

2022 U.S. Cannabis Report

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Industry Projections & Trends

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About New Frontier Data



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

Mission

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

Core Values

- Honesty
- Respect
- Understanding

Vision

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

Commitment to Our Clients

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

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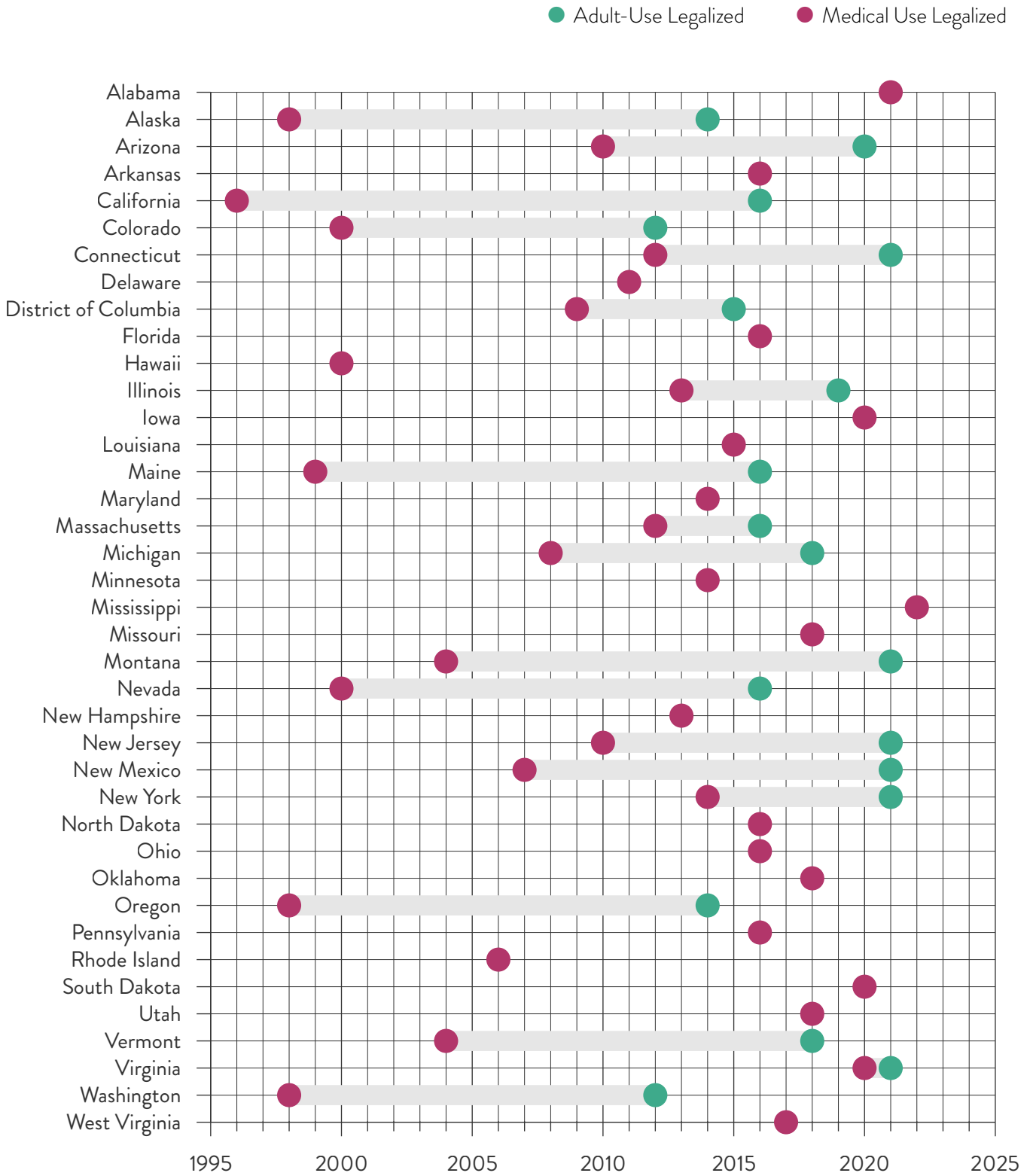
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2022 U.S. Cannabis Industry Update

Legalization Timeline



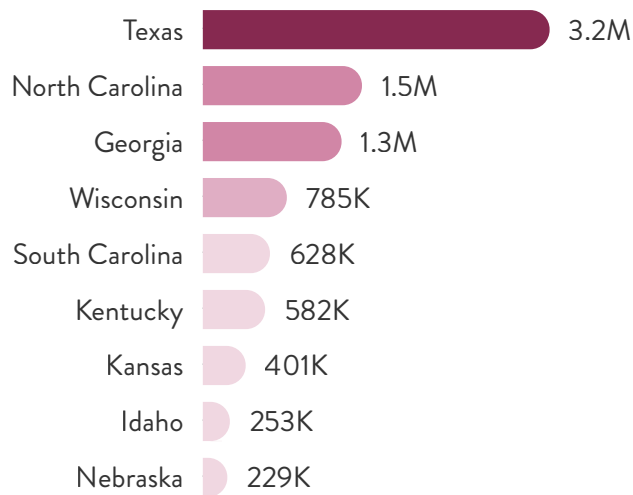
Strong Outlook for Potential New State Market Activation in Coming Years

WITH EACH passing year as the number of legal states (and the size of the legal industry) grows, there is increasing pressure for federal action to address the disconnected patchwork of state regulations nationwide. With Democratic leadership in place, the odds for federal cannabis reform seem likelier than they would under more conservative Republican administrations. However, though support for federal reform is higher within the Democratic Party, consensus on the particulars of a national reform measure remains elusive, as liberals and moderates remain divided on several issues, including:

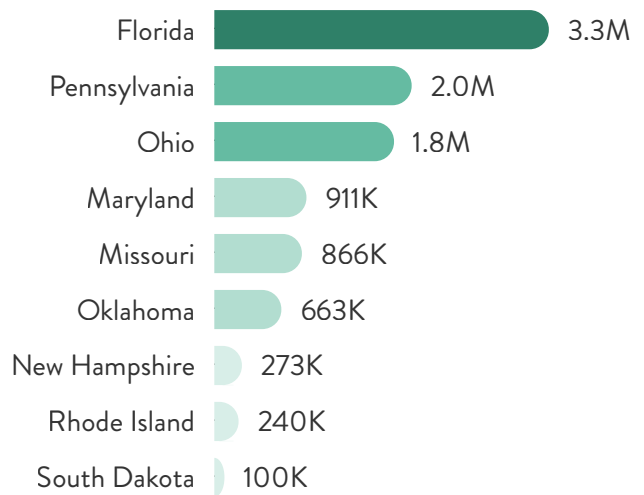
- Legalization vs. decriminalization;
- The appropriate federal tax rate;
- The extent to which the federal government should prioritize social-equity programs;
- Which cannabis-offenders might be eligible for release and records expungement;
- How much the federal government should invest in supporting small cannabis businesses;
- The FDA’s role in governing consumer products, and;
- Investments in advancing cannabis research.

Potential New Markets by 2030: State Estimated Cannabis Consumer Populations

MEDICAL USE



ADULT-USE



Note: Values shown are the estimated populations of existing cannabis consumers in 2022. Cannabis consumer is defined as a state resident who consumes cannabis at least once per year.

Furthermore, without a filibuster-breaking majority in the Senate, any national reform measure would need the support of at least 10 GOP senators, further raising the bar for getting any reforms done within this Congressional cycle.

While more limited reforms are likely to be implemented in the near term, especially banking reforms to enable the cannabis industry to fully participate in the national and global financial markets, the low likelihood of sweeping national decriminalization will perpetuate the current patchwork of state model for the foreseeable future.

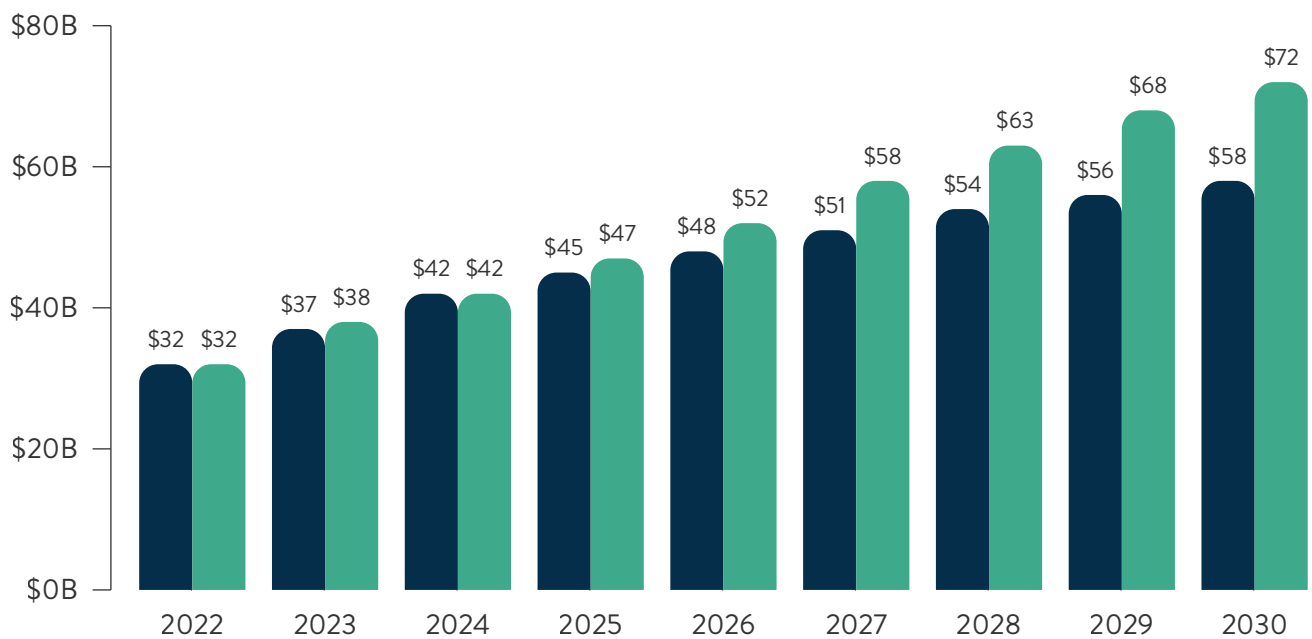
POTENTIAL NEW LEGAL STATE MARKETS

Based on New Frontier Data’s analysis of state legalization efforts, we have identified nine states demonstrating strong likelihood to legalize adult-use cannabis, and nine states likely to legalize medical use prior to 2030. Passage of medical-use legalization in those nine markets would bring legal medical cannabis access to an additional population of nearly 74 million Americans (8.9 million current cannabis consumers). Passage of adult-use legalization in the specified nine markets would bring adult-use cannabis to a population of 67 million additional Americans (across which there are an estimated 10 million current cannabis consumers).

