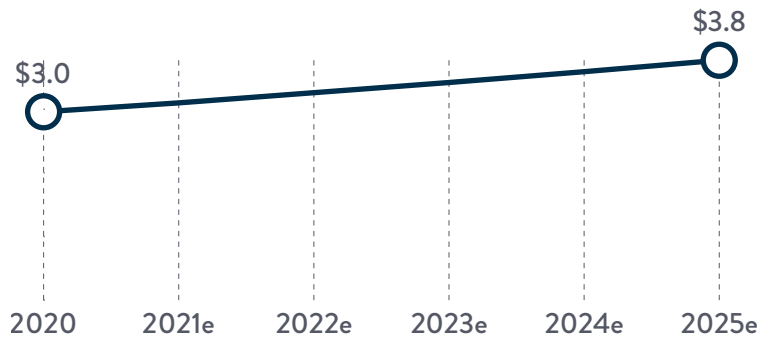
2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

# Mexico

At the end of June, following an unusual and circuitous path, Mexico’s Supreme Court set foundations for the consolidation of a domestic market for legal cannabis. By modifying the national health law, the court eliminated federal prohibition of adult-use cannabis. Moreover, by using its powers to modify the health-care law, the court put pressure on the executive branch to lead national discussion on cannabis policy. Since Mexico’s population exceeds 127 million, through the government’s finalization of rules for regulating home cultivation, associations, and commercial sales, Mexican legislators could create the world’s largest market for adult-use cannabis. With no regulations set in stone, the current market in Mexico is one of legal home-cultivation with no market for regulated distribution (similar to Georgia and South Africa). It is therefore not currently included among New Frontier Data’s global and regional summary roundups of legally operating, high-THC cannabis sales. While the timeline for implementation of legal sales is uncertain and final regulations unclear, the size and potential growth for a legal cannabis market in Mexico is sizeable — New Frontier estimates that the country could see a potential \$2.4 billion in annual sales of legal cannabis by the fourth year of sales.

## Mexico Illicit Cannabis Sales Growth

2020-2025e, in \$USD billions



Note: Illicit Sales Estimates for Domestic Sales Only





# Uruguay



## POPULATION

3.5 million



## CANNABIS CONSUMERS

420 thousand



## TOTAL CANNABIS SPENDING

\$127.5 million



## AVG. ANNUAL USAGE RATE

15.2%



## AVG. PRICE PER GRAM (Flower)

\$3.87

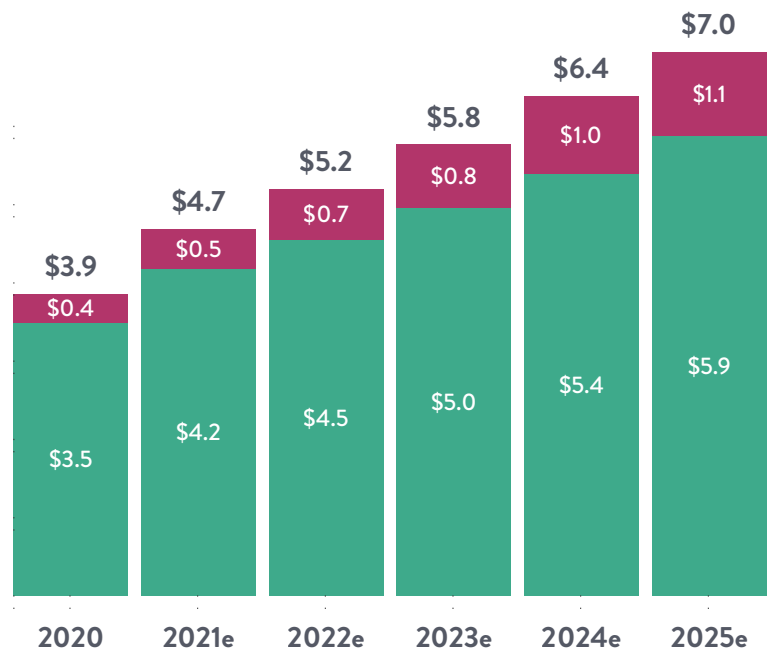
Uruguay’s adult-use reform was enacted in 2014, and the country has since also established a regulated medical cannabis program. Unlike many early legalization efforts in the U.S., which were spurred on by voter initiatives, cannabis policy reform in Uruguay was driven by the government. The stated goals of adult-use legalization were to reduce violence associated with drug trafficking, and to promote public health.

Uruguay’s government tightly controls the cultivation, processing, and dispensing of both medical and adult-use cannabis, and

### Uruguay Legal Cannabis Sales Growth

2020-2025e, in \$USD millions

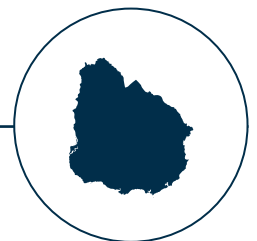
Legal Medical Use  
Legal Adult-Use



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

is the only known market to require registration by consumers to make regulated adult-use purchases. Sales of cannabis through pharmacies totaled 1,600 kilograms in 2020, but products are much more limited than cannabis available via clubs, home cultivation, or the illicit market, and the requirement to register with the government to participate discourages participation to some extent.

The clubs across Uruguay do not charge consumers for cannabis as per a typical retail model (i.e., with consumers paying for the product by weight), but consumers can instead join a club for which they pay registration fees and monthly membership for access to up to 40 grams per month.





# Chile



## POPULATION

19.2 million



## CANNABIS CONSUMERS

2.5 million



## TOTAL CANNABIS SPENDING

\$2.1 billion



## AVG. ANNUAL USAGE RATE

16.3%



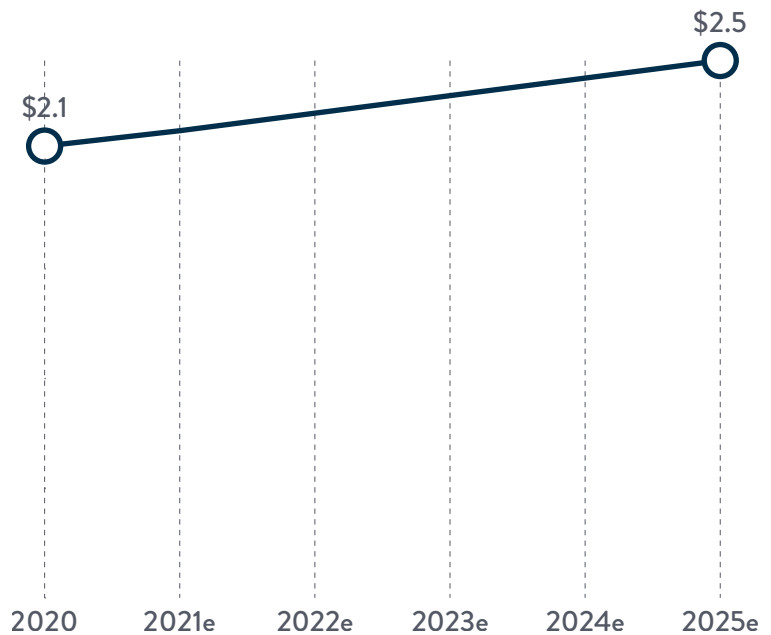
## AVG. PRICE PER GRAM (Flower)

\$4.54

Cannabis cultivation has a long history in Chile, and the country holds the highest annual usage rate in Latin America. Although there is no current system of regulated legal cannabis, the country began clinical trials on medical cannabis in 2014, and decriminalized personal use and home cultivation in 2015, which given the region’s climate, rich soil, and long agricultural tradition of hemp farming, has led to a booming market for home-cultivation equipment.

## Chile Illicit Cannabis Sales Growth

2020-2025e, in \$USD billions



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

## Patient Access

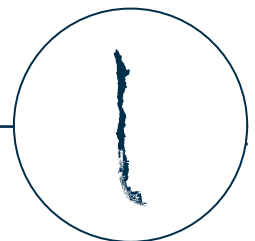
The law in Chile stipulates that if any valid doctor prescribes a treatment for a patient, the state must allow safe access to the prescribed drugs, leading to a gray market of medical dispensaries selling high-THC cannabis to patients with valid prescriptions – despite cannabis not being explicitly federally legal for distribution.

There are roughly 200,000<sup>1</sup> Chileans with medical cannabis prescriptions permitting them to purchase high-THC cannabis at one of the estimated 500 dispensary locations across the country. Without the infrastructure to support manufacture of edibles, product variety on dispensary shelves is limited to flower and extracts only, with prices comparable to other mature legal flower markets (i.e., \$10/gram average). With an estimated 2.5 million cannabis consumers in Chile, the unregulated medical cannabis market is far short of meeting overall demand. The large majority of consumers are purchasing from the illicit market outside of dispensaries.

## Illicit Market

In countries or jurisdictions that legalize or decriminalize cannabis use or home cultivation, but provide no immediate avenues for legal regulated retail distribution, the illicit market thrives. Even in jurisdictions legalizing cannabis with explicit plans to enact regulated distribution, the delays in implementation of retail access after legalization becomes a crucial factor in determining whether and how fast, illicit market sales can gain a foothold in advance of legal retail sales. In Chile, the combination of the country's history of hemp cultivation, high rate of cannabis use, and pseudo-legal medical market access support a strong and growing illicit market. There are an estimated 2.5 million cannabis consumers in Chile, only a fraction of who are participating at a medical dispensary with a prescription; the equation marks a strong growth opportunity should the country choose to legalize and regulate distribution of adult-use cannabis in the future.

1. A fraction of the total estimated number of patient prescriptions is expectedly either inactive or acquiring some or all of their cannabis from the illicit or home-grow market.





**POPULATION**

51 million



**CANNABIS CONSUMERS**

1.5 million



**TOTAL CANNABIS SPENDING**

\$709.7 million



**AVG. ANNUAL USAGE RATE**

3.8%



**AVG. PRICE PER GRAM (Flower)**

\$2.66



**MEDICAL CANNABIS PATIENTS**

11,382

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

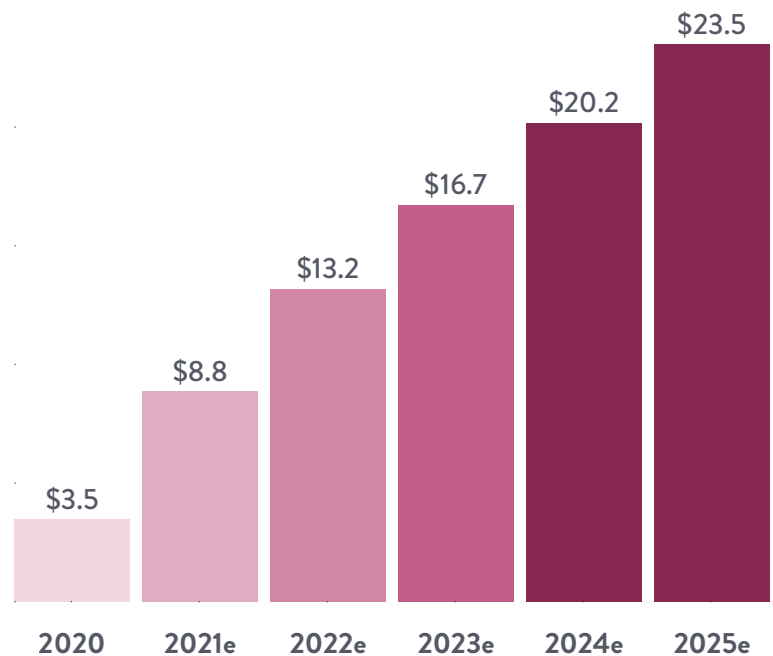
Patient counts are estimated registered patients as of Q2 2021.

# Colombia

Colombia is positioning itself to be a global exporter of medical cannabis derivatives. With its inexpensive cultivation costs, ideal growing conditions, and experienced cultivators, Colombia is expected to produce cannabis at a fraction of the cost of exporters like Canada. Attention to domestic demand has been slower, however, with companies like Khiron Life Sciences stepping in with dedicated strategies to open cannabis clinics and increase access to high-THC products for patients across the country and region. Khiron has opened a total of nine clinics in Colombia, and intends to open future locations in other Latin American countries that have allowed for high-THC access to medical patients but not yet provided any structured programs with access to regulated products.

## Colombia Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions





# Peru



## POPULATION

33 million



## CANNABIS CONSUMERS

425 thousand



## TOTAL CANNABIS SPENDING

\$308.6 million



## AVG. ANNUAL USAGE RATE

1.7%



## AVG. PRICE PER GRAM (Flower)

\$4.09



## MEDICAL CANNABIS PATIENTS

16,156

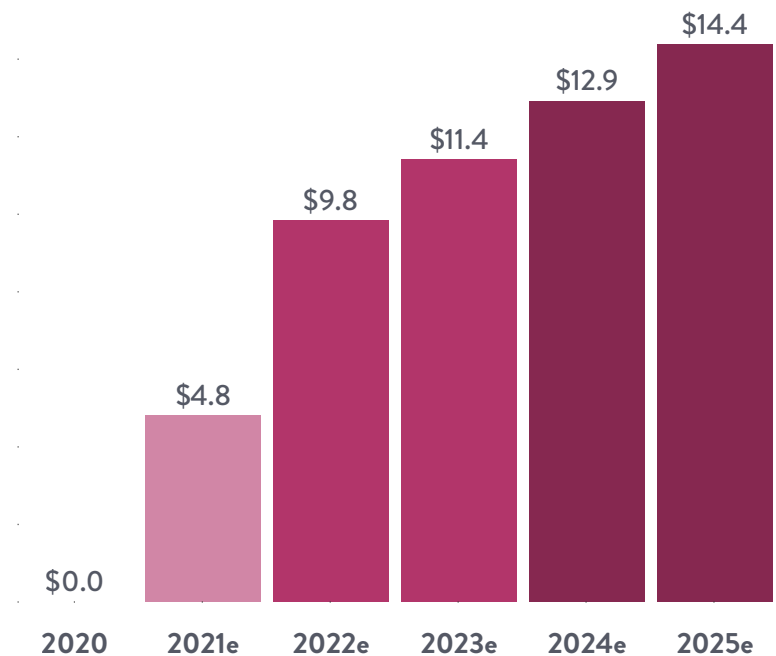
2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

Peru effectively legalized medical cannabis in October 2017 via its Law 30681. That mandates the creation of a series of registries within its Ministry of Health, and explicitly allows domestic production, importation, and commercialization of cannabis for medical and scientific purposes — but patients in Peru’s medical cannabis program were effectively limited to low-THC imported products prior to 2021.

## Peru Legal Medical Cannabis Sales Growth

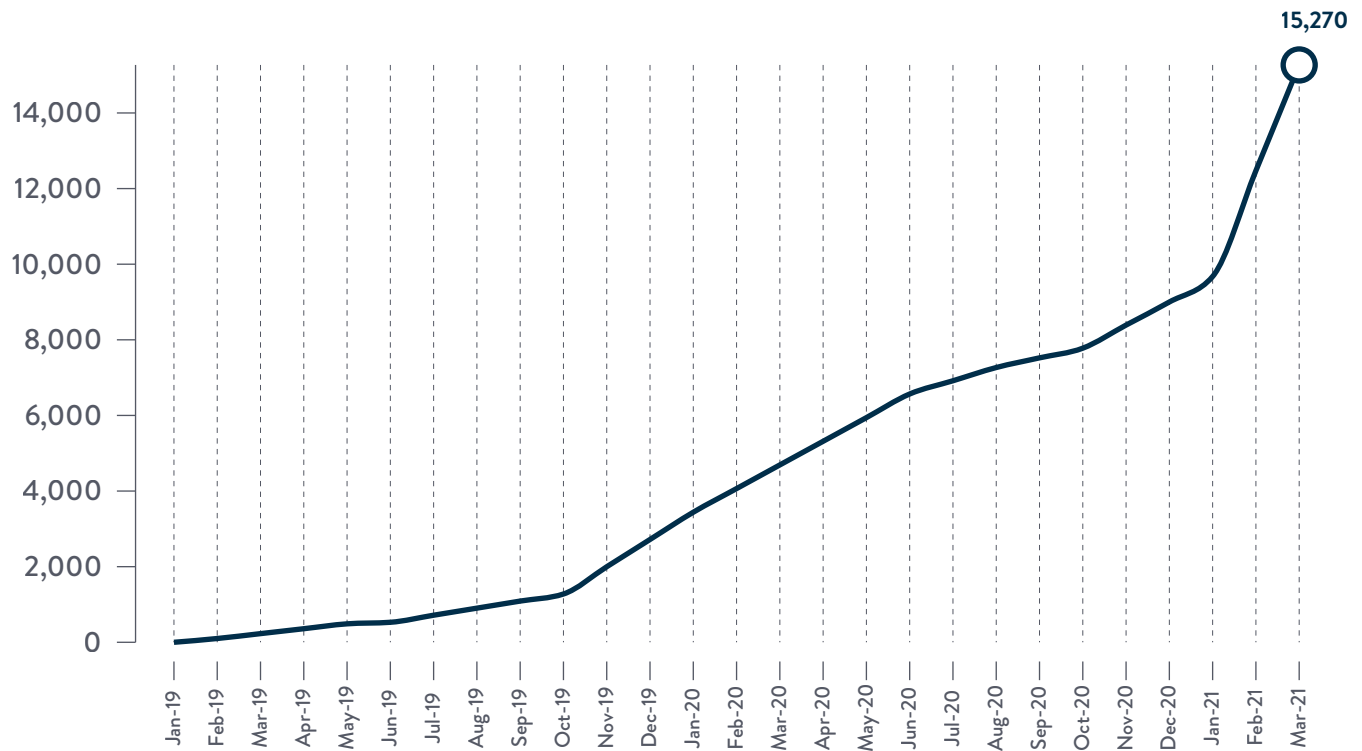
2020-2025e, in \$USD millions



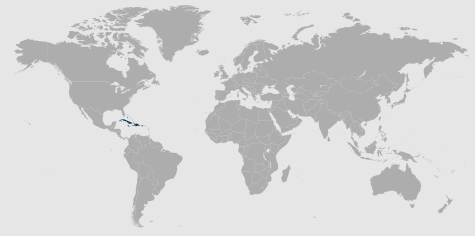
Following a series of pharmaceutical and CBD product shortages in pharmacies in 2020, qualified patients were for the first time given access to high-THC products in June 2021, through dedicated cannabis clinics. Early in the program, access to

CBD products in pharmacies pushed registration through 2019, and participation and import volumes are likely to increase significantly over the next year as access to high-THC products improves through the appearance of dedicated clinics.

