

ARCVIEW MARKET RESEARCH & BDS ANALYTICS

The State of Legal Marijuana Markets

6TH EDITION

2019
UPDATE

The State of Legal Marijuana Markets

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**Worldwide spending is now
forecast to grow
39.1% to \$17 Billion in 2019**

Letter from the Editor

Legal cannabis continued its winning streak at the ballot box in 2018, but the industry is finding such victories can sometimes be hollow, or at least an opportunity to learn patience.

Occasionally the will of voters has faced outright defiance, such as that of Gov. Paul LePage, who lost the fight against Maine's Question 1 at the ballot box in 2016, then vetoed two bills that would have opened up retail sales to all adults in the state. More often legal cannabis launches have faced expensive regulatory regimes, such as that in California that handicapped the legal business with a 77% price disadvantage against a robust illicit market.

Historically, states moving from medical-use to adult-use legalization have seen stratospheric growth—Colorado spending on legal cannabis more than doubled from \$333 million to \$681 million when all adults were allowed into stores starting in January 2014; by 2017, sales were \$1.5 billion.

Of the four states that voted to go adult-legal in November 2016, Maine remains medical-only, Massachusetts took until Nov. 20, 2018, to get stores open, and California is on track to be the first state to actually shrink legal spending (from \$3 billion to \$2.5 billion) in its first year of adult-use legality. Only Nevada put reasonable regulations in place quickly, opened stores apace in July 2017, and is now seeing a shrinking illicit market and the jobs, tax revenue and economic benefits that flow from legal spending growing from \$117 million in 2016 to an estimated \$580 million in 2018.

But the highest profile experiment in rational regulation came to fruition October 17 in Canada with the launch of regulated, legal sales of cannabis to all adults 18 and older (19 in some provinces). In anticipation, the market capitalization of the five largest publicly traded Licensed Producers (LPs) there soared to nearly \$20 billion by Dec. 26, 2018.

Glimmers of reasonableness on cannabis-related matters even emerged from Washington, DC, in 2018 with the Food and Drug Administration's (FDA) approval of Epidiolex, the legal-hemp provisions of the latest farm bill and the post-election departure from the scene of Jeff and Pete Sessions.

So, despite the hiccups chronicled in this "2019 Update to The State of Legal Marijuana Markets, 6th Edition," and the downward revision of the Arcview Market Research forecast model therein, there's every reason to remain bullish about the future of the legal cannabis business. The science, product development and consumer marketing of a consumable that humans have enjoyed for at least 8,000 years is just beginning. There's enormous potential in all of that.



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METHODOLOGY

The foundation of GreenEdge™ data is BDS Analytics' panel of participating dispensaries that contribute daily point-of-sales data. Dispensary panels are recruited to be both statistically significant as well as representative of the makeup of dispensaries in the market. Panel recruitment is ongoing, and, whenever possible, new participating dispensaries provide historic sales data that is incorporated into the data of record. As the underlying sample increases over time, historic data also undergoes changes that could impact category mix, brand/product share and average retail prices.



The Ups & Downs of Legalization

Since the June 2018 publication of “The State of Legal Marijuana Markets, 6th Edition,” the industry has been whipsawed by developments, with conflicting implications for its future.

On the upside, Canada became the second country and by far the largest (Uruguay went first in 2014) to legalize cannabis possession and commercial activity. Although the October 17 launch came three months later than planned, total spending in Canada more than doubled from a medical-only figure of \$569 million in 2017 to an estimated \$1.2 billion in 2018.

On the downside, California became the first market in the world to transition from medical use to adult use and see the size of its legal market shrink. That remarkable development only became clear as BDS Analytics’ GreenEdge point-of-sale tracking of third-quarter data from dispensaries came in. Total spending is expected to drop from \$3 billion in 2017 to \$2.5 billion in 2018.

The Canadian delay and the California shortfall mean that while the world-

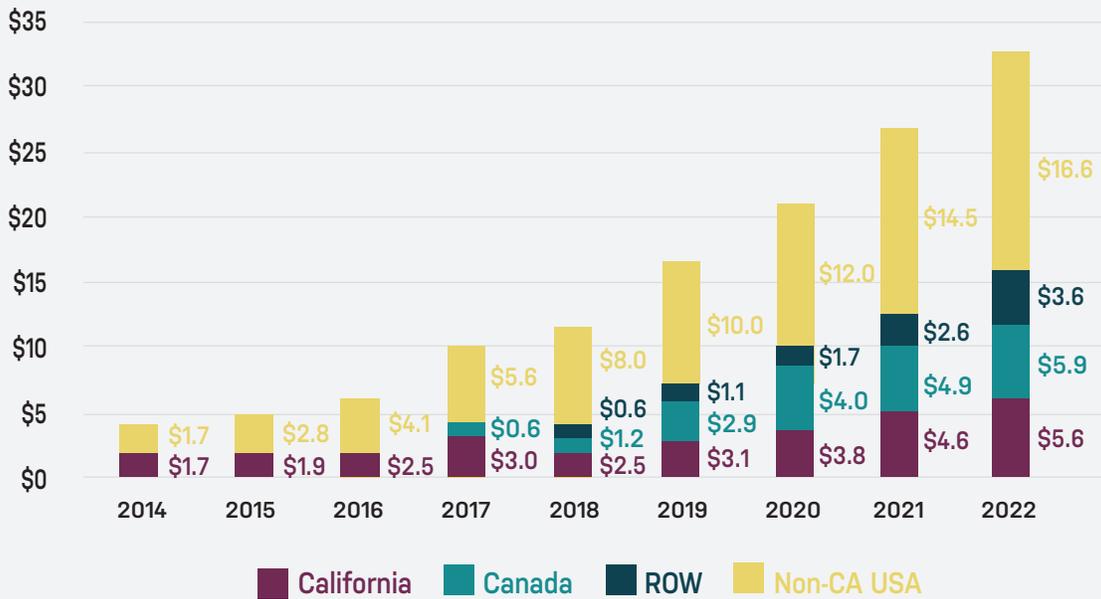
wide market for legal cannabis posted very robust 28.2% growth to \$12.2 billion, it missed the \$12.9-billion forecast for 2018 published in “The State of Legal Marijuana Markets 6th Edition” in June.

Nevertheless, with Massachusetts finally launching adult-use sales in the fourth quarter and Nevada dramatically outperforming expectations, the pieces are in place for a reacceleration of growth in 2019. Worldwide spending is now forecast to grow 39.1% to \$17 billion in 2019 and beyond that will reach \$31.6 billion in 2022, averaging a 26% compound annual growth rate (CAGR) during the five-year period from 2017 to 2022.

Total California spending is expected to drop from \$3 billion in 2017 to \$2.5 billion in 2018



Worldwide Spending by Market (In Billions)



Source: Arcview Market Research/BDS Analytics

That’s slightly short of the \$32-billion forecast published in the June report, but the basic story line behind an explosion of investment in the industry in 2018 remains intact: A plant that humans have been happily consuming for millennia is becoming legal around the world, creating one of the most impressive industry growth phenomena in history.

The Consumer Market

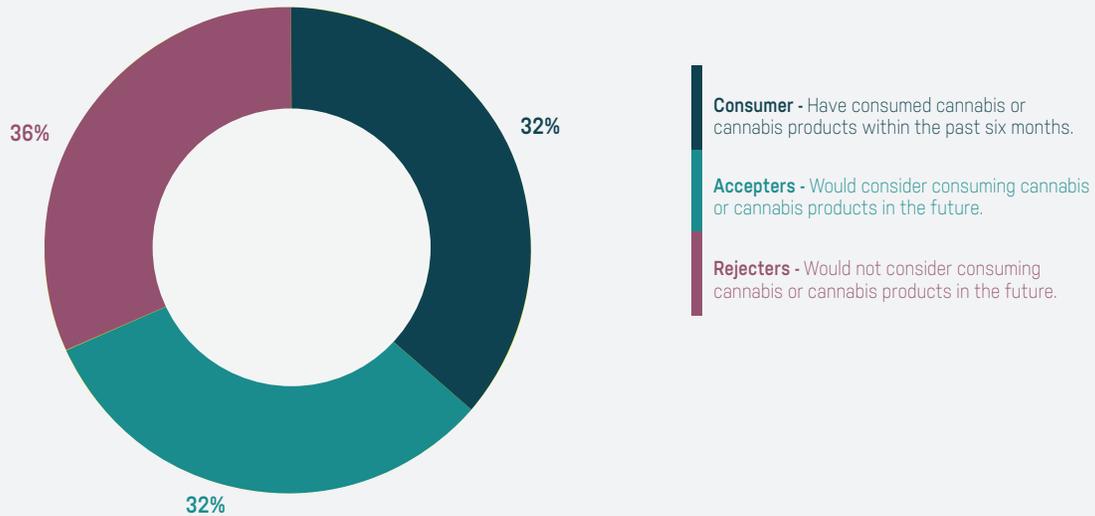
Of that total worldwide spending, the two biggest single markets by far will be Canada and California. Each have populations in the 38- to 40-million range, double-digit monthly cannabis consumption percentage rates among adults, and well-developed legal infrastructures from the medical-only era. Both are seeing massive investment as the adult-use era dawns.

Although their combined share of the worldwide market dropped from 49.1% in 2014 to 29.9% in 2018, it is forecast that Canada and California’s combined share will rebound to 36.3% by 2022. Both have opened up dispensary doors to all adults, while elsewhere cannabis legalization, as it comes to the other biggest population centers in the world, is likely to remain medical-only through 2022.

As noted in “The State of Legal Marijuana Markets 6th Edition” adult-use legalization creates an opportunity for a 10-fold increase in the number of potential customers a legal cannabis market can address. For example, the US had 1.9 million medical patients in 2017 but 21 million monthly cannabis consumers overall.



Cannabis Consumption in Fully Legal US Markets



Source: BDS Analytics Consumer Insights

According to the latest round of consumer research from BDS Analytics, the number of cannabis consumers in the US and Canada is growing. In Q3 2018, in adult use and/or medically legal states, 25% of adults consumed cannabis or cannabis products within the past six months, an increase from 23% in Q1 2018. In Canada, the percentage of consumers increased from 21% in Q1 2018 to 25% in Q3 2018.

In Level 1 US states where adult recreational consumption is approved and available, 32% of adults are Consumers. Plus, a sizeable proportion of non-consumers have prior experience with cannabis or cannabis products. In Q3 2018, 61% of Accepters and 34% of Rejecters indicated they had

tried cannabis or cannabis products in the past but do not currently consume.

The growth in the number of consumers coincides with a dramatic expansion in the types of cannabis products available in legal states. Consumer preferences have shifted to the point that sales of

25% of adults consumed cannabis or cannabis products within the past six months



the traditional flower product category have seen years of declining share in BDS Analytics' GreenEdge tracking; the category was overtaken by concentrates in November 2018 California sales, a first in any tracked market.

Legalization: State, Federal and International

In the US, legalization continued to advance substantially at the state level in 2018. With over \$12 billion being spent legally on cannabis around the world, governments everywhere are looking at capturing the potential tax revenue. Evidence is mounting that medical-use legalization benefits many, and it's becoming undeniable that adult-use legalization has spread to multiple states with little or no downside.

On Nov. 6, 2018, voters in three states approved major cannabis initiatives: Michigan legalized adult-use cannabis, and Missouri and Utah legalized medical cannabis. Additionally, in June 2018, voters in Oklahoma legalized medical cannabis, and then saw the state move with rare alacrity to put a program in place. Only North Dakota voted no on cannabis in 2018, rejecting an adult-use initiative and remaining a medical-only state for now.

But with 28 US states now medical-legal and seven, plus Washington, D.C., having adult-use laws, the growth of the legal cannabis industry is now more tied to expansion of existing markets than to opening up new ones.

Major public companies and investment firms remain sidelined by federal prohibition, but 2018 saw many developments that suggest 2019 may be the year Washington gets out of their way. The implications of the most recent moves in Washington are analyzed in "Key Events of 2018," in this "2019 Update to the State of Legal Marijuana Markets."

The key state-level developments affecting forecasts of cannabis' future are analyzed in "US State Markets," also in this publication. Key states analyzed in detail include California, Colorado, Nevada, Massachusetts, New York, New Jersey and North Dakota.

Legalization continued to forge ahead

**Voters in Oklahoma
legalized medical cannabis,
and then saw the state move
with rare alacrity to put a
program in place**



in 2018 in international markets as well. While Canada's full adult-use legalization was the headline event of the year, several key international markets either significantly broadened their existing programs or started new medical programs, developments analyzed "International Markets," also in this publication. Among the key country-level moves analyzed: Mexico and the UK expanded both patient and product access; South Korea became the first Southeast Asian country to legalize cannabis for medical purposes, and Thailand followed suit shortly afterward.

The Capital Markets

Despite the obvious opportunities created by the legalization of cannabis, continuing prohibition at the federal level in the US has traditionally limited the capital available to industry companies. Canada, by instituting full adult-use legalization, changed all that in 2018.

In this modern Gold Rush, prospectors are flowing across the border in both directions. The Canadian licensed-producer (LP) move from the over-the-counter market to US exchanges culminated with Tilray's first US IPO of a Canadian cannabis

company in July. As the new year approached, five of the LPs had \$1-billion-plus market caps totaling nearly \$20 billion among them.

That move south was made possible by the fact that US exchanges are open to foreign companies so long as they are not violating either US laws or those of their own countries, which Canadian LPs are not.

The Canadian Securities Exchange is more accommodating, prompted by its status as the third largest exchange north of the border. Although multi-state cannabis operators are in violation of US law, the CSE welcomed their listings, and five of them are now valued at a combined \$2.3 billion (\$3.1 billion Canadian) there. It's a harbinger of a world to come in which cannabis and capital flow across international borders with ease (see graph).

South Korea became the first Southeast Asian country to legalize cannabis for medical purposes



Canadian Licensed Producers on US Exchanges (In Billions)

COMPANY	12/26/2018 CAPITALIZATION
Canopy Growth Corp	\$6.3
Tilray	\$5.5
Aurora Cannabis	\$4.9
Cronos	\$1.8
Aphria	\$1.5
Total (In Billions of US Dollars)	\$20.0

American Multi-State Operators on Canadian Securities Exchange (In Billions)

COMPANY	12/24/2018 CAPITALIZATION
Curaleaf Holdings	\$2.0
MedMen Enterprises	\$0.3
Green Thumb Industries	\$0.3
Acreage Holdings	\$0.4
Cresco	\$0.2
Total (In Billions of Canadian Dollars)	\$3.1

Source: BDS Analytics

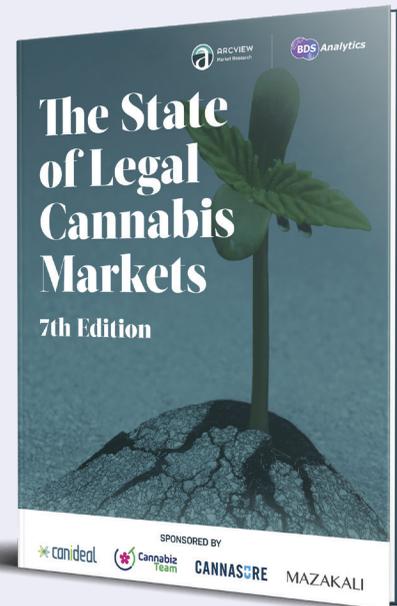


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Adult Sales Surpass Medical for the First Time

It will be years before it's known for sure which was the most significant event of 2018 for the legal cannabis industry:

1. Canada making legal sales available to all adults on October 17.
2. Approval by the FDA of Epidiolex, the first cannabis-derived pharmaceutical drug, on September 27.
3. The legalization of hemp by the farm bill President Trump signed December 20.

In the near term, Canada's new program will be an important revenue driver for a worldwide legal cannabis business that posted an estimated \$12.2 billion in revenue in 2018. The doubling of Canada's market from a medical-only 2017 figure of \$569 million to an estimated \$1.2 billion in 2018 helped make the adult-use component of worldwide legal cannabis spending larger than the medical market for the first time (\$6.5 billion versus \$5.7 billion).