Legal Cannabis Sales Growth

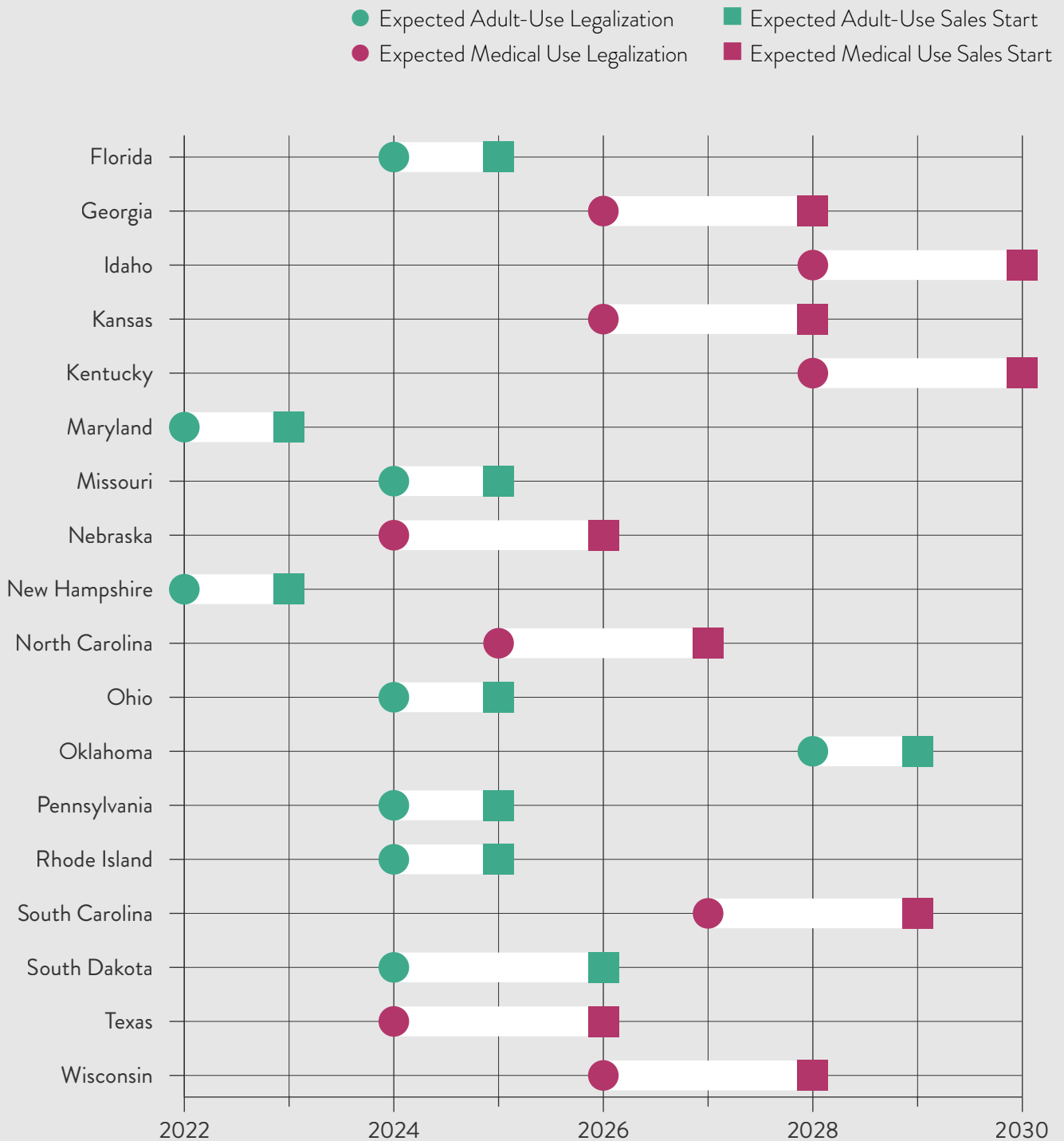
Current legal market growth projection vs. expanded legal market growth

● Current Legal Sales ● Potential Legal Sales



Note: Historically, states which legalize adult-use cannabis on top of existing medical markets experience declines in medical market patient participation.

Potential Legalization Timeline



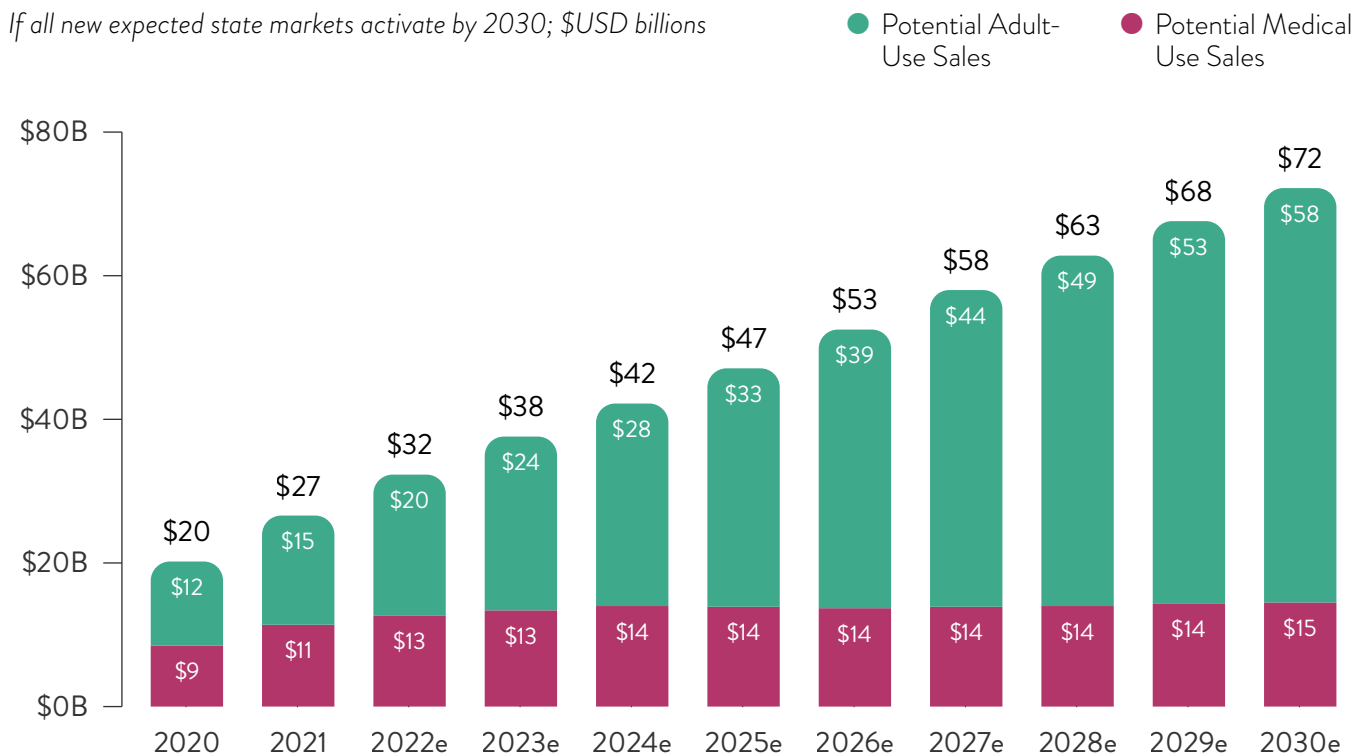
Note: Year shown for new markets is the expected year of legalization. New Frontier Data estimates a sales start date of +2 years from legalization for newly legalized medical markets, and +1 years from adult-use markets with preexisting medical markets. South Dakota is the sole exception, assumed to have an adult-use sales start date of +2 years from legalization.

In states that have chosen to legalize cannabis for adult-use on top of an existing medical cannabis program, the key drivers of size and growth for each market have been in the details of the respective regulatory structures. Some of the key distinctions having the greatest impact on legal market sales are:

- The chosen integration approach for retail access of both market types;
- Availability and accessibility of retail outlets (e.g., differences in total number of accessible retail locations between market types);
- Maturity level of existing medical market (e.g., the more entrenched a medical market is before adult-use activation, the higher its likelihood to maintain the patient base)
- Effective tax differences between medical and adult-use programs;
- Ease of medical market entry by new participants (e.g., number and types of approved qualifying conditions in medical markets, cost of card renewal);
- Differences in product type restrictions between markets; and
- Home cultivation/caregiver laws.

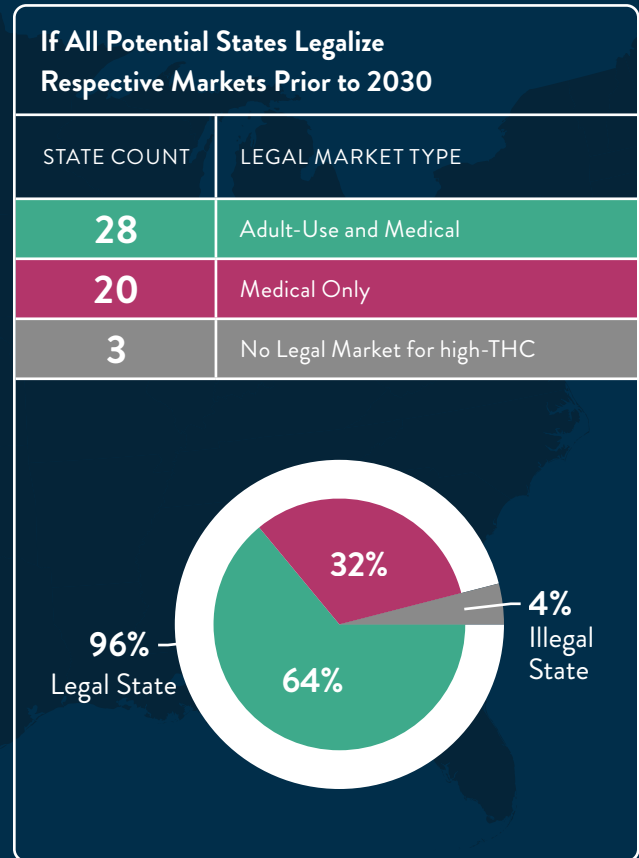
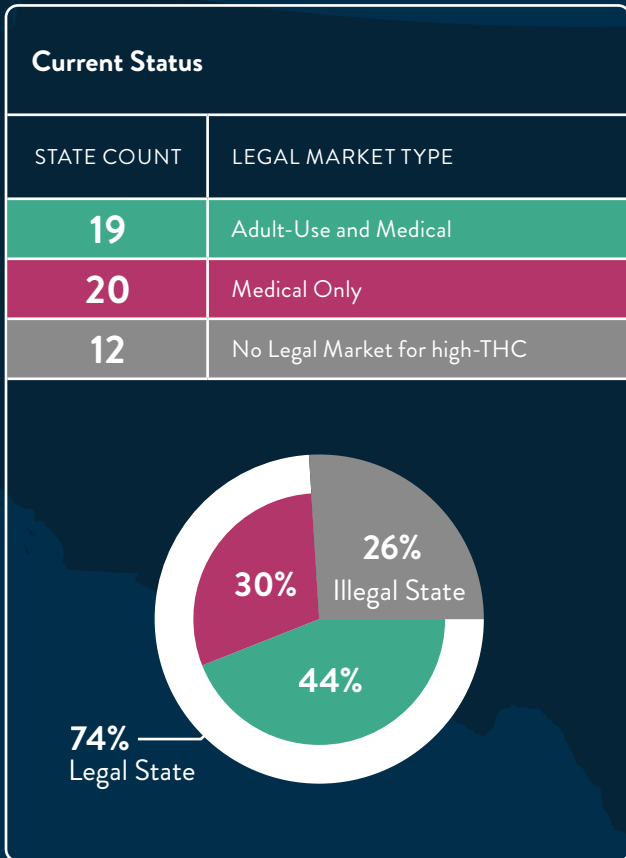
Potential Growth of the U.S. Legal Cannabis Industry

If all new expected state markets activate by 2030; \$USD billions



Note: Includes sales from all 18 new potential markets.

Percentage of Americans Living in Legal Cannabis Markets



If all 18 potential states are successful in enacting legalization measures over the next eight years, it would not only add an additional \$14.5 billion annually to U.S. legal retail sales by 2030, but also immeasurable political pressure for federal reform. The new markets would increase the percentage of Americans living in states with some form of legal cannabis access to 96%, and of those living in states with legal access to adult-use cannabis to 64%.

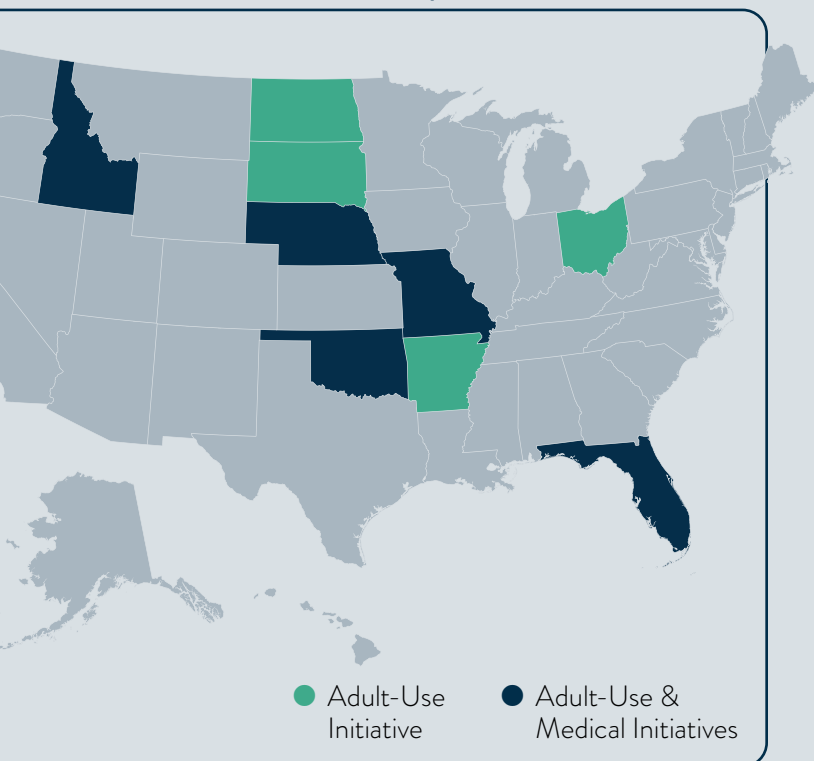
While it is difficult to pinpoint when federal legalization may occur, or what form it might take, it seems clear that expansion of the legal market would create further public support and social normalization that lawmakers would be hard pressed to ignore.