### Registered Medical Cannabis Patients in Peru



# Caribbean



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.



## POPULATION

43.1 million



## CANNABIS CONSUMERS

1.3 million



## TOTAL CANNABIS SPENDING

\$1.6 billion



## AVG. ANNUAL USAGE RATE

3.8%



## AVG. PRICE PER GRAM (Flower)

\$8.29



## MEDICAL CANNABIS PATIENTS

129,436\*

Bermuda



- Legal Access to High-THC for Medical Patients Only
- Limited Access to Low-THC for Medical Patients
- No Legal Access

\*Estimated registered patients as of Q2 2021.





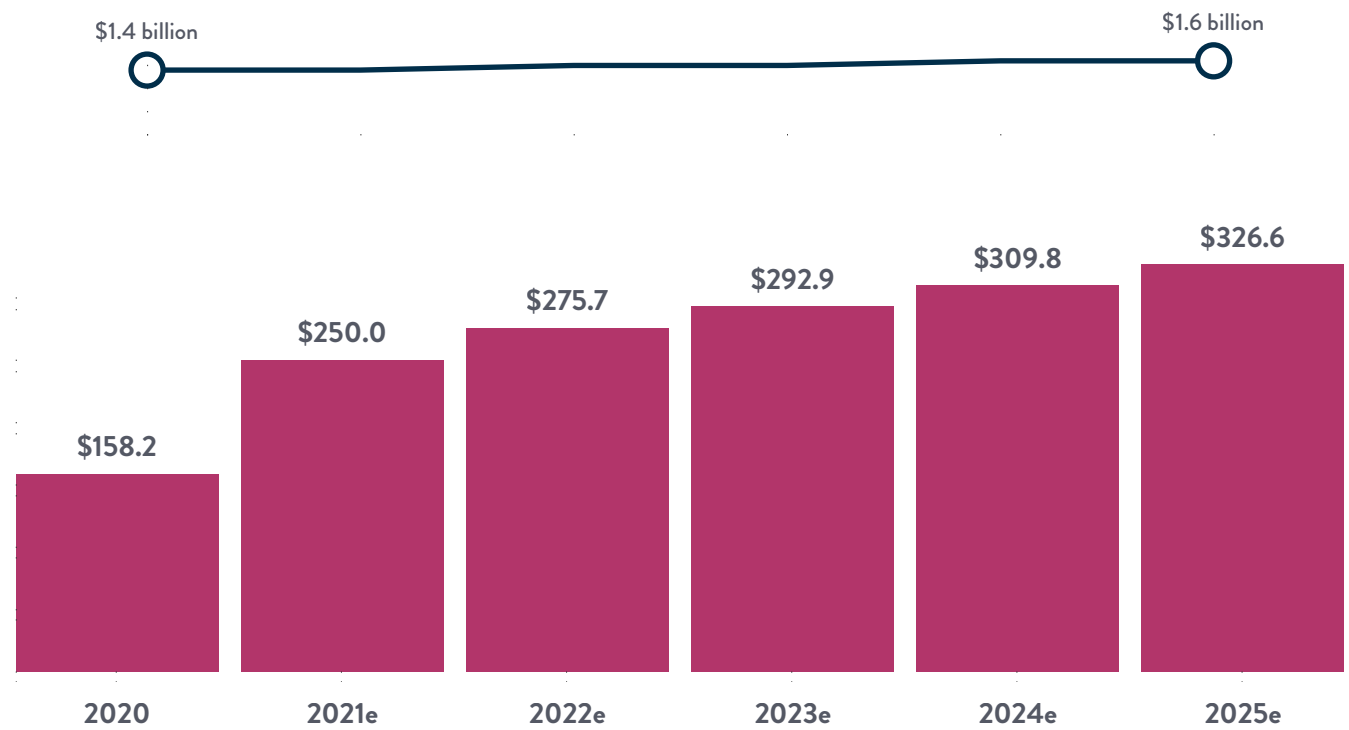
The number of consumers in the Caribbean is comparatively small in global terms, but the region has several advantages. Known as one of the most fertile regions in the world, the Caribbean has a rich agricultural history, and low-cost production advantages that manufacturers have taken ad-

vantage of since the 1970s. While the domestic market is relatively small, the potential for production of exports (and demand from the tourist market) is extremely attractive in the context of future global cannabis trade.

### Caribbean Cannabis Sales Growth

2020-2025e, in \$USD millions

- Illicit Market
- Legal Medical Use



**15.6%**

2020-2025 LEGAL MARKET CAGR





**POPULATION**

3 million



**CANNABIS CONSUMERS**

408 thousand



**TOTAL CANNABIS SPENDING**

\$282.4 million



**AVG. ANNUAL USAGE RATE**

18.0%



**AVG. PRICE PER GRAM (Flower)**

\$3.73



**MEDICAL CANNABIS PATIENTS**

10,812

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

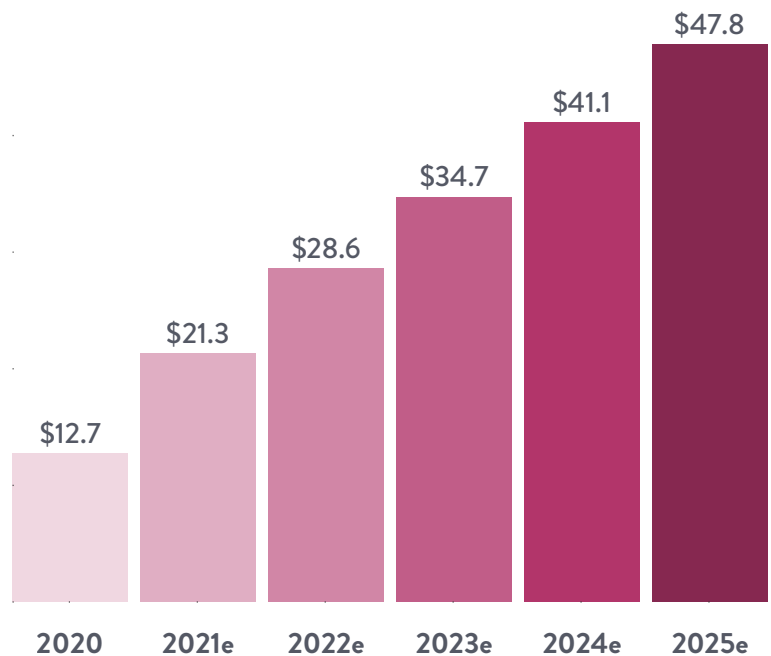
# Jamaica

Despite a long history of therapeutic and religious uses on the island, cannabis remained illegal in Jamaica until mid-2015, when the country passed an amendment to its existing drug law and decriminalized possession for personal use. Under the law, possession of up to 2 ounces of cannabis is now treated as a petty offence resolved with a ticket, as opposed to a criminally prosecutable offense.

Rastafari-practicing adults on the island are now permitted to use cannabis freely for sacramental purposes, making Jamaica

## Jamaica Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



one of the only countries to legalize cannabis use for religious purposes. Jamaican citizens are also permitted to cultivate up to five cannabis plants for personal use, and smoking has been made legal in both licensed premises and private residences (though consumption in public remains prohibited).

The amendment also permitted the development of a legal medical cannabis industry to serve tourists traveling with valid medical cannabis prescriptions. The first medical dispensaries opened in 2018; since then, the country has authorized 29 cultivators and issued 73 licenses for transportation, retail, and processing of medical cannabis.

## Medical Market Access

While most health-care providers in other legal medical cannabis countries will only prescribe medicinal cannabis for serious life-threatening illnesses or drug-resistant epilepsy, Jamaican doctors have shown willingness to prescribe medical cannabis for less acute conditions, including anxiety, insomnia, chronic pain, or nausea. The more liberal approach to patient qualification has opened a path to market growth through participation by tourists.

Jamaicans can legally grow cannabis at home, and ample access to cannabis flower at low prices has kept domestic patient participation in the regulated market lower than might be seen in a country with no such history of cultivation and use. Illicit market cannabis in Jamaica, although plentiful, is

comparatively weaker than the strength of regulated products. While the higher-quality products with higher concentrations of THC that are available at dispensaries will continue to offer incentive for increased participation by domestic consumers, the ease of access for tourist participation is bound to push much of the legal market's growth in the next few years.

## Canna-Tourism

Across the few countries and jurisdictions to have legalized cannabis for medical use and offer reciprocity – allowing medical cannabis patients from other countries or states to access their local legal market while visiting – almost all require those patients to have obtained their cards from their home markets prior to visiting. Jamaica, however, has approached the canna-tourism market differently, with some dispensaries providing on-site physicians to provide patients (for a small fee) with a prescription to shop at legal medical cannabis dispensaries.

## Shortages in Products Reported by Tourists

In 2020, heavy rains and pandemic-related restrictions affected farmers, resulting in product shortages reported by tourists visiting the island and seeking to access legal products through medical dispensaries, though no official shortages have been cited by the government.





# Puerto Rico



## POPULATION

3.1 million



## CANNABIS CONSUMERS

172 thousand



## TOTAL CANNABIS SPENDING

\$229.0 million



## AVG. ANNUAL USAGE RATE

6.6%



## AVG. PRICE PER GRAM (Flower)

\$5.54



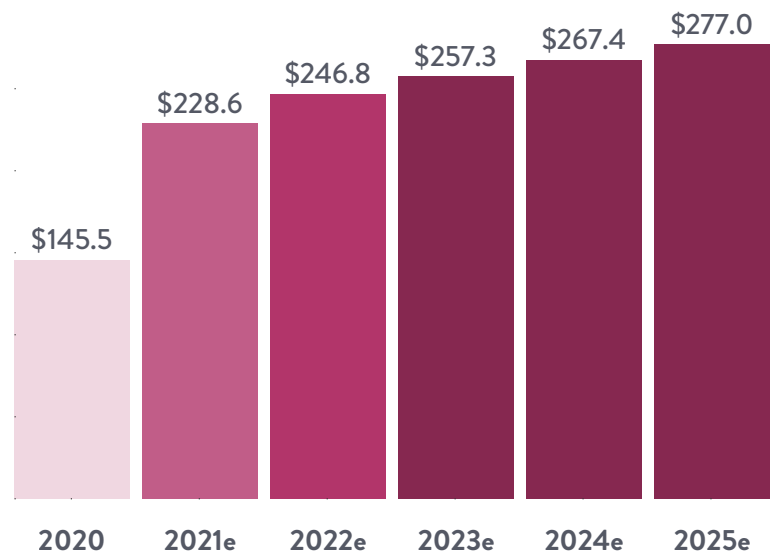
## MEDICAL CANNABIS PATIENTS

118.625

Medical-use of cannabis has been legal in Puerto Rico since 2015, with first sales made in 2017. Initial program regulations were restrictive, but have since been expanded. The current list of accepted qualifying conditions is extensive, and includes conditions with high rates of associated patient participation, including anxiety, chronic pain, migraines, or depression, and the island offers medical reciprocity for card-holding medical cannabis patients from other jurisdictions – a move that has propelled sales on an island with a heavy influx of tourism dollars coming from the cannabis-friendly U.S. Product forms have also been expanded since the first days of the program. Initially, smoking was prohibited, and only capsules, tinctures, or topicals were permitted – with an exception for inhalation/vaporization of flower. Now, all cannabis product forms are found in medical dispensaries across the island, providing Puerto Ricans and medical tourists with a wide variety of options to choose from.

## Puerto Rico Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.



**POPULATION**

106 thousand



**CANNABIS CONSUMERS**

3 thousand



**TOTAL CANNABIS SPENDING**

\$3.7 million



**AVG. ANNUAL USAGE RATE**

3.8%



**AVG. PRICE PER GRAM (Flower)**

\$6.29

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

# U.S. Virgin Islands

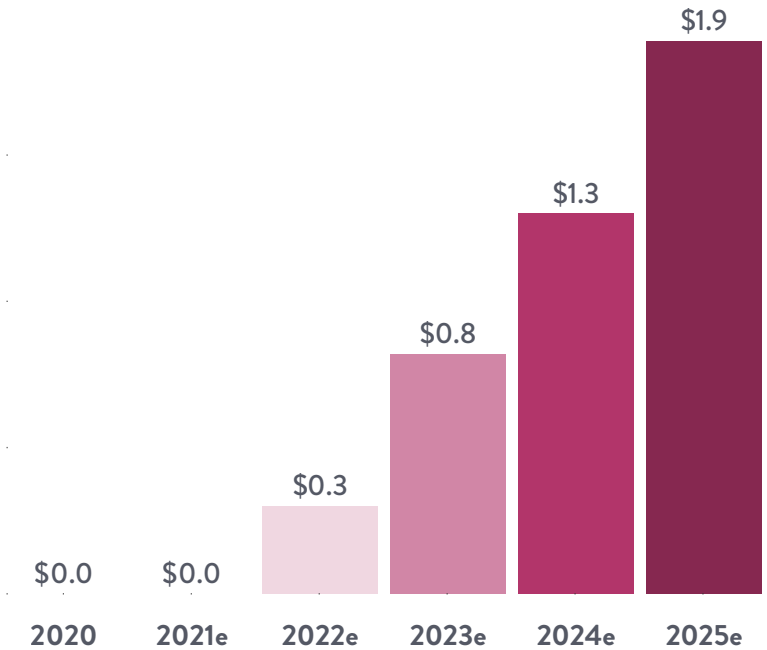
Cannabis was legalized for medical use in the U.S. Virgin Islands in 2018, and the adopted regulatory framework includes wide provisions for patients, licensing, and home cultivation.

## Medical Market

Once operational, the rate of participation in the legal medical market is expected to be high. The list of accepted qualifying medical conditions includes chronic pain and PTSD, and the island has a high concentration of U.S. residents (where medical cannabis use is widely accepted).

### U.S. Virgin Islands Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



## FULL LIST OF QUALIFYING CONDITIONS

- Alzheimer's disease
- Amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease
- Arthritis
- Autism
- Cachexia, or wasting syndrome
- Cancer
- Chronic or severe pain
- Crohn's disease
- Diabetes
- Glaucoma
- Hepatitis C
- HIV/AIDS
- Huntington's disease
- Multiple sclerosis (MS)
- Neuropathy
- Opiate use disorder
- Parkinson's disease
- Post-traumatic stress disorder (PTSD)
- Seizures
- Severe nausea
- Terminal illness
- Traumatic brain injury
- Ulcerative colitis

## Supply Chain

Licensing regulations for cannabis growers in the USVI will have different tiers, according to the plant quantity. The cultivation tier amounts were specified as:

### LICENSE APPLICATION FEE LIMITS:

#### 1) Cultivation Licenses

Tier	Plant Count Limit	Cost for New Farmer License	Cost for Existing Licensed Farmer
1	100	\$1,000	\$500
2	500	\$2,500	\$2,000
3	1,000	\$5,000	\$4,500

*Note: These are total plant counts a cultivation operation may have, both flowering and non-flowering cannabis plants.*

2) Dispensary License: \$5,000

3) Cannabis Product Manufacturer License: \$5,000

4) Research and Development License: \$1,000

5) Approved Vendor Certificate: \$1,000

Growers can only sell products to processing facilities or dispensaries, and — unlike some collective/home-cultivation markets — cultivators are not allowed to sell to patients directly. The Medical Cannabis Patient Care Act (MCPCA) taxes the sale of products from growers to dispensaries and processing facilities at 10% of their per-pound selling prices.



# Oceania



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.