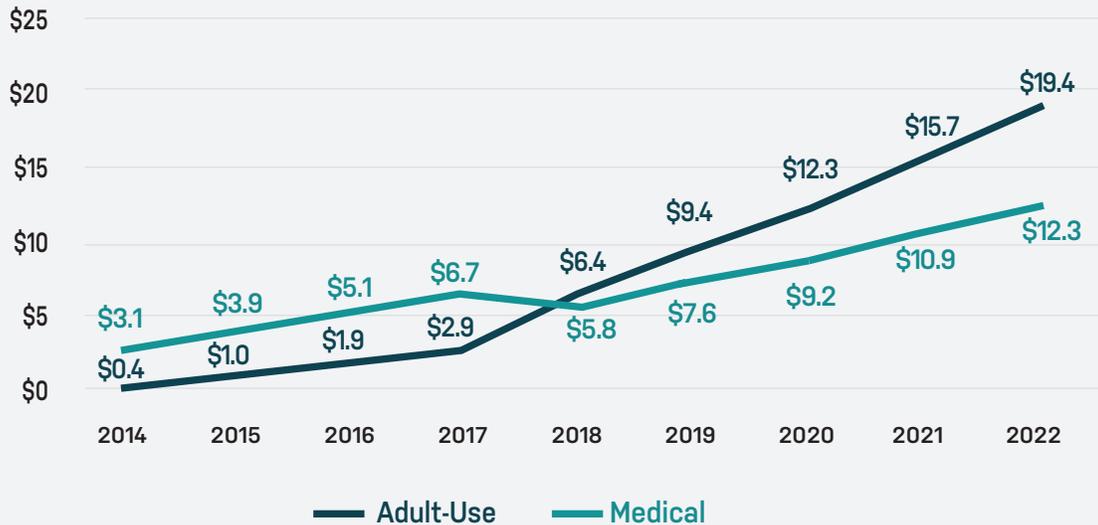
New states and countries are legalizing medical cannabis on nearly a monthly basis these days. But in part because of Canada becoming the first major economy to move beyond medical-use restrictions, adult-use spending will continue to outpace medical, growing to become 62% of a \$31.6 billion overall legal market in 2022.

At the same time, the FDA's Epidiolex decision changes the medical side of the business dramatically, which may have broader implications around the world in the decade ahead than Canada's move to adult-use legalization.

Adult-use spending will continue to outpace medical, growing to become 62% of a \$31.6 billion overall legal market in 2022



Worldwide Legal Cannabis Spending Adult-Use vs. Medical (In Billions)



Source: Arcview Market Research/BDS Analytics

That's because most governments have only recently started thinking about cannabis legalization, mostly in terms of cannabinoids as medicine. The US federal government has been the driving force behind worldwide prohibition for 80 years. The Epidiolex decision represents Washington, DC, admitting that at least one cannabinoid—cannabidiol (CBD)—is both efficacious for treating a serious illness and safe for the children who suffer from it. That will inevitably encourage more and better scientific study of the health effects of all cannabinoids. If the science supports the copious anecdotal evidence of benefits built up over 20 years of medical programs in the US, the Epidiolex decision will look in retrospect like the watershed moment when cannabis moved from the dispensary to the pharmacy.

In the long-run, however, the legalization of hemp may have the most far reaching implications of the events of 2018. By itself, legalizing the growing of cannabis

sativa with less than 0.3% THC is a modest move; the same FDA that approved Epidiolex for distribution through pharmacies rushed out a statement after the farm bill passed, serving notice that it views hemp-derived CBD as a drug and that companies will need its approval to sell CBD-containing products.

But the historic uses of the cannabis sativa plant are many, not just in medicine and recreation, but as a raw material in markets ranging from food, paper and textiles to packaging and fuel. Those are sectors of the \$80-trillion world economy that dwarf the recreational and medical segments of the legal cannabis industry, and always will. Applications in those areas will take decades to develop now that cultivating hemp is legal in the US—as well as in many other countries where it already was.

But there's no need to look decades ahead to see the importance of other major cannabis events of 2018.



Legalization Marches On

Full legalization of the right of adults to grow, transact and consume cannabis took on an air of inevitability in 2018 with changes in the law in California on January 1 and Canada on October 17. Those are now the No. 1 and No. 3 legal cannabis markets in the world (\$2.5 billion and \$1.2 billion, respectively), but with Colorado's market seeming in 2018 to mature in the \$1.6-billion range, the world's No. 5 and No. 11 economies (treating California as a country) will be the two largest cannabis markets for years to come.

Regulators in both markets, however, have laid a number of obstacles across the path of licensed operators that will limit legal growth and keep the illicit market operational. Most importantly, California is following the federal definition of what constitutes an adult, set when Washington threatened to withhold highway funds from any state that didn't raise the drinking age to 21 in the 1980s. It also allowed local jurisdictions to block licensing of cannabis companies, and outside the major population centers most have done so.

Canadian provinces have set the legal age at either 18 or 19. But there are severe restrictions at the federal level on sale and marketing of edibles and concentrates,

and a hodgepodge of provincial limitations on private enterprise and licensing.

Regulations driven by decades of government treating cannabis as one of the most dangerous of drugs are par for the course in these early days of legalization. Even so, market opportunity beckons across the map (see detailed by-state analysis in this publication's "US States Markets:").

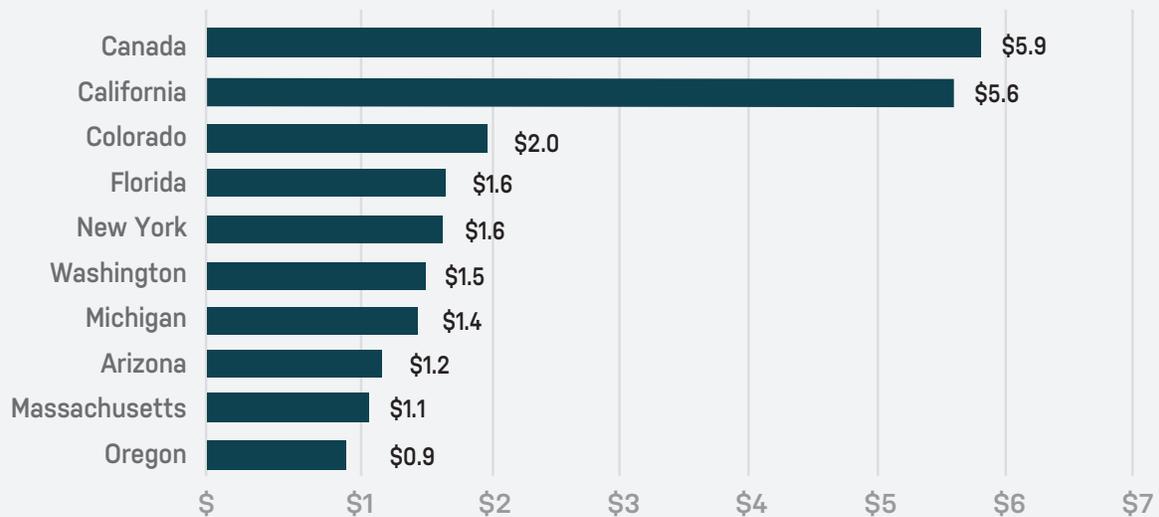
California

After a launch year with total licensed sales falling far short of expectations, California's latest round of regulations taking affect in the new year may improve a very challenging situation for legal operators. For example, the proposed final regulations would allow for non-storefront retailers to deliver to any jurisdiction within the state. That could both compensate in the short term for the fact that, by Dec. 19, 2018, cities and counties had only licensed 521 retailers, but also provide incentive to local jurisdictions to capture tax revenues by licensing local operators.

Canadian provinces have set the legal age at either 18 or 19



Top 10 Cannabis Markets — 2022 Forecast (In Billions)



Source: Arcview Market Research/BDS Analytics

Nevada

Of all of the “Class of 2016” states that legalized adult-use, Nevada has moved most expeditiously to implement the voter decision. The state is on track to see 2018 adult-use sales of more than \$476 million and medical sales of almost \$104 million. Patient counts dropped rapidly following the launch of adult-use sales but appear to have stabilized over the last few months in the 17,000 range.

Massachusetts

Adult-use sales, approved in the November 2016 election, finally started on Nov. 20, 2018. Even with only two retail stores open, sales soared to over \$7 million in the first three operational weeks. The state’s medical market is still significant and experienced strong growth as the state awaited launch of adult-use sales.

New York

The state’s medical cannabis program continued to grow despite being tightly restricted on many fronts. In July 2018, the Department of Health added opioid use to the list of qualifying conditions, and patient counts are soaring as a result: by mid-December, 84,971 patients were registered, up from 50,483 in mid-April. Longtime legalization opponent Gov. Andrew Cuomo announced in December that his administration would act on a July report from the state’s Health Department that recommended full adult-use legalization.

New Jersey

Though blocked by the legislature from pursuing adult-use legalization, New Jersey Gov. Phil Murphy has expanded the state’s medical program, adding



more qualifying conditions and increasing the number of dispensaries allowed from six to 12.

Additionally, late in 2018, the legislature advanced a sweeping adult-use legalization bill that would allow home delivery, smoking lounges and up to 400 dispensaries.

New Mexico

A ruling by a state District Court judge found a rule limiting dispensaries to a plant count of 450 to be arbitrary and capricious, opening up the opportunity for existing dispensaries to expand operations. Democrat Michelle Lujan Grisham will replace Republican Gov. Susana Martinez, who had repeatedly blocked attempts to add more qualifying conditions to the state's medical cannabis program. A broader list of conditions could allow for significant growth in patient counts, which already represent 3.5% of the population, a relatively high percentage.

North Dakota

Even before voters rejected an adult-use ballot measure, the state's medical program was delayed past its expected 2018 launch date. But the pieces are all finally in place for the state to have a functioning medical market by mid-2019, almost three years after medical use was approved in the 2016 election. All eight allowed dispensaries are expected to be open by July.

Washington, D.C.

The industry's major practical problems—the 280e tax rule and limited access to banking services—

would be lifted by the STATES Act (Strengthening the Tenth Amendment Through Entrusting States) introduced June 7, 2018. It failed to advance in an election year, but the industry's disappointment was tempered by the results of that election: House Rules Committee Chairman Pete Sessions was denied re-election, and Democrats took control of the House of Representatives. New Chairman Jim McGovern (D-MA) announced, "Unlike my predecessor, I'm not going to block amendments for marijuana."

It's unclear whether newly nominated Attorney General William Barr would be better on cannabis than Jeff Sessions, who was forced to resign November 7. Sessions sent a chill through the industry in January when he withdrew the Cole Memo, guidance to US attorneys around the country to grant forbearance from federal law to cannabis operators in states that had legalized. That move turned out to have little impact.

International Markets

Incremental progress in 2018 also came around the planet, from the UK and Lesotho to South Korea and Thailand. Few other countries appear poised to move beyond very limited medical access in the near term but the sheer number of countries moving to allow medical cannabis likely makes our forecast of \$4.4 billion in non-US medical spending in 2022 conservative. Updated forecasts for countries covered in "The State of Legal Marijuana Markets, 6th Edition," can be found in Chapter 4 of this 2019 update. Forecasts for newly legal countries will be provided in "The State of Legal Marijuana Markets, 7th Edition," later this year.



Even Washington Liberalized Cannabis Law in 2018

The coincidence in 2018 of the FDA approving Epidiolex for the treatment of childhood epilepsy and the latest farm bill legalizing the cultivation of hemp took the wraps off the legal cannabis dispensaries' best-known secret: CBD, the active ingredient in some of the most popular products for tension, pain and anxiety relief.

But the window of legalization opened in Washington, DC, in 2018 remains narrow for now. The distinction in the law between “cannabis” and “hemp” is artificial: The hemp now cleared for cultivation in the US is the same cannabis sativa plant that produces what is sold as “cannabis”, some strains of which are more than 25% psychoactive THC. The new farm bill simply enshrines in US law that hemp is now defined as having no more than 0.3% THC.

Furthermore, the FDA's approval of Epidiolex was followed by the Drug Enforcement Administration's (DEA) rescheduling only specifically FDA-approved CBD formulations out of the Controlled Substances Act's Schedule 1 category. That leaves the hundreds of non-FDA-approved CBD-containing products on the market federally illegal.

Similarly, the FDA followed up the signing of the farm bill legalizing hemp by insisting that CBD is a drug ingredient and thus illegal to add to consumables without the agency's approval.

Still, the two decisions out of Washington, DC, remove barriers to further scientific studies of the cannabis sativa plant. Given the evidence already in hand from millennia of human usage and the rigorous studies already conducted in the face of federal prohibition, the lifting of strictures on the cultivation and consumption of any kind of cannabinoids represents a turning point for cannabis.

The FDA followed up the signing of the farm bill legalizing hemp by insisting that CBD is a drug ingredient and thus illegal to add to consumables without the agency's approval



Canadian Companies on US Exchanges

COMPANY	TICKER-EXCHANGE	US EXCHANGE TRADING BEGINS	FIRST DAY CLOSE PRICE/SHARE	12/26/18 CLOSE	% CHANGE FIRST DAY TO 12/26/18	SHARES OUT 12/26/18	12/26/2018 CAPITALIZATION (IN BILLIONS)
Canopy Growth Corp	CGC-NYSE	5/24/18	\$30.21	\$27.36	-9%	232.1	\$6.3
Tilray	TLRY-NASD	7/19/18	\$22.39	\$71.50	219%	76.5	\$5.5
Aurora Cannabis	ACB-NYSE	10/23/18	\$7.70	\$5.08	-34%	965.1	\$4.9
Cronos	CRON-NASD	2/27/18	\$7.62	\$10.18	34%	178.7	\$1.8
Aphria	APHA-NYSE	11/2/18	\$12.00	\$5.82	-52%	249.8	\$1.5
Total							\$20.0

Source: BDS Analytics

Cannabis Investment: Public Markets Open Wide

Worldwide cannabis investment opportunities continued to open up through 2018 and not just in the private equity market that was the only source of funding for years. Constellation Brands' October 2017 purchase of 9.9% of Canadian licensed producer Canopy Growth opened the eyes of public stock investors who, in 2018, avidly supported a broad-based move by cannabis companies to tap the public markets.

Historic precedent was set as North American companies crossed the US/Canada border in both directions to begin public trading. Disqualified from listing on the US exchanges and the Toronto Stock Exchange (TSX), US cannabis companies operating in multiple states (MSOs) found a home with the welcoming Canadian Securities Exchange (CSE). Meanwhile Canada's domestic LPs capitalized on interest from large multinationals to do what their

neighbors to the south couldn't—begin trading on the NASDAQ and NYSE.

With operations that, as of now, do not take place in the US, large Canadian cannabis companies are breaking no US laws and therefore enjoy the option—unavailable to American companies—of trading on the large US stock exchanges. Near year's end, there were five LPs valued above \$1 billion—combined they are worth nearly \$20 billion.

Massachusetts-based Curaleaf Holdings Inc. joined the CSE on Nov. 1, 2018. The company holds licenses in nine states and has pending applications in two more. The company operates 33 dispensaries, 12 cultivation sites and 10 processing sites, focusing on high-density, limited license states such as New Jersey and New York.

Currently operating 16 high-end stores across California, Florida, Arizona, New York and Nevada, MedMen listed on the CSE on May 29, 2018. Chicago's Green Thumb Industries currently runs nine



American Multi-State Operators on Canadian Securities Exchange

COMPANY	TICKER-EXCHANGE	CSE TRADING BEGINS	FIRST DAY CLOSE PRICE/SHARE	12/24/18 CLOSE	% CHANGE FIRST DAY TO 12/24/18	SHARES OUT 12/24/18	12/24/2018 MARKET CAPITALIZATION (IN BILLIONS)
Curaleaf Holdings	CURA.CN	11/1/18	\$11.00	\$5.85	-46.8%	335.5	\$2.0
MedMen Enterprises	MMEN.CN	5/29/18	\$4.95	\$3.64	-26.5%	93.5	\$0.3
Green Thumb Industries	GTII.CN	6/13/18	\$8.95	\$10.73	19.9%	24.2	\$0.3
Acreage Holdings	ACRG-U.CN	11/15/18	\$27.36	\$18.92	-30.9%	21.4	\$0.4
Cresco Labs	CL.CN	12/3/18	\$6.55	\$7.39	12.8%	21.9	\$0.2
Total							\$3.1

Note: All currency in Canadian dollars

Source: BDS Analytics

manufacturing facilities and 73 retail locations across nine US markets.

Acreage Holdings, listed on Nov. 15, 2018, operates five dispensaries and holds licenses to cultivate and process in Oregon, owns a 10,000-square-foot cultivation facility in California and operates in 14 other states as well.

The latest to go public, Cresco Labs operates in Illinois, Pennsylvania, Ohio, Nevada, California and Arizona. On December 11, the company announced that it had been licensed to open the first medical marijuana dispensary in Ohio.

It's a measure of the growing confidence of investors that cannabis is heading toward complete legalization that the five American companies are

valued on the CSE at C\$3.1 billion or \$2.3 billion at current exchange rates.

It's a measure of the growing confidence of investors that cannabis is heading toward complete legalization that the five American companies are valued on the CSE at C\$3.1 billion or \$2.3 billion at current exchange rates



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Canada Gets Out in Front

With federal legalization of adult-use cannabis on Oct. 17, 2018, Canada is poised to seize the first-mover advantage in a worldwide market forecast to reach \$31.6 billion in legal spending by 2022. That is just the tip of the iceberg, since the North American illicit market alone is estimated at \$61.2 billion in 2018, and there are untold tens of billions more in market opportunity available around the world.

In the near term, the domestic opportunity for Canadian cannabis companies is substantial enough. The 374,000 patients able to purchase cannabis products under Canada's medical program grew to nearly 30 million adults age 18 and up on October 17 (some provinces will require customers to be 19 or older). This leads to a projected jump in revenue from \$569

Canada Legal Spending (In Billions)



Source: Arcview Market Research/BDS Analytics



million in 2017 to \$5.9 billion in 2022, representing a CAGR of 57%.