Current Proposed State-Level Initiatives in 2022

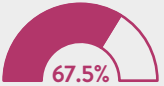

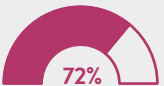




THE 2022 midterm elections represent opportunities for voters to again demonstrate support for new cannabis markets across a number of states. There are proposed adult-use ballot initiatives in Arkansas, North Dakota, Ohio, and South Dakota. Similarly, there are both adult-use and medical ballot measures proposed in Florida, Idaho, Missouri, Nebraska, and Oklahoma. Every initiative would need

to complete a signature-gathering process and be certified by their respective state before appearing in front of voters in the fall. Additionally, each proposed initiative can expect to face both procedural and legal headwinds before (and in some cases even after) the elections. For example, the Oklahoma measure is currently subject to a lawsuit claiming that signatures collected in Native American territory are invalid. Such challenges are to be expected throughout the upcoming year.

States with 2022 Proposed Initiatives



Several states are also considering cannabis related legislation with varying levels of support. Georgia introduced state-level legislation for both medical and adult-use in 2021, yet there has been no movement on either. Kentucky has a state-level medical cannabis bill under consideration, though the state Senate is presenting significant headwinds. In Maryland, an adult-use bill has been pre-filed; if it passes the legislature, the question of legalization will be put to voters on the 2022 ballot. The Maryland measure has a fair chance of passage as a 2021 poll showed 67% of Maryland voters support legalization. New Hampshire saw a cannabis legalization bill pass the state house on January 6, 2022. This bill moved to Senate where similar bill failed two years ago.

State	Current Proposed Initiatives	Legality Type	Polls
Arkansas	Arkansas Recreational Marijuana Initiative	● Adult-Use	 Support medical use (2021)
	Arkansas Decriminalize Marijuana, Create Regulations and Grant Limited Immunity to Cannabis Businesses Initiative	● Adult-Use	
Florida	Florida Medical Marijuana for Mental Health Disorders Initiative	● Medical	 Support legalization (2021)
	Florida Medical Marijuana Plants Initiative	● Medical	
	Florida Marijuana Use and Growth Legalization Initiative	● Adult-Use	
Idaho	Idaho Marijuana Legalization Initiative	● Adult-Use	 Support medical use (2020)
	Idaho Medical Marijuana Initiative	● Medical	
Missouri	Missouri Changes to Medical Marijuana Program Initiative	● Medical	 Support medical use (2021) Support adult-use (2021)
	Missouri Marijuana Legalization and Automatic Expungement Initiative	● Adult-Use	
	Missouri Marijuana Legalization and Commercial Facilities Initiative	● Adult-Use	
	Missouri Marijuana Legalization Initiative	● Adult-Use	
Nebraska	Nebraska Medical Marijuana Regulation Initiative	● Medical	
	Nebraska Medical Marijuana Program Initiative	● Medical	
	Nebraska Medical Marijuana Initiative	● Medical	
	Nebraska Marijuana Legalization Initiative	● Adult-Use	
North Dakota	North Dakota Legalize Marijuana and Allow Home Growth Initiative	● Adult-Use	 Supported measure to legalize (2018)
Ohio	Ohio Marijuana Legalization Initiative	● Adult-Use	 Supported measure to legalize (2015)
Oklahoma	Oklahoma State Question 818, Cannabis Commission and Medical Marijuana Regulation Initiative	● Medical	
	Oklahoma Marijuana Legalization Initiative	● Adult-Use	
	Oklahoma Marijuana Legalization and Taxation Initiative	● Adult-Use	
South Dakota	South Dakota Marijuana Legalization Initiative	● Adult-Use	 Support legalization (2020)

Legal Industry Sales Growth Across States with Current Legal Markets

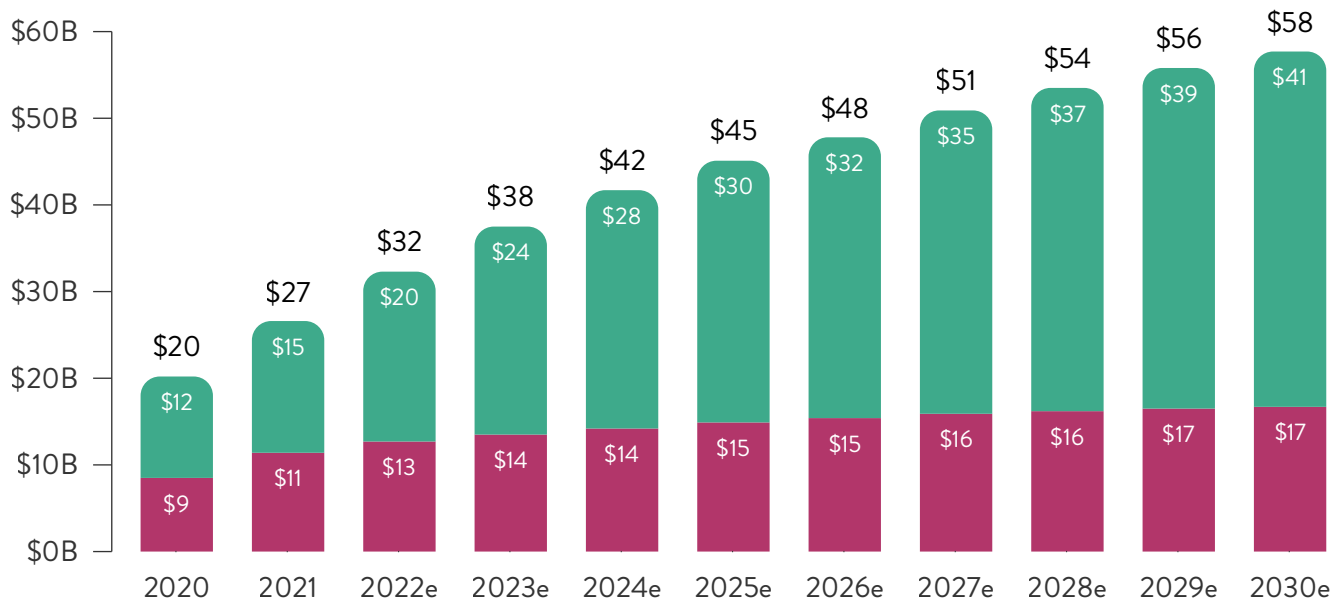
THE LEGAL cannabis market was worth an estimated \$26.5 billion in 2021, and is expected to reach annual sales of \$32 billion in 2022. Fueled by strong consumer demand and an influx of newly operational legal state markets, annual legal sales of cannabis in the U.S. are projected to grow at a compound annual growth rate (CAGR) of 11% in the years between 2020 and 2030, and reach beyond \$57 billion.

In states where it is currently legal, annual sales of medical cannabis are projected to grow at a 7% CAGR through 2030, from \$8.5 billion in 2020 to an estimated \$16.7 billion by 2025. During the same period, adult-use sales are projected to grow at a 13% CAGR, from \$11.7 billion to \$40.9 billion.

Growth of the U.S. Legal Cannabis Industry

Across currently legal states only, with no expectation for new legal markets; \$USD billions

● Legal Adult-Use ● Legal Medical Use



Note: Market size projections in this chart are based solely on the state markets that have passed medical and adult-use legalization initiatives as of November 2020, and do not include assumptions for any additional states that may pass legalization measures in the future.

Overall growth in the national legal industry is fueled by convergent forces, including:

- The addition of new legal revenues from state markets that have recently reformed their cannabis laws and expect operational sales within two years;
- Sustained demand growth in legal states as consumers make the transition from the unregulated market to the legal one; and
- Increased cannabis consumption throughout the U.S. population as public recognition of cannabis' expansive therapeutic value grows, usage becomes increasingly normalized and destigmatized, and the product landscape is diversified for more medical and wellness uses.

LEGALIZATION'S IMPACT: INCREASED COMPETITION BETWEEN MARKETS AND DOWNWARD PRICE PRESSURES

Market competition created by the activation of a legal market — both within the legal market and between illicit and legal markets — tends to create downward price pressure. The speed of retail price declines is influenced by the regulatory structure of the market (e.g., prices will generally decline more slowly in limited license markets than in unlimited licenses markets, and more slowly in medical markets than in adult-use markets). However, other factors (e.g., how quickly retail outlets open, state taxation levels, and the quality and breadth of available products) also have significant effects.

Decline in Average Price per Ounce of Flower in the U.S.

Average paid by consumers across all markets



Note: Price per ounce data was scraped from self-reporting consumer sites (i.e. PriceofWeed Index, etc) for both high- and medium-quality cannabis flower across all U.S. states, and includes prices paid by consumers in illicit markets.

Looking specifically at state-level flower prices, it is the oldest adult-use markets — CO, WA, and OR — which have seen some of the steepest cannabis price declines. Since 2010, average prices paid per ounce have fallen approximately 30%.

While competitive forces and economies of scale should continue to drive down both wholesale and retail prices in the legal market,

strong growth in consumer demand will ensure sustained positive market growth through 2030. Furthermore, increasing demand for value-added products (i.e., vapes, concentrates, edibles, and topicals) will buoy prices, since those products have held their premium pricing better than flower. As value-added products command an increasing market share (in the most mature markets, flower now accounts for less than half of all sales), the rate of market-wide price compression is expected to slow relative to prices in markets where flower remains the dominant product.

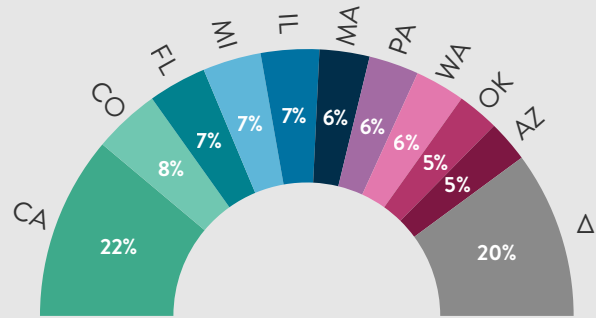
New Frontier Data projects that by 2030, California, New York, and Illinois will be the three largest legal state markets, with Florida, New Jersey, and Michigan close behind.

△ Denotes "Rest of Legal States Combined" and includes annual revenue projections for 29 currently legal states with expected sales operational before 2030. All share calculations are based on combined legal sales in both existing medical and adult-use markets.

Top 10 Largest Legal State Markets

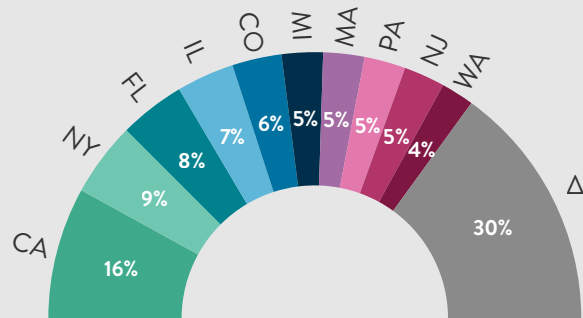
2021

Annual sales, legal medical and adult-use combined.



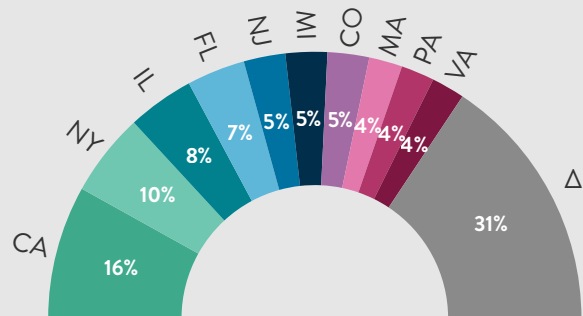
2025

Projected annual sales, legal medical and adult-use combined.



2030

Projected annual sales, legal medical and adult-use combined.