## POPULATION

43.1 million



## CANNABIS CONSUMERS

3.6 million



## TOTAL CANNABIS SPENDING

\$9.3 billion



## AVG. ANNUAL USAGE RATE

12.2%



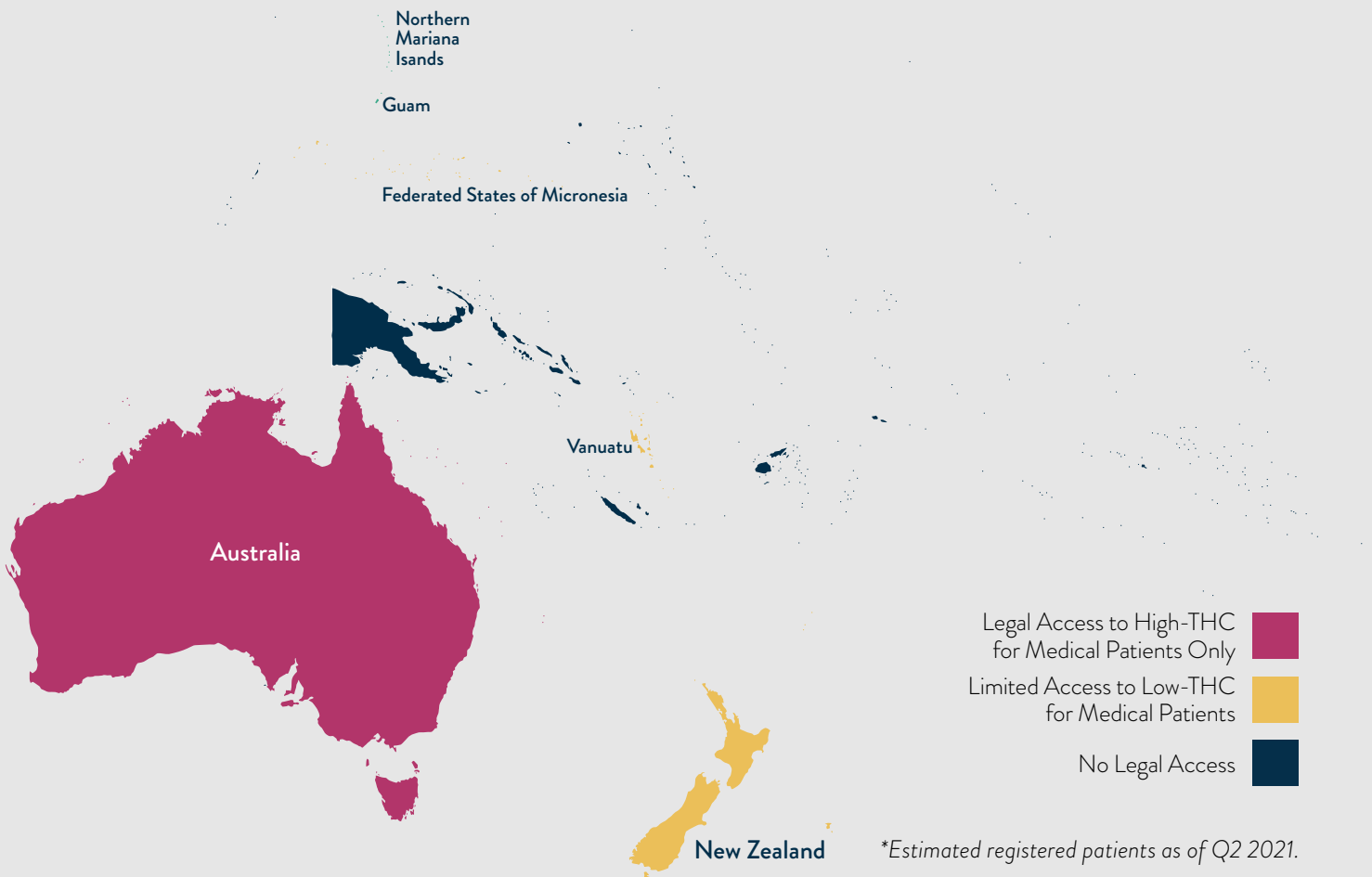
## AVG. PRICE PER GRAM (Flower)

\$14.95



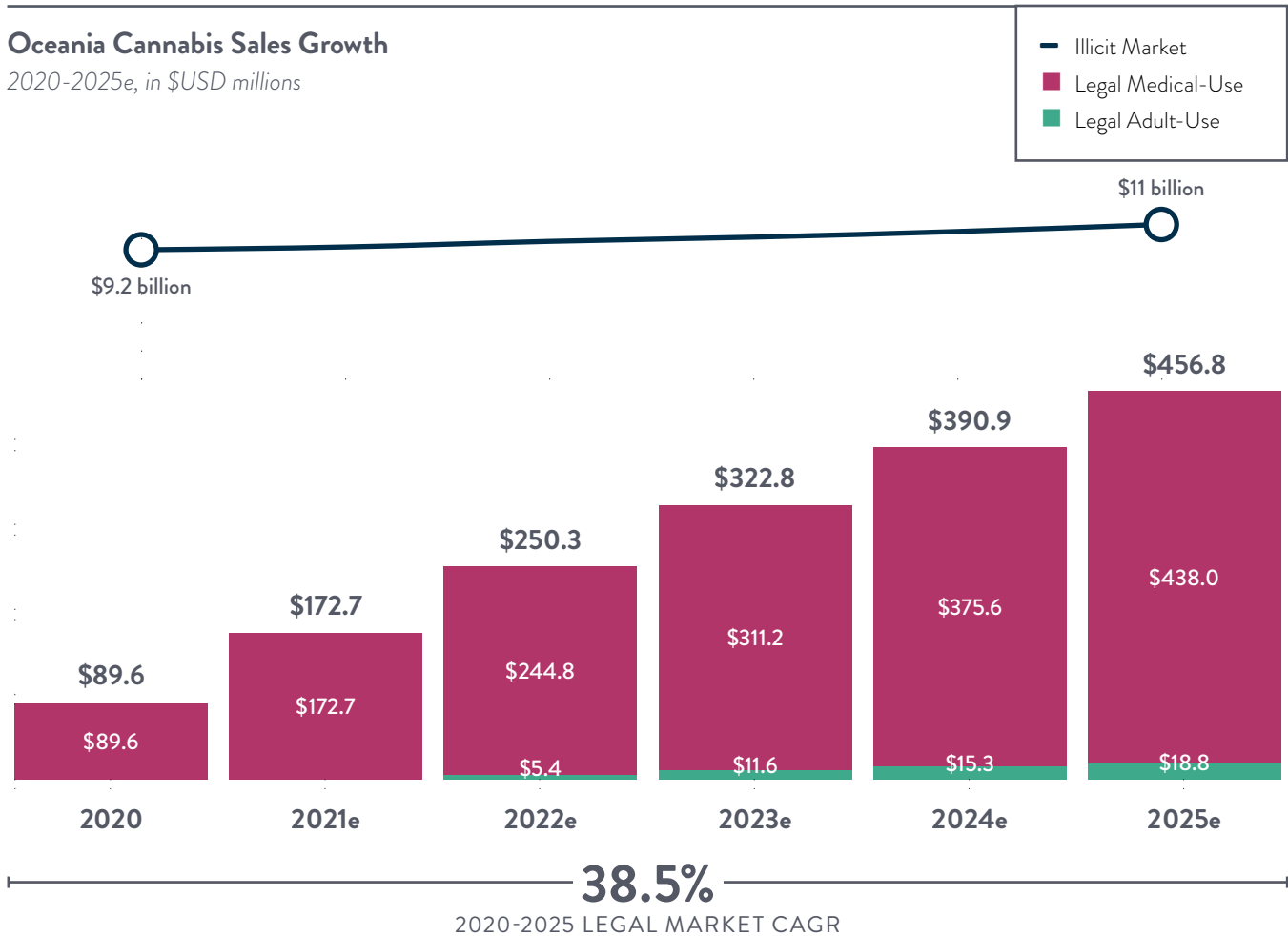
## MEDICAL CANNABIS PATIENTS

72,948\*



Oceania comprises Australasia, Melanesia, Micronesia, and Polynesia. It spans an area of roughly 3.3 million miles, with a population of more than 40 million. Oceania is home to a diverse mix of economies, from the highly developed and globally competitive financial markets of Australia, New Zealand, and Singapore (all which rank highly in quality of life and GDP per capita), to the much less developed island nations of Kiribati and Tokelau, remote islands in the north of the region which have among the world’s lowest GDP per capita values.

While Oceania is a large and culturally diverse region, attitudes toward cannabis are shifting across it. Although tiny in population, Guam and the Northern Mariana Islands are on a very short list of countries in the world to legalize and regulate adult-use cannabis sales, expected to begin within the next year. Australia and New Zealand anchor the region by featuring the most progressive attitudes and highest rates of use regarding cannabis, and as seen elsewhere around the world, the acceptance and adoption of legalization by those two developed countries will significantly influence the acceptance and adoption of cannabis legalization throughout the region.







# Guam



## POPULATION

169 thousand



## CANNABIS CONSUMERS

16 thousand



## TOTAL CANNABIS SPENDING

\$47.8 million



## AVG. ANNUAL USAGE RATE

12.2%



## AVG. PRICE PER GRAM (Flower)

\$16.95

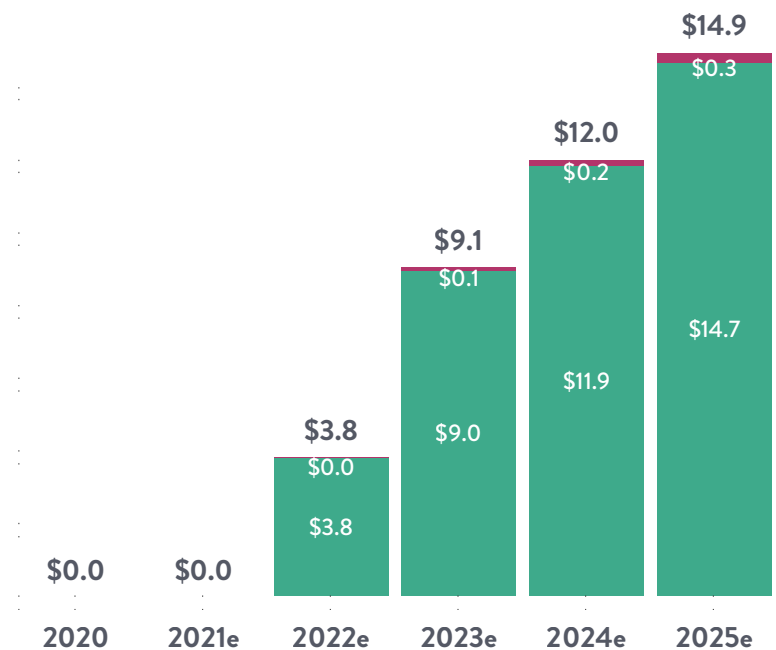
2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

To date, the legal cannabis market in Guam has relied on a system of home cultivation. Medical use of cannabis has been legal since 2014, and adult-use cannabis has been legal since April 2019, allowing adults aged 21 years or older to possess, legally consume and grow cannabis at home, with limits on the number of plants being grown at any given time. However, as of this report’s publication no regulated system of distribution is operational, and — with final confirmation of retail rules and regulations still to come — the legal market in Guam remains in limbo.

### Guam Legal Cannabis Sales Growth

2020-2025e, in \$USD millions

Legal Medical-Use  
Legal Adult-Use



## Medical Market

Guam passed the Joaquin (KC) Concepcion II Compassionate Cannabis Use Act in 2014, allowing patients with qualifying medical conditions to legally possess and consume cannabis. The law directed the Department of Health and Human Services (DHHS) to create a registry to issue patient ID cards and develop a system for producing and distributing cannabis products. In 2016, Bill No. 343-33 expanded the list of qualifying conditions, allowing physicians to recommend cannabis for any patient they thought could benefit. It also specified the amount of cannabis that patients could possess (2.5 ounces), set up the Medical Cannabis Regulation Commission, mandated testing for all products, and made registry cards optional for patients but mandatory for caregivers.

## No Access Yet

In 2018 the legislature passed Public Law 34-125, allowing patients and caregivers to grow cannabis at home until dispensaries become operational. As of June 2021, the Cannabis Control Board remained

in the process of finalizing regulations surrounding production and retail sales, and getting the seed-to-sale tracking system operational. In the meantime, adults have been allowed to grow up to six plants at home, and possess up to 1 ounce (28 grams). Like other legal medical cannabis markets around the world, Guam requires products to be tested, and similar to other markets, the start of legal sales will be heavily dependent on the timing and operation of a licensed testing facility on the island.

## Growth Will be Restricted by Military Presence

Guam's economy is largely driven by U.S national defense spending – with the island serving as a forward U.S military base of the Western Pacific. The population of Guam totals about 168,000, with military personnel making up a portion of that. As members of the military are forbidden from consuming cannabis (even if legal in a particular locality), a portion of the adult population in Guam is restricted from the potential consumer base, limiting growth of potential sales on the island.



# Northern Mariana Islands



## POPULATION

58 thousand



## CANNABIS CONSUMERS

5 thousand



## TOTAL CANNABIS SPENDING

\$8.2 million



## AVG. ANNUAL USAGE RATE

12.2%



## AVG. PRICE PER GRAM (Flower)

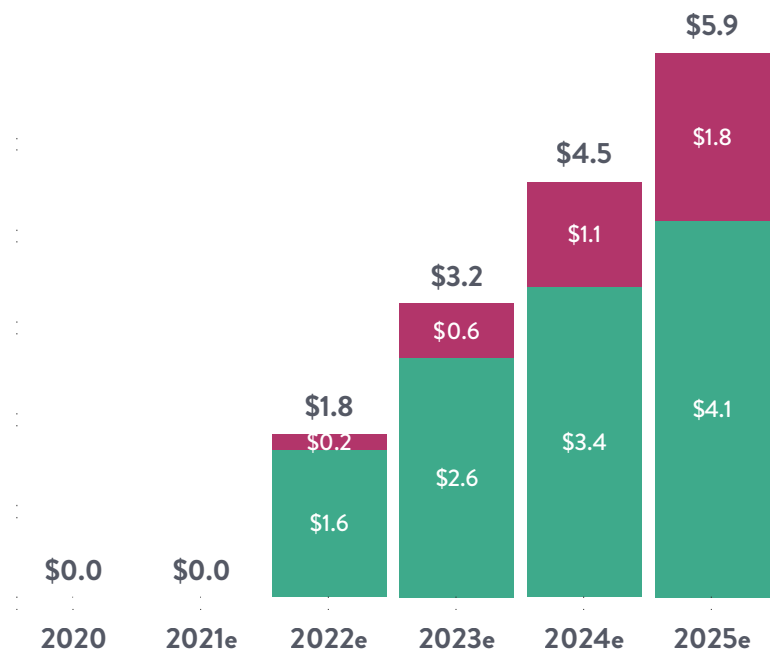
\$9.29

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

In September 2018, the Governor of the Commonwealth of the Northern Mariana Islands (CNMI) signed House Bill 20-178 into law. Also known as the Taulamwarr Sensible CNMI Cannabis Act of 2018, it lifted all prohibition on cannabis and related products, effectively legalizing cannabis and hemp for adult-use, medical use, and industrial purposes. Sales have not yet begun, but the detailed regulatory framework laid out by the government and action on licensing suggest legal medical and adult-use sales in the Northern Mariana Islands may begin in early 2022.

## Northern Mariana Islands Legal Cannabis Sales Growth

2020-2025e, in \$USD millions



## Adult-Use Market

The text of the Taulamwarr Sensible CNMI Cannabis Act provided a detailed regulatory plan, including rules on possession, cultivation, and social-use spaces. Possession limits are set at 1 ounce of cannabis flower, 16 ounces of cannabis products in solid form, and 72 ounces of liquid cannabis (or five grams of extract) at any one time. Public consumption remains prohibited, though consumption lounges will open on the island to allow visitors to bring and use their own products or purchases on-site — a move that puts the island at the forefront of legal markets offering social-use spaces for consumption. Cultivation is permitted, but all cultivators must be included in the government registry. Registered cultivators will be legally permitted to keep up to six mature and 12 immature plants onsite. Rules for tourist participation in the adult-use market have not yet been explicitly defined, but if permitted, sales from tourists could potentially double the size of the island's expected annual sales of adult-use cannabis.

## Medical Market

The new statute includes over 30 qualifying conditions for medical patients to participate in the medical program, including cancer, diabetes, Parkinson's disease, traumatic brain injury, stroke, asthma, muscular dystrophy, and assorted neurological disorders. The list also includes the key conditions of chronic pain and PTSD — which have high rates of associated active patient participation in other legal medical markets.

Since the country legalized cannabis for medical and adult-use simultaneously, overall rates of patient participation are not expected to be as high as in legal markets where patients have access to legal products for medical use only, or those jurisdictions which have legalized cannabis for both medical and adult-use purposes, but had years in between enactment of two, giving the medical market enough time to gain a foothold as a source of product for patients. Despite such, the program has adopted a regulatory structure to provide protections and incentives for patient participation, including expectedly lower retail prices and cultivation limits 2x those of registered adult-use cultivators.