Only about 100 legal cannabis retail stores were in operation on opening day. But in stark contrast to their American counterparts, all can take advantage of unfettered industry banking and the same income tax regime as other retailers. Other differences from the US: Canada will allow online ordering and inter-province shipping through the postal service (though some provinces are initially choosing to keep adult-use online commerce government-owned), giving Canadian companies access to customers that is unparalleled in the US.

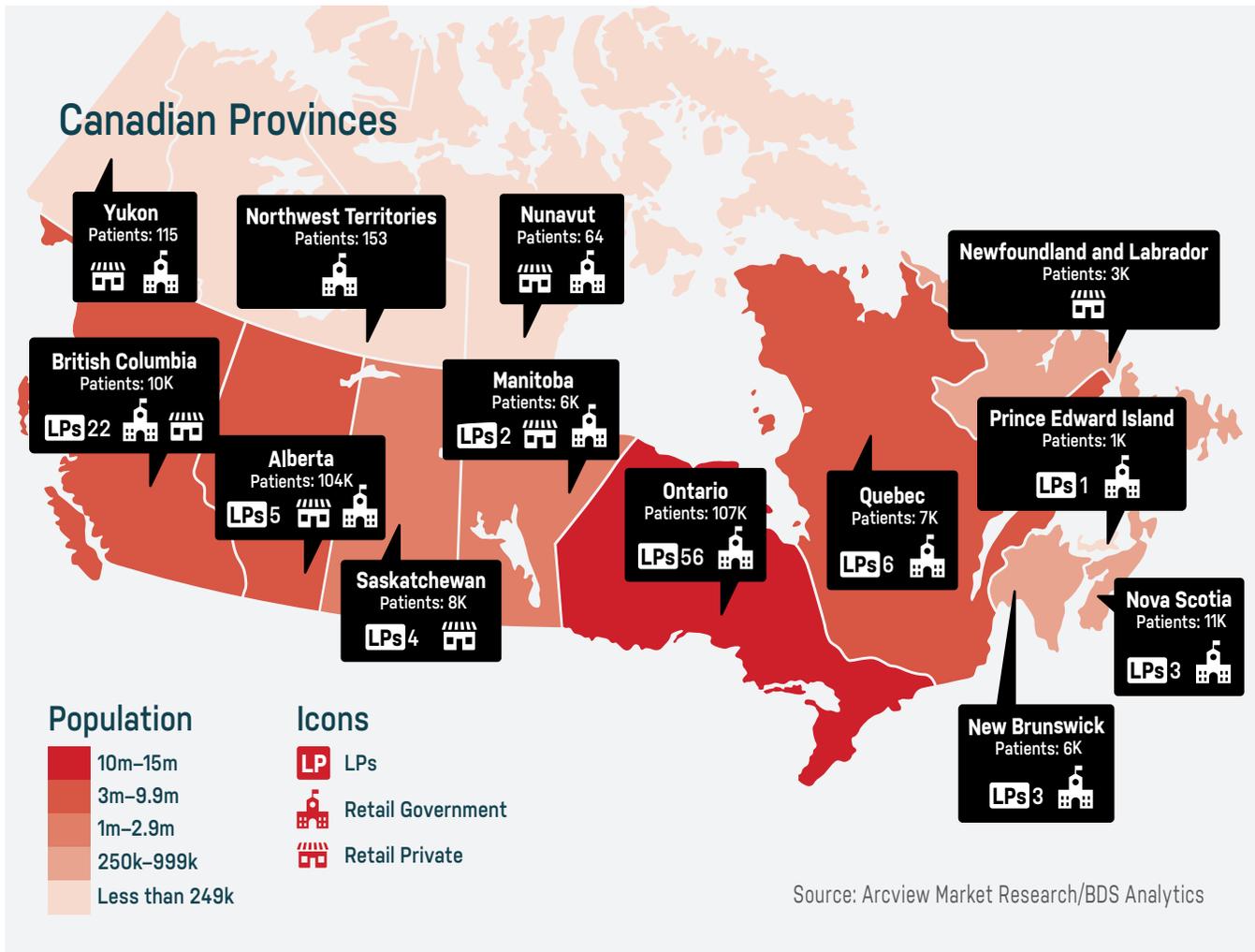
The tax burden that cannabis retailers will bear in Canada is slightly less onerous than that in many US states—California and Washington, for example—but it will likely be high enough to keep the illicit market in business. Nationwide, all retailers collect a Goods and Services Tax (GST) of 5%; most provinces tack on their own sales tax, which can range as high as 8% in Ontario, where about half of Canadians live, and 10% on Prince Edward Island. Some provinces are tacking on a 6% Social Responsibility Tax. Producers pay a duty of the higher of 2.5% or C\$0.25 per gram; as prices inevitably come down, the

latter will become the norm, which works out to C\$7/ounce (US\$5.18), somewhat less painful than California's flat \$9.25/ounce grow tax.

- While adult-use will surpass medical in revenue by far, medical cannabis is expected to survive as an active industry in Canada, in contrast to its near-total disappearance in California. Patient counts have exploded since Justin Trudeau promised to legalize cannabis, a key plank in the platform that led to his election as prime minister in 2015. That year ended with 78,572 patients signed up, and some 300,000 new patients have been registered since, even as adult-use legalization gets into gear. Medical spending is forecast to continue growing to \$1.1 billion in 2022 even as adult-use spending grows to \$4.7 billion.

This leads to a projected jump in revenue from \$569 million in 2017 to \$5.9 billion in 2022, representing a CAGR of 57%





• Federally regulated medical cannabis began in 2001 after Canada’s Supreme Court forced the federal government to allow patients access to medical cannabis. By 2003, the Marijuana for Medical Purposes Regulations (MMPR) established guidelines for licensed producers and distributors. In August 2016, Health Canada (the governmental agency responsible for public health) replaced the MMPR with the Access to Cannabis for Medical Purposes Regulations (ACMPR), which shapes the current medical market.

Under the ACMPR, patients are allowed to grow some of their own cannabis but must obtain a prescription and register with a licensed provider. By April 2018, 102 pro-

ducers were licensed under the ACMPR. However, most producers have been busy getting ready for adult-use legalization, though some companies are choosing to focus on the medical market. For example, InMed Pharmaceuticals, which has a cannabis-based dermatology product in trials, is concentrated on developing cannabinoid-based treatments for diseases and other medical needs.

The Leaders and Their Plans

There are currently over 120 licensed growers, many of which are well into development of vertically integrated seed-to-sale business models. Thus far, the most successful have positioned themselves to become na-



tional providers domestically, potential distributors of cannabis to developing medical markets in countries with little or no domestic production, and as enticing collaborators for giants in the food and beverage industries that are looking for a piece of the ascendant cannabis market.

In the deal that sparked the explosion in equity values of Canadian LPs (see Key Events of 2018), Canopy Growth has attracted a series of investments from Constellation Brands, one of the world's largest alcoholic beverage companies, resulting in a 38% share in the cannabis company, with the option to increase to a majority stake in the future. Constellation Brands CEO Bruce Linton has expressed interest in developing a number of mainstream products featuring cannabis such as sports drinks, sleep aids and psychoactive cannabinoid-based alternatives to alcoholic beverages.

Canopy Growth is now targeting 500,000 to 525,000 kg in production a year, expanding its 4.3 million square feet of licensed growing space to 5.6 million square feet. The company has already secured supply deals with most provinces, launched a chain of retail cannabis stores under the Tweed brand, and bought Hiku, the owner of the Tokyo Smoke retail cannabis chain.

Aurora Cannabis began preparing for adult-use legalization by buying 11 companies in the last year and is projecting more than 500,000 kg per year output. Tilray—an early investment of Peter Thiel's Privateer Fund that recently went public in the US—is expected to produce 150,000 kg per year by 2019. Aphria has built an international foothold in Latin America and countries such as Germany, Australia and Malta, and is on track to produce 255,000 kg per year. Cronos Group plans on producing 135,000 to 150,000 kg per year.

With smaller market caps and less production currently, other Canadian LPs are also actively rolling out strategies to compete worldwide, something US companies can only dream about doing directly. HEXO Corp. will be producing 108,000 kg per year and has secured a partnership with Molson Coors Brewing. Originally a medical-market focused company named Hydrothecary Corp, that name will be retained for the medical market while HEXO will serve as the adult-market brand. CannTrust aims at matching HEXO's production at 105,000 to 110,000 kg per. The Green Organic Dutchman expects to soon be producing 156,000 kg per year and is expanding overseas by buying HemPoland, a stake in Jamaican cannabis producer Epican, and is making plans to enter the Mexican medical marijuana market.

OrganiGram is planning to produce around 110,000 kg per year, and Emerald Health could be on its way to doubling that number, while The Supreme Cannabis Co. will reach 50,000 kg by mid 2019. OrganiGram has teamed up with companies in Germany, Serbia and Australia. Supreme has formed a global partnership with Lesotho company Medigrow.

Other companies are looking to capitalize on Canada's cannabis-friendly business environment with strategies that don't involve directly producing cannabis. BLOCKStrain Technologies is a software company developing a blockchain-based platform for supply-chain management. Namaste Technologies is an online and app-based platform connecting patients to physicians prescribing cannabis medications. National Access Cannabis is positioning itself as one of the nation's leading facilitators (and retailers) of legal access to cannabis, partnering with licensed producers such as Meta Cannabis Supply Company and NewLeaf Can-



nabis, securing investments from Aphria, CannTrust, Zenabis and VIVO. NAC has also entered into partnership with Second Cup, one of Canada's largest coffee retailers, to convert some of the chain's Ontario retail locations to NAC-run recreational cannabis stores under the Meta brand name.

The Domestic Market Limits

Canada did one major thing differently than California that largely explains why its market grew in 2018 while California's shrank: Provinces, unlike cities and counties in California, were not allowed to ban legal cannabis. They have been given the authority to decide how markets will be regulated under their jurisdiction, and some provincial governments, eager to benefit from this new source of public revenue, have adopted government-owned retail models. In such cases, private companies won't be able to enter the market directly.

In other ways Canada is being far stricter than California. Federally, the government has set stringent guidelines on packaging and marketing, ostensibly in order to prevent the targeting of underage customers. Such restrictions, and the fact that edibles and concentrates are still approximately a year away from being federally legal, will help the well-established illicit market stay in the game for the foreseeable future and limit the growth of Canada's legal market to considerably less than it could be.



Canadian Province Supply Agreements

PROVINCE	GOVERNING BODY	NUMBER OF SUPPLY AGREEMENTS	COMPANY W/PUBLISHED COMMITMENT	AMOUNT OF COMMITMENTS KG/YEAR*
Alberta	Alberta Gaming, Liquor & Cannabis Commission	14	Aphria	870
			Aurora Cannabis	50,000
			Canopy Growth	30,000
			Choom	3,700
			Marican Group	3,375
British Columbia	Liquor Distribution Branch	32	7 Acres/The Supreme Cannabis Co.	553
			Aphria	5,000
			Canopy Growth	5,719
			Emerald Health	8,000
			Marican Group	3,622
			THC BioMed	2,390
			Tilray	4,000
			Zenabis	4,000
Manitoba	Manitoba Liquor & Lotteries Corporation	8	7 Acres/The Supreme Cannabis Co.	1,690
			Aphria	2,700
			Canopy Growth	6,500
			Delta 9	2,300
			Hiku	2,000
			Marican Group	550
New Brunswick	Cannabis Management Corporation	5	Organigram	1,000
			Aphria	2,500
			Canopy Growth	4,000
			Nuuvera, Inc.	2,500
			Organigram	5,200
Newfoundland & Labrador	Newfoundland & Labrador Liquor Commission	3	Zenabis	4,000
			Back Home - Biome	4,000
			Canopy Growth	8,000
			Eve and Co.	1,200
Ontario	Ontario Cannabis Store	32	7 Acres/The Supreme Cannabis Co.	1,000
			Aphria	20,400
			CannTrust	3,600
			Cronos	40,000
			Emblem	3,000
			Indiva	3,000
			WeedMD	1,500
Prince Edward Island	PEI Cannabis Management Corporation	3	Canopy Growth	1,000
			Island Green, Inc.	1,000
			Organigram	1,000
			Aphria	12,000
Quebec	Societe des alcools du Quebec	6	Aurora Cannabis	5,000
			Canopy Growth	12,000
			HEXO	20,000
			Hydrophthecary	20,000
			MedReleaf	8,000
			Tilray	5,000
Yukon	Yukon Liquor Commission	3	Aphria	50
			Canopy Growth	900
			Tilray	350
Nova Scotia	Nova Scotia Liquor Corporation	14	Aqualitas	9,000
			Up Cannabis/CanniMed	1,500
Saskatchewan	Saskatchewan Liquor & Gaming Authority	4	High Tide	9,500
			Organigram	4,000
			Zenabis	11,858

*Lists only include companies with published amounts as of 8/31/18

Source: BDS Analytics



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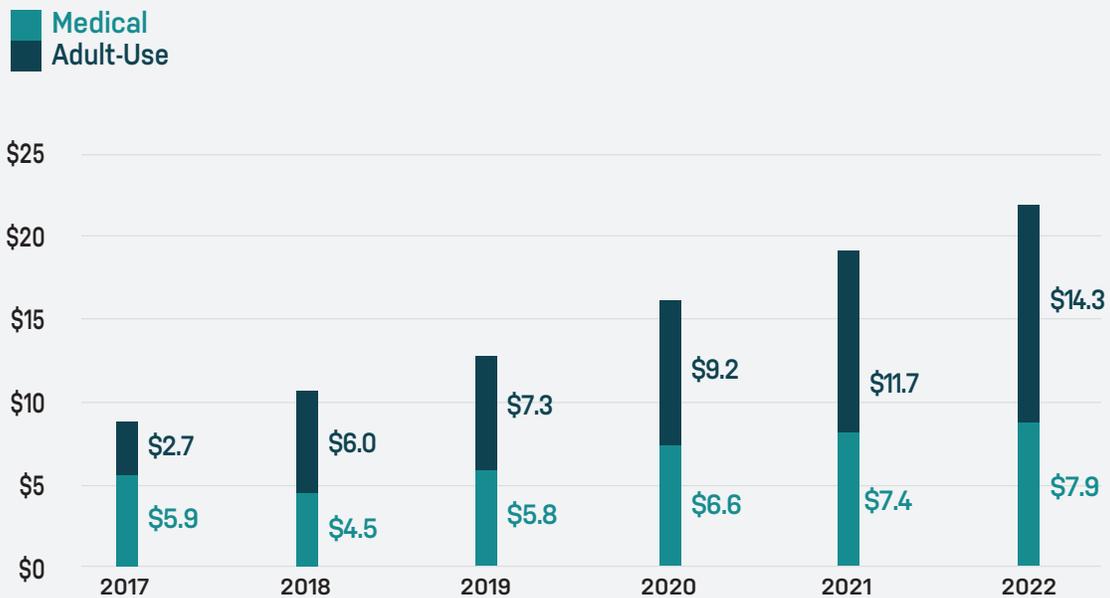
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Adult-Use Takes the Lead, More Dominoes Fall

This year was an eventful one for the legal cannabis industry in the US. Consumer spending reached \$10.5 billion in 2018—the first year in which adult-use eclipsed medical, mainly spurred by the emergence of new adult-use markets in California and Nevada.

Adult-use spending rocketed from \$2.7 billion in 2017 to \$6 billion in 2018, while spending on medical cannabis shrank from \$5.9 billion to \$4.5 billion. In 2022, adult-use spending is forecast to reach \$14.3 billion and medical \$7.9 billion.