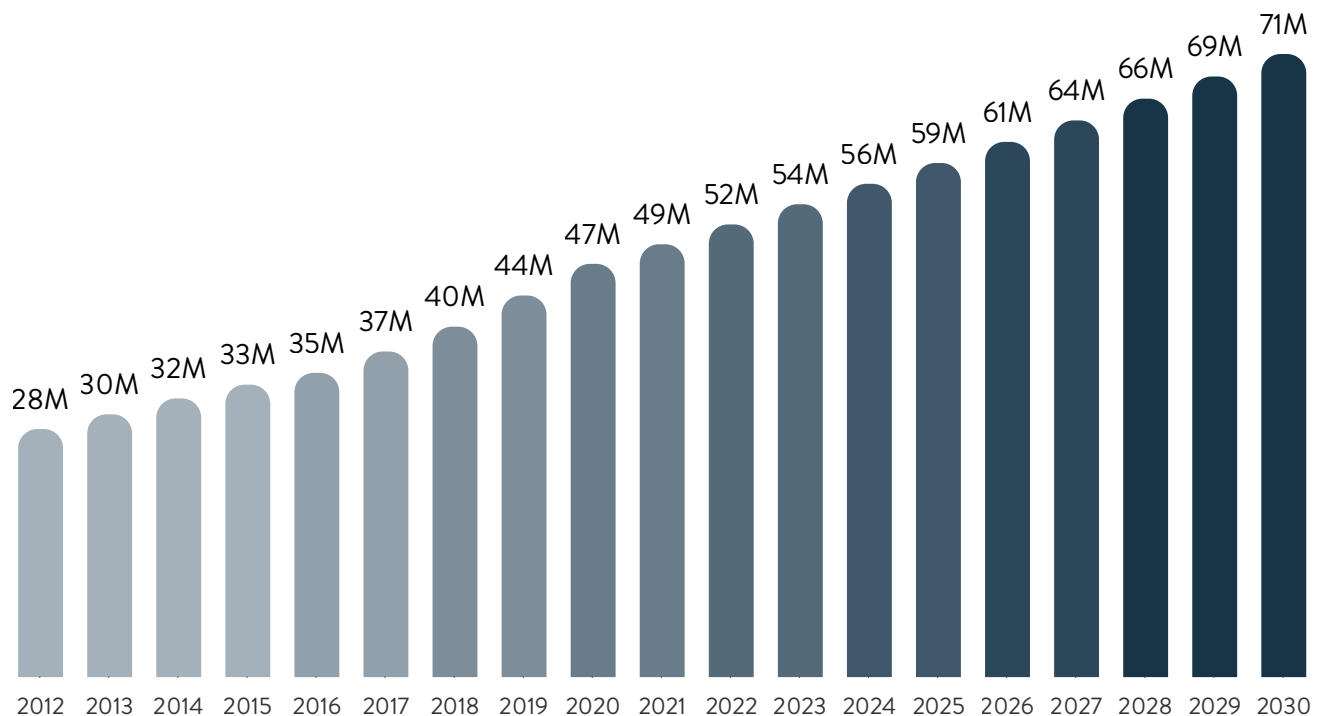
The Growing U.S. Cannabis Consumer Base

AN ESTIMATED 52 million U.S. adults will consume cannabis at least once in 2022 across both legal and unregulated markets. That number is projected to grow by roughly 4% per year over the next eight years, reaching an estimated 71 million U.S. consumers by 2030.

Notably, five of the 10 states with the most consumers (i.e., FL, NC, OH, PA, and TX) are still several years away from legalizing adult-use, while Texas and North Carolina have yet to approve full medical programs. The current restraints on legal cannabis in those markets underscore the scale of opportunity over the medium term, as there remain many major markets for the legal market to expand into throughout the coming years.

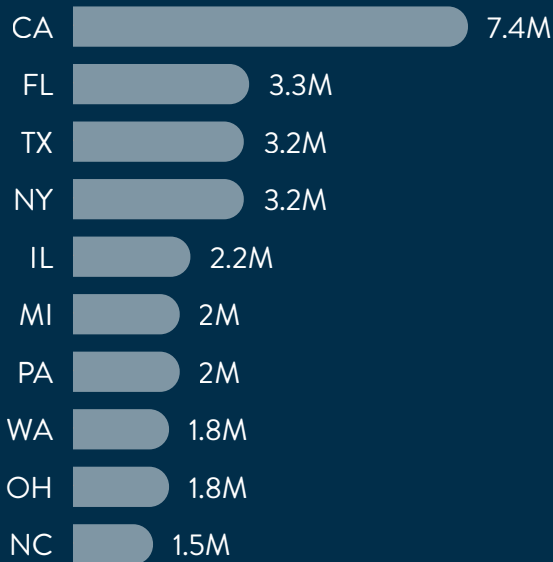
Total U.S. Cannabis Consumers

2012-2030



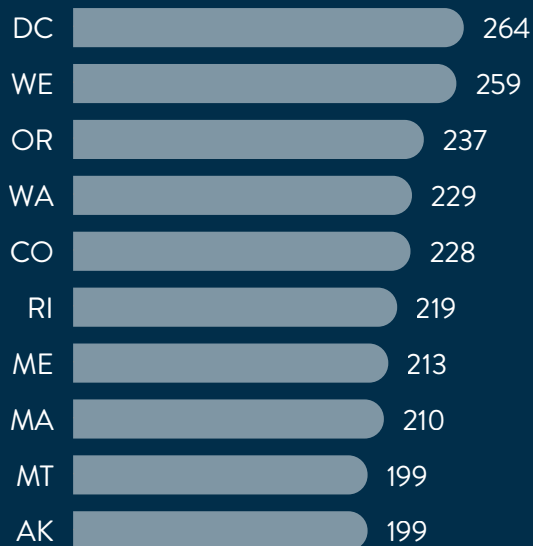
States with the Most Cannabis Consumers

2022e, consumers in millions



States with Highest Cannabis Consumer Density

Est. cannabis consumers per 1,000 people



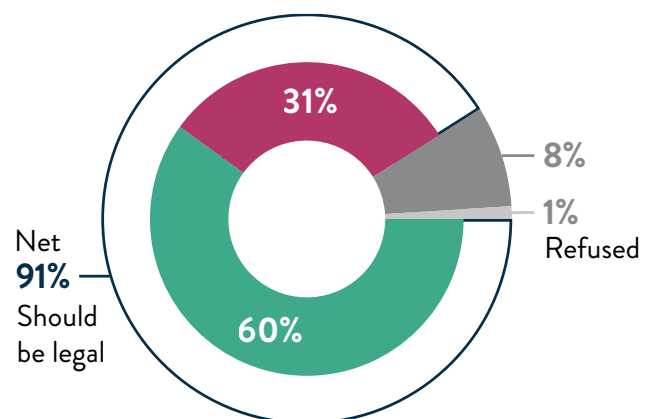
Note: Counts are for consumers who consume cannabis at least once per year.

NATIONAL SUPPORT FOR LEGALIZATION AT ALL-TIME HIGH

Support for cannabis legalization is among the fastest-evolving social issues in the U.S. With 39 states including D.C. (and counting) choosing to legalize and open markets for legal cannabis sales, social stigma about the plant's usage has been quickly eroding. According to Gallup's most recent polling, support for legalization hit an all-time high of 68% in 2020. Conversely, a Pew Research Center study from April 2021 found just 8% of U.S. adults saying that cannabis should not be legalized at all.

Percent of U.S. Adults Who Say Marijuana...

- Should be legal for medical & adult-use
- Should be legal for medical use only
- Should not be legal



Source: Pew Research Center; Survey of U.S. adults conducted April 5-11, 2021.

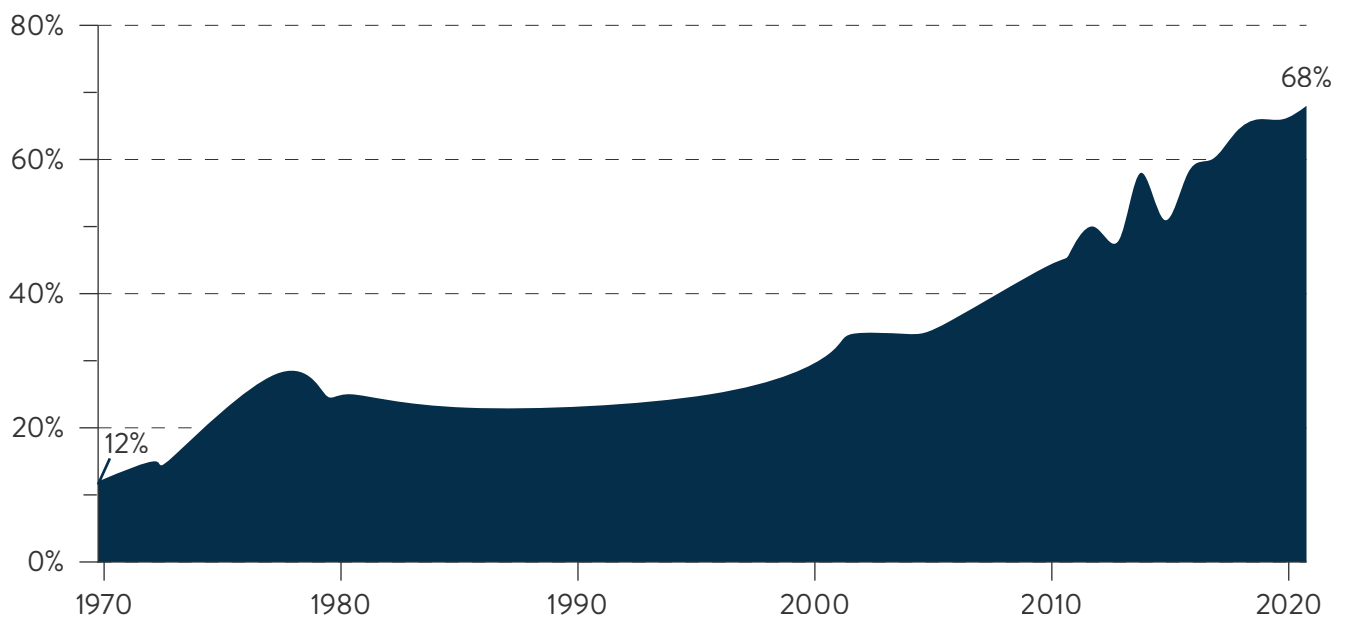
One attendant benefit of rising social acceptance is improved quality of cannabis data available to the industry. The punitive enforcement of cannabis prohibition has resulted in underreporting among government surveys of cannabis consumers, as some have been reticent to admit their use. However, as the steady increase in public support for legalization and the expansion of legal state markets work in tandem to quicken the normalization of attitudes, the margin of underreporting errors seen in survey-reported usage rates collected by the National Survey on Drug Use and Health (NSDUH) will continue to diminish.

RATES OF REPORTED CANNABIS USE CONTINUE TO RISE

Roughly 12% of American adults aged 18+ report using cannabis at least once per month, with 18% reporting having used cannabis in the previous year – both new records for NSDUH. The number of regular cannabis users has grown by 15 million since 2010 (surpassing 31 million in 2020), reflecting rapidly evolving public attitudes toward cannabis and accelerating social normalization, trends expected to continue as more states liberalize policies and more consumers find ways to integrate cannabis into their lives.

Support for Full Legalization

Q: Do you think marijuana should be made legal?



Source: Gallup Opinion Poll on Support for Legalization

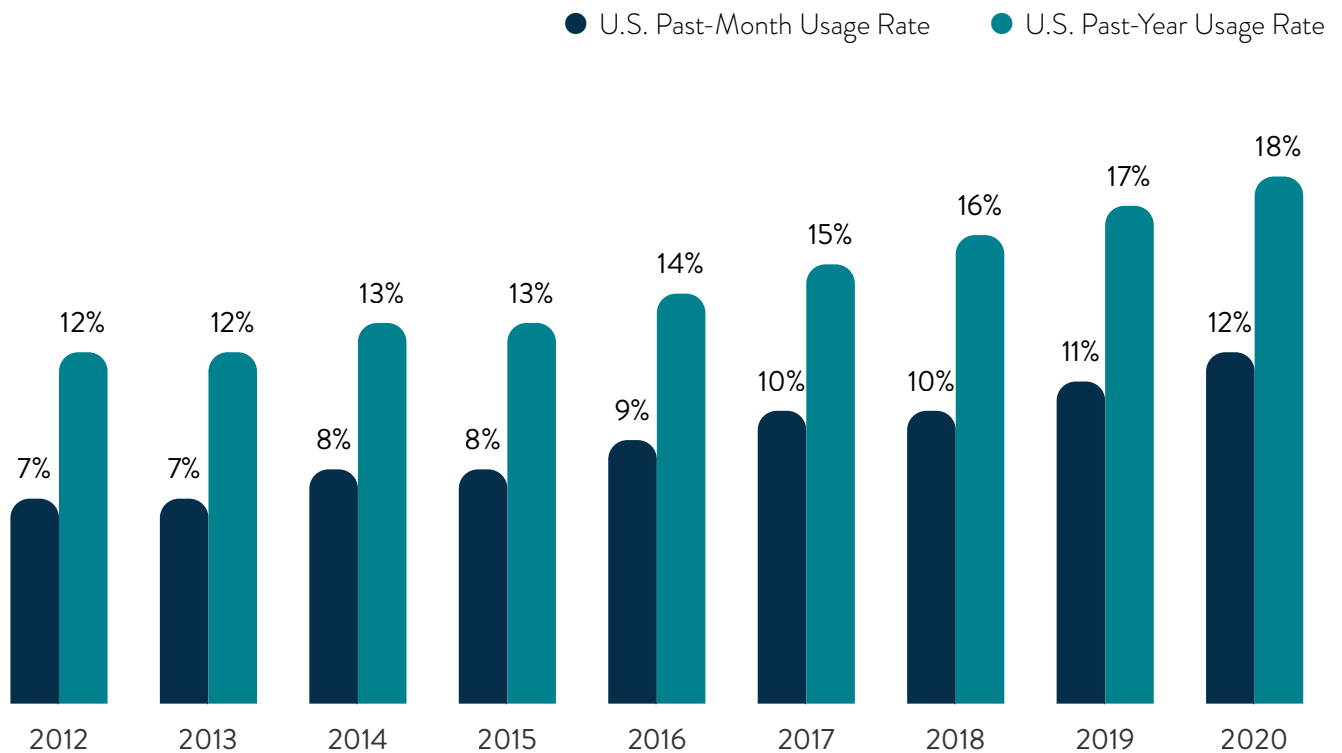
Oklahoma saw the highest increase in past-year cannabis usage over the last year (as reported by NSDUH survey), largely due to the opening of the state's easily accessible legal medical market; the expansion and success of which has decreased stigma and increased public comfort levels in admitting usage across the state.