**POPULATION**

25.8 million



**CANNABIS CONSUMERS**

2.5 million



**TOTAL CANNABIS SPENDING**

\$7.5 billion



**AVG. ANNUAL USAGE RATE**

11.8%



**AVG. PRICE PER GRAM (Flower)**

\$17.11



**MEDICAL CANNABIS PATIENTS**

72,948

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

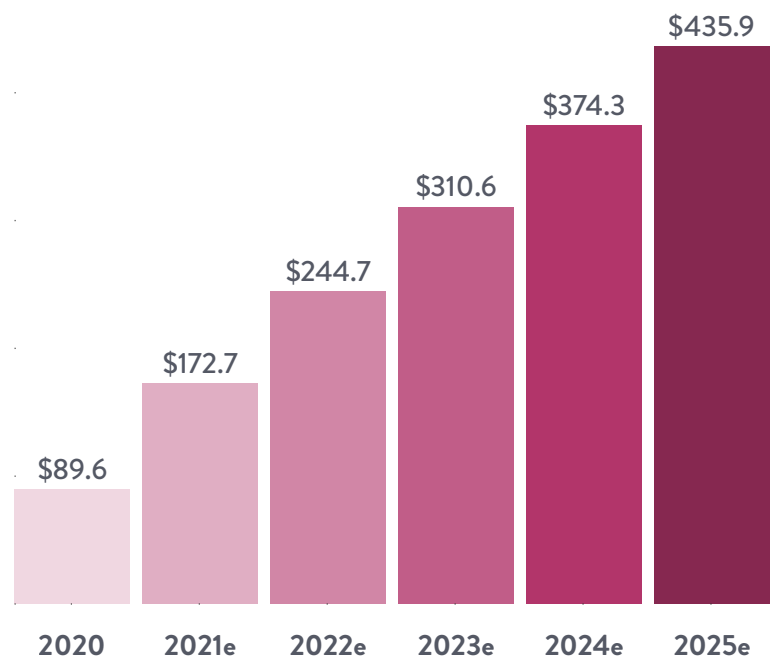
Patient counts are estimated registered patients as of Q2 2021.

# Australia

Cannabis was federally legalized for medical use in Australia in 2016, and both patient participation and the breadth of prescribed products have since grown substantially. Patients can access medical cannabis via a prescription from a general practitioner or specialist, and doctors can prescribe through two methods: either through the Therapeutic Goods Administration (TGA) Special Access Scheme, or by applying to the TGA to become an authorized prescriber.

## Australia Legal Medical Cannabis Sales Growth

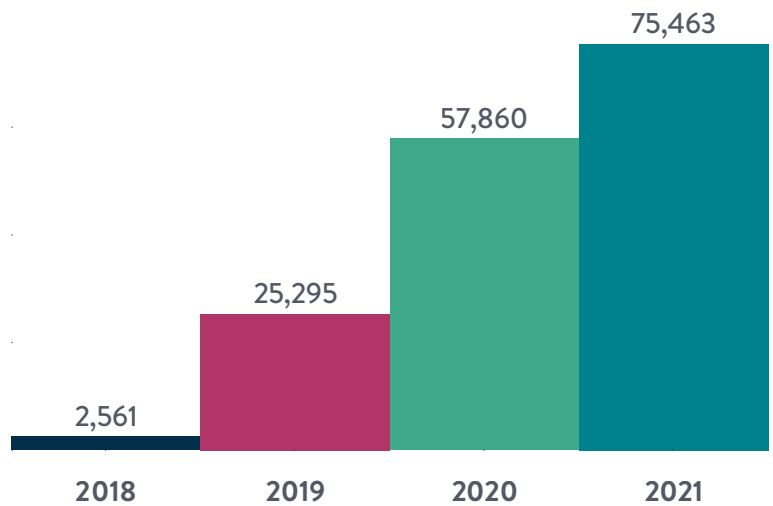
2020-2025e, in \$USD millions



As of July 2021, there were more than 75,000 registered medical cannabis patients in Australia – up over 29% from 58,000 at the end of 2020.

Like other legal medical markets around the world that have chosen to include chronic pain as a qualifying condition for program participation, Australia’s medical cannabis program has a large portion of patients participating to treat chronic pain, with over 60% of all patients as of July 2021 reporting it as their reason for treatment.

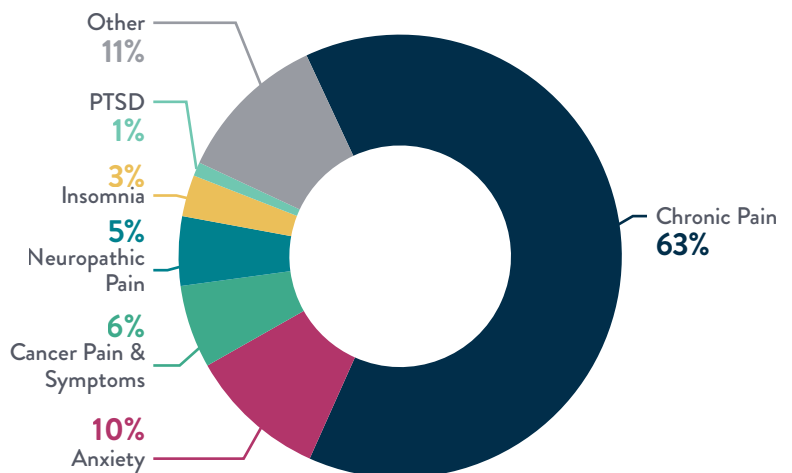
### Registered Medical Cannabis Patients in Australia



Note: Data is as of year-end for 2018, 2019, and 2020. Data for 2021 as of July 31st.

### Australian Medical Cannabis Patients

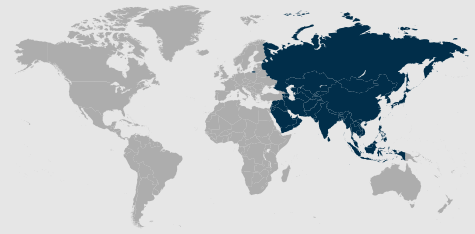
% by qualifying medical condition



Note: Patient data is as of July 2021.



# Asia



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.



## POPULATION

4.5 billion



## CANNABIS CONSUMERS

93.8 million



## TOTAL CANNABIS SPENDING

\$186 billion



## AVG. ANNUAL USAGE RATE

2.8%



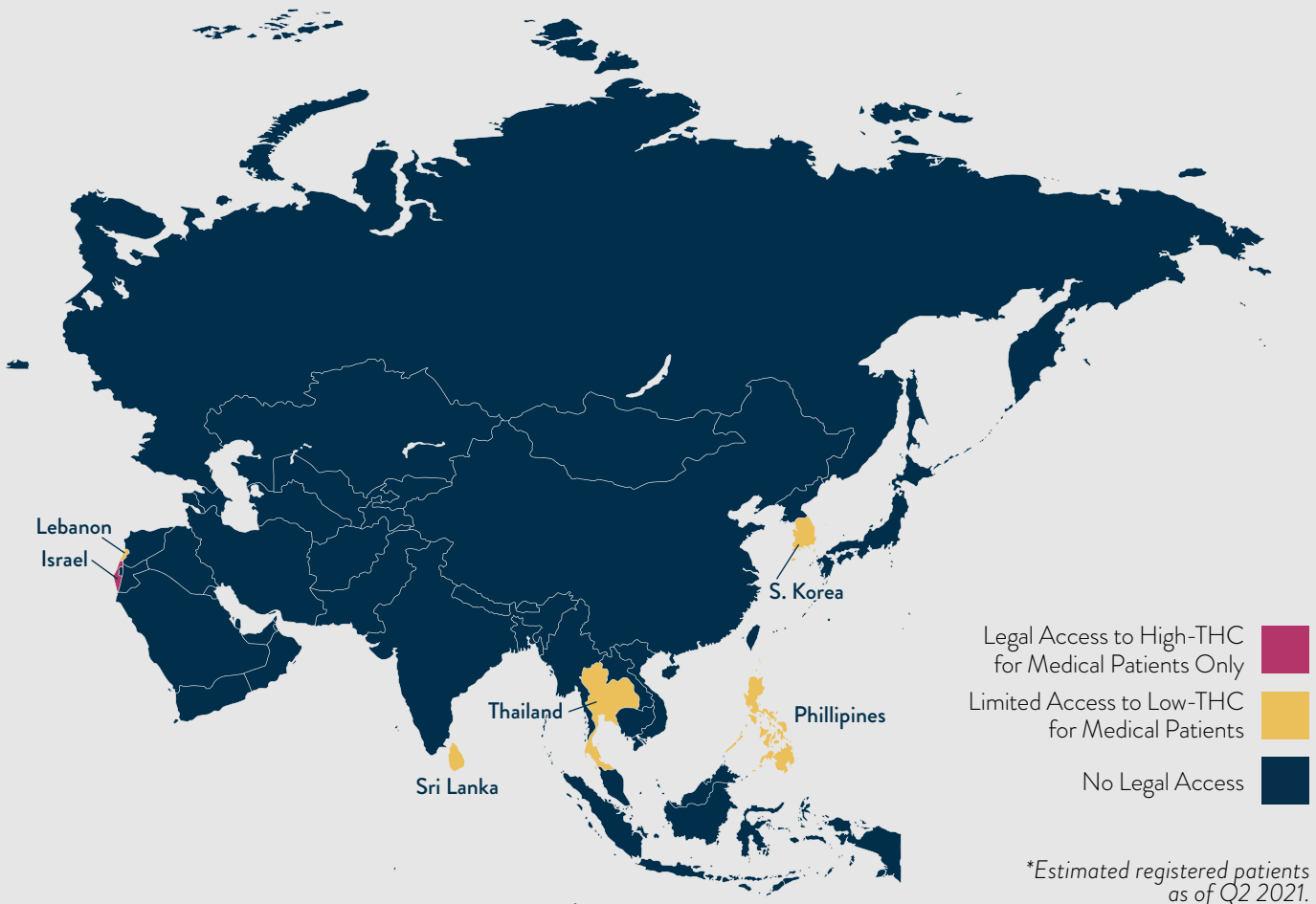
## AVG. PRICE PER GRAM (Flower)

\$13.73



## MEDICAL CANNABIS PATIENTS

91,851\*

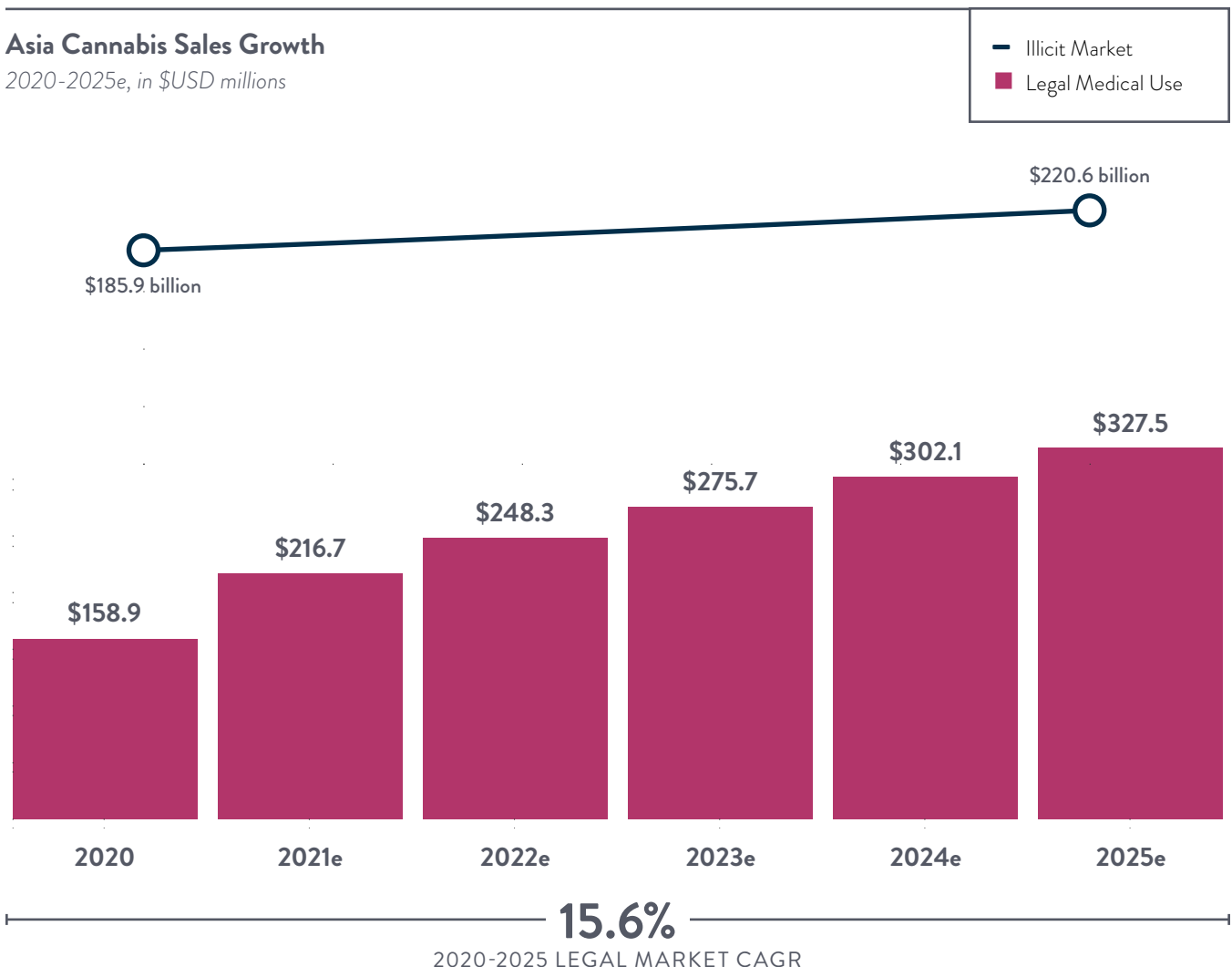


Though Asia has historically been known for some of the world’s most restrictive cannabis policies, the doors to cannabis-related opportunities are beginning to crack open. In the most densely populated of all the world’s regions, total spending on cannabis by consumers in Asia equated to roughly \$186 billion USD in 2020. Israel remains the only operational high-THC cannabis market in the region, with the highest usage rates in the world and a long history of cannabis medical research.

Despite a deficiency of legal operational country markets in 2020, as the global markets for cannabis take shape, Asia has the potential to dominate future global cannabis trade through low-cost labor and rapidly advancing industrial sectors. While many are looking towards the EU for their continental market of choice, savvy investors and operators (e.g., those in New Zealand and Australia) are targeting Asia as an untapped market ripe for the picking should legalization policies advance.

### Asia Cannabis Sales Growth

2020-2025e, in \$USD millions







**POPULATION**

9.2 million



**CANNABIS CONSUMERS**

1.8 million



**TOTAL CANNABIS SPENDING**

\$7.4 billion



**AVG. ANNUAL USAGE RATE**

27%



**AVG. PRICE PER GRAM (Flower)**

\$23.49



**MEDICAL CANNABIS PATIENTS**

91,851

2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

Patient counts are estimated registered patients as of Q2 2021.

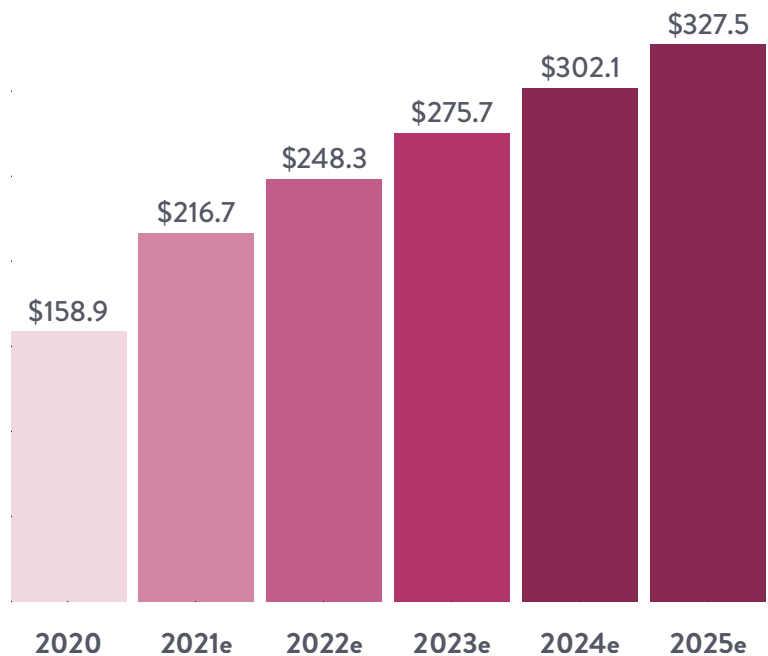
# Israel

Cannabis-based medicines have been legal in Israel since the late 1990s, and since the allocation of the first domestic licenses in 2006, Israel has developed into a burgeoning cannabis R&D hub. The country possesses the most developed medical cannabis scheme outside of North America, with over 0.6% of the Israeli population currently registered as users of medical cannabis. By contrast, Germany (Europe’s leader for cannabis-based treatments) has a penetration rate of under 0.15%.