US Legal Spending (In Billions)



Source: Arcview Market Research/BDS Analytics



US Cannabis Market Summary

STATE	LEGAL SPENDING		SITUATION
	2018	2022	
Alaska	\$31.0	\$121.2	Eighty-one licensed cultivators paid \$1 million in taxes in January 2018. There were 79 cultivators with active licenses and 85 retailers with active licenses as of 1/26/2018. Alaska's department of revenue reported that number of licensees steadily rose throughout the year, with the state reporting a total of 119 licensed operators by the end of September 2018. Reported tax revenue from cannabis reached a peak in August 2018 with \$1.54 million, declining slightly to \$1.48 million in September. Alaska's Marijuana Control Board has released their proposed set of regulations for on-site consumption. Licensed retailers will be able to apply for an on-site consumption license allowing them to sell consumers up to a gram of cannabis for consumption on the premises.
Arizona	\$664.3	\$1,180.8	See below.
Arkansas	-	\$87.9	Nearly 7,000 patients approved by end of 2018. Court-ordered delays in issuing cultivation licenses will likely result in sales beginning early- to mid-2019.
California	\$2,517.7	\$5,573.4	See below.
Colorado	\$1,581.2	\$1,990.1	See below.
Connecticut	\$84.6	\$207.8	The 2018 Mid-Term election brought the necessary shift in the legislature and governors mansion to see legislative movement toward adult-legalization. In total, nine new dispensaries approved, 31 conditions on the list, and 30,800 patients. Legislators have agree to work toward adult legalization in 2019.
Delaware	\$17.8	\$92.4	7,825 patients, 5 operating despensaries. Delaware added glaucoma & chronic debilitating migraines to their list of conditions as well as implementing a process to allow minors to be considered as adults for the debilitating conditions.
District of Columbia	\$20.5	\$128.9	Washington, DC's medical program continues to see healthy growth, though efforts to establish commercial adult-use cannabis remain blocked by efforts of federal lawmakers. Washington is looking to expand the program by licensing more dispensaries, and many district residents do not live in one of the burroughs where one of the five current dispensaries are located. The city has also announced plans to streamline the application process for patients, as many new and renewing patients note excessive wait times for application processing.
Florida	\$626.4	\$1,624.7	See below.
Hawaii	\$57.6	\$112.6	Hawaii is currently receiving public comment to allow reciprocity, extend the registration period, allow primary caregivers to have more than one patient, allow physician/client interactions through telehealth. Currently providing for 23,699 patients through eight dispensaries.
Illinois	\$160.5	\$399.5	Gov.-elect J.B. Pritzker made his support for legalization known in the primary stage of his campaign. He now has the support of the state house speaker, and a study from the Univerity of Illinois indicates that adult-legalization will create 24,000 jobs, generate \$500+ million in tax revenue, and infuse roughly \$1 billion into the state economy by 2020.
Louisiana	-	\$46.6	The start of medical sales has been delayed until at least January 2019. While the first crop was harvested in mid-October, no independent testing labs were approved. The Department of Agriculture will perform testing until an independent lab gets licensed so that sales can start.
Maine	\$65.7	\$264.8	New medical rules allow caregivers to open "dispensaries," do not require vertical integration. Adult use could start in late 2019.
Maryland	\$97.9	\$469.1	Maryland's medical program had a very successful launch. Within the first operational year sales reached nearly \$100 million from more than 50,000 registered patients.
Massachusetts	\$220.6	\$1,070.4	See below.
Michigan	\$957.6	\$1,404.0	See below.
Minnesota	\$41.6	\$97.0	Minnesota legislature may take up adult-legalization; the current governor is supportive. However, there are finance tasks that must be enacted first such as a budget, tax bill and bond measures. It is not likely that Minnesota will legislate adult legalization in 2019.
Missouri	-	\$25.1	Medical cannabis legalized by voters in November 2018. First sales forecast for 2020.
Montana	\$94.5	\$155.8	Removal of patient limits and dispensary reopenings have rekindled patient growth, with more than 29,000 registered as of Oct. 20, 2018.
Nevada	\$580.0	\$795.6	See below.
New Hampshire	\$16.0	\$35.8	While the states prohibitioninst governor won re-election in November 2018, a number of state lawmakers opposed to legalization were voted out in the midterms, possibly signaling an easier path for commercial adult-use legalization moving forward. Regarding legalization, a commision founded by the legislature to advise on a blueprint for legalization released a report stating that legal cannabis could bring in up to \$385 million/year in sales and up to \$58 million/year in revenue to the state.

Source: Arcview Market Research/BDS Analytics



Cannabis Market Summary (continued)

STATE	LEGAL SPENDING		SITUATION
	2018	2022	
New Jersey	\$116.4	\$361.4	Patient counts more than doubled to nearly 40,000 by the end of 2018, in part due to efforts by new Gov. Phil Murphy to expand state's medical program. The Murphy administration has expanded qualifying conditions and doubled the number of dispensaries from six to twelve, as well as advocated for the adult-use legalization that is currently moving through the state legislature and is expected to pass in early 2019.
New Mexico	\$239.8	\$372.8	New Mexico's cannabis program has seen healthy growth in growth despite the lack of significant support from the largely conservative state legislature and outgoing GOP Gov. Susana Martinez, who has been in office since 2011. A November 2018 court ruling threw out the previous plant-count limit of 450 per business that has inhibited the growth of the New Mexico medical program. This cannabis victory in the courts was followed by the election of Democrat Michelle Lujan Grisham to the governor's mansion. Grisham has vowed to increase the number of licensed medical businesses as well as abolish the plant count, moves which likely will increase the supply of cannabis in the state's medical program, lowering prices and possibly driving greater sales.
New York	\$263.8	\$1,587.0	See below.
North Dakota	\$0.2	\$26.2	North Dakota's medical program has put all the pieces in place to see a successful launch in early 2019. One cultivator, Pure Dakota, is expected to harvest its first crop before the end of 2018, and the first four dispensary licensees have been selected by the state.
Ohio	-	\$273.7	Sales have not started but with the awarding of the state's first certificate of operation to a testing lab in late December the program has operating licensees in all segments required for it to become operational. The Ohio Board of Pharmacy reported that there were 4,440 doctor recommendations submitted to the patient registry.
Oklahoma	\$19.0	\$164.5	See below.
Oregon	\$670.8	\$913.7	See below.
Pennsylvania	\$194.1	\$448.4	Pennsylvania's medical program is set for significant growth throughout the forecast period. By Q4 2018 more than 80,000 patients registered online, and nearly 50 dispensaries were operational.
Rhode Island	\$83.0	\$154.5	Growth in medical sales is steady. A cannabis commission is expected to release its recommendation on adult-use legalization in Rhode Island sometime in 2019.
Texas	-	\$316.4	Medical cannabis forecast to begin in 2021.
Utah	-	\$19.5	See below.
Vermont	\$20.4	\$87.1	Vermont has taken a unique approach to adult legalization by allowing any adult to grow product for personal consumption. Their current regulatory structure does not include the creation of the typical infrastructure as seen in other states. With the pressure from adult legalization in states near Vermont, it is likely that the pro-legalization legislature will help the anti-legalization governor move toward their stance.
Virginia	-	\$17.4	In September, the state approved five "pharmaceutical processors" to produce CBD or THC-A oils for registered patients. These licensees have one year to commence operations.
Washington	\$1,008.6	\$1,484.6	Ongoing glitches with the state's seed-to-sale system, rushed into service after expiration of the previous contract, continue to hamper operations. Earlier confusion over edibles regulations cleared up in October with new regulations designed to limit appeal to minors.
West Virginia	-	\$19.6	Medical program not yet operational. Progress has slowed, and there are concerns that sales will not start by the July 2019 deadline.

Source: Arcview Market Research/BDS Analytics

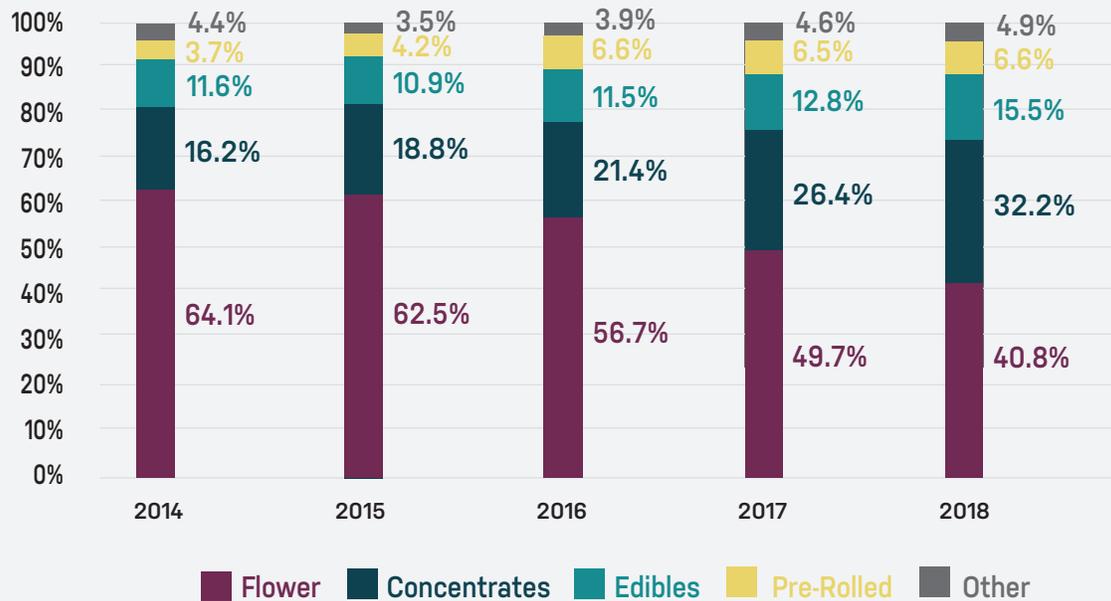
- The 2018 November election ushered in two new medical cannabis states (Missouri and Utah) and one new adult-use state (Michigan). A June 26 special election brought Oklahoma into the medical cannabis fold—and regulators there set a

record pace, rolling out licenses and getting sales going late in the year.

- The US Congress passed the \$867 billion 2019 Farm Bill on December 11 (Senate) and 12 (House).



Share of Products Sold at Cannabis Retail



Source: BDS Analytics's GreenEdge

Buried among myriad agricultural issues, the bill legalized the cultivation of hemp nationwide. A number of states already have active hemp industries, but federal legalization will likely spread and prompt the DEA and the FDA to make crucial decisions on how hemp-derived CBD will fare as an additive for food and other products.

The table on the previous two pages provides a look at estimated 2018 and 2022 forecast legal cannabis spending for all states as well as additional information on the legal cannabis industry situation in states not discussed below.

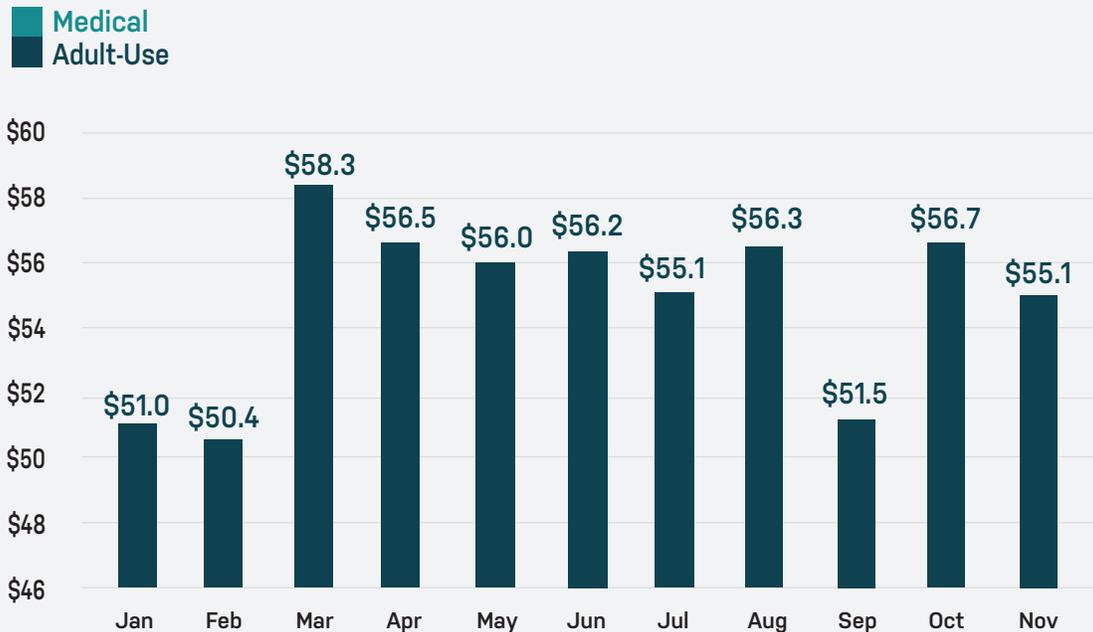
In states tracked by BDS Analytics' GreenEdge retail point-of-sale tracking service, clear product category trends have emerged over the five years since Colorado began legal adult-use cannabis sales.

The chart above shows annual aggregate category share across all states tracked. In general, flower's share of total spending has trended downward, in part due to rapidly declining per-gram prices, while the share of concentrates and edibles have trended upward. In 2014, when Colorado and Washington (July onward) were tracked, flower accounted for 64% of total sales. Concentrates held 16% share and edibles nearly 12%. Flower prices in January 2014 were \$7.04/g.

Through November 2018, which included tracking for Arizona, California, Colorado and Oregon, flower expenditures dropped to less than 41% of total spending, while concentrates rose to 32.2%. Average retail price for flower across these states hit an all-time low of \$5.80/g in November.



Arizona 2018 Monthly Legal Spending (In Millions)



Source: BDS Analytics' GreenEdge

Though this data is aggregated across tracked states, the story in individual states is much the same though particulars vary slightly. In Colorado, for instance, flower has declined from 63% of spending in 2014 to 43% in 2018, and concentrates have risen from 17% to 31%. Over that time, average retail price for flower began at \$7.04/g in January 2014, peaked at \$7.55/g in August 2014, and ended November 2018 at \$4.03/g. November prices in Oregon were similar at \$4.27/g, while Arizona and California came in higher at \$6.88/g and \$8.94/g, respectively.

Arizona

Growth in Arizona's medical-only cannabis market continued to pick up pace in 2018. Spending on legal cannabis in the state reached an estimated \$664 million for

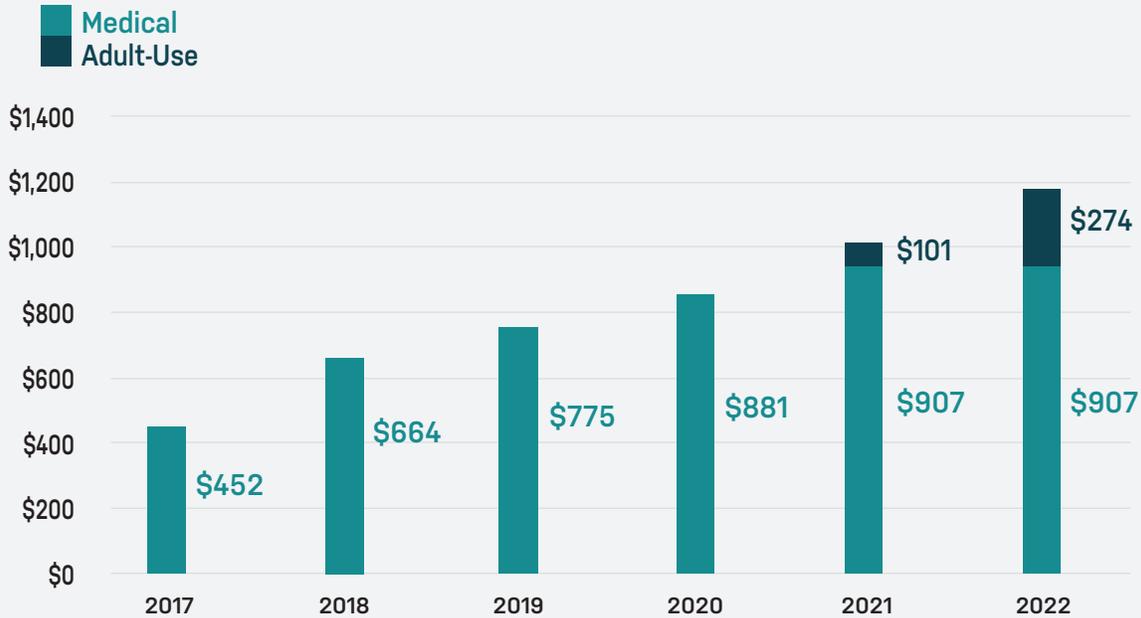
the year, an increase of more than 47% over the \$452 in spending seen in 2017. Monthly spending from January through November, as tracked by BDS Analytics' service, as shown in the chart.

Arizona's patient registry grew by about 32,000 during the year to end at almost 185,000, or 2.6% of the population. The number of patients added annually is slowing; however, the state added nearly 39,000 patients in 2017. The number of patients is forecast to grow significantly for the next two years before slowing considerably in 2021, assuming the state legalizes adult use in 2020 and begins sales in 2021.

In November 2016, an adult-use ballot initiative nearly passed muster with voters—it barely failed with just



Arizona Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

over 49% support. Another proposal failed to reach the ballot in 2018. The current forecast for adult use in the state is predicated on a successful attempt in 2020, with implementation by late 2021. Under that scenario, medical cannabis sales are expected to reach \$907 million that year and decline slightly in 2022, while adult-use sales near \$101 million in 2021 and rise to \$273 million in 2022.