The states with the highest reported rates of monthly use are all states which have legalized

cannabis to some extent (e.g., have an active medical market, adult-use market, or both), which strongly correlates to a natural increase in self-reported usage.

States with the lowest reported usage rates include the most historically conservative states in the South and Midwest, which have also featured the most punitive cannabis laws during the past half-century.

Continuous Rise in Reported Usage Across the U.S.

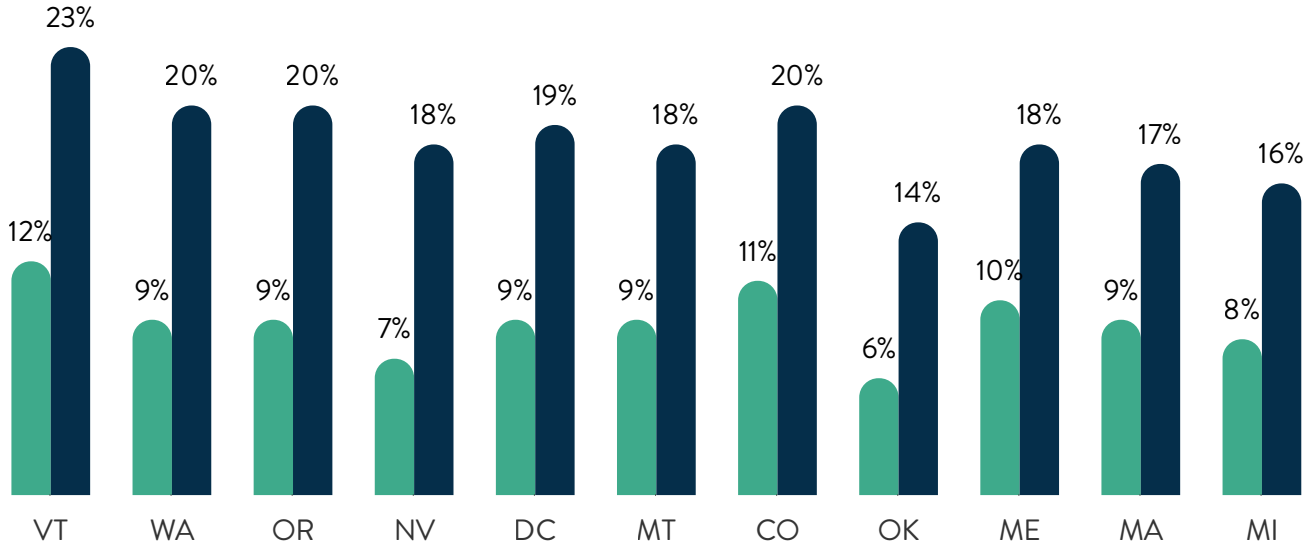


Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 18+ population, Released December 2021.

States with the Largest Increases in Reported Monthly Cannabis Use

By adults 18+ (2010-2020)

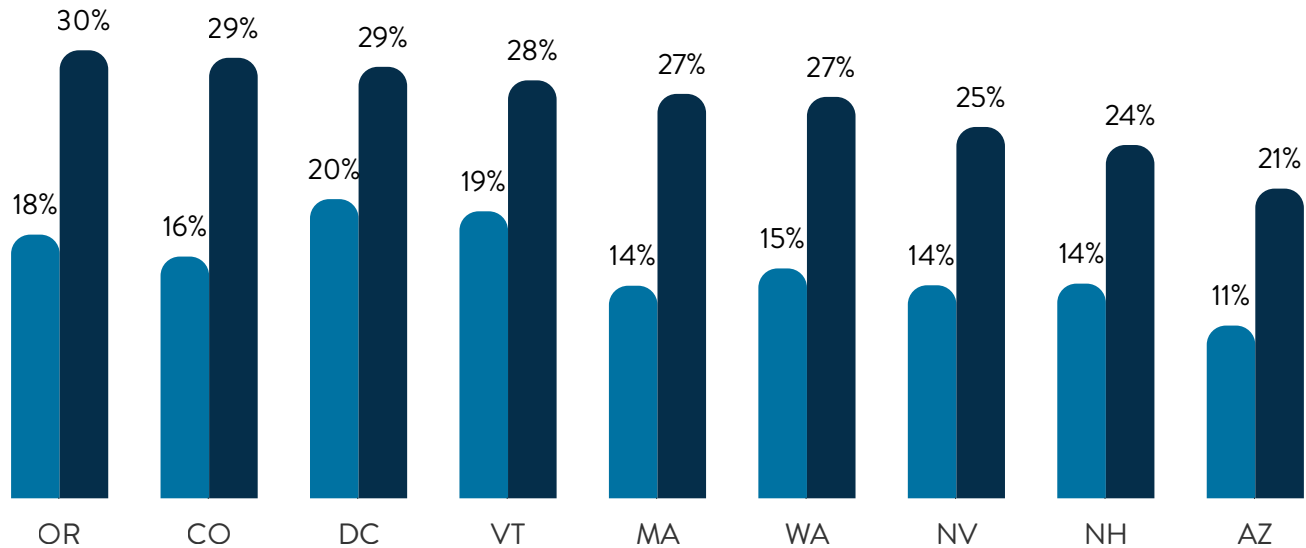
● 2010 Reported Monthly Usage ● 2020 Reported Monthly Usage



States with the Largest Increases in Reported Annual Cannabis Use

By adults 18+ (2012-2020 reported)

● 2012 Past-Year Usage Rate ● 2020 Past-Year Usage Rate



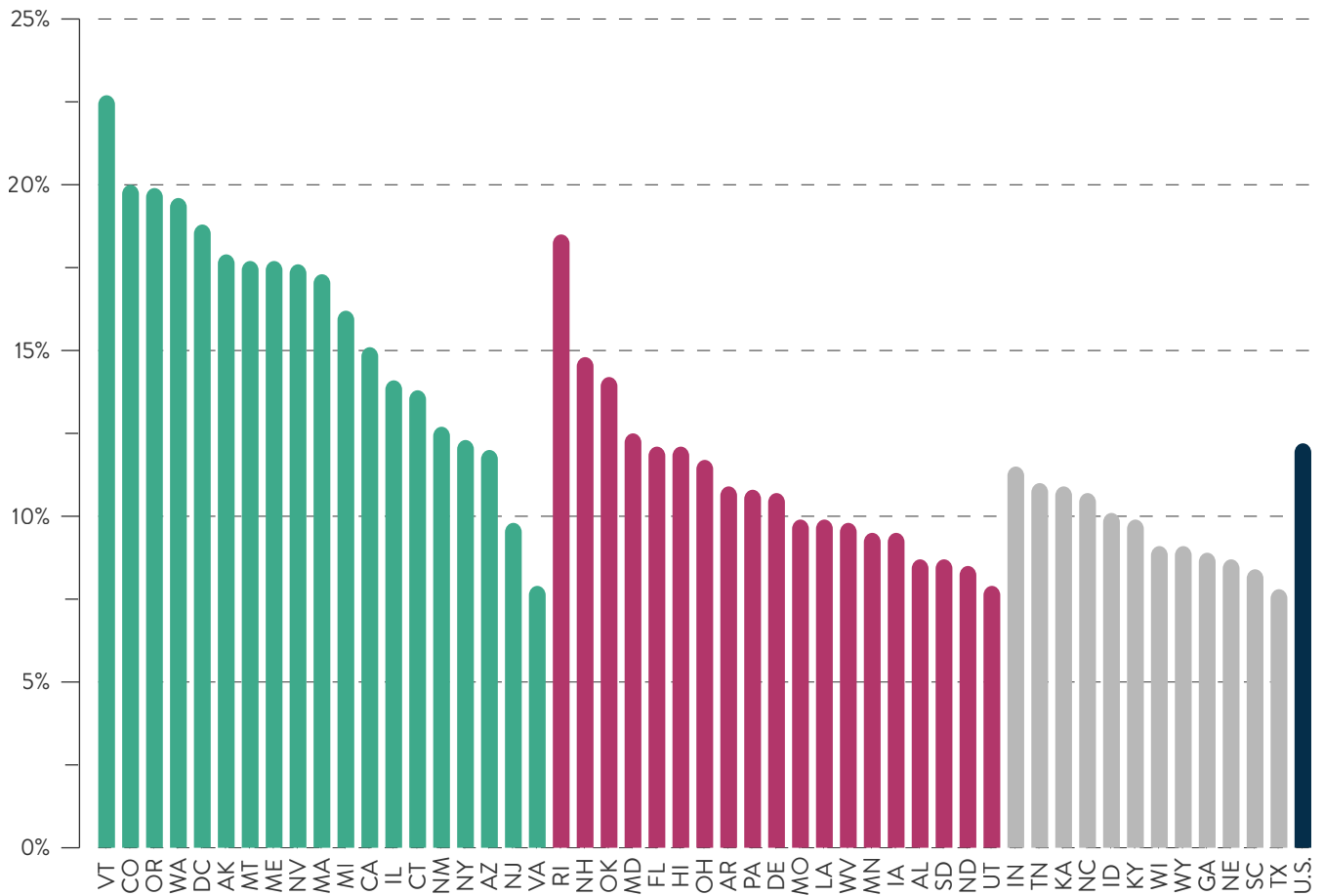
Note: States are visually represented in order of their respective delta in reported usage rate percentage between 2010 and 2020.

Source (this page): SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 18+ population, Released December 2021 for annual 2020 estimate.

Cannabis Usage Rates by Legal Market Type

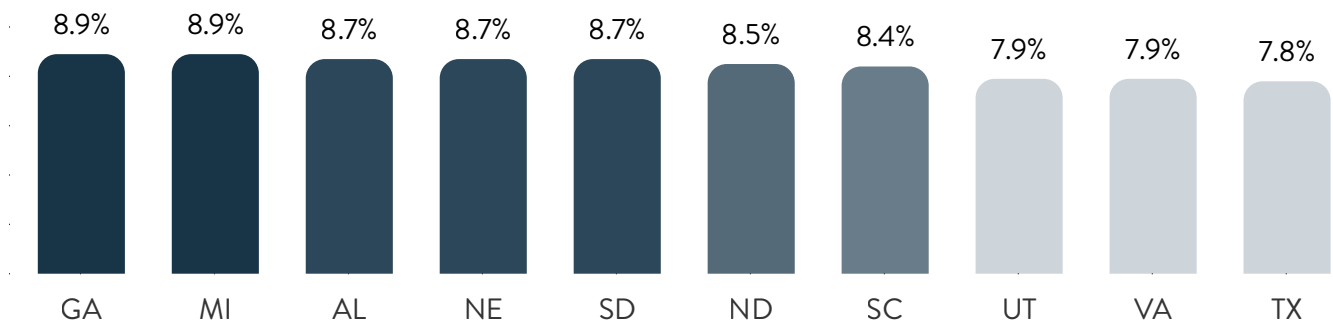
Past-month usage (2020)

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



States with the Lowest Reported Monthly Cannabis Use

By adults 18+ (2020)



Source (this page): SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 18+ population, Released December 2021.

National Medical Cannabis Program Participation

WITH 39 state markets (including D.C.) currently operating legal medical cannabis programs, the total number of registered patients nationwide surpassed 4.4 million in 2021. Just in those legal medical-use states (with no assumptions for new markets by 2030), New Frontier Data projects that there will be a combined 5.7 million patients registered by 2030, representing nearly 2% of the entire U.S. population.