According to new data from the Israeli Medical Cannabis Agency (IMCA), the number of authorized medical cannabis patients in Israel has more than doubled in the past two years –

## Israel Legal Medical Cannabis Sales Growth

2020-2025e, in \$USD millions



topping 88,000 in March '21 – despite persistent supply and regulatory challenges. Unlike in other medical cannabis jurisdictions, in Israel the cost of medical cannabis is actually lower than for cannabis sold in the illicit market. Given that, it creates consumer incentive to purchase only legal cannabis.

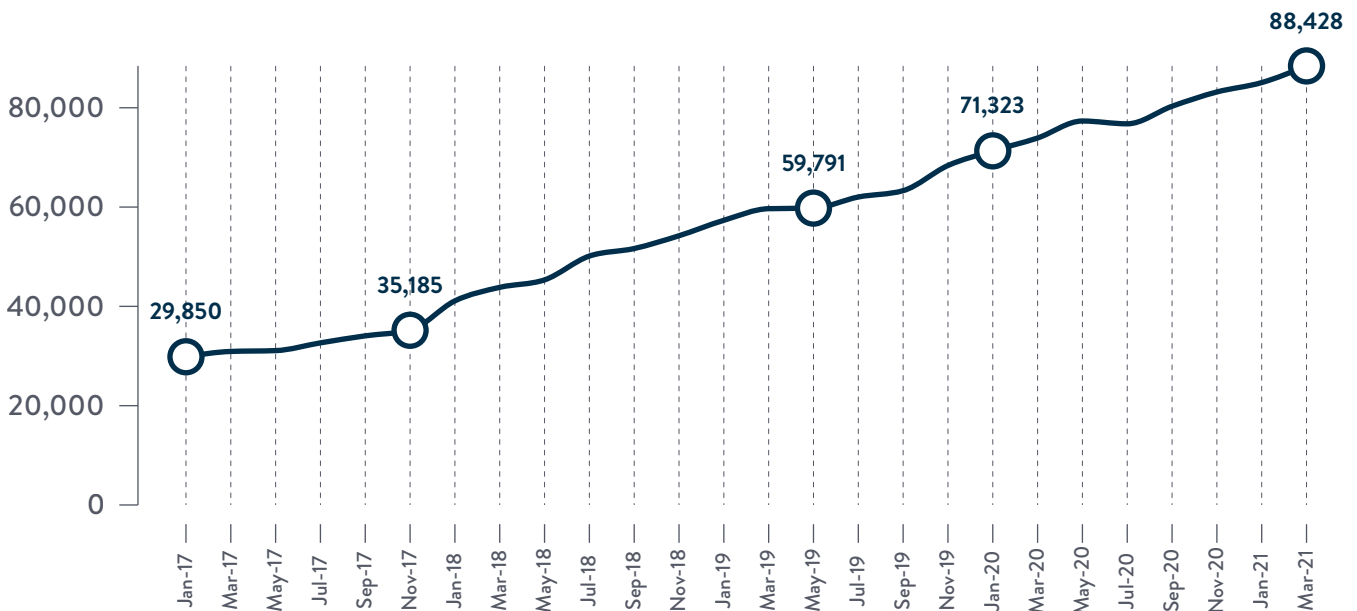
In Israel, 31 companies were permitted to grow medical cannabis for the program's 88,000 authorized patients, with five more authorized to process and manufacture medical cannabis products, according to the Israeli Medical Cannabis Agency.

Prior to 2019, patients obtained their supplies directly from a few licensed producers, for a fixed cost of under €100 (\$118 USD) a month, regardless of the amount of cannabis needed. However, regulatory

reforms in 2019 caused shortages and fueled dissatisfaction within the industry. In addition to new quality standards for producers – having caused compliance issues for a number of companies – patients enrolled in the new program are forced to buy their cannabis in pharmacies, where they are charged per gram rather than the previous flat rate. Thus, patients requiring higher doses have seen their costs for cannabis supplies rising dramatically, without the government introducing any reimbursement or relief.

Dry flower dominates Israel's medical cannabis program, and likely will for the foreseeable future. The country's medical cannabis sector is highly regulated and quite advanced compared to other global markets, and is going through reforms to expand and open it even more widely for consumption and import.

### Active Medical Cannabis Patients in Israel



## Israeli Cannabis Exports Still Not a Reality

After years of discussion on regulations to allow Israeli producers to export, 2020 has paradoxically seen Israel becoming the largest global importer of cannabis, as the government allowed dozens of batches of foreign-grown cannabis to be imported to solve the shortages of the domestic market, which are especially pronounced in regard to high-THC strains.

At time of publication, only one Israeli producer had obtained the EU-GMP certification required early in the year to access the European markets, and there had been no confirmation of export shipment to its partners in Germany or Denmark. The same

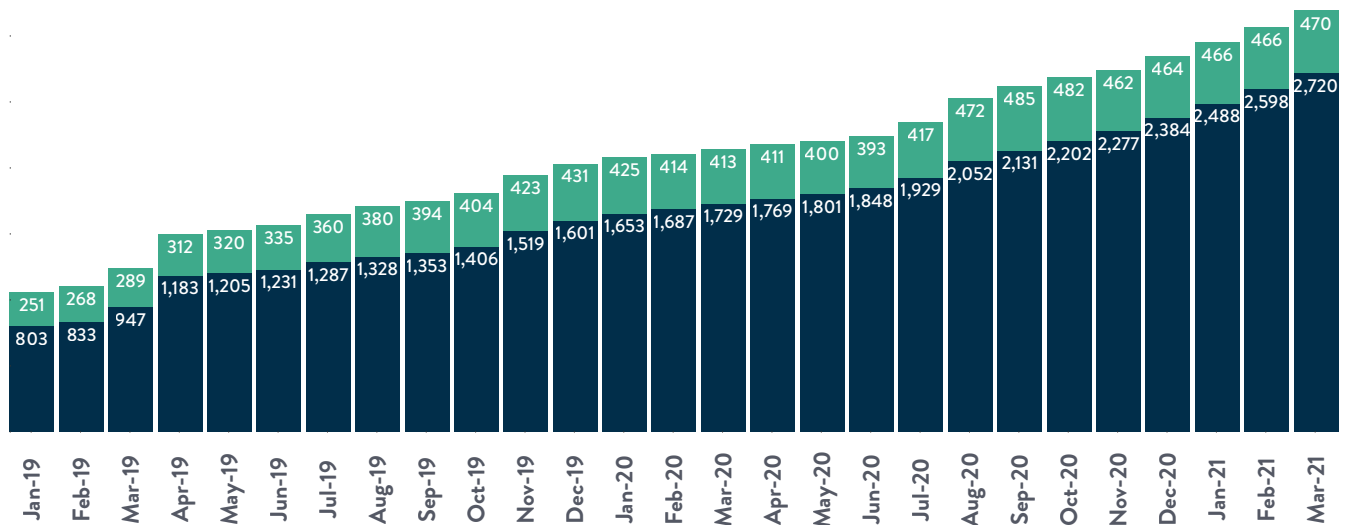
company had concluded an agreement to import at least 100 kg from Canada.

More broadly, half a dozen importers and distributors had collectively imported over 7 tons from at least 12 different international producers, bringing many new strains into the market, with some patients claiming the products to be superior to the Israeli-grown varieties. However, complaints by patients have been recorded about breaks in the "therapeutic sequence", with a diverse range of products arriving on the market. Importation to Israel is only going to increase in the next few quarters, and with demand in the market being estimated by the government at 25 tons per year, at least 30% will likely be met by international suppliers.

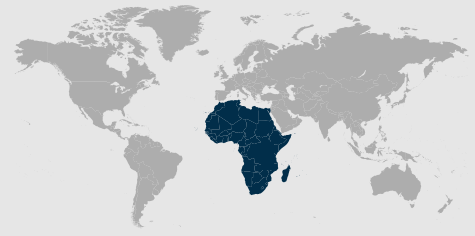
### Sales of Legal Medical Cannabis in Israel by Product Type

In kilograms

- Flower
- Extracts & Oil



# Africa



2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.



## POPULATION

1.3 billion



## CANNABIS CONSUMERS

59.2 million



## TOTAL CANNABIS SPENDING

\$33.1 billion



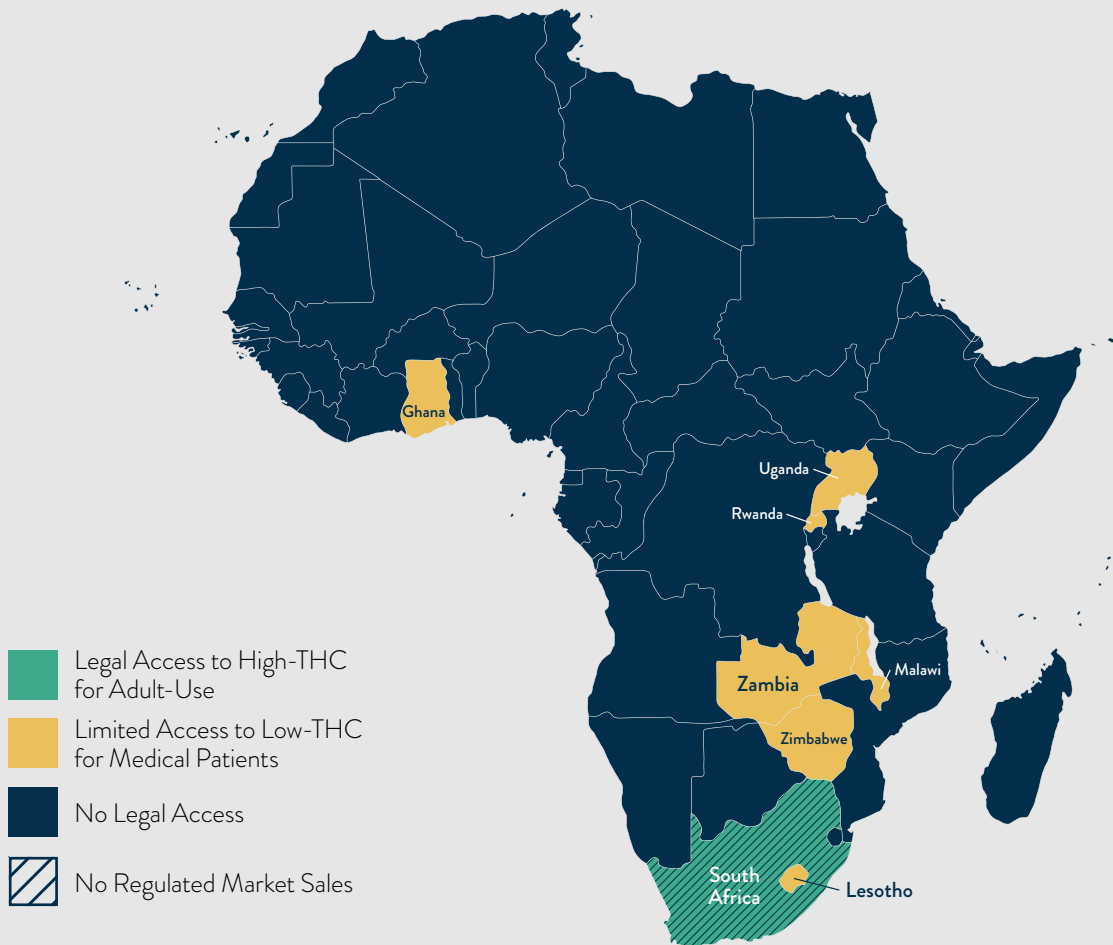
## AVG. ANNUAL USAGE RATE

7.5%



## AVG. PRICE PER GRAM (Flower)

\$2.68



- Legal Access to High-THC for Adult-Use
- Limited Access to Low-THC for Medical Patients
- No Legal Access
- No Regulated Market Sales



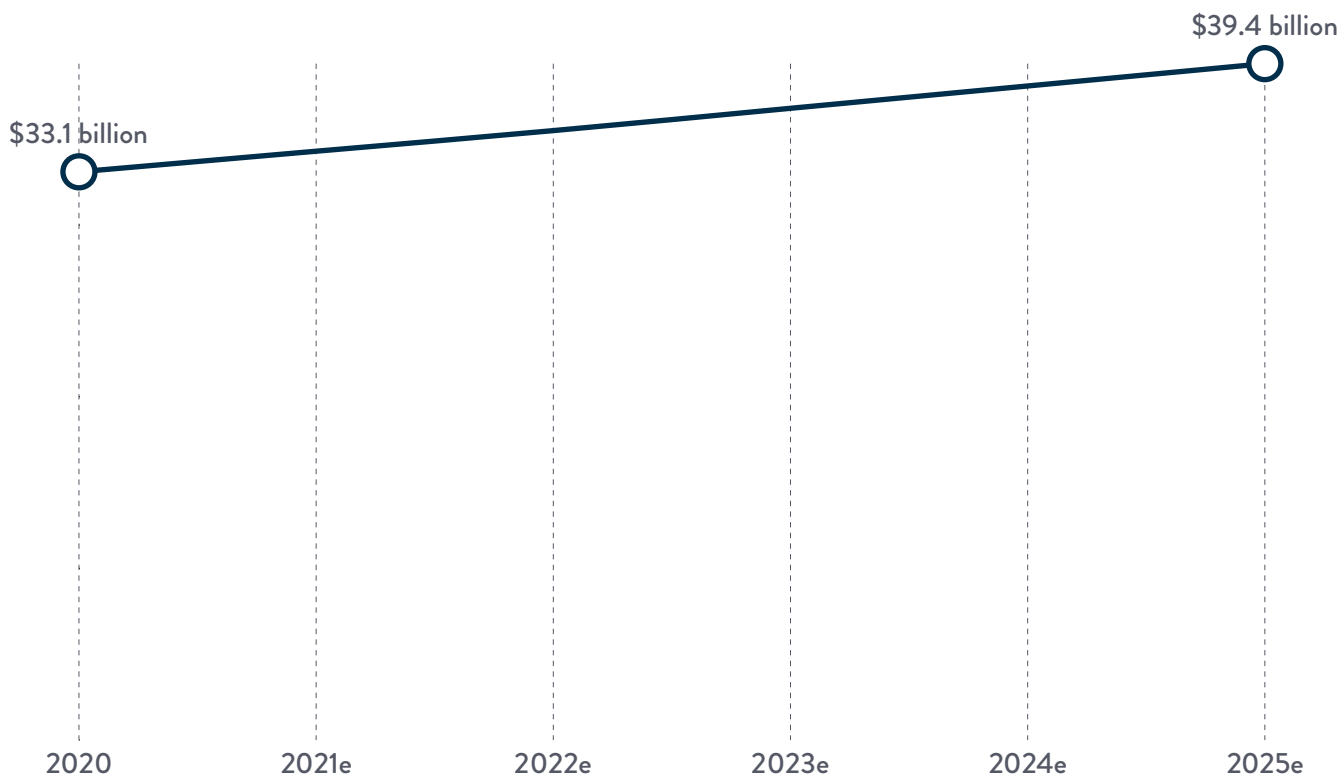
Despite pervasive cultivation and use of cannabis in Africa (and legalization initiatives advancing in countries like Morocco), only South Africa has formally legalized or decriminalized cannabis for personal or adult-use. While most cannabis is produced for local consumption, countries like Lesotho, Swaziland, and Morocco have served as major suppliers to the illicit markets of neighboring countries and regions. In fact, cannabis cultivation and interregional trade is prevalent in many African countries, fueled by widespread demand despite strict laws and harsh

punishments. As such, cannabis serves as a vital source of revenue in many communities.

While South Africa is the only country to have formally decriminalized cannabis, many employ unofficial decriminalization approaches (such as Lesotho) where use and possession are tolerated or ignored by local law enforcement for reasons including religion, prioritization of trafficking, or preservation of tourism income.

### Africa Illicit Cannabis Sales Growth

2020-2025e, in \$USD billions





#### POPULATION

59.4 million



#### CANNABIS CONSUMERS

1.8 million



#### TOTAL CANNABIS SPENDING

\$1.2 billion



#### AVG. ANNUAL USAGE RATE

4.4%



#### AVG. PRICE PER GRAM (Flower)

\$3.63

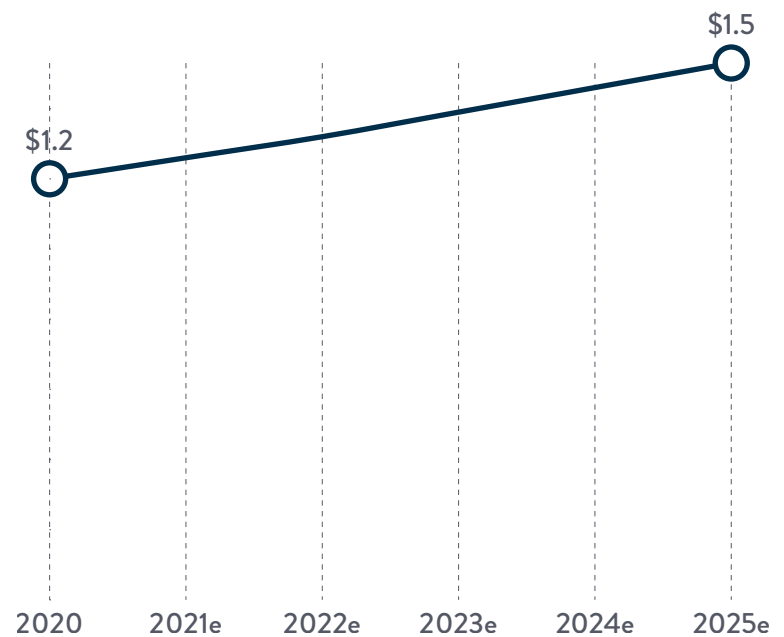
2020 annual estimates. Consumers, spending and pricing shown are totals for legal & illicit markets combined.