The biggest potential legal hurdle to the state’s medical market is a June 2018 ruling by the Arizona Court of Appeals that deemed cannabis extracts illegal under state laws. That case faces appeal to the Arizona Supreme Court though it’s unclear whether the state will continue to pursue the case. Concentrates and edibles, which this ruling would prohibit, accounted for approximately 18%

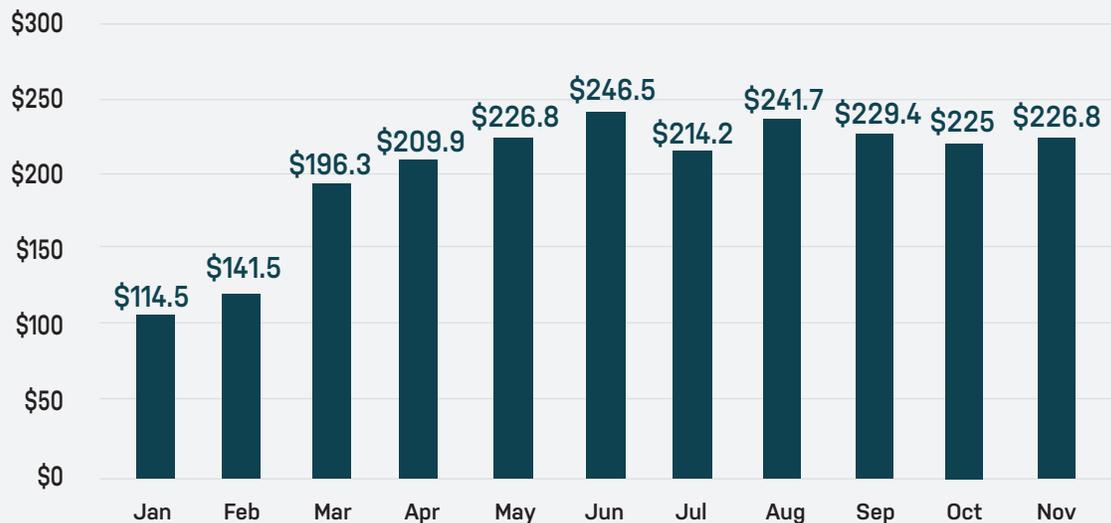
of sales in 2018, according to BDS Analytics. A high-court finding in favor of the state’s case would negatively impact medical cannabis and future adult-use sales.

California

After the “reset” provided by the move to a comprehensively regulated market, California’s industry saw healthy growth for the first half of 2018, with retail sales climbing monthly and reaching a yearly high in June. However, the phase-in of Stage II lab testing requirements on July 1 caused major disruptions in the supply chain, leading to a massive bottleneck of samples at testing labs and a dearth of products on retail shelves. The lackluster recovery of retail sales since July’s regulatory whiplash leads to a revised forecast



California 2018 Monthly Legal Spending (In Millions)



Source: BDS Analytics' GreenEdge

of \$2.5 billion in retail sales in 2018, short of the previous \$3.4 billion sales forecast.

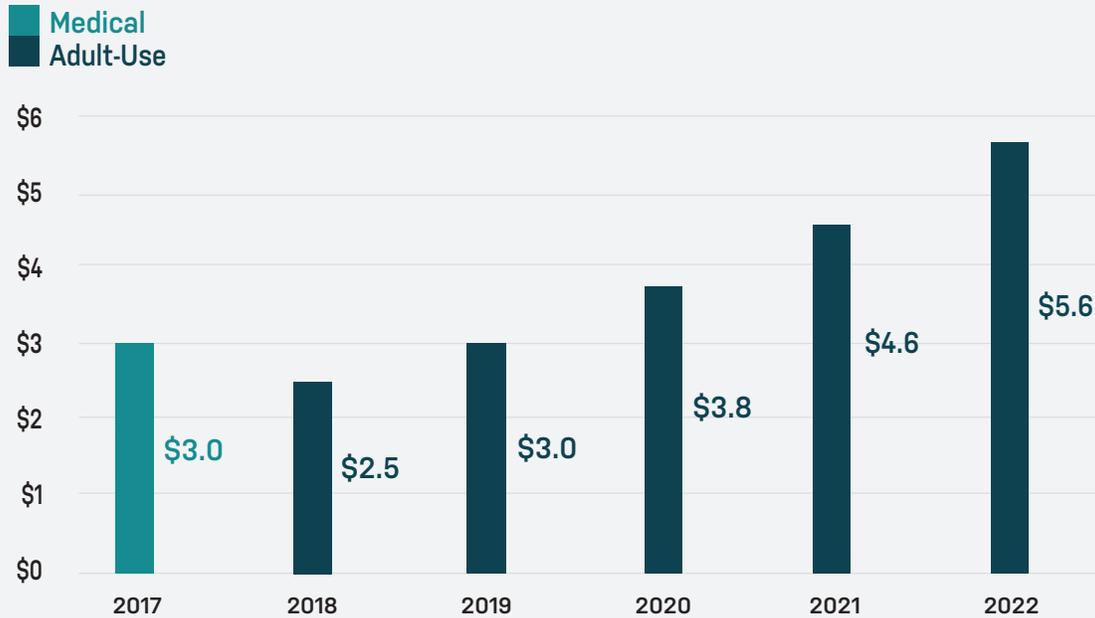
A well-established illicit market undercutting the regulated market remains an issue around the state. Though retailers have overcome testing and supply-chain challenges to provide customers with a wide variety of products, the tax and regulatory burden has pushed prices too high for some consumers, and a good number continue to buy cannabis from cheaper, unlicensed sources. The difficulty of overcoming the well-established illicit market is a major factor that will keep retail sales this year to a mere \$2.5 billion.

These lower-than-expected total sales can be attributed to numerous factors largely unique to California,

such as the fact that the state grows an estimated 70% of the illicit cannabis sold in the US. The volume of cannabis grown in California, coupled with the well-entrenched infrastructure of illicit cannabis production and distribution, challenge licensed cannabis producers to fight an uphill battle to compete due to higher compliance costs and tax burdens. Also, it is rare that a major medical market becomes as highly developed as California's without any comprehensive regulation. The costs of becoming compliant with new regulations incentivized many in the medical system to keep operating without state licensure, thereby undermining the business of legal operators. Without the threat of swift enforcement, especially against unlicensed retailers, licensed sales are likely to remain stunted by illicit competition.



California Legal Spending (In Billions)



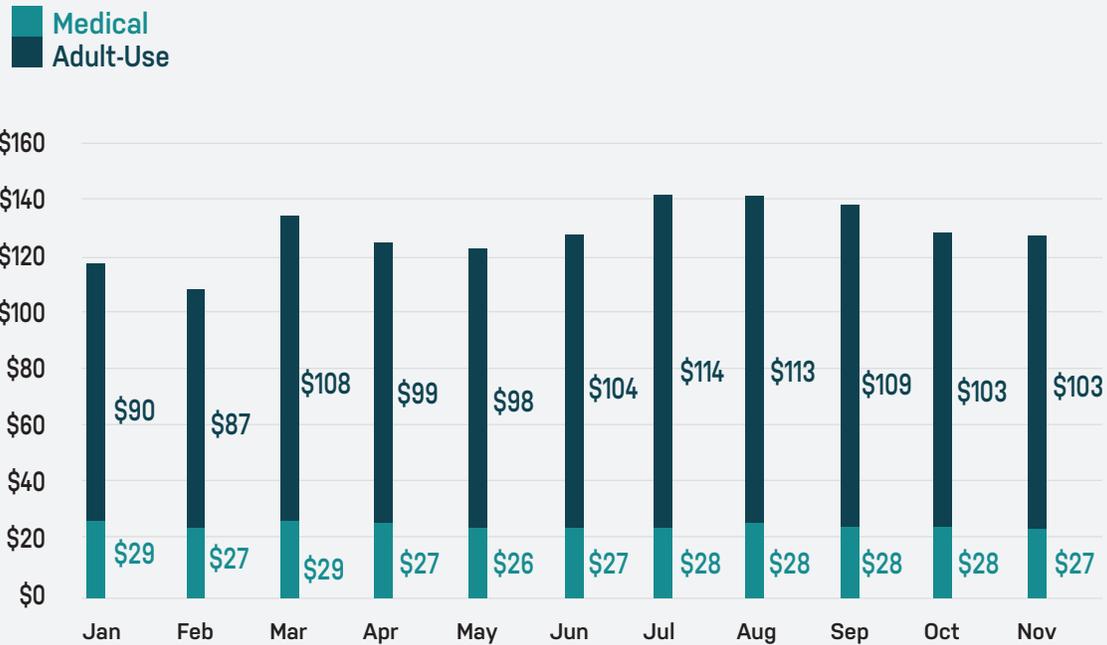
Source: Arcview Market Research/BDS Analytics

While California's market may have seen a less-than-ideal performance in its first year of adult-use sales, California is still appealing to cannabis entrepreneurs. Many licensed operators—outside of Los Angeles, where gray market competitors operate openly—are seeing substantial top-line growth in the smaller statewide market of 2018, since a smaller number of licensees are sharing in the newly regulated market. When legal spending in 2017 was \$3 billion, sales were spread among an estimated 1,150 retail storefronts and 2,000 delivery services. By the end of 2018, the Bureau of Cannabis Control listed just over 500 retailers with active licenses. This number is up from 358 in August 2018 and just over 100 in January, painting a picture of a market with lower overall sales yet higher sales figures for each licensed retailer.

The picture will improve for retailers as time goes on, as more cultivators and distributors entering the market will stabilize the supply chain, likely lowering wholesale prices to retailers. In turn, they will lower retail prices, incentivizing more customers to buy from licensed shops rather than from illicit operators. The new year will also bring the sunset of California's Cannabis Collective Law (SB 420): Medical collectives operating under the 2004 law will have to seek licensure through the existing regulators or close. While this means the end of the road for many veterans of California's medical cannabis scene, the move could potentially spur those operators to enter the regulated adult-use market or close shop. In either case, their patients will be ushered into the licensed retail channel.



Colorado 2018 Monthly Legal Spending (In Millions)



Source: BDS Analytics' GreenEdge

Colorado

Sales in Colorado’s adult-use cannabis market broke \$1.1 billion in 2017 but growth has been tapering off, with 2018 spending estimated at \$1.2 billion, an increase of 12% over the previous year. Medical cannabis spending for the year is estimated at just over \$333 million, a decline of 20.4%.

The number of patients registered under Colorado’s medical cannabis program has declined considerably since the introduction of legal adult-use cannabis—from more than 115,000 at the end of 2014 to 93,000 at the end of 2017—but those losses have slowed and levelled off to the 85,000 to 90,000 range during the latter half of 2018, stabilizing monthly medical spending in the \$20 million to \$30 million range.

Continued declines are expected on the medical side, with a forecast 81,000 patients generating spending of \$260 million by 2022. Growth in adult-use spending is expected to drop into the single-digits in 2019 and beyond, growing to top \$1.7 billion by 2022.

Colorado’s cannabis consumers continue to trend away from dried flower toward concentrates and edibles, according to category data from GreenEdge. In 2014, flower accounted for 63% of total spending across medical and adult-use. Concentrates and edibles held respective 17% and 12% shares. In 2018 through November, flower’s share of spending declined to 43% while concentrates and edibles rose respectively to 31% and 16%.



Colorado Legal Spending (In Billions)



Source: Arcview Market Research/BDS Analytics

Florida

The 2018 election will bring positive changes to Florida’s medical market. Gov.-elect Ron DeSantis has stated that “the people have spoken, and so I will implement that,” referencing the 2016 passage of Florida Constitutional Amendment No. 2. The state has been appealing a ruling that the current law is unconstitutional because it limits the number of growers’ licenses and requires businesses to follow a vertically integrated model. Revising the law will open the market to businesses that want to serve as distributors or processors, arguably reducing their startup and production costs.

A unique aspect of Florida’s program is the high volume of people who are “seasonal residents” during the winter months. This is not handled through a

reciprocity process—where a medical card from one state is accepted in Florida—but by requiring people to prove residency for 31 consecutive days to be added to the patient registry by a physician.

Our forecast of the medical market is being increased for 2018 from \$456 million to \$626 million to account for higher demand, and progressing to \$1.6 billion by 2022. While efforts are still being made to move toward adult legalization, DeSantis has cited the risks for children and public safety.

Massachusetts

Adult-use sales began in Massachusetts on Nov. 20, 2018, nearly five months after the original deadline of July 1, 2018, and two years after the 2016 voter initia-



Florida Legal Spending (In Billions)



Source: Arcview Market Research/BDS Analytics

tive passed to legalize and regulate adult-use cannabis sales. No independent testing labs were licensed by the July deadline, which delayed the start.

In late December, 11 authorized businesses were operational: two cultivators; two product manufacturers; five retailers, and two independent testing labs.

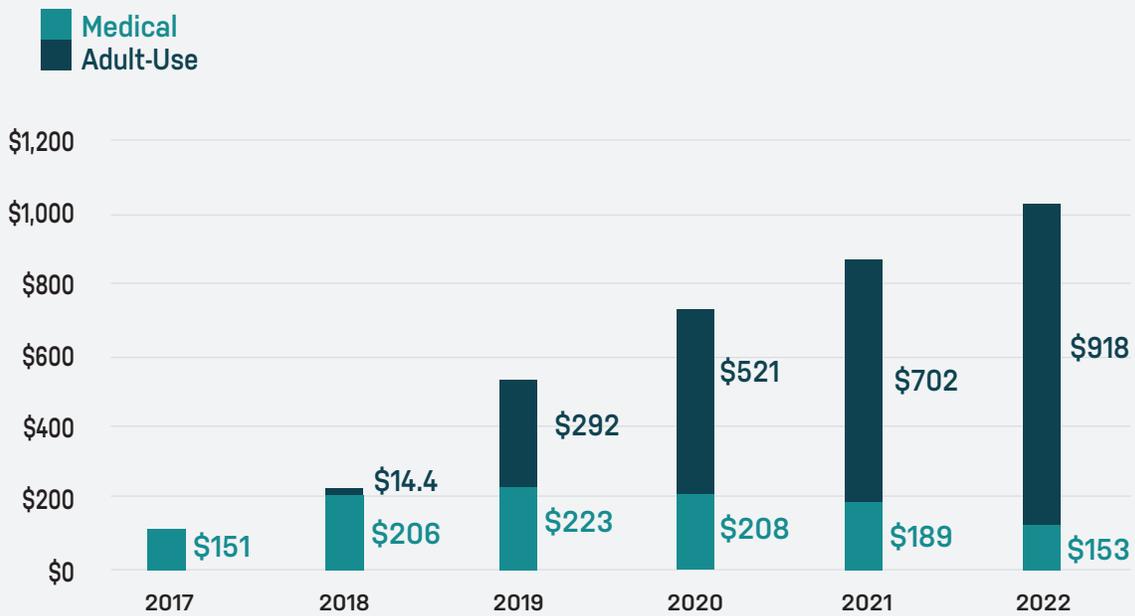
Despite the delay and limited number of licensed businesses, Massachusetts adult-use sales are booming. Spending reached nearly \$7 million in the first three operational weeks. As more businesses are licensed and access expands to the roughly 5.2 million adults statewide, adult-use spending is forecast to be substantial. There are about 200 completed cannabis business applications awaiting review and licensing in the state.

Even with the slower-than-anticipated rollout, Massachusetts’ adult-use program is expected to swiftly emerge as one of the largest adult-use markets in the world. Adult-use spending is forecast to reach \$292 million in 2019, up from \$14.4 million in the last weeks of 2018. In 2022, spending is forecast to reach \$918 million, lagging only behind adult-use pioneers Canada, California, Colorado, Washington and New York, now forecast to launch adult-use sales in 2020.

The state’s medical program continues to perform well and is expected to remain significant throughout the forecast period. In December, administration of the medical program officially switched over from the Department of Health to the Cannabis Control Commission. The commission reported there were 64,917



Massachusetts Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

registered and active patients and caregivers on Nov. 30, 2018. Patient numbers are expected to see slight growth in 2019 before experiencing a decline as a result of the growing adult-use market. Medical spending is forecast to peak just under \$223 million in 2019 dropping to \$153 million in 2022.

With its likely-to-explode adult-use market and solid medical sales, total legal sales in Massachusetts are forecast to reach over a billion dollars in 2022.

Michigan

Michigan became the first state in the Midwest to legalize adult-use cannabis in the 2018 midterm election. The passage of Proposal 1 with 56% of the vote, legalized possession and home growing for those 21

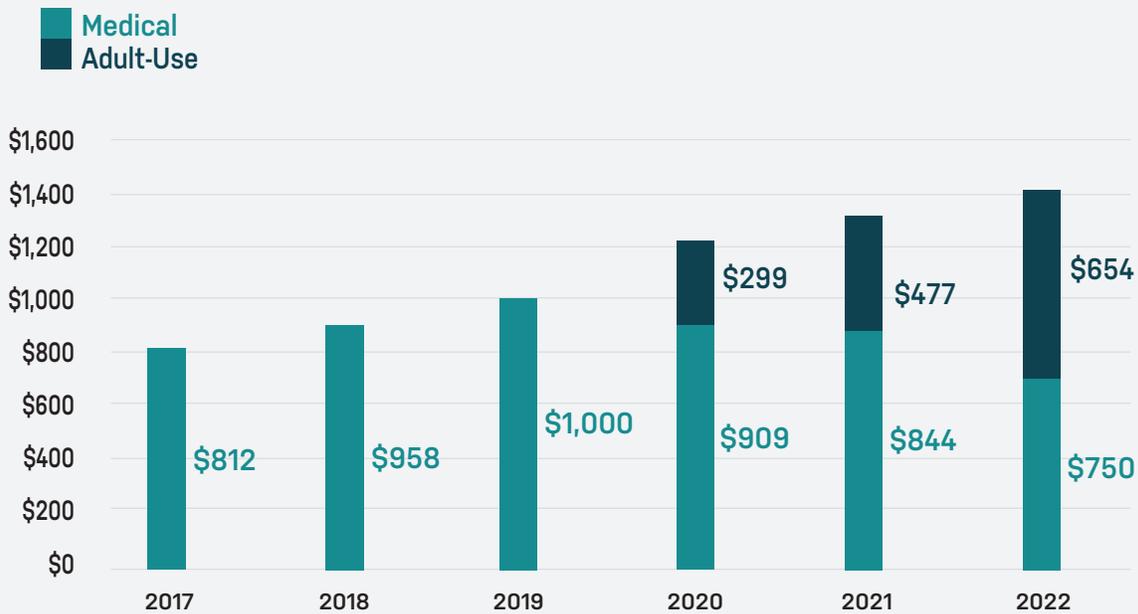
and older and allowed for the establishment of a commercial cannabis industry. While the provisions of the law legalizing the possession and use of cannabis took effect on Dec. 9, 2018, regulators have announced that adult-use sales will not launch until 2020.