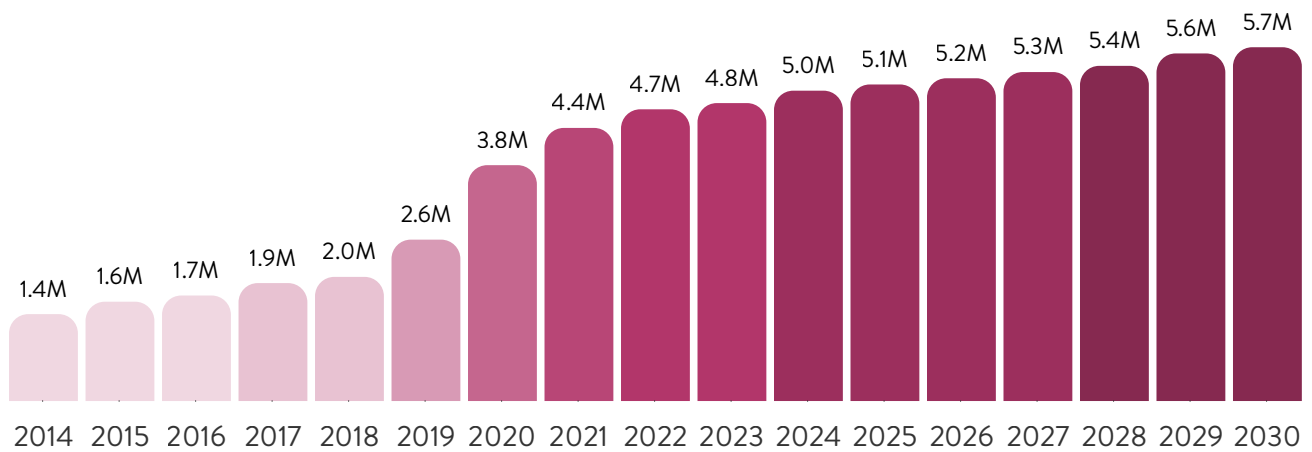
While most Americans now live in a state with a medical market, specific state regulations (e.g., restricted lists of qualifying conditions, product

limitations, program participation costs, retail access, and product taxation) all significantly influence the level of participation within each state. These factors collectively determine how quickly and how large each state program will grow.

The range of qualifying medical conditions permitted by each state is a key determinant of patient participation within legal medical markets. States permitting broader lists of conditions generally attract far greater participation than do those states which limit medical cannabis accessibility (e.g., markets restricted to

Projected Growth in Number of U.S. Medical Cannabis Patients

In millions (2014-2030)

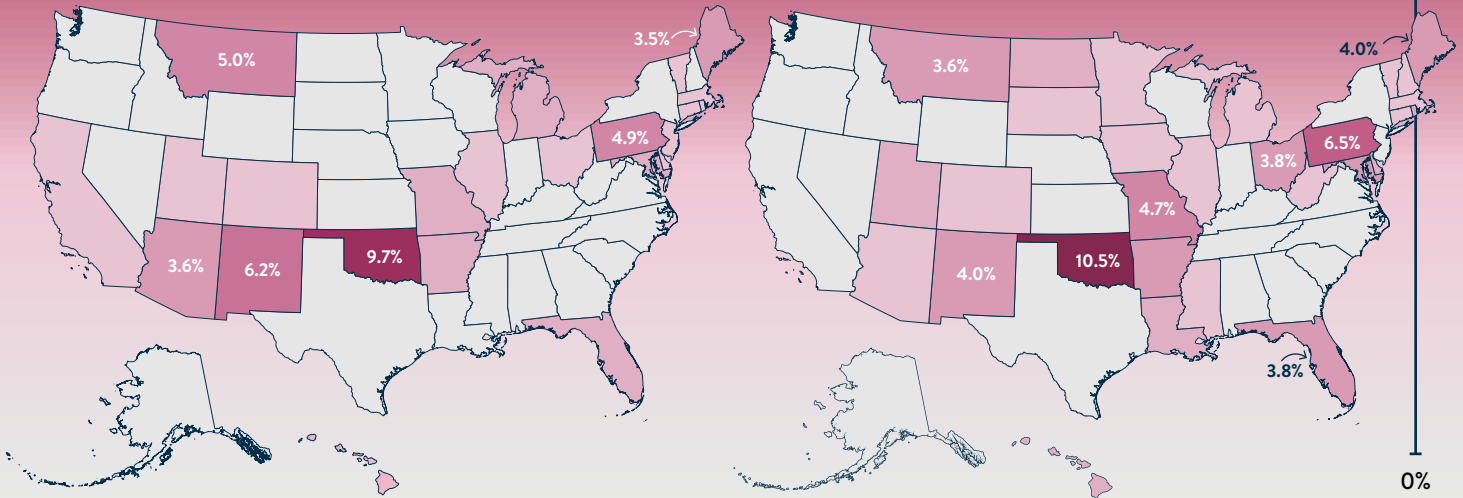


Note: Values shown are estimates for total counts of patients registered as of December each year.

U.S. Medical Cannabis Patients

Current Patient Saturation¹

Estimated Patient Saturation by 2030¹



4.5 million
Current number of U.S. medical cannabis patients as of Jan. 2022

1.9%
Average saturation rate across all medical states as of Jan. 2022

5.7 million
Est. number of U.S. medical cannabis patients by Dec. 2030

2.4%
Est. average saturation rate across all legal medical states by Dec. 2030

Top 7 States by Patient Saturation (as of January 2022)

	REGISTERED PATIENT SATURATION %
1. OKLAHOMA	9.68%
2. NEW MEXICO	6.15%
3. MONTANA	4.99%
4. PENNSYLVANIA	4.92%
5. ARIZONA	3.61%
6. MAINE ³	3.50%
7. MISSOURI	2.96%

Top 7 States by Patient Count (as of January 2022)

	REGISTERED PATIENT COUNT
1. PENNSYLVANIA ⁴	639,345
2. FLORIDA	600,718
3. CALIFORNIA ⁵	466,109
4. OKLAHOMA	385,360
5. ARIZONA	265,498
6. OHIO	240,002
7. MICHIGAN	235,788

1. Patient saturation reflects the number of estimated registered medical cannabis patients in each state as a percentage of state population.
 2. The national average saturation reflects the average patient saturation rate across all legal medical cannabis markets that have begun the patient registration process.
 3. Estimate displayed for the state of Maine includes patients that shop from both regulated medical dispensaries as well as through the caregiver system.
 4. Estimate for Pennsylvania includes total program registrations. Estimate for active purchasing patients in Pennsylvania was 372,000 as of January 2022.
 5. Estimate displayed for the state of California are New Frontier Data estimates for active medical patients only. There are an estimated 2 million card-holding medical cannabis patients in California (4.9% saturation), of which only an estimated 1/5th are active purchasers of medical cannabis products from licensed and regulated medical dispensaries.

cancer patients and the terminally ill). Recognizing this, there has been a distinct trend for initially restrictive medical programs to expand their allowable conditions and subsequently boost rates of patient registration and program sales. The most common way to broaden the potential patient pool and increase program sales has been to add key ailments associated with higher rates of patient registration (e.g. chronic pain) to the list of accepted qualifying conditions.

IMPROVING MEDICAL CANNABIS ACCESS: EVOLUTION OF QUALIFYING CONDITION LISTS

Newly legal medical markets are generally trending toward more expansive programs, permitting a broad array of health care practitioners to recommend medical cannabis for increasingly diverse lists of qualifying conditions.

In the first states to legalize medical use programs, the most commonly approved qualifying conditions included terminal illness, epilepsy, cancer, HIV/AIDS, and glaucoma. Those conditions still appear most commonly across all states which specify qualifying conditions, though newer markets have greatly expanded their lists to include ailments such as PTSD, anxiety disorders, Alzheimer's, and autism spec-

trum disorders. Additionally, with a growing body of research suggesting that cannabis may hold promise in helping mitigate rates of opioid dependence and overdoses, many states have turned to cannabis as a countermeasure to the crippling opioid crisis. Some indirectly (by including chronic pain as an accepted qualifying condition), others by explicitly allowing any patient with an opioid prescription to automatically become eligible to access medical cannabis.

While most states have allowed the public to petition for new conditions, (and some have grown their qualifying condition lists considerably through this process), it is the permission for physician discretion (i.e., medical authority to prescribe cannabis for any condition which they deem appropriate) that has served as the greatest catalyst for expanding medical programs. Oklahoma has experienced explosive growth in its medical program in the past few years, and currently features the nation's highest patient participation rate (by a wide margin). While participation in Oklahoma's medical market is supported by other low regulatory barriers to entry (e.g., absence of license caps, and overall ease of access to retail dispensaries), the latitude granted to physicians has been instrumental to that market's explosive growth.

Expanding Legalization and the Erosion of the Illicit Market

IN 2022, an estimated 52 million U.S. adults will consume cannabis at least once across both legal and unregulated markets. That number is projected to grow by roughly 4% annually over the next eight years, reaching an estimated 71 million consumers by 2030. Despite strong performances seen in legal state markets (e.g., \$26.5 billion in combined state legal sales for 2021), illicit markets continue to serve most U.S. demand, with an estimated \$70 billion spent across illicit sources nationally in 2021.

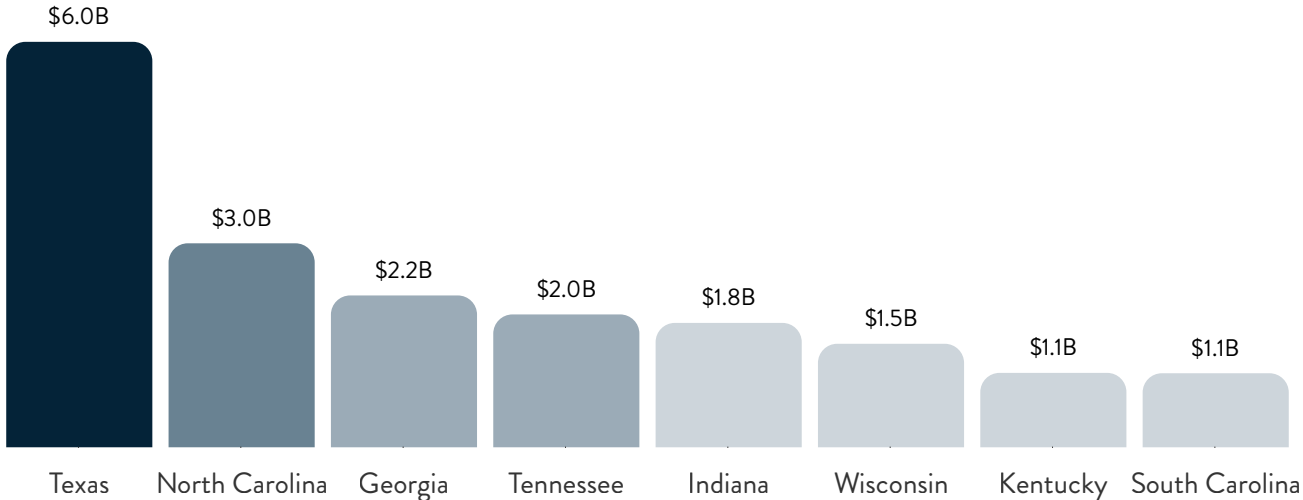
Among states without medical or adult-use cannabis sales in place, Texas, North Carolina,

and Georgia represent the three largest currently unregulated state markets, worth a combined \$11.2 billion in estimated illicit cannabis sales in 2022. Barring any action to legalize cannabis, the combined illicit market in those three states is projected to be worth roughly \$17 billion by 2030.