# South Africa

In 2018, South Africa's Constitutional Court issued a ruling that effectively decriminalized cannabis, ordering that it should be legal for adults to grow and smoke cannabis in the privacy of their own homes. According to the ruling, cannabis cultivated in a private place may only be used by the grower/cultivator, and it is illegal to supply it to anyone else. That has created a strong home-cultivation market in South Africa, where there is wide access to homegrown cannabis and no criminal penalties for consumption or personal use. Sales are still illegal, however, which has prevented South Africa from developing any system for distribution, and to date kept the country from entering the high-THC global cannabis market.

## South Africa Illicit Cannabis Sales Growth

2020-2025e, in \$USD billions



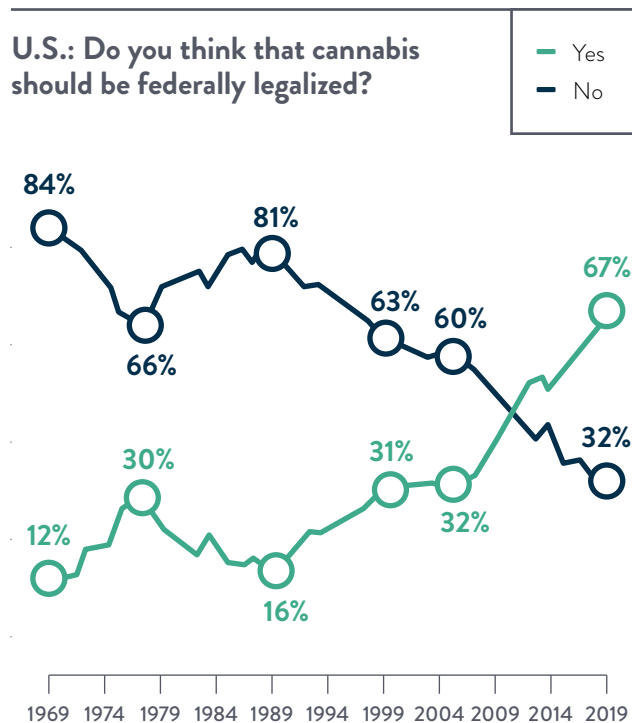
# Key Trends

## 1 Changing Tides of Public Opinion on Cannabis Policy

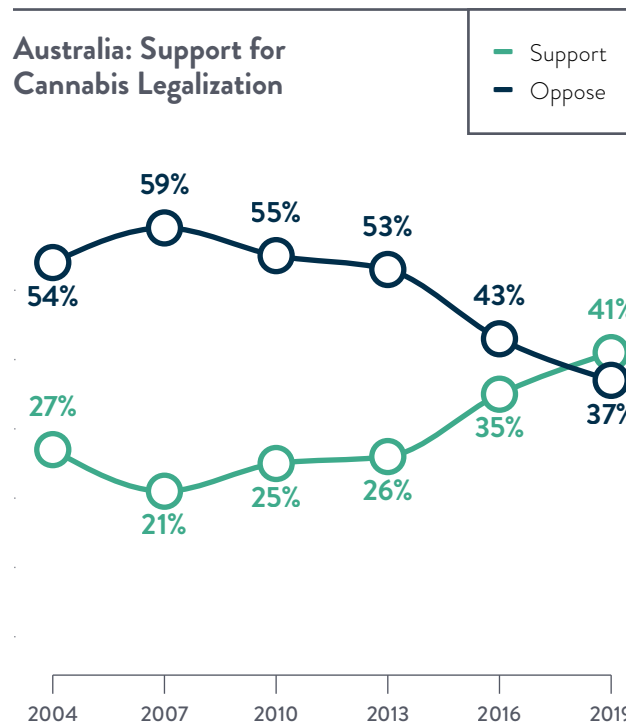
After decades of global cannabis prohibition, public attitudes toward legalization have recently begun to shift in favor of cannabis policy reform — dramatically, in some places. Only in the past decade have rates of public support for federal legalization

in the U.S. surpassed rates of support for continued prohibition, according to Pew Research. Likewise, Australia even more recently saw support surpass opposition, per a 2019 survey by the Australian Institute of Health and Welfare.

Support for legalization in the U.S. dramatically increased in the late 2000s and early 2010s as many legal (i.e., medical, then adult-use) markets were coming online. As more markets were estab-



Source: Pew Research



Source: 2019 National Drug Strategy Household Survey



lished (and after fears which the public may have harbored about cannabis legalization did not come to pass), support continued to rise.

Legal markets across the globe play an important role in lessening public concern about the possible harms of cannabis legalization. They offer concrete examples of potential models for policy reform, allowing people to reevaluate their stances on the issue based on real events and outcomes.

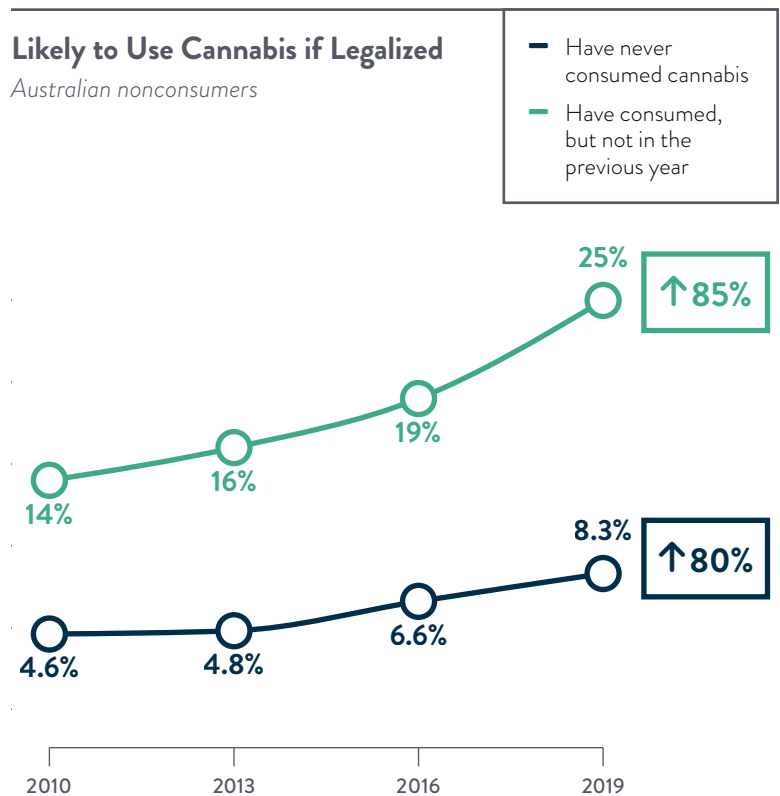
In Germany, public support for cannabis legalization reached 46% in a 2020 survey, up from 30% in 2014 (both surveys by Deutscher Hanfverband). The German survey reflected the value of having a real-world example for people to assess policy by, specifically referring to the legalization models of North America: "Cannabis should be available legally and regulated for adults, for example through specialist shops such as in Canada or the USA."

## 2

## Medical Cannabis and Diffusion of Normalized Social Attitudes

Medical cannabis has found increasing global acceptance over the past few years. A broader understanding of the plant's properties and growing social acceptance of cannabis and cannabis-derived products have spurred the normalization of attitudes surrounding the plant.

For operators working within the global cannabis industry, it has been a process of consumer education. Introducing consumers to various cannabinoids, terpenes, and flavonoids while also illuminating the distinctions between full-spectrum and broad-spectrum oils facilitates the process by which consumers



Source: 2019 National Drug Strategy Household Survey





identify which products might best suit their needs, and help establish product and brand preferences.

For retail consumers, social influences have a substantial impact. In 2019, when more than half (56%) of Europeans surveyed had heard of CBD, social interactions with CBD consumers were already proving to be powerful influencing factors contributing to individuals' willingness to purchase and consume products.

Respondents who indicated that a member of their social circle — family or friends — consumed CBD were far more likely to have been recommended a CBD product. That was likely due to the fact that, at the time, nearly three-quarters (74%) of CBD consumers reported it having a positive impact on their quality of life. For those with more ties to CBD consumers, the likelihood of a recommendation increased in kind. Those who had been recommended CBD were also more likely to have recommended it to others.

A subsequent survey in the U.S. reinforced the influence which social relationships can have on CBD consumption. While more than half (51%) of all Americans reported having friends or family who consumed CBD, for those consuming CBD themselves that number was closer to 9 out of 10 (88%).

Moreover, expanding social acceptance opens the door to enticing to the market “canna-curious” consumers who have not yet experimented with cannabis or cannabis-derived products. In Australia, a recent survey found that individuals identifying as former cannabis consumers and non-consumers have increasingly indicated that they would try cannabis were it legalized.

As social stigmas are overcome, and the introduction of new markets make cannabis products increasingly available, potential consumers will increasingly indulge their curiosity. Many may only engage with the market infrequently, which nonetheless will have a substantial impact on spending in the cannabis industry.

### 3 Gray Markets and the Complexities of Canna-tourism

While many countries are fully legalizing and regulating their domestic cannabis industries, others have taken a more circumspect approach. In many instances that means decriminalizing cannabis, and removing criminal penalties for possession and use, but without putting a regulatory framework in place for the production and sale of cannabis, thus promoting the emergence of a gray market. The Netherlands and Spain offer two cases where operators in gray markets are providing services for canna-tourists, with varying results.

#### THE NETHERLANDS

Cannabis in the Netherlands has been decriminalized for personal use but remains otherwise illegal. The famous coffee shops of Amsterdam have entered the popular imagination as tourist destinations for cannabis. While coffee shops throughout the Netherlands are licensed to sell small quantities of cannabis products, their continued ability to operate is due in part to the tolerance of local municipalities, but becoming an increasing source of friction



among some locals. As of 2019 there were an estimated 570 coffee shops across the Netherlands; 29% of them located in Amsterdam. Unlike the Spanish model of private cannabis clubs (which require memberships), anyone is able to patronize the Dutch coffee shops, making the experience more attractive for foreign tourists.

### SPAIN

Spain has found success with the cannabis social club (CSC) model for cannabis distribution. CSCs are estimated to serve more than 4 million Spanish cannabis consumers annually, while attracting roughly 6 million canna-tourists annually. Under Spain's decriminalization model, the commercial production of cannabis remains prohibited; however, CSCs are allowed to cultivate cannabis on

behalf of their members and provide social spaces for consumption. There are approximately 500 CSCs across Spain, with the large majority located in Barcelona. The clubs manage the cultivation, processing, distribution, and sites for consumption of cannabis, operating much like other vertically integrated organizations, but with the addition of a social-use space. However, Spain has no formal federally-regulated program, and many CSCs have been operating outside of initial intentions set by autonomous jurisdictions (most by operating for-profit and/or permitting tourism participation), leading to a recent court decision that could significantly limit the near-term growth potential of CSC sales of cannabis in Spain over the next few years.

### CANNA-TOURISM

As the availability of cannabis continues to expand, new opportunities arise to capitalize on consumer demand as a tourist destination. Recent research has found that 29% of leisure travelers express interest in engaging in cannabis-related experiences or activities on vacation. In a survey of cannabis consumers, New Frontier Data found that 19% of U.S. cannabis consumers indicated that they acquire cannabis at their destination each time they travel; an additional 22% acquire cannabis on most trips. Nearly half (47%) of those consumers express interest in consuming cannabis as a means of socializing with other travelers. Prior to the COVID-19 pandemic, Amsterdam was receiving in excess of 1 million visitors each month. As such, there is demonstrable appetite, at least among current cannabis consumers, for incorporating cannabis-oriented experiences into their travel activity. How much appeal remains for nonconsumers, as well as residents of destination cities, remains to be seen.



**Recent research has found that 29% of leisure travelers express interest in engaging in cannabis-related experiences of activities on vacation.**



As noted above, the Netherlands (Amsterdam in particular) has become a popular destination for canna-tourists. However, the Dutch have become increasingly less tolerant of tourists specifically visiting to consume cannabis. Some municipalities have already begun to restrict access to coffee shops to Dutch nationals, and Amsterdam is considering restrictions as well. Driven in part by quality-of-life issues such as overcrowding, rowdy behavior from intoxicated tourists, and increased housing costs from short-term rentals (concerns echoed in Barcelona), the Dutch capital is looking to rein in the behavior of tourists. The mayor of Amsterdam has proposed banning tourists from coffee shops as well as shrinking the overall cannabis market and limiting the number of licensed stores.

Alternately, some legal markets are leaning into the potential of canna-tourism. Destination cities in the U.S. such as Denver and Las Vegas were quick to capitalize on legalized cannabis as an enhanced feature for visitors. Those cities are also lobbying for social consumption spaces, a provision already included in New York's proposed legislation, as a means of both economic stimulation and an additional tool to drive interest from potential canna-tourists. Similarly, Negril's Hedonism II resort is taking advantage of Jamaica's medical cannabis regulations with an on-site dispensary. Visitors can obtain a medical card from the resort's staff physician, or bring their own documentation, and consume their cannabis at designated areas within the resort. For those locations with legal cannabis, attracting tourist consumers not only supports jobs, but also generates tax revenue and functions as a value-add for multiple ancillary tourist segments. Local support for canna-tourism also helps attract

investment in the sector, with operators seeing both the opportunity for strong revenue and a regulatory environment that is stable and conducive to operating successful cannabis businesses.

As more legal markets come online, the competition to be a compelling canna-tourism destination will continue to be fierce. When consumers, particularly infrequent consumers, have greater access to cannabis in their own markets, the draw of traveling elsewhere specifically for cannabis is greatly diminished. As such, expanding access across markets may undercut canna-tourism over time as a unique proposition for those first-movers in the space.



## 4 Underreporting of Cannabis Use in Punitive, Conservative Markets

Cannabis use rates in illicit markets are underreported, particularly in places with harsh penalties for cannabis use or where cannabis use remains highly stigmatized.

Most population-level drug use prevalence rates are measured through self-reported surveys, with many of these studies being funded or implemented by governments, sometimes even through in-person interviews. Many respondents are understandably wary of disclosing any stigmatized or illicit behavior, with many consumers reporting less frequent consumption than in actuality, or a complete abstinence from use altogether.



**CASE STUDY: OKLAHOMA**

The U.S. state of Oklahoma offers an example of underreported cannabis use prevalence amid changing regulations. Oklahoma’s permissive medical cannabis market is structured as such that most adults who want to legally purchase cannabis can do so in a simple process of obtaining a doctor’s recommendation and registering with the state’s cannabis authority.

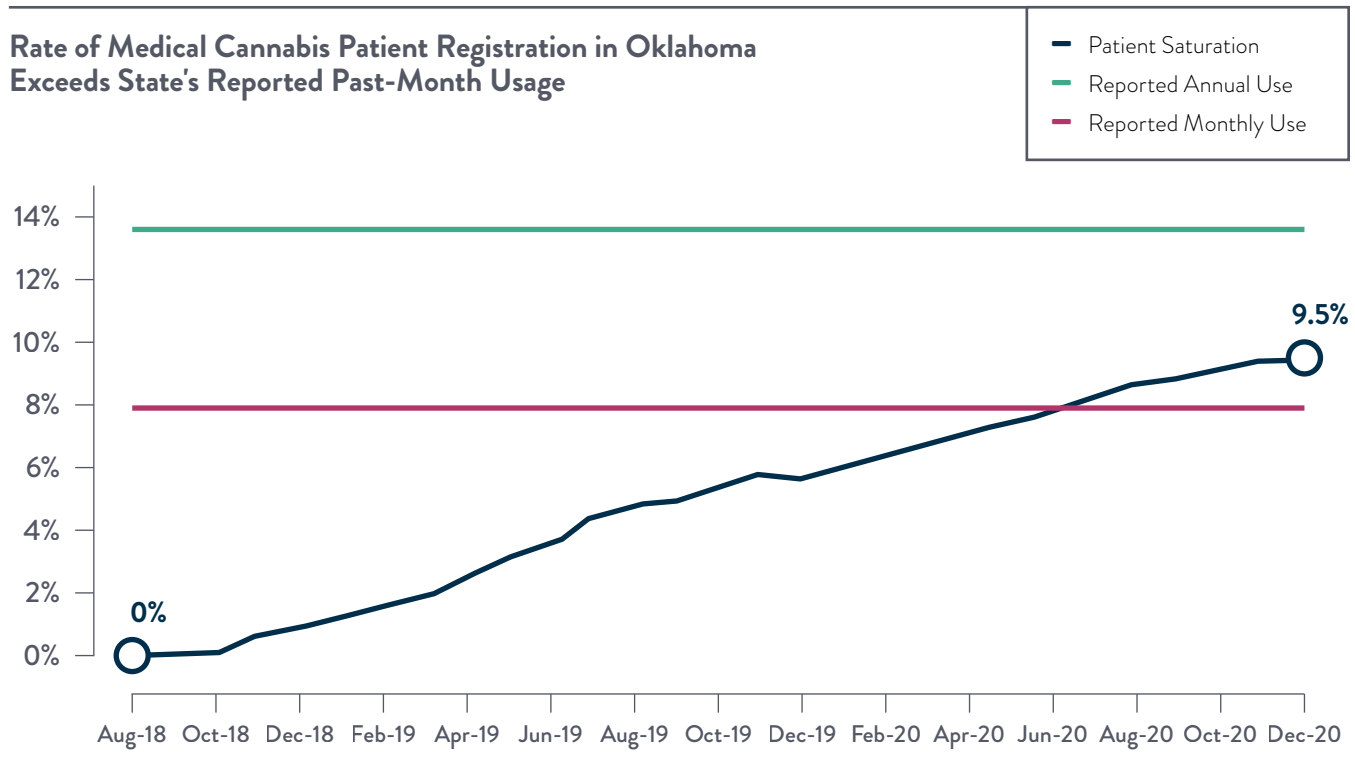
According to SAMHSA’s 2019 National Survey on Drug Use and Health, administered by the U.S. federal government, 7.8% of adults in Oklahoma used cannabis at least once a month, the 8th-lowest among 50 U.S. states. In the summer of 2020, the number of cannabis patients registered with the state medical cannabis regulator surpassed the supposed rate of monthly cannabis use, and con-

tinued to climb, reaching over 9% of all residents in December 2020, indicating that cannabis use — at least frequent use — is underreported on the national survey.