Michigan has been home to one of the larger legal-but-unregulated, cannabis markets in the US since possession for medical use was legalized by ballot proposition in 2008. By the end of 2017, the state’s medical program had grown to include 270,000 cardholders, up 18% from the previous year. Though the 2008 ballot proposal lacked a framework for the establishment of a commercial industry, a robust gray market has been established.

As the state moved toward comprehensive regulation of medical cannabis at the end of 2017, there were al-



Michigan Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

ready almost 500 dispensaries operating, bringing in an estimated \$812 million in sales in 2017. Medical sales are expected to peak in 2019 at nearly \$1 billion, then begin to decline as adult-use launches. By 2022, total legal sales are projected to reach \$1.4 billion, with \$654 million coming from adult-use sales.

By November 2018 only eight growers and 40 dispensaries had been licensed. While a state Court of Claims judge in October issued an order to allow unlicensed dispensaries to remain open until the end of 2018, enforcement efforts have already decreased access in some areas. Limited retail options present concerns for patients as well as for state officials, the latter hoping that legal sales eliminate illicit dealers waiting for the business of almost 300,000 patients.

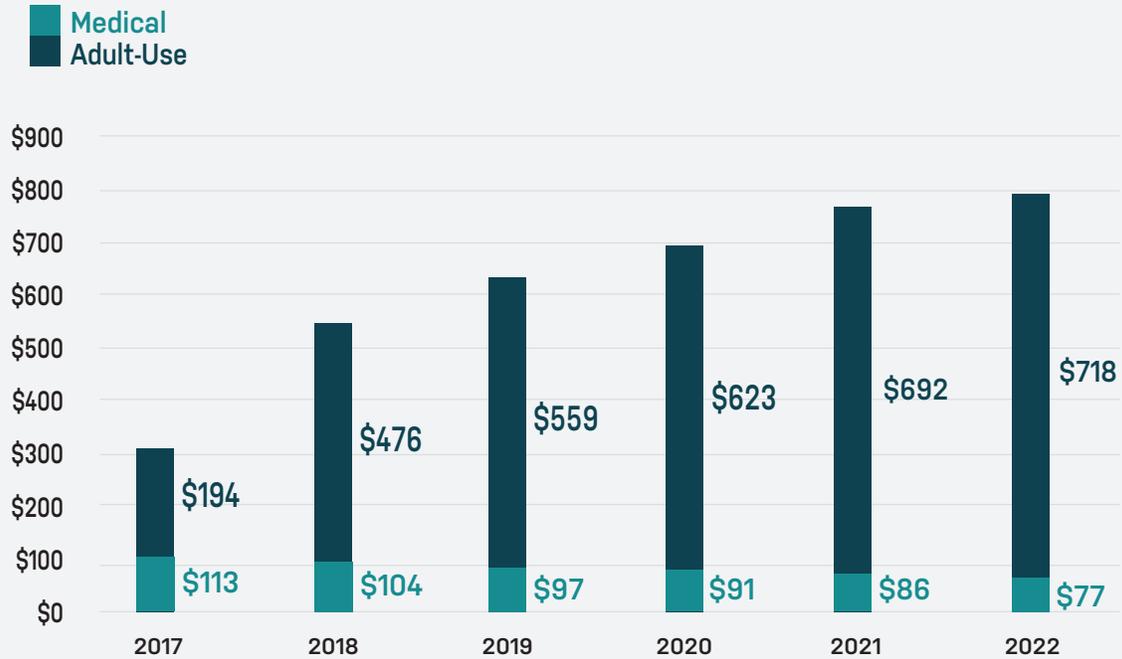
Other factors that may limit the growth of the industry in Michigan are the widespread local bans already in place in municipalities across the state. Several municipal governments were quick to spring into action the week after the election, taking advantage of provisions in the new adult-use law granting local control over commercial cannabis to ensure that legal sales were banned locally before the state opened the licensing process to applicants.

Nevada

The roll out of legal adult-use cannabis regulations and sales in Nevada occurred at a record pace, and initial consumer spending lived up to the hype. During the first 12 months of sales, beginning July 2017, cannabis retailers generated more than \$425 million in adult-use sales. These figures edged out first-year sales in



Nevada Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

Colorado (\$310 million in 2014) and Washington (\$212 million between July 2014 and June 2015), though lag behind the estimated \$2.5 billion in 2018 adult-use sales in much-larger California.

Nevada adult-use sales for calendar 2018 are estimated at \$476 million, alongside medical cannabis sales of \$104 million—a slight decline from \$113 million in 2017. Registered patients in the state topped 25,000 by the end of 2016, but declined sharply once adult-use sales rolled out in July of 2017. The number of patients seems to have stabilized in the second half of 2018, however, dipping into the high 16,000 range before rising slightly in November to just over 17,000.

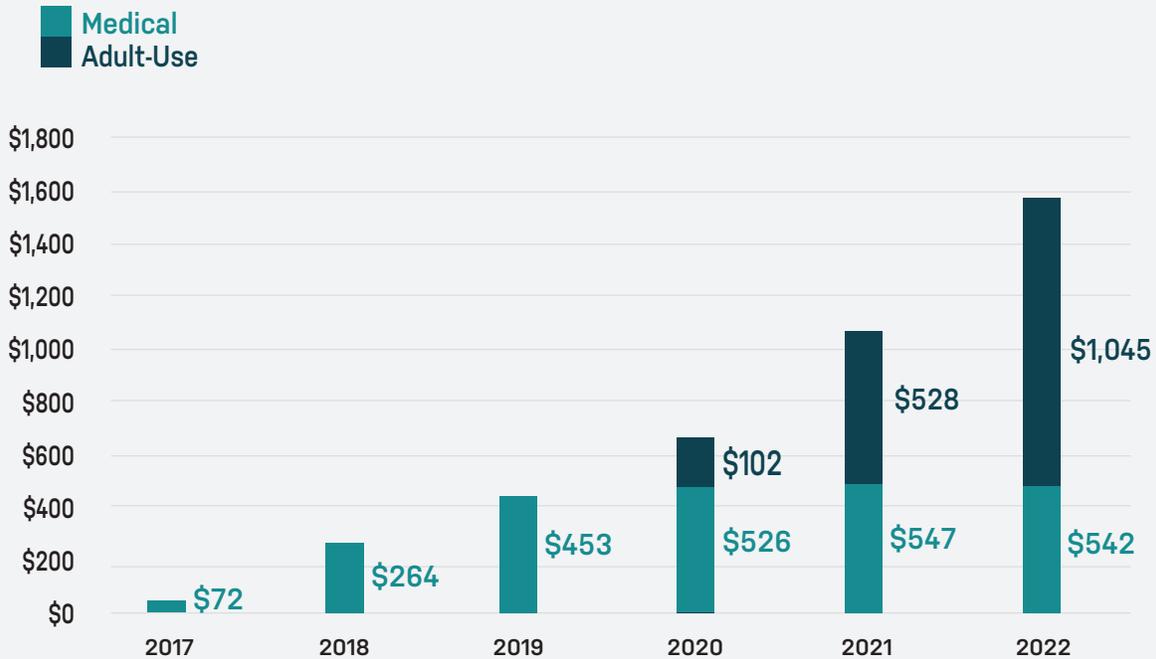
Tourism in Nevada is an important factor affecting in-

state cannabis sales, more so than in other legal states. The state’s small population of about 3 million, coupled with more than 60 million tourist visits, amplifies that effect. Tourism continues to be influential—despite public consumption bans facing visitors, who would rather smoke flower or vape than consume edibles or other less-obtrusive forms of cannabis product.

Examining first-year sales on a per-capita basis shows directly the impact of tourism on cannabis product in Nevada. Sales of adult-use cannabis in the state between July 2017 and June 2018 amounted to expenditures of about \$190 per adult (21+). That is more than twice the \$80/adult spending seen during Colorado’s first year (2014) and the estimated \$74/adult spending in California (2018) and nearly five times Washington’s



New York Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

\$40/adult (July 2014-June 2015)—though all three of those states also see significant annual tourism.

Its initial year-and-a-half of huge growth put Nevada on the national cannabis map, but after the explosive opening, year-over-year growth is forecast to slow through 2022, when the market is expected to reach \$718 million. The number of patients has stabilized in the near term but is expected to decline slowly over the next few years, with spending forecast to decline to just over \$77 million by 2022.

New York

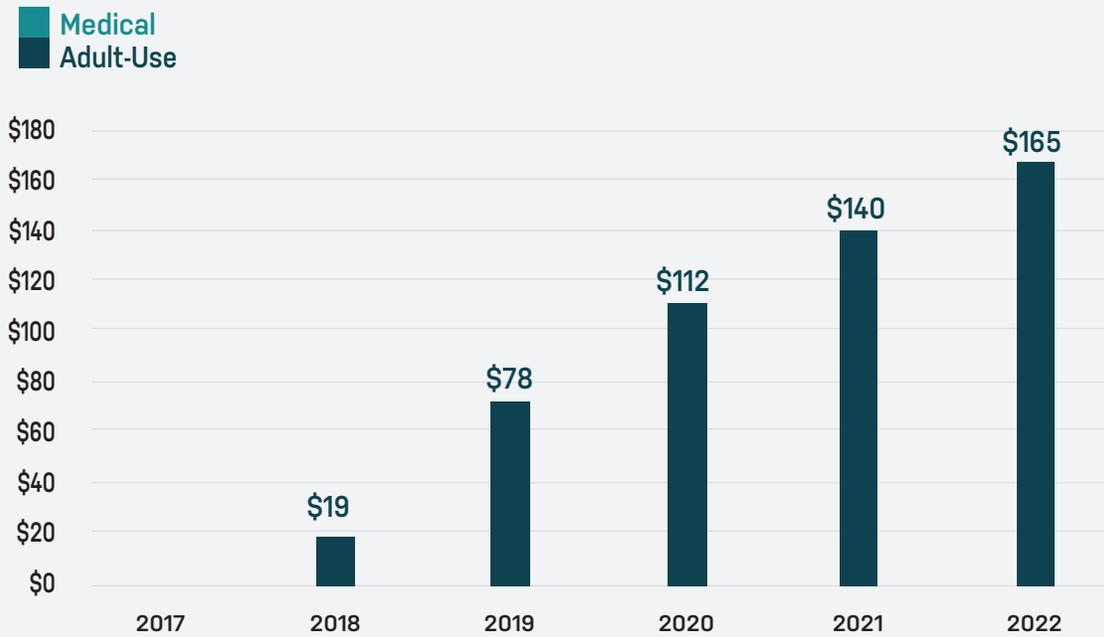
New York’s medical program continues to grow at a noteworthy pace. Regulators continue to make strides to broaden patient access to medical cannabis, and as

a result, sales are experiencing significant growth. Patient numbers started a substantial climb after chronic pain was added as a qualifying condition in March 2017. The July 2018 decision to recommend cannabis as a replacement for opioids also has the potential to significantly increase the patient pool. Medical sales are forecast to reach to \$453 million in 2019, peaking at \$547 million in 2021 before sales begin to decline because of adult-use legalization.

In Gov. Andrew Cuomo’s state address on Dec. 17, one of the biggest takeaways was his intent to legalize adult-use sales of cannabis in 2019. His proposal for legalization has a component intended to help bring justice to African-American and other minority communities in New York, who, as elsewhere, represent a



Oklahoma Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

disproportionate share of cannabis-related incarcerations. Legalization is expected to be supported by the Democratic-led legislature.

Current forecasts now account for adult-use sales starting in 2020. The populous market is expected to substantially contribute to the global arena, with adult-use spending in New York growing from \$102 million in 2020 to over a billion dollars in 2022.

Oklahoma

The government of Oklahoma made medical cannabis a reality in record time after voters on June 26, 2018, approved State Question 788, instructing the state to create a regulatory framework within 30 days and be-

gin licensing by Aug. 25, 2018. By December 24, the Oklahoma Medical Marijuana Authority had approved nearly 25,000 patient and 136 caregiver applications, and had licensed 1,284 cultivators, 336 processors and 799 dispensaries, even more stores than in similarly sized Oregon or much larger California.

The original initiative was scheduled for consideration on the 2016 ballot but a dispute over wording between backers and state Attorney General Scott Pruitt led to a lawsuit. The Oklahoma Supreme Court eventually ruled that the language of the original ballot initiative should be restored. But the delay pushed back the initiative to June 2018.

Many dispensaries were already in operation by late 2018, generating an estimated \$19 million in sales of



Oregon 2018 Monthly Legal Spending (In Millions)



Source: BDS Analytics' GreenEdge

medical cannabis. By 2022, that figure is forecast to grow to nearly \$165 million as the number of registered patients approaches 55,000, or about 1.3% of the Oklahoma’s 4.1 million residents at that time.

Oregon

Spending on legal cannabis in Oregon grew to a total of \$671 million in 2018, an increase of 23% over \$546 million in 2017. Monthly spending from January through November, as reported by BDS Analytics’ GreenEdge retail tracking service, is shown in the chart on the next page. Adult-use spending grew to an estimated \$605 million while spending on medical cannabis fell to just over \$66 million. Growth in adult-use sales is slowing, from a 72% increase between 2016 and 2017 to just 27%

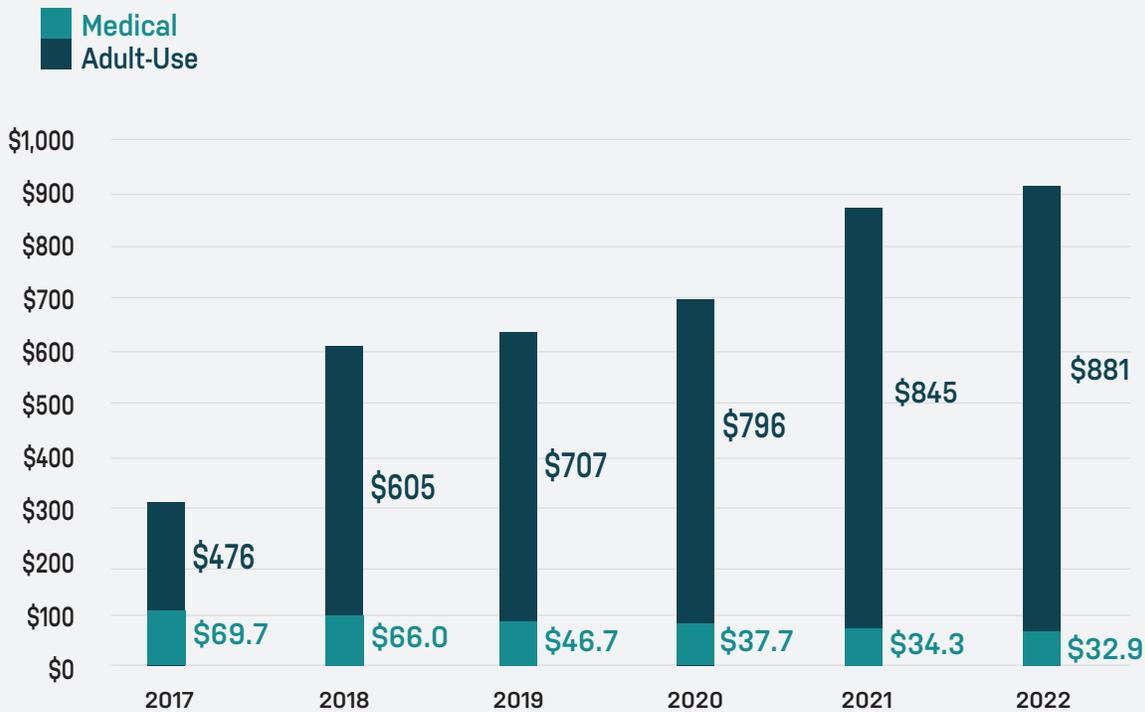
this year. Meanwhile, the decline in medical spending slowed to 5% in 2018. Despite a rapidly shrinking base of registered patients—a loss of more than 21,000 during the year to end 2018 at just over 31,000—the patients who remain are spending more on average.