If a key objective of legalization is to disrupt illicit markets, that end is being achieved in states where cannabis has been legalized. Even with continued growth in the number of cannabis consumers nationally, both legal medical and adult-use markets will increasingly erode the demand met by

Largest Estimated Illicit Markets in 2022

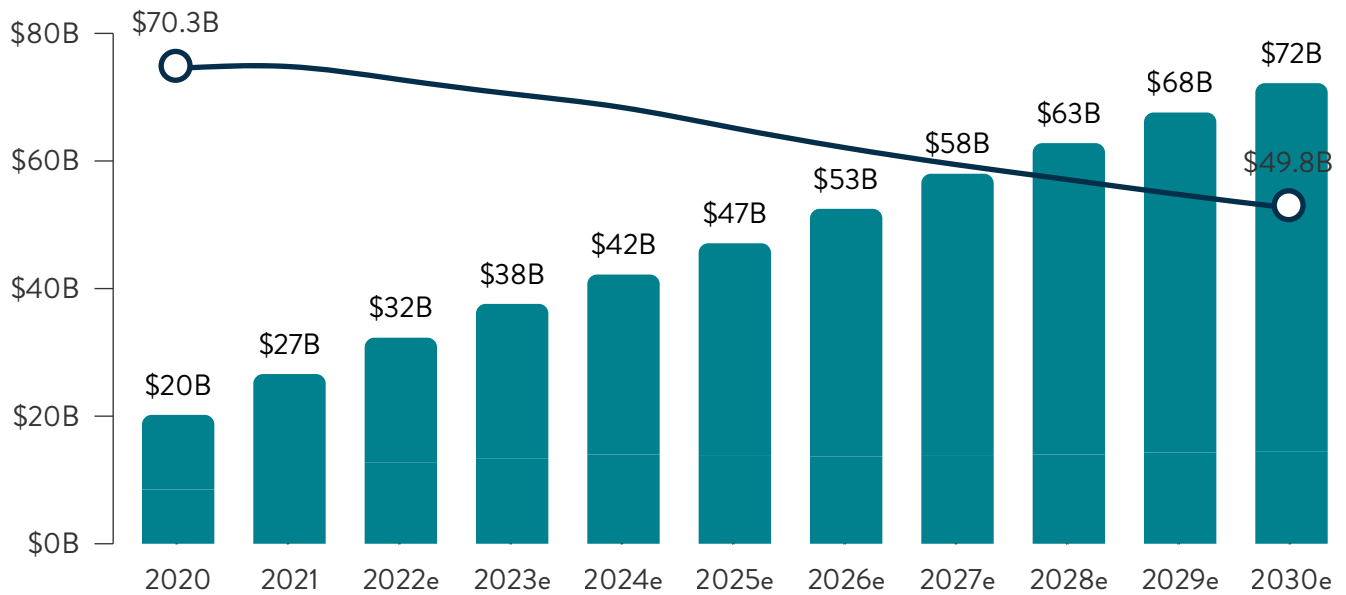
Annual illicit market spending, in states with no legal market; \$USD billions



Legal vs. Illicit Sales

With activation of new expected state markets by 2030; \$USD billions

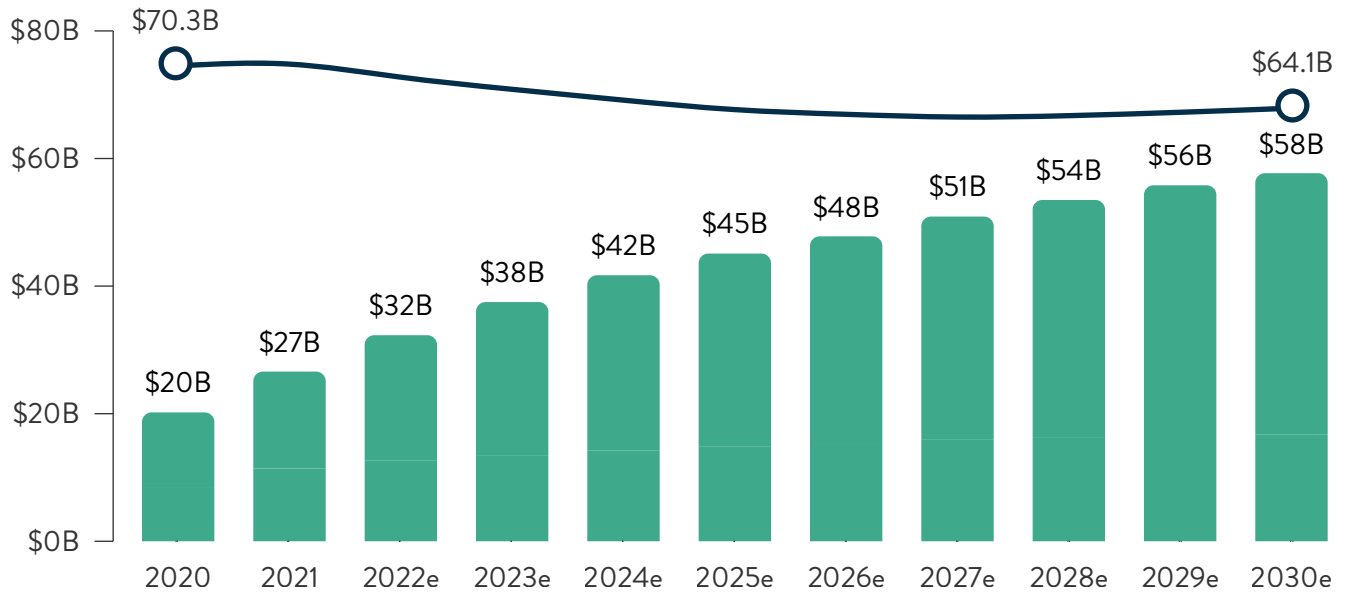
● Total Legal Market ● Illicit Market



Legal vs. Illicit Sales

Across currently legal states only, with no expectation for new legal markets; \$USD billions

● Total Legal Market ● Illicit Market



New expected legal markets by 2030 include: 9 adult-use states (New Hampshire, Maryland, Florida, Ohio, Pennsylvania, Missouri, Rhode Island, South Dakota, Oklahoma) and 9 medical-use states (Georgia, Idaho, Kansas, Kentucky, Nebraska, North Carolina, South Carolina, Texas, Wisconsin).

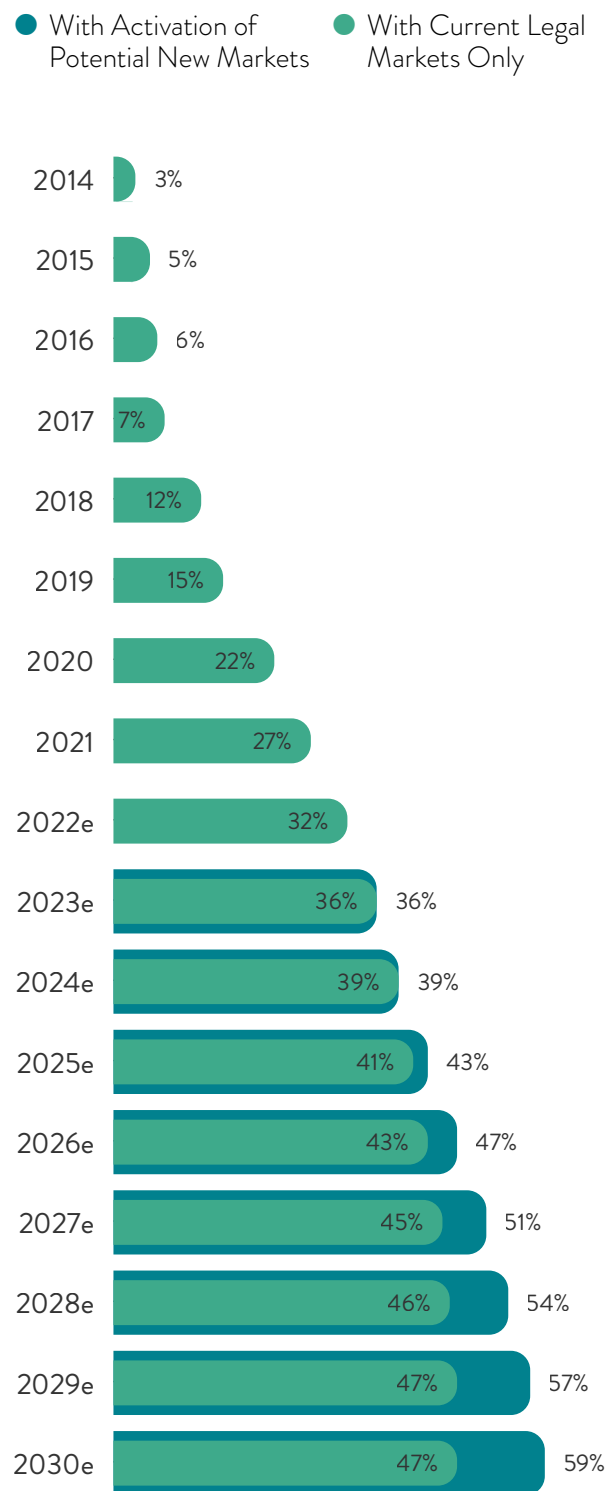
illicit sources. In 2021, an estimated 27% of U.S. cannabis sales were through legal channels; by 2030, 47% of total annual U.S. demand will be expected to be met by the legal market. If all 18 of the potential markets legalize within their respective expected timelines, the legal market capture could reach nearly 60% by 2030.

Key factors influencing how much demand a legal market can capture – and how quickly – include:

- Flexibility of regulatory structures to address changing market dynamics;
- Market implementation timelines;
- Allowances for diverse product types;
- Taxes and retail prices;
- Product access (largely determined by the number of state licenses issued for cultivars and dispensaries, as well as allowances for delivery services); and
- Barriers to patient participation (largely determined by qualifying conditions in medical states).

When individual legalized states impose strict market limitations to limit access, or otherwise experience delays, illicit markets can recapture consumers. In California, for example, just 44% of in-state demand will likely be met by legal regulated sources in 2022; that share is projected to grow to 53% by 2025, and 69% by 2030. Meanwhile, other recently activated adult-use markets like Massachusetts’ are expected to convert nearly three-quarters of all cannabis sales to the legal market by 2025.

Percentage of Total U.S. Cannabis Demand Met with Legal Source





FTI Consulting's Services for the Cannabis Industry



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Cannabis Trends: Special Topics





The 2022 Outlook for Federal Legalization in the U.S.

OVER THE course of 2021, both major U.S. political parties released proposed legislation to regulate cannabis. Senate Majority Leader Chuck Schumer (D-NY) presented the Cannabis Administration and Opportunity Act (CAOA), while freshman South Carolina Representative Nancy Mace (R-SC) introduced the States Reform Act. Each piece of legislation articulated a framework for decriminalization over legalization, the inclusion of an excise tax, investment in cannabis research, the release of currently imprisoned nonviolent cannabis offenders, and the expungement of criminal records related to cannabis convictions. Yet, neither made any progress through the legislative process; the CAOAs has yet to evolve beyond a discussion draft.

The CAOAs was useful insofar as it was an exceptionally broad piece of legislation providing insights to the thinking of centrist Democrats and how future legislation might develop. However, significant gaps in the proposed regulations remained to be addressed in the future. Specifically, the bill proposed an overly burdensome taxation scheme that would do little to remedy the current economic pressures stemming from 280E. That element alone would serve to undermine legal cannabis businesses, and continue to support the illicit market. Similarly, the bill established a broad (yet largely

undefined) regulatory function for the FDA, in contrast to Mace's bill, which mostly leaves cannabis regulation in the hands of the Alcohol and Tobacco Tax and Trade Bureau (TTB) and Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF). The CAOAs is also largely silent on the regulation of cannabis-derived products and synthetic compounds. Additionally, efforts toward criminal justice reform — while included — were limited, and issues such as police reform went entirely unaddressed.

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The CAOAs was useful insofar as it was an exceptionally broad piece of legislation providing insights to the thinking of centrist Democrats and how future legislation might develop.

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Both bills were met with fanfare for the progress they represented, yet neither would establish what existing operators would label as an ideal framework for the regulation of the cannabis industry. Still, the legislative differences were indicative of the strong ideological divide between Republicans and Democrats. Given the current climate of bipartisan hostility, as well as ongoing intraparty conflict, it seems unlikely that much progress will be made in 2022. The increasing likelihood of a divided government after the midterm elections suggests that if no significant federal movement on cannabis reform is achieved in the first half of 2022, the issue could stagnate until after the 2024 election cycle.

With broad federal reform seemingly unlikely in the near term, calls persist to address cannabis banking, which remains a key constraint on market growth. While most major banks are not lending to cannabis businesses, the industry is largely limited to raising capital from private sources, with companies paying interest rates up to 25% or higher.

Legislation such as the SAFE Banking Act would remedy the restrictions by establishing legal protections for those financial institutions serving compliant cannabis businesses in legal markets. Increased access to capital at lower borrowing costs would increase business profitability (by lowering debt levels), accelerate innovation (by lowering capex investment costs), and intensify competition by enabling smaller operators to compete against larger companies that are securing the more favorable financing terms.

Whether the deeply divided Congress can reach consensus about banking remains to be seen. However, it seems far more likely that an incremental measure to address the industry's financing gap will pass before lawmakers are ready to address more expansive national decriminalization.

Continued Evolution of Consumer Preference by Product Type

PRODUCT PREFERENCES and consumption habits have changed significantly since adult-use markets first began cannabis sales. Advancements in manufacturing have led to novel infused products and allowed individuals to enjoy cannabis in a variety of different ways. At the same time, new legal markets have come online, and existing legal markets have expanded the products they allow for sales.