**IMPLICATIONS FOR THE GLOBAL MARKET**

In other regions where broad social stigma applies to drug users, and/or where cannabis crimes are harshly enforced, use rates measured by survey are likely undercounting actual use, similar to Oklahoma’s situation.

While actual rates of cannabis use in regions like Africa and Asia may indeed be lower than in other markets, given the regions’ sizeable populations and underreporting of cannabis use by simply 1% would represent a delta constituting tens of millions of consumers going uncounted in official estimates.



It is currently impossible to know the extent of undercounting due to survey respondents' self-censoring, and given such, New Frontier Data's estimates are presently conservative. As legalization and normalization of cannabis use expand globally, consumers will become gradually more comfortable in accurately reporting their behaviors, leading to more precise and complete consumer reporting.

## 5 Product Form Diversification

### EVOLVING CONSUMER TRENDS IN CANADA AND THE UNITED STATES

Most legal medical markets around the world have enacted strict regulatory frameworks for legal cannabis, which limit product forms and the variety available to patients and consumers. In the most mature consumer markets of Canada and in legal U.S. states, patients and consumers have access to a wide and growing variety of high-quality cannabis products in flower, concentrated, edible, or topical forms.

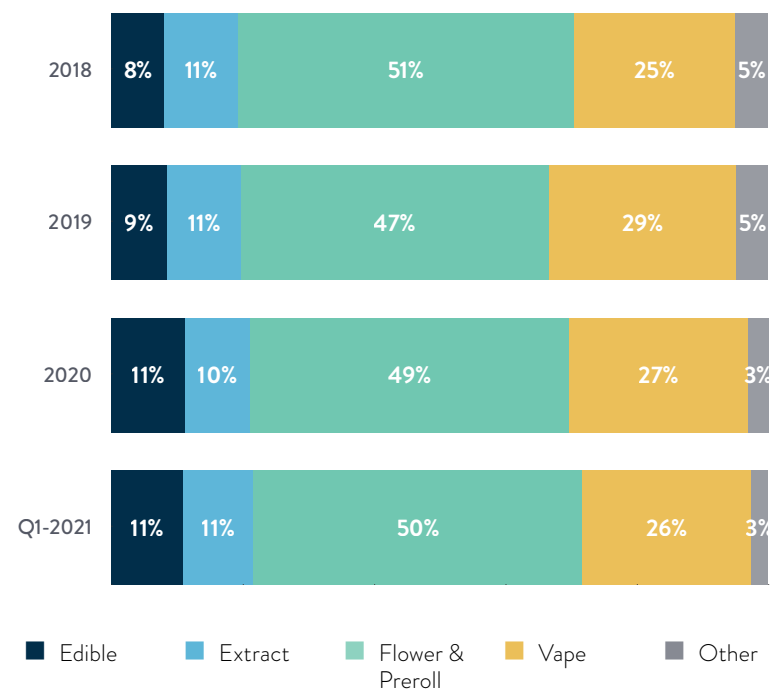
As cannabis legalization expands, investment capital is flowing into the industry, driving the creation of new product forms and formulations, and causing massive

expansion among the number of available product options in legal markets. In Washington State, over 4,300 ingestible cannabis products (i.e., edibles, beverages, tinctures, and capsules) have been approved, according to the Washington State Liquor and Cannabis Board.

With access to an increasingly diverse range of product forms and formulations, consumers develop more nuanced product preferences and use cases: 43% of current consumers who use more than one form of cannabis report switching forms to engage in different activities, 40% switch forms to create different moods, and 32% use different forms per different times of day.

Consumers' product form preferences have and will continue to diversify over time, especially in legal markets where they have

Share of Total U.S. Legal Cannabis Sales by Product Category  
2018 - Q1 2021

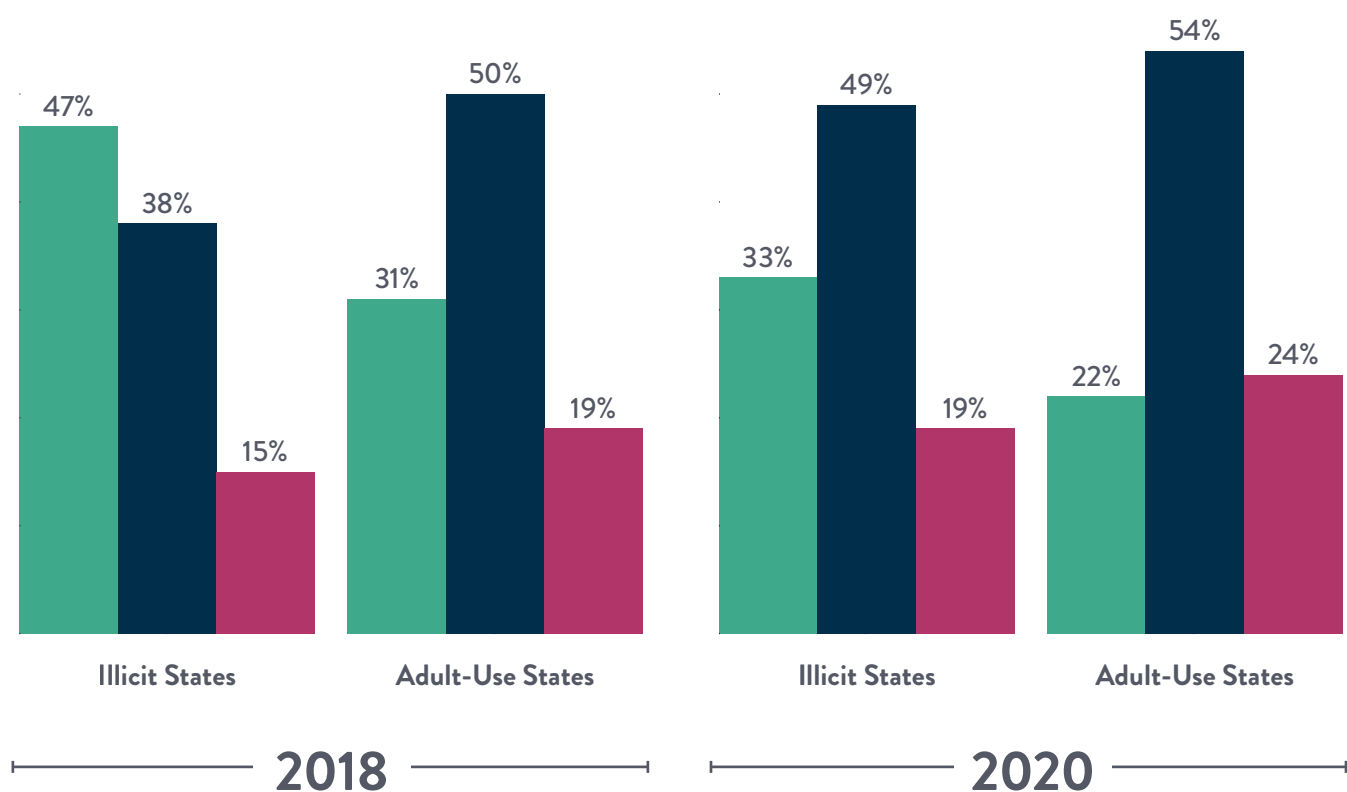
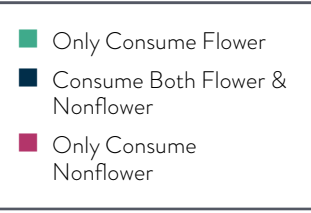


safe and easy access to new products. But even consumers in illicit markets are gaining familiarity with new product forms and formulations as local operators make unregulated products to mirror legal products, and as legal products are smuggled in from out of state. In the two years between New Frontier Data’s 2018 and 2020 U.S. consumer surveys, broad use patterns for product forms among consumers in illicit states in 2020 were nearly identical to those of consumers in adult-use states during 2018.

With consumers’ tastes and preferences evolving alongside new product development — even in markets which are not yet legal — the pace to reach mature product landscapes in newly and future legalized markets is expected to continually accelerate.

**U.S. Consumers Use of Flower & Nonflower Product Forms**

*By state regulations, 2018 & 2020*



# Key Takeaways

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**With consumers globally spending \$415 billion USD annually, cannabis already represents a market of global consequence.**

As spending approaches a half-trillion dollars worldwide — most of it spent in unregulated and unsophisticated markets — and countries around the world increasingly ease their long-standing prohibitions on cannabis to establish regulated markets, the transition of a significant proportion of that total spending into legal regulated channels will create a major new growth market in the coming years.



**That \$415 billion in current spending reflects the floor, not the ceiling, for cannabis' long-term market opportunity.**

Beyond the transition of spending from illicit to legal markets, there will be additional market growth as scientific research establishes new therapeutic applications for cannabis-derived compounds; innovation and commercialization introduce product forms to improve each the product quality, convenience, dosing, and consumer experience for customers; and advancements in industrial applications for cannabis biomass create new revenue

potential among non-ingestible applications for the plant. While much of the global demand would be traditionally classified as recreational, expansion and adoption of medical and industrial applications will expand the total market opportunity well beyond its current reach.



**With more than 268 million cannabis consumers globally, further social acceptance and normalization of cannabis use will unveil a massive consumer group with corresponding buying potential.**

As New Frontier Data's cannabis consumer research has shown, consumption and use spans the spectrum of demographic and socioeconomic strata. Far from being monolithic, cannabis consumers represent a highly diverse and richly varied cross section of society. The emergence of cannabis consumers as a stand-alone market segment, combined with a deepening understanding about where each consumer fits within the broader economy, will be key to building products, brands, and experiences aligned with the consequential but often misunderstood consumer group. The emergence of cannabis consumers from the shadows will not happen uniformly, but rather begin first in the world's most progres-



sive markets before slowly progressing within more restrictive markets. However, in a digitally connected age where information about cannabis can seamlessly slip across (most) borders, the advancement of legalization will elevate global awareness and discussion about cannabis even as access to legal markets remains limited to small subsets of the global consumer population.



**Globally, nearly one-third of nations have passed some form of legalization, but most programs are too restrictive to be considered operational high-THC markets.**

More than 70 countries have eased prohibitions on cannabis, but nearly all have done so for limited use of low-THC cannabis. Ten countries have legalized high-THC cannabis for adult-use, and another 26 have allowed high-THC cannabis for medical use. Outside of North America, most of those markets remain nascent, as they have faced slow regulatory rollouts and delays in industry operationalization. However, as capacity builds and consumer participation grows, they will form the vanguard of the slowly emerging global cannabis economy.



**Across legal country markets, sales of high-THC cannabis totaled nearly \$24 billion in 2020, with sales forecast to double to \$50 billion by 2025.**

Much of the growth in legal markets will be propelled by adult-use sales, which tend to occur in less restrictive markets seeing faster, more widespread

consumer adoption than in medical-only markets. Consequently, while most countries sooner activate medical markets (which tend to have higher barriers to entry and lower participation rates), adult-use legalization will play a more consequential role in the long-term growth of global legal revenues.



**North America will remain the global epicenter of legal cannabis for the foreseeable future.**

With Canada being the first G-20 nation to fully legalize and regulate cannabis, and most Americans now living within states where cannabis is legal for either medical or adult-use, North America will be the engine both for the industrialization and commercialization of cannabis, and in shaping the emerging consumer culture. Other countries — most notably Israel — will pursue outsized roles in advancing cannabis scientific and clinical research. Israel already has well-established and well-funded public and private research programs. However, the foundations of legal markets — from capitalization strategies and cultivation best practices, to new product innovation and social-use experiences — will largely stem from North America before subsequent adoption by other parts of the globe as new markets legalize.







**More than 4.4 million patients globally are registered in medical programs, with participation forecast to reach 7 million by 2025 despite limited physician education on medical cannabis treatment currently slowing program growth.**

There is a large and growing body of scientific research affirming wide-ranging therapeutic applications for cannabis, and ways through which cannabis compounds can interact to affect human physiology. However, globally speaking, few medical schools teach health-care practitioners how to integrate cannabis with patient care, slowing the rate at which doctors are introducing cannabis to their patients for treatment options. While growth in medical programs thus far has been driven by doctors proactively seeking education on cannabis, and by patients who have requested medical cannabis as treatment options, the diffusion of cannabis education among health-care practitioners will be a key catalyst for its legitimization and acceptance among treatment options, and a growth driver for patient participation in legal medical markets.



**Pain-related conditions collectively represent the biggest segment opportunity for medical cannabis use globally, as more than one-fifth of the global population suffers from pain-related conditions.**

According to the Global Health Index, nearly 1 billion of the world's population suffers from chronic or persistent pain. While there are over 70 medical conditions for which medical cannabis is being used

worldwide, a well-established body of research specifically focused on the efficacy of cannabis as an analgesic make it a natural vector by which to advance medical cannabis use. As U.S. state markets have shown, those jurisdictions which permit pain as a qualifying condition to participate in a medical cannabis program tend to see the highest participation rates (and the most robust program growth) relative to jurisdictions which exclude pain or otherwise much more narrowly define conditions for which patients might qualify. Ultimately, the most successful medical cannabis programs are those which give the physician full latitude to prescribe cannabis for any condition they believe might benefit from medical use, however few emerging medical markets permit such broad latitude in their programs. Therefore, it is the programs which include pain as a qualifying condition that are most likely to see the fastest growth and greatest participation, assuming other key elements are in place (e.g., physicians willing to prescribe cannabis, access to affordable products, low costs for program registration, etc.).



**While global cannabis trade remains limited, countries around the world are vying for early-mover advantages.**

While the medical applications of cannabis have been instrumental in driving legalization (especially in Europe, Oceania and Asia), economic potential within the industry has been a catalyst for adoption in developing countries across Latin America and Africa. Early movers (i.e., Colombia and Peru, Lesotho and Eswatini) have respectively advanced some progressive cannabis policies in part to secure positions as low-cost suppliers to the world. Featuring favorable climates for cultivation, low costs of labor,



and attractive investment incentives, those countries have fashioned their markets for expected global growth for medical cannabis, and the significant production cost advantages they can feature when compared to producers in Western markets. Furthermore, as countries deal with the economic fallout from the COVID-19 pandemic, the need to stimulate new economic growth will countervail resistance to legalization in historically conservative countries, leading primarily to medical-use legalization in some countries which have maintained the most punitive prohibition enforcement regimes.



**Rapid expansion of production capacity in export-focused markets will result in supply-chain asymmetry as import markets experience slower-than-expected growth.**

Europe represents the largest opportunity for legal medical cannabis markets; however, no European country has sufficient domestic production capacity to meet either current or expected future demand. Recognizing that production gap, Canadian, Latin American, and African cultivators have been scaling up production to supply those low-capacity markets. However, with more countries quickly ramping up production capacity, and the comparatively slower growth of medical cannabis program participation in Europe, there will likely be an acute inventory glut for the next few years until demand grows sufficiently to meet the burgeoning supply. Furthermore, the excess inventory

will likely lead to sharp price declines, eroding some of the anticipated future economic returns relative to current market prices, and ceding advantages to the lowest-cost, most-efficient operators, and those markets with the most cannabis-friendly regulatory environments.