Oregon’s adult-use spending is forecast to grow to \$881 million by 2022, a CAGR of just over 13%. Medical spending will continue to decline, at a CAGR of nearly 14%, to \$33 million as the number of registered patients shrinks to less than 15,000 by the end of 2022.

The decline in flower’s share of cannabis spending in Oregon has outpaced Colorado’s—beginning with 69% in 2015 and ending with just 42% in 2018 (January through November), according to catego-



Oregon Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

ry data from GreenEdge. Concentrates' share has risen from 18% to 28% over that time while edibles have more than doubled from under 7% of spending to more than 16%.

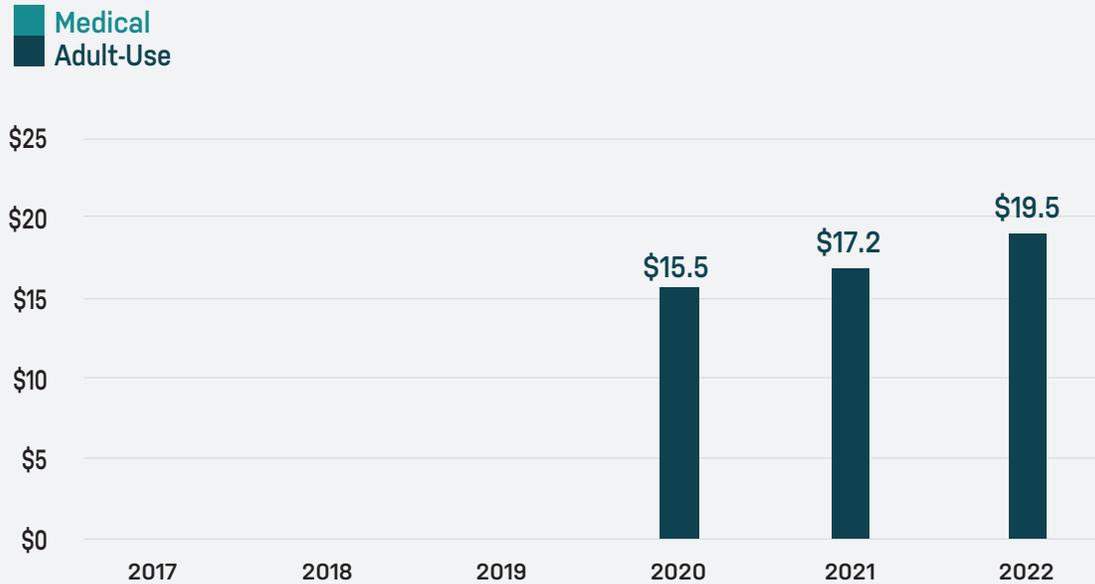
Though consumer tastes are evolving in Oregon toward concentrates and edibles, the shift of spending away from flower is also tied to the radical decline in Oregon's wholesale flower prices en route to retail. Prices have tanked, especially as the outdoor crop came into the pipeline in the fourth quarter, due to the state's broad licensing of producers who are growing several multiples of what the legal market can consume annually.

Utah

A state with some of the nation's harshest drug policies, Utah was a latecomer to looser cannabis laws. The Beehive State's first taste of legal cannabis came in March 2014, when Gov. Gary Herbert signed a law legalizing industrial hemp cultivation and research. This law, HB 105, also legalized low-THC cannabis oil for epilepsy patients who register with a state program. In another incremental move, the state legislature passed a bill in 2018 granting terminally ill patients the "right to try" medical cannabis, along with a companion bill granting the state a monopoly over the production and sale of medical cannabis.



Utah Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

The November 2018 midterms marked a dramatic leap forward for legalization in Utah. After a contentious campaign, voters passed Proposition No. 2, The Medical Marijuana Initiative, with almost 53% of the vote. While the measure limits smoking of cannabis and does not allow as many qualifying conditions as in many other states, it allows cannabis to be recommended for chronic pain and allows home growing of up to six plants.

Soon after the November election, however, Herbert called a special legislative session to modify the medical cannabis system that voters had approved with Prop 2. At the urging of legalization opponents, state lawmakers reversed many aspects of the voter-approved proposition, greatly limiting the potential size

of this incipient market. Signed into law December 3, HB3001 removes a number of qualifying conditions, lowers the number of dispensaries from 40 to seven, removes the allowance for home-growing, and mandates that a pharmacist be on staff at every dispensary. It is estimated that dispensaries will start operating in 2020 and see \$16 million in sales that year, projected to climb to nearly \$20 million by 2022.



Legalization Wave Reaches Asia

The pace at which legalization is spreading around the globe is picking up with major reform efforts happening in every part of the world. Canada and the US dominate legal spending and will do so throughout the forecast and beyond but spending outside of these countries is growing at a noteworthy speed. Legal cannabis sales sans the aforementioned North American giants will make up 6.3% share of legal spending in 2019 (\$1.1 billion) increasing to 11.5% share in 2022 (\$3.6 billion).

International news outlets covered breaking cannabis news in 2018, reporting on every issue from medical cannabis expansion laws to pending adult-use federal legislation. Among the stories:

- Adult-use sales began Oct. 17, 2018, in Canada.
- Luxembourg introduced laws for full cannabis legalization and is likely to become the first European country to allow adult residents to buy and consume cannabis.

- South Korea revised its National Drug Policy on Nov. 23, 2018, to allow for the importation and distribution of cannabis-based oil as treatment of approved conditions. The Ministry of Food and Drug Administration is now in the process of establishing regulations pertaining to patient registration procedures, permitted medicines and more. Medicine will be dispensed in special government-run facilities.

Legal cannabis sales sans the aforementioned North American giants will make up 6.3% share of legal spending in 2019 (\$1.1 billion) increasing to 11.5% share in 2022 (\$3.6 billion)



International Cannabis Market Summary

COUNTRY	LEGAL SPENDING		SITUATION
	2018	2022	
Argentina	\$3.6	\$48.2	After a stall in progress promising news came in July 2018, when regulatory bodies in Argentina announced plans to grow cannabis on a large scale to be processed in neighboring Chile. State agencies will manage production but authorities are also welcoming development by foreign companies, as is evidenced by Canadian LP Aphira signing a letter of intent to establish cultivation and processing facilities in the province of Jujuy.
Australia	\$6.7	\$15.7	Aphira, Inc. has completed the second delivery of co-branded medical cannabis to Althea Company in Australia. The co-branded products include dried packed flower and cannabis oil. Currently there are 2,511 patients with legal access to medical cannabis.
Austria	\$3.0	\$27.1	Limited access to cannabis-based products via prescription. Government banned sales of CBD food and cosmetics in December under existing EU "novel food" laws.
Belgium	\$4.8	\$16.7	Belgium's medical program remains very limited with patients having access to select licensed medicines. Adult-use consumption is illegal but possession of small amounts of cannabis is decriminalized.
Brazil	\$4.1	\$62.2	While Brazil's previous medical cannabis laws only allowed for the importation of cannabis-based medicine on a case-by-case basis, the senate approved a bill in late November 2018 to allow for approved patients to grow and possess a limited amount of cannabis in their homes. This could signal a sea-change in the nation's policy toward cannabis but the election of new President Jair Bolsonaro may spell trouble for the liberalization of drug laws and growth of the cannabis industry.
Colombia	\$1.9	\$8.1	Over 100 cultivation licenses have been issued so far to companies in Colombia, many to Canadian LPs who see the country's huge potential as a major cannabis exporter. Colombia's newly sworn in president, Ivan Duque, has taken a hard line on drugs, decreeing that police arrest citizens found in possession of even small amounts of cannabis. While the president has yet to interfere with the cultivation of cannabis for medical research, it is unclear whether this new track on drug policy will affect the growing medical industry.
Finland	\$0.5	\$0.9	Finland's medical program is very limited. Currently Sativex is the only medical cannabis product prescribed in Finland.
France	\$1.3	\$226.8	ANSM committee recommended broadening the medical program to include a full spectrum of cannabis products. Final results from a second round of questioning are due in September 2019. It is expected that the committee will grant final approval for expanding the medical program, and the legislature will follow the recommendation.
Germany	\$79.0	\$1,009.8	See below.

Source: Arcview Market Research/BDS Analytics



International Cannabis Market Summary - continued

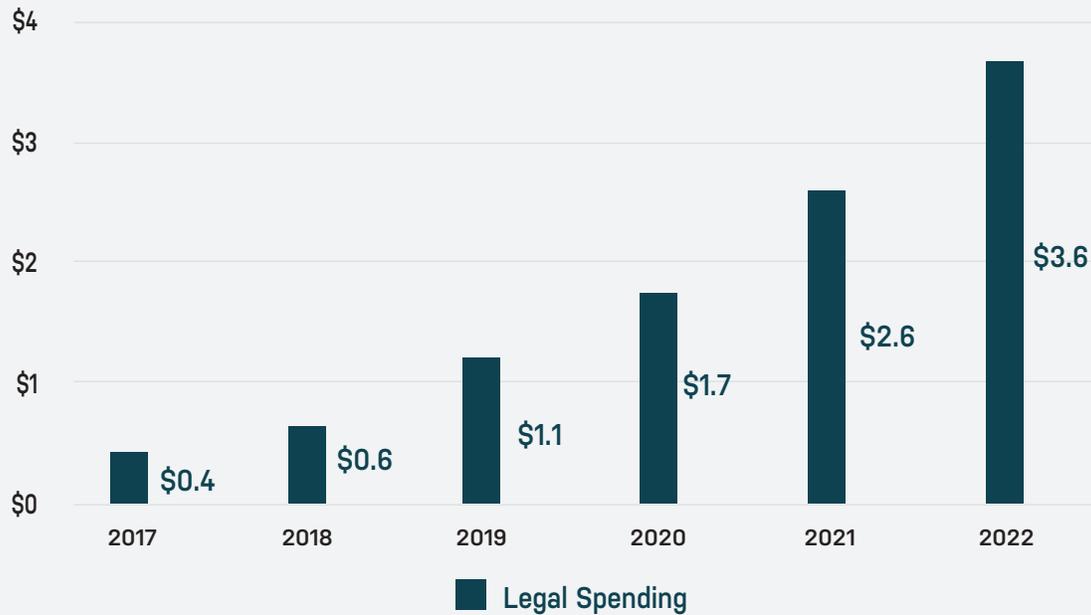
COUNTRY	LEGAL SPENDING		SITUATION
	2018	2022	
Israel	\$49.3	\$79.9	The medical program is experiencing strong growth, reaching over 40,000 patients in 2018. In December 2018, Israel's Parliament unanimously voted to allow exportation of medical cannabis positioning themselves as not only a leader in research but in cannabis exports as well.
Italy	\$5.1	\$112.5	Medical sales continue to grow. The Military Pharmaceutical Plant is able to supply more product for patients making the program less dependent on imports from Canada and the Netherlands.
Mexico	\$24.9	\$537.2	See below.
Netherlands	\$49.0	\$85.1	Limited medical cannabis program relying on imports though the OMC has sought to license an exclusive cultivator. Gray-market adult-use continues via "coffee shops."
New Zealand	\$1.4	\$2.6	Medical cannabis laws were passed on Dec. 11, 2018. There have been one-off approvals for cannabis prescriptions, and the medical market in New Zealand is just getting started.
Peru	\$5.2	\$17.5	Peru legalized medical cannabis in October 2017. While the law stipulated that regulations would be drafted 60 days after the law's passage, a sluggish legislature and protests from activist groups objecting to the exclusion of home growing have delayed the release of any comprehensive regulations.
Poland	\$6.1	\$42.9	Medical cannabis laws went into effect in late 2017 but a ban on local cultivation has hampered growth. In October 2018 Aurora Cannabis was approved as a supplier of medical cannabis.
Portugal	\$1.3	\$15.7	Portugal's legislature passed a bill in July 2018 to legalize cannabis-based medicines. While this is surely a step toward legalization, the bill greatly limits when doctors are able to prescribe cannabis, as well as prohibits many forms of cannabis, which will likely limit patient numbers after the program launches.
Spain	\$2.7	\$48.5	Little movement in national cannabis reform. The legal market remains a patchwork of regional laws and regulations.
*Switzerland	\$130.2	\$163.4	Cannabis products with <1% THC are available in supermarkets to all adults over 18. Pre-rolled cigarettes are the most popular products.
UK	\$23.1	\$541.9	See below.
*Uruguay	\$26.6	\$36.8	Registered purchasers total more than 25,000, alongside 80+ clubs and 8,000+ home growers. Only 17 participating pharmacies as of October. Banking difficulties and limited supply have hindered legal access.
ROW	\$142.0	\$531.4	See below.
Total International	\$571.6	\$3,631	

*Uruguay and Switzerland estimates are derived per legal adult consumer. All other countries are derived per patient.
Note: Population in millions, spending in US dollars.

Source: Arcview Market Research/BDS Analytics



International Legal Spending (In Billions)



Source: Arcview Market Research/BDS Analytics
Note: Excludes US and Canada spending.

- Thailand, long known for its harsh drug laws, approved medical cannabis. The medical program will be much less restrictive than South Korea's. Although adult use is still illegal in Thailand, many legalization proponents see recent medical approval as the first step to full legalization in Thailand opening up a very robust Southeast Asian market.

Spending in markets outside of Canada and the US will experience prolific growth throughout the forecast period. Legal spending in 2019 is forecast to reach \$1.1 billion—nearly twice the \$560.3 spending in 2018. Legal sales are forecast to more than triple between 2019 and 2022 when spending is forecast to reach \$3.6 billion.

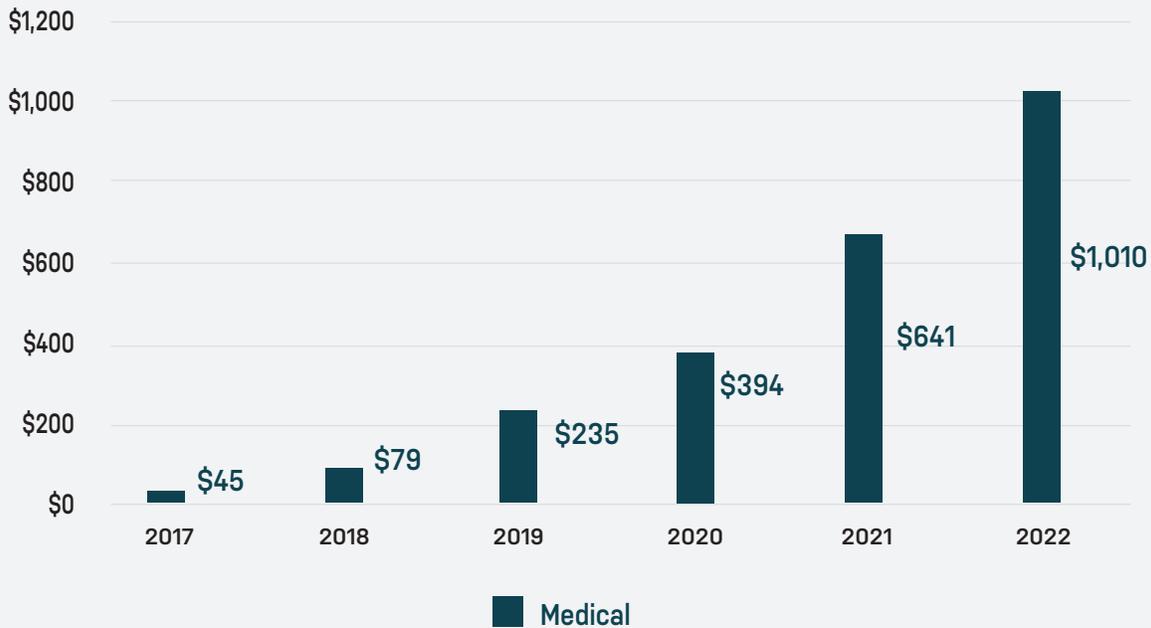
Germany

Germany, working to standardize its medical cannabis program, continues to dominate Europe's legal market. There is strong and steady growth in patient numbers but patients are still experiencing issues in getting cannabis prescriptions filled. The process to begin domestic cultivation, originally set to start in early 2018, has been mired in controversy, including a lawsuit from a company disgruntled with the outcome of the application process.

In March, the Higher Regional Court in Dusseldorf halted the application process after ruling that unlawful administrative mistakes were made in the



Germany Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

tender process for cultivation licenses. The German Institute for Drugs and Medical Devices (BfArM) adjusted application requirements, setting a new application deadline of Nov. 20, 2018, that further delayed domestic cultivation. These ongoing delays for domestic cultivation have benefitted companies with German import licenses, especially Canadian LPs. As demand for medical cannabis continues to rise, more companies are applying for import licenses while license-holders are applying to increase the amount of product that they import.