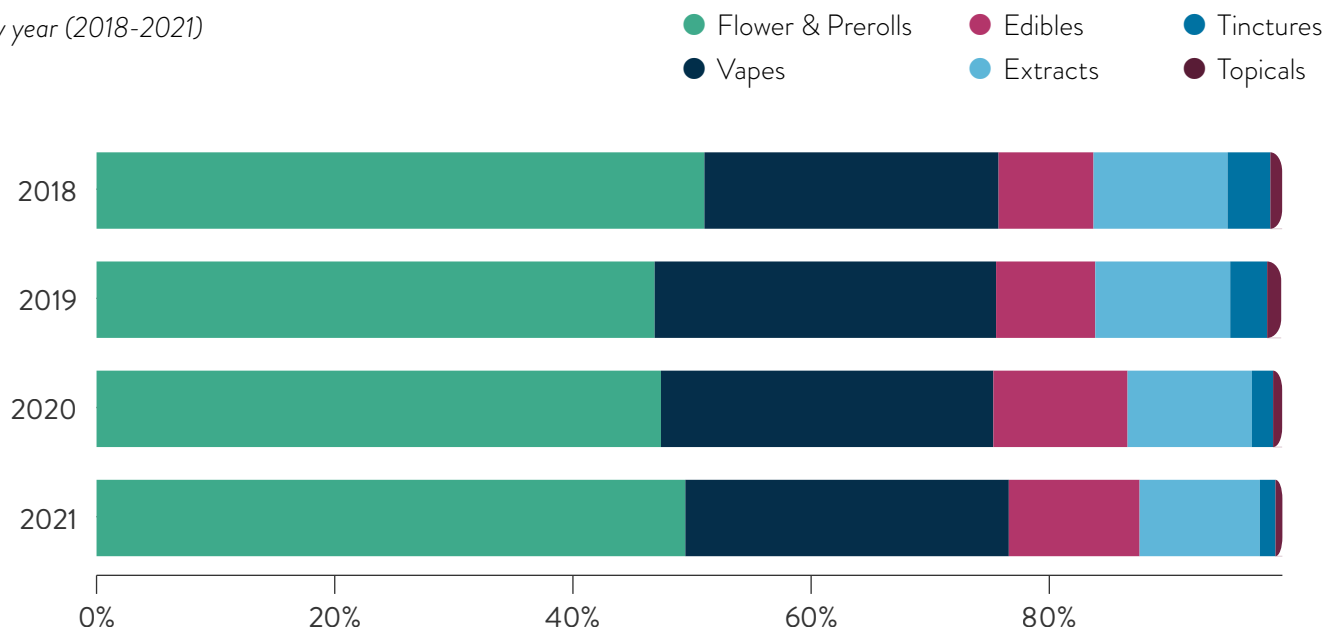
The disruptive effect of the COVID-19 pandemic has continued to impact product preferences. While vapes, edibles, and tinctures allow people to consume cannabis in a broader

range of contexts, demand for flower —which had seen a decline in share of sales the last few years—grew to 49% in 2021 and accounted for 50% of sales in the first month of 2022.

Since 2019, vapes, extracts, and tinctures have all experienced moderate decline in market share while edibles' have grown. Edibles can present a lower barrier to entry for new consumers, and recent advances in technology have made edible products more competitive with combustible alternatives by allowing for reduced onset time as well as a more consistent user experience.

Share of Product Category

By year (2018-2021)



States which were early to legalize often began with restrictions on product categories or limited accessibility based on a few qualifying conditions. While newer states often launch without those strict limitations, the expansion of available products in existing legal markets will likely also affect both product preferences and market participation. In Minnesota, for example, the medical cannabis program was signed into law in 2014. However, medical cannabis stores in the state only began to sell flower products as of March 1, 2022. Edible cannabis products are still not legally available at this time.

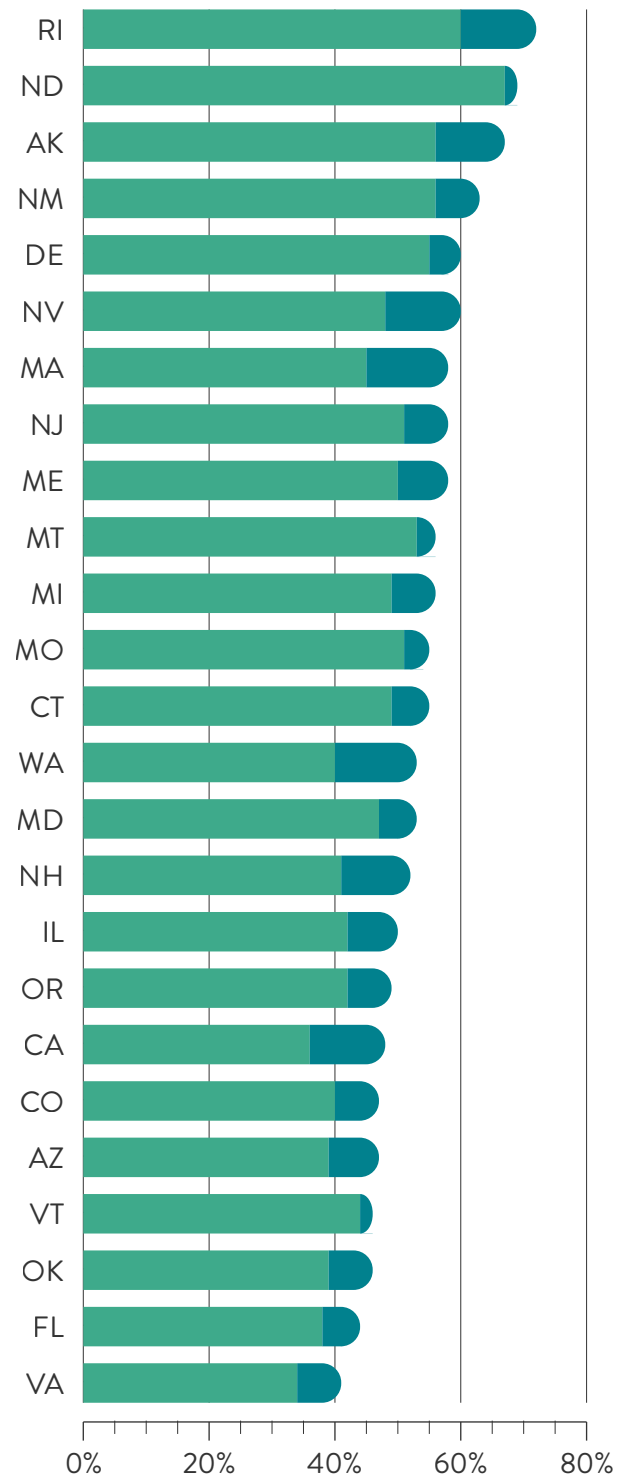
Limitations on product type can hamper efforts to combat the illicit market and potentially impact legal market growth. With new markets on the East Coast preparing to open their doors, it is critical to consider not only the influence product restrictions have on the overall trajectory of the legal market, but also competition from neighboring markets as national legal access continues to expand.

Demand for flower products (including loose flower and prerolls) varies widely across markets, based on the local regulations, the size and maturity of the market, and local consumer preferences. Rhode Island, North Dakota, and Alaska have the strong bias for flower, with the combined sales of loose flower and prerolls accounting for two-thirds or more of the products sold in the state. Conversely, flower accounts for less than half of the sales in nine of the markets tracked, including Illinois, Oregon, California, Oklahoma, and Virginia.

Flower's Share of Sales

By state (Feb. 2022)

● Flower ● Preroll



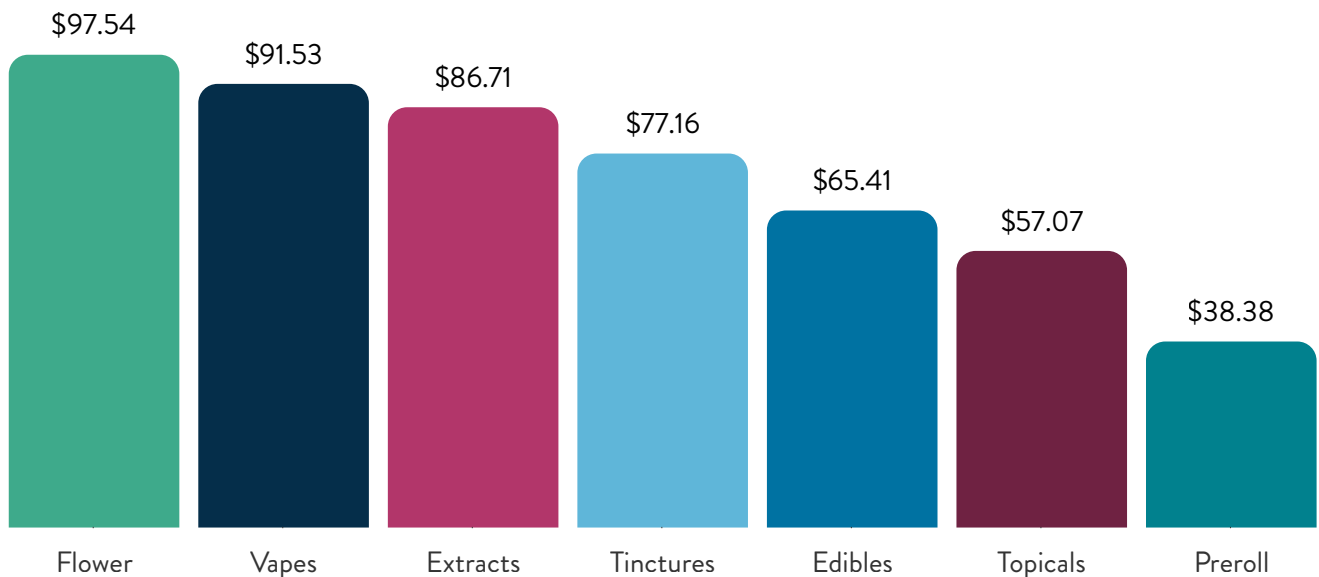
While flower will remain the top selling product in all markets for the foreseeable future, we expect its share to fall significantly over the coming years, cannibalized by edibles, beverages, and other non-combustible forms.

It is worth noting that given the continued growth across all the state markets, a decline in share does not mean demand for the category is falling. Rather, it means that other categories are capturing more spending within the ever-increasing pool of capital. We do not expect the revenues earned in any category to decrease over the near term. However, revenues within the best-established categories will grow more slowly than in the faster-growing non-combustible categories.

Nationally, average consumer spending per transaction is highest for Flower (\$98) and vapes (\$92), and lowest for topicals (\$57) and prerolls (\$38). The spending thresholds vary widely based on the products that are available in each market, however, a detailed breakdown of spending per category per state is available on [Equio](#), New Frontier Data's industry data platform which houses all the data references in this and all other reports we produce.

Average Product Category Value

Per transaction in all markets where data is available (2021)

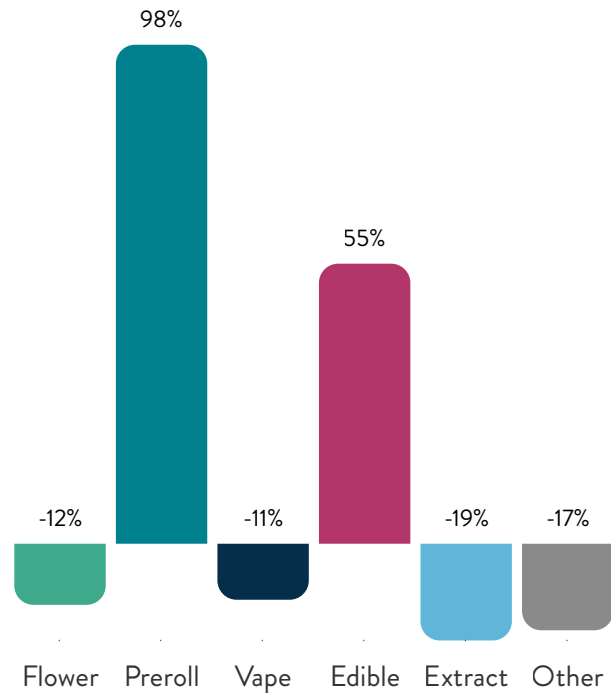


A SPOTLIGHT ON CALIFORNIA'S EVOLVING PRODUCT LANDSCAPE:

California's legal market has evolved dramatically since adult-use sales began in 2018. Flower has lost 31% of its share of market, falling from over 50% of the products sold in 2018 to 35% by the end of 2021. Conversely, prerolls have seen the greatest share increase, jumping threefold from 3% to 11% over the same period. Edibles have also seen strong gains, nearly doubling from 9% to 17%. Vapes are the one category whose market position has remained unchanged, with share increasing two percentage points, 25% to 27%, which indicates that the ways in which vapes are consumed relative to other products has remained quite consistent even as the market has grown and product landscape fragmented.

California: Annual Change in Share of Market