**The emerging global cannabis economy is primed with opportunities, but complex regulations, immature supply chains, nascent consumer markets, and disruptive emerging trends will significantly increase risk and time to market over the coming years.**

Explosive growth seen in North American legal markets is a compelling indicator for growth potential internationally as more countries legalize cannabis. However, given the relative infancy of legal markets and how many foundational regulatory and supply-chain structures still need to be established, realizing the market's full potential will be a high-risk, resource-intensive, and time-consuming enterprise. Investors and entrepreneurs interested in capitalizing on it must prepare for a challenging path to profitability, but those who proceed with clear understanding of the markets in which they operate, adopt agile operational structures that can adapt to the evolving market, employ sufficient capital to weather longer-than-anticipated timelines for returns on investment, and adopt innovative strategies to differentiate themselves in an increasingly competitive market, will be best positioned for future success.



# Methodology

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There are 217 individual countries considered in this first-of-its kind analysis of the global market for high-THC cannabis. Due to the highly fragmented nature of regulated markets for cannabis and variable classifications of cannabis products, New Frontier Data has narrowed the focus of this global market sizing to include only markets for high-THC cannabis and cannabis products (>10mg/10% THC).

The market sizing included in this analysis is broken into two distinct parts:

- 1) Sales projections for regulated markets in countries that (at time of publication) have legalized access to high-THC cannabis for patients or adults.
- 2) An analysis of the value of the total annual cannabis demand based on consumer usage and spending by all consumers purchasing from all sources – legal and illicit – in all 217 countries.

The comparison of the legal market demand model against total global consumer demand is key to understanding the size of the existing illicit cannabis markets, the cannibalization of illicit markets by legal ones, and how varying regulatory frameworks for legalization can have drastic effects on the level of active patient and consumer participation in a given legal regulated market.

## Legal Market Sizing

Of the 217 countries considered in this global cannabis demand analysis, 70 have legalized the use of cannabis in some form, (though the large majority of countries have implemented either legalization measures too strict and/or industry regulations too burdensome to be considered as functional and operational for this analysis). To ensure that only currently viable markets were included in the analyses, New Frontier Data developed a quantitative legalization index to score each country according to legalization of the use and possession of cannabis, as well as ease of access to regulated high-THC products.

The New Frontier Data Legal Market Access Score (NFDLMAS) is a summation of both the Medical Market Access Score and the Adult-Use Market Access Score, which respectively score and rank countries based on legality and access to high-THC cannabis products whether for medical patients or adult-use consumers. Among the 70 countries having advanced some cannabis legislation, 30 (43%) meet the NFDLMAS requirement for legalized access to high-THC cannabis products.



## MEDICAL MARKETS:

Of the 70 countries having legalized cannabis use in some form, 26 countries (37%) meet New Frontier Data's Medical Market Access Threshold Score. All countries in this category have legalized the use of medical cannabis for patients, and provided some form of legal access to cannabis products with high levels of THC (>10mg/10% THC). Within those 26 countries, three do not currently have systems for regulated sales – i.e., Chile, France, and Mexico. In Chile, while there are thousands of operating clinics where patients can access cannabis, and home cultivation laws afford personal access, the clinics are neither regulated nor federally sanctioned, and there are no validated estimates either for the number of clinics in operation or their estimated revenues. In France, the current legal program for high-THC cannabis access is in a pilot stage, where patients are provided cannabis free of cost (i.e., without active market sales). In Mexico, though recent rulings have resulted in legalized cultivation for personal use, the government has not yet presented a framework for a regulated commercial market. Consequently, the medical cannabis market size and growth figures in this report include country-level estimates for 23 of the 26 countries currently allowing sales of legal high-THC cannabis products.

## ADULT-USE MARKETS:

Of the 70 countries having legalized cannabis use in some form, 10 (14%) meet New Frontier Data's Adult-Use Market Access Threshold Score. All countries in the category have legalized the use and possession of high-THC cannabis for adults. Within those 10 countries, four have decriminalized cannabis without having any framework for regulated distribution and sales. Mexico has yet either to determine a regulatory framework or confirm commercial sales, and South Africa and Georgia both currently rely largely on structures of home cultivation and the gray market. Spain has approached legalization through regional autonomy to allow private cannabis businesses (i.e., social clubs), which have been operating for years through legal loopholes and self-regulation outside of the originally intended guidelines. Recent court rulings in Spain (still under review) could undo the Spanish club model, casting new doubt on their long-term viability. The size and growth figures for legal regional and global adult-use cannabis markets in this report include country level estimates for six of the 10 countries currently allowing legal possession and use of high-THC cannabis for adults.

*The cannabis industry is one in which slight variations in the adopted regulatory framework can have a drastic impact on consumer access and legal participation. As much of the world has not yet legalized cannabis in any form, and the countries that have are in their infancy, the assumptions made for implementation timelines of new medical and adult-use markets considers only countries that have legalized high-THC cannabis as of the writing of this report.*

*As new data becomes available and regulatory policies guiding legalized markets become clearer, New Frontier Data will release individual country and regional specific reports that address the complex regulatory nuances of each market, and respective updated quantitative projections for market size and growth.*



The table below outlines the countries by legal tier. The analysis of global legal cannabis demand within this report will address legal market size growth projections for the country markets in gray.

	Population (in billions)	Percentage of World Population
<b>World Population</b>	7.73	100%
<b>Countries Where Cannabis is Legal in Some Form (70)</b>	1.98	26%
<b>Countries Meeting NFD Legal Score (30)</b>	1.13	15%
<b>Legal Tier 2 "Medical Use" (26)</b>	1.01	13%
<b>Legal Tier 1 "Adult-Use" (10)</b>	0.63	8%

*\*Note: Tier 1 and Tier 2 country counts may not sum to total universe count, as some countries with adult-use access do not have regulated high-THC medical cannabis sales, and vice versa.*

Region	Countries Included in Regional Analysis	Countries in Region with Some Form of Legalized Cannabis	Countries in Region Meeting NFD Legal Score Access Threshold	Countries in Region Meeting NFD Medical Use Score Access Threshold	Countries in Region Meeting NFD Adult-Use Score Access Threshold
Africa	54	8	1	0	1
Asia	44	6	1	1	0
Caribbean	23	7	3	3	0
Europe	54	32	15	13	3
Latin America	20	9	5	4	2
North America	3	2	2	2	2
Oceania	19	6	3	3	2
<b>Total</b>	<b>217</b>	<b>70</b>	<b>30</b>	<b>26</b>	<b>10</b>



Parts of this report quantify figures by region. The table below displays which individual countries were included as part of each regional rollup in this analysis.

Countries Included in Global Analysis by Legal Tier						
Africa	Asia	Caribbean	Europe	Latin America	North America	Oceania
South Africa	Israel	Jamaica	Netherlands	Uruguay	Canada	Guam
Ghana	Korea, Rep.	Puerto Rico	Georgia	Mexico	United States	Northern Mariana Islands
Lesotho	Lebanon	Virgin Islands (U.S.)	Spain	Chile*	Greenland	Australia
Malawi	Philippines	Bermuda	Czech Republic	Colombia		Micronesia/FSM
Rwanda	Sri Lanka	Barbados	Denmark	Peru		New Zealand
Uganda	Thailand	Cayman Islands	Finland	Argentina		Vanuatu
Zimbabwe	Afghanistan	St. Vincent & the Grenadines	France*	Brazil		American Samoa
Algeria	Bahrain	Antigua and Barbuda	Germany	Ecuador		Fiji
Angola	Bangladesh	Aruba	Italy	Paraguay		French Polynesia
Benin	Bhutan	Bahamas, The	Luxembourg	Belize		Kiribati
Botswana	Brunei Darussalam	British Virgin Islands	Malta	Bolivia		Marshall Islands
Burkina Faso	Cambodia	Cuba	Norway	Costa Rica		Nauru
Burundi	China	Curacao	Poland	El Salvador		New Caledonia
Cabo Verde	Hong Kong SAR, China	Dominica	Portugal	Guatemala		Palau
Cameroon	India	Dominican Republic	United Kingdom	Guyana		Papua New Guinea
Central African Republic	Indonesia	Grenada	Austria	Honduras		Samoa
Chad	Iran, Islamic Rep.	Haiti	Belgium	Nicaragua		Solomon Islands
Comoros	Iraq	Sint Maarten (Dutch part)	Channel Islands	Panama		Tonga
Congo, Dem. Rep.	Japan	St. Kitts and Nevis	Cyprus	Suriname		Tuvalu
Congo, Rep.	Jordan	St. Lucia	Estonia	Venezuela, RB		
Cote d'Ivoire	Korea, Dem. People's Rep.	St. Martin (French part)	Faroe Islands			
Djibouti	Kuwait	Trinidad and Tobago	Gibraltar			
Egypt, Arab Rep.	Kyrgyz Republic	Turks and Caicos Islands	Greece			
Equatorial Guinea	Lao PDR		Croatia			
Eritrea	Macao SAR, China		Ireland			
Eswatini	Malaysia		Lithuania			
Ethiopia	Maldives		Macedonia, FYR			
Gabon	Mongolia		Romania			
Gambia	Myanmar		San Marino			
Guinea	Nepal		Slovenia			
Guinea-Bissau	Oman		Switzerland			
Kenya	Pakistan		Turkey			
Liberia	Palestine		Albania			
Libya	Qatar		Andorra			
Madagascar	Saudi Arabia		Armenia			
Mali	Singapore		Azerbaijan			
Mauritania	Syrian Arab Republic		Belarus			
Mauritius	Tajikistan		Bosnia & Herzegovina			
Morocco	Syrian Arab Republic		Bulgaria			
Mozambique	Tajikistan		Hungary			
Namibia	Timor-Leste		Iceland			
Niger	Turkmenistan		Isle of Man			
Nigeria	United Arab Emirates		Kazakhstan			
Sao Tome and Principe	Uzbekistan		Kosovo			
Senegal	Vietnam		Latvia			
Seychelles	Yemen, Rep.		Liechtenstein			
Sierra Leone			Moldova			
Somalia			Monaco			
South Sudan			Montenegro			
Sudan			Russian Federation			
Tanzania			Serbia			
Togo			Slovak Republic			
Tunisia			Sweden			
Zambia						

-  **NFD Tier 1: Legal Adult-Use Market** (w/ regulated distribution)
-  **Tier 1.a: Legal/Decriminalized Adult-Use Market** (w/ grey or pseudo-regulated distribution)
-  **Tier 1.b: Legal/Decriminalized Adult-Use Market** (w/ no regulated distribution)
-  **NFD Tier 2: Legal Medical Only Market** (legal medical access to high-THC medical cannabis products)  
\*France & Chile do not have any regulated market sales.
-  **NFD Tier 3: Legal Medical Market** (Some restricted legalized access for patients to medical cannabis products across the lower-concentration THC concentration spectrum)  
\*Tier 3 medical markets are not included in the regional and global legal market estimates, since at time of publication they had no legalized access to high-THC products.
-  The remaining 146 countries are considered illicit-only markets – i.e., **NFD Legal Tier 4.**

## Total Demand Estimates

Proprietary usage rate and consumption rate modeling, along with demographic census data and price sampling, were used by New Frontier Data to develop the demand and consumption estimates for cannabis in the 217 countries across the seven selected regions of the world. The demand figures referred to as TAM or total available market, represent an estimate of total current demand for cannabis by consumers in all markets – both legal, regulated ones as well as illicit, combined, based on average prices and rates of consumption by annual consumers across all country markets.

The total demand analysis utilizes a total addressable market (TAM) approach to provide a foundation to quantify the size and potential opportunity that legal cannabis currently represents across the globe in terms of total current annual spending on cannabis in all markets (illicit and legal) combined.

## Illicit Market Demand

For both the countries in NFD Legal Tier 4 (countries where high-THC cannabis is yet to be legalized), or NFD Legal Tier 3 (where cannabis use has been legalized, but for highly restricted use and which lack regulated access to products), the estimates for the value of total cannabis demand equate to estimates for the illicit market in each country.

For countries which have legalized and provided regulated access to medical and/or adult-use cannabis

(NFD Legal Tier 1 and NFD Legal Tier 2), estimates for the value of total cannabis demand in each respective country equate to the combined value of legal and illicit demand.

The foundational modeling for the growth of legal market spending is built from ground up using country-level demand estimations, factors in the impact of variable regulatory structures, and demand elasticity in different markets.

## Usage Rates

Current cannabis usage rates (i.e., the reported percentage of adults in the population that consume cannabis) were estimated from various year rates sourced from the United Nations Office on Drugs and Crime (UNODC) and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). For the countries where usage data was unavailable, a regional average rate was applied based on the population-weighted average usage rate for the countries within the region for which usage rates were available.

## Consumer Types and Consumption Volumes

Considerations for varying types of consumers with different consumption habits were made in this analysis. Through the aggregation and analysis of consumption and sales data across various legal markets, New Frontier Data developed distinct consumers segments within the total number of cannabis consumers.



For the purpose of this analysis, the total number of cannabis consumers in each country has been refined into two consumer groups: heavy consumers and light consumers. Heavy consumers are considered individuals who have consumed cannabis within the last 30 days, while light consumers are those who consume cannabis less than once per month.

## Pricing

Price sampling was completed by the New Frontier Data International team, and price ranges and weightings were developed based on pricing data compiled from independent online sources including: UNODC, WeedIndex.io's Cannabis Price Index, PriceofWeed.com, and Havocscope. For countries where price data was not available, proxy values were applied based on regional averages, and adjusted using a relative-wealth ratio based on GDP per capita.

## Analysis Limitations

We recognize two potential areas of data limitations in the development of the global demand and legal market models:

### POTENTIAL LIMITATIONS IN REGIONAL CONSUMPTION USAGE ESTIMATES

Usage data from sources including UNODC and EMCDDA provide an anchoring input into the analyses in this report. The reliance on the UNODC data presented a number of challenges:

**Inconsistent data availability across countries:** While the UNODC remains the most comprehensive source for cannabis use rates globally, the data only spans 125 countries (57% of countries included in

NFD total global demand analysis). For countries where the data was not available, regional (continental) averages were adjusted and applied. The use of continental averages for countries with missing data could either over- or under-estimate the usage rates in those countries.

**Inconsistent data currency across countries:** Even for the countries where the data was available, the currency of data varied widely, with some countries having data as recent as 2019, while others having data as old as 2003. For the countries with older data, we applied a normalized growth function based on consumption growth trends observed in countries with similar legal and regulatory cannabis environments with available data. While this application of a standardized growth rate for historical data enables a uniform view of annual use rates (all countries have estimated usage rates for 2020 – 2025), regional socio-economic factors may be influencing evolution of consumption rates at higher or lower rates than those observed in the trend proxy group.

**Variability in multi-year data records:** The UNODC has used variable data collection practices over the past two decades resulting in some inconsistency in data trends within a limited number of countries which have multiple years of data. For example, in some countries, historically reported usage rates are multiples higher than those in more recent years. In other countries, historic usage rates were flat for many years before experiencing sudden spikes. Some of this variability has been due to UNODC changing data sources between years, as well as a reliance on survey reporting - which relies on consumers to self-report use and is thus more susceptible to large swings due to changes in political





regimes and legal status, regardless of an actual change in usage of cannabis by the underlying population. In markets with the most consistent and robust data collection protocols, cannabis usage rates generally increase gradually and linearly over time, tapering at varying ceiling levels dictated by legal policy and social acceptance. As such, there may be instability in extrapolating data from the countries with anomalous trend patterns, but we lack the data to modulate the trends in the data provided by the agency.

### POTENTIAL LIMITATIONS IN COUNTRY-LEVEL PRICING DATA

Cannabis pricing data from a number of different sources, ranging from UNODC, EMCDDA, to public-sourced consumer price data repositories (including Havoscope and ThePriceofWeed.com) are a second category of key inputs into this model. While the volume of self-reported consumer data on these platforms has grown significantly, a key factor is price centralization, and two issues that impact the potential reliability of reported price data are:

**Pricing data gaps and inconsistencies across country market sources:** Pricing data is available from at least one source for 144 countries (92% of the world population). For the countries where no data was available, regional averages were applied, with an adjustment rate for the relative GDP per capita.

**Potential price variability in pricing for locals vs. tourists:** In countries with low GDP per capita but high tourism rates (e.g., countries in North Africa), some cannabis pricing data from the crowd-sourced inputs may be reported by tourists who are paying

significantly higher prices than what is paid by the much larger local population. As such, prices for some markets may potentially see inflation by the delta between what is paid by the small proportion of tourists relative to the lower prices paid by residents, who may be less likely to report to these platforms.

### Managing limitations in future analysis iterations:

Efforts to mitigate these limitations in future studies will include:

- 1) Triangulating usage rates with international and national data sources. In addition to the UNODC and global bodies we have expanded on-ground research capabilities to identify reliable country-level data sources, which can be used to more effectively estimate local usage rates.
- 2) Using proprietary data to estimate consumption rates and pricing: For countries which lack either consumption data or average spending data, New Frontier Data has plans to deploy proprietary consumer surveys to estimate usage and spending patterns across the globe, focusing in the markets moving most quickly toward legalization and usage liberalization.
- 3) Refining modeling to account for sub-regional variability: As new data becomes available, country and regional forecasts will be further refined to allow for stratification of countries into more accurate low, medium, or high consumption rates and spending error ranges based on emerging socio-economic, demographic, and cultural factors.





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