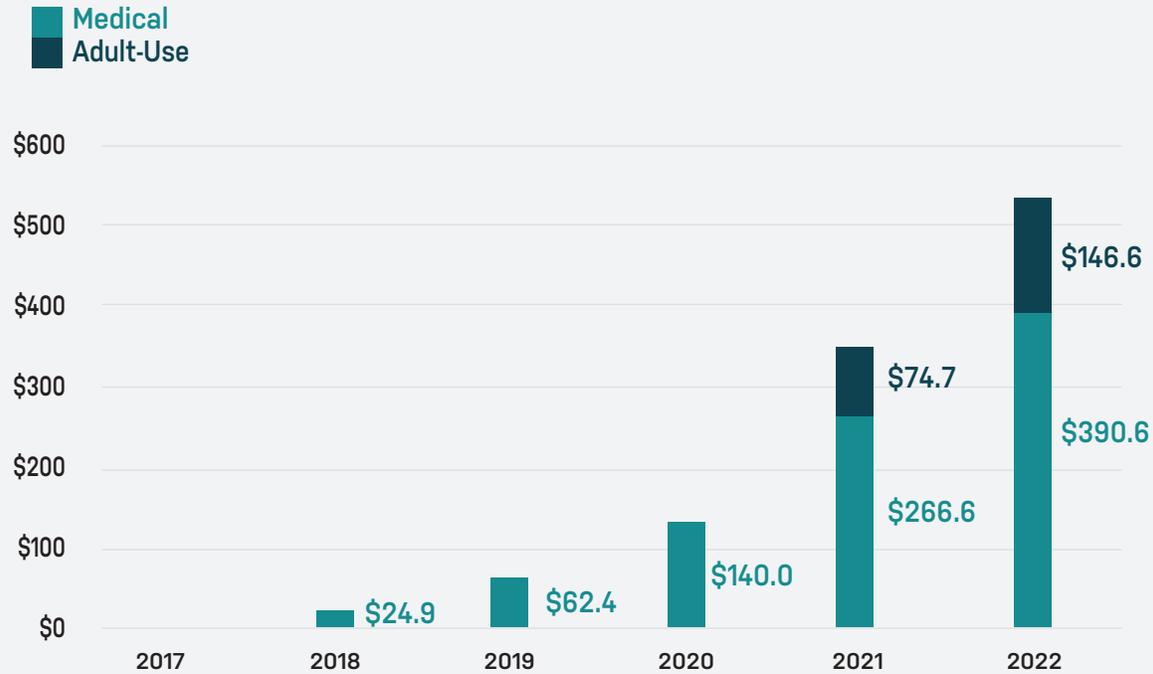
Imports are likely to remain an important part of the German medical market even with domestic cultivation beginning in 2019. Demand continues

to rise, and critics believe that the cultivation limits set by BfArM domestic supply will fail to meet demand. No relevant government data is available, but insurance companies are reporting steady increases in the number of applications for reimbursement for cannabis treatment. Health insurance companies can only reject an application if they can prove that cannabis treatment is unwarranted. Approval rates range between 60 and 70 percent of applications submitted.

Current forecasts have been adjusted to reflect market performance largely based on data reported by statutory health insurance companies. Medical spending is forecast to be robust throughout the



Mexico Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

forecast period reaching \$235 million in 2019. Rapid and significant annual growth is expected to continue through 2022 when sales are forecast to reach slightly over \$1 billion. Adult-use sales are not forecast to begin within the period.

Mexico

The last few months could prove to have been monumental for legal cannabis in Mexico. On October 31, the Supreme Court ruled that the country's adult-use cannabis prohibition was unconstitutional. According to the Associated Press, the court "found that adults have a fundamental right to personal development

which lets them decide their recreational activities without interference from the state." This is the fifth time that such a ruling has been reached, which is significant because when the Supreme Court reaches similar rulings in five separate cases, Mexico's legal system applies the precedent across all of its courts.

Laws regulating cannabis use are unchanged. Individuals can still be arrested for possession and consumption, but can challenge the constitutionality of the case in the court system. While the commercialization or sale of cannabis is not covered under the ruling, the new precedent mandates that the courts must allow personal consumption, possession and growing.



Legalization proponents see the ruling as a pivotal step in building a viable legal cannabis industry in Mexico. President Andrés Manuel López Obrador's administration supports legalization and Sen. Olga Sánchez Cordero has introduced a bill to legalize and regulate cannabis consumption and sales for medical and adult use. High-ranking officials see the next steps as formalities and have indicated that legalization will likely occur in the near future. Businesses are being urged to perform due diligence and lay the groundwork to make swift inroads into Mexico. Aurora Cannabis took heed, announcing in early December that it will acquire Farmacias Magistrales S.A., Mexico's first and only federally licensed importer to date of raw materials containing THC.

Current forecasts assume that Mexico's medical program will expand quickly, with revenues experiencing significant growth within the forecast period. Medical spending is forecast to grow from \$62.4 million in 2019 to \$390.6 million in 2022.

Adult-use sales are forecast to start in 2021, to reach \$74.7 million that year and nearly double to \$146.6 million by 2022. Mexico's large population will position the country as a leading international market in 2022 when total legal spending is forecast to reach \$537.2 million.

United Kingdom

The UK, the world's fifth-largest economy, greatly expanded the potential for growth in its medical cannabis market on Nov. 1, 2018. Prior to that date, UK patients only had access to cannabis-derived medicines such as low-potency oils, or GW Pharmaceuticals' Sativex, approved to relieve symptoms of multiple scler-

osis in 2010. As of November 1, patients could seek access to other cannabis-derived treatments.

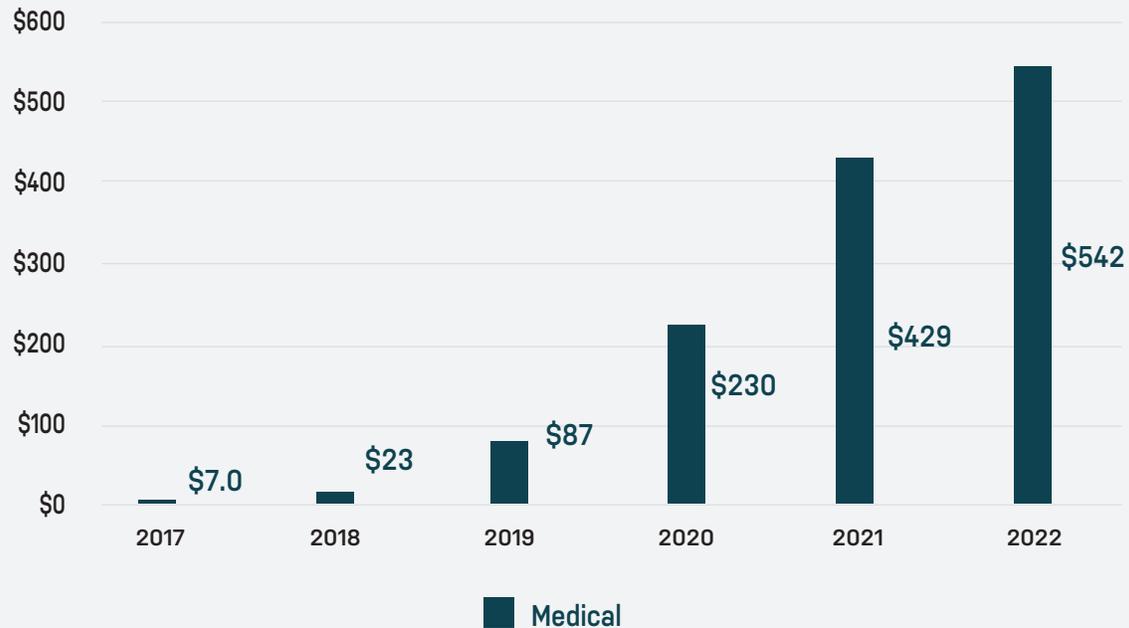
The series of events leading to this change began when Health Secretary Jeremy Hunt proclaimed his support for medical cannabis on June 20 and championed a review of existing law that limited access to cannabis-derived treatments. Home Secretary Sajid Javid announced on July 26 that cannabis products would become available for patients with an "exceptional clinical need" and that cannabis would be re-scheduled on the UK Misuse of Drugs Act. The new rules were approved on October 11 and went into effect on November 1.

Under the new rules, there is no defined list of qualifying conditions for which patients may be prescribed medical cannabis. Instead, according to a statement by the Home Office, physicians "must make decisions on prescribing cannabis-based products for medicinal use on a case-by-case basis, and only when the patient has an unmet special clinical need that cannot be met by licensed products."

The effect on legal spending on cannabis in the UK will be considerable. The forecasts presented in "The State of Legal Marijuana Markets: 6th Edition," were predicated upon an expansion of the nation's medical program beginning in 2021. Under the new rules, with no defined list of qualifying conditions, an expansion of patients consuming cannabis-derived products will occur immediately and rapidly. Spending is forecast to reach \$87 million in 2019 and grow to nearly \$542 million by 2022—alongside a rise in the number of patients from just 11,000 at the end of 2018 to more than 256,000 at the end of 2022.



UK Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

REST OF THE WORLD (ROW)

The list of countries experiencing cannabis reform on all levels continues to grow. The industry has seen progress from incremental steps to legalize the use of medical CBD products, to laws totally transforming existing medical programs, to promises of full legalization in the near future in significant world markets.

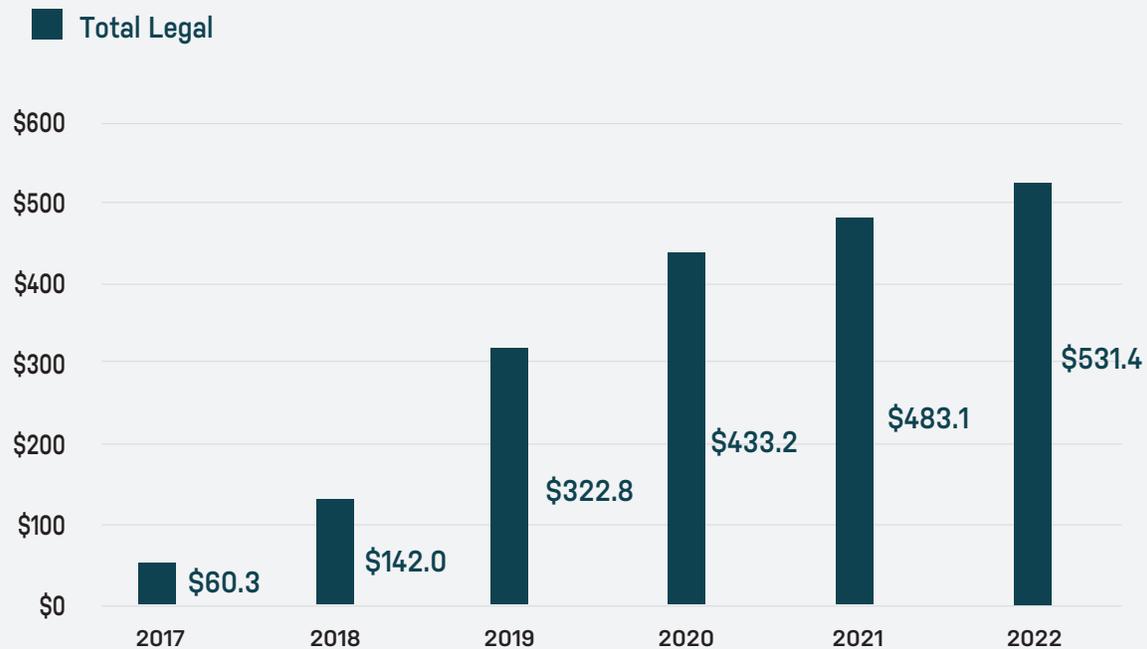
In addition to the international markets listed in the table at the beginning of the chapter, there are several markets that contribute to global legal spending. A ma-

jority of the markets not listed have highly restrictive legislation, limited patient pools or barriers to patient access that result in relatively low spending. But they are still developing new rules, and significant growth is forecast within ROW markets as reforms continue.

The ROW estimate specifically includes spending from Australia, Chile, the Czech Republic, Croatia, Denmark, Greece, some states in India, Jamaica, Lithuania, Luxembourg, Macedonia, Malta, New Zealand, Norway, the Philippines, Romania, San Marino, South Korea, Sweden, Thailand, Turkey and Zambia. The estimate also assumes spending from a number of other nations with positive, if slow,



Rest of the World Legal Spending (In Millions)



Source: Arcview Market Research/BDS Analytics

movement toward legal cannabis sales. Medical spending makes up the overwhelming share of ROW sales outside of the pioneering adult-use country Uruguay throughout the forecast period, but it is assumed that Luxembourg and South Africa will begin adult-use sales by 2022.

Many of these markets saw significant progress in 2018:

- The government of Greece created a framework for providing legal medical cannabis to qualifying patients in June 2017. In fourth quarter 2018, Greece issued its first cultivation licenses to two privately owned companies and expects to issue more licenses shortly. Greece is

focused on cannabis exportation as a means to help its struggling economy.

- Lithuania approved the use of medical cannabis in October 2018. The law will become effective May 1, 2019.
- Luxembourg announced in November 2018 that it would legalize adult-use cannabis consumption and sales for all adult residents.
- Philippine President Rodrigo Duterte supports reform and says that he will sign legislation to broaden legal medical cannabis access. The Philippine Compassionate Medical Cannabis Act is cur-



rently before the Philippine House of Representatives.

- South Africa's Constitutional Court unanimously ruled to decriminalize cannabis consumption. The ruling gave Parliament 24 months to change the laws to reflect the court's ruling.
- South Korea legalized medical cannabis in late November 2018. Products will be strictly controlled and restricted but the legislation is a breakthrough for Southeast Asia.
- Thailand's National Legislative Assembly voted to allow medical cannabis for medicinal and research purposes on Dec. 25, 2018. The legislation legalized production, importation, exportation, and possession of cannabis for medical purposes. Patients with a qualifying condition must obtain a medical card from a state-licensed doctor.

This progressive trend is expected to persist throughout the forecast period. It is assumed that new markets will continue to enter the industry, mainly through establishing medical programs, then legalize adult-use spending as has been the pattern everywhere but Uruguay.

Spending is estimated to grow at a CAGR of 54.6% from \$60.3 million in 2017 to \$531.4 million in 2022.

With 193 countries in the United Nations, this ROW category has enormous upside. Cannabis consumption in many Asian and African markets dates back millennia, and many nations are rapidly developing into active participants in the world trading system. This momentum, along with our conservative assumptions in forecasting the markets that we model in detail, provide a high confidence level in forecasting that global cannabis sales will more than triple from \$9.6 billion in 2017 to \$31.6 billion in 2022.

ROW spending is estimated to grow at a CAGR of 54.6% from \$60.3 million in 2017 to \$531.4 million in 2022





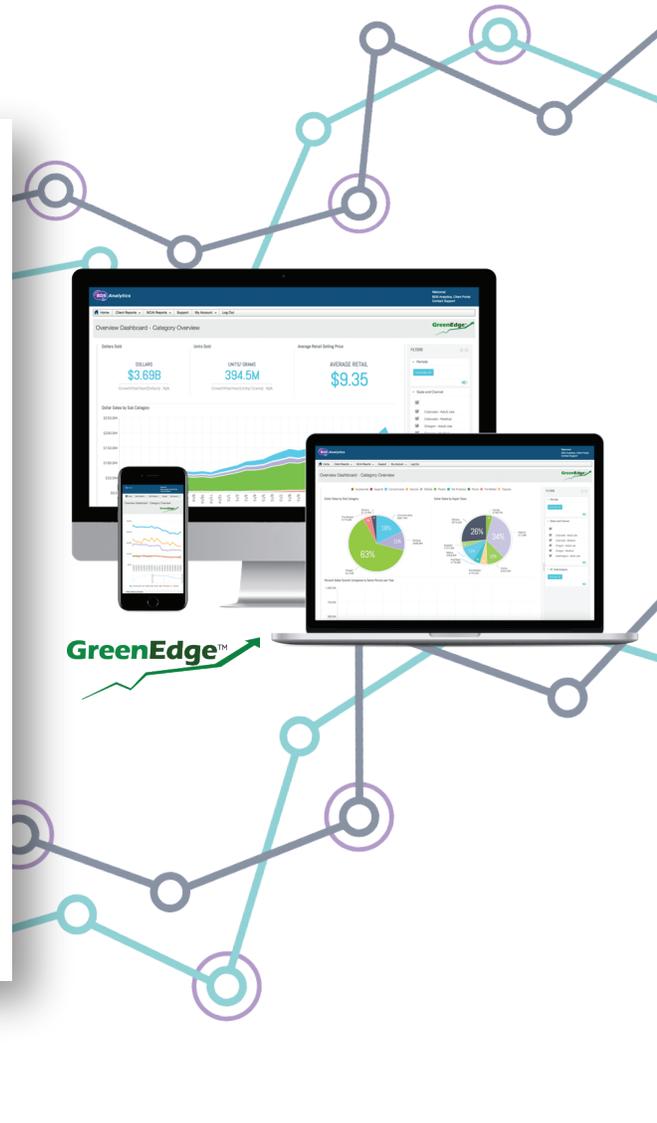
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“BDS Analytics has been a great partner from Day 1. The retail data they provide our business helps us in so many ways. We're able to track trends, more smartly merchandise our dispensary, and just make better business decisions all-around.”

Debby Goldsberry, Executive Director, Magnolia Wellness



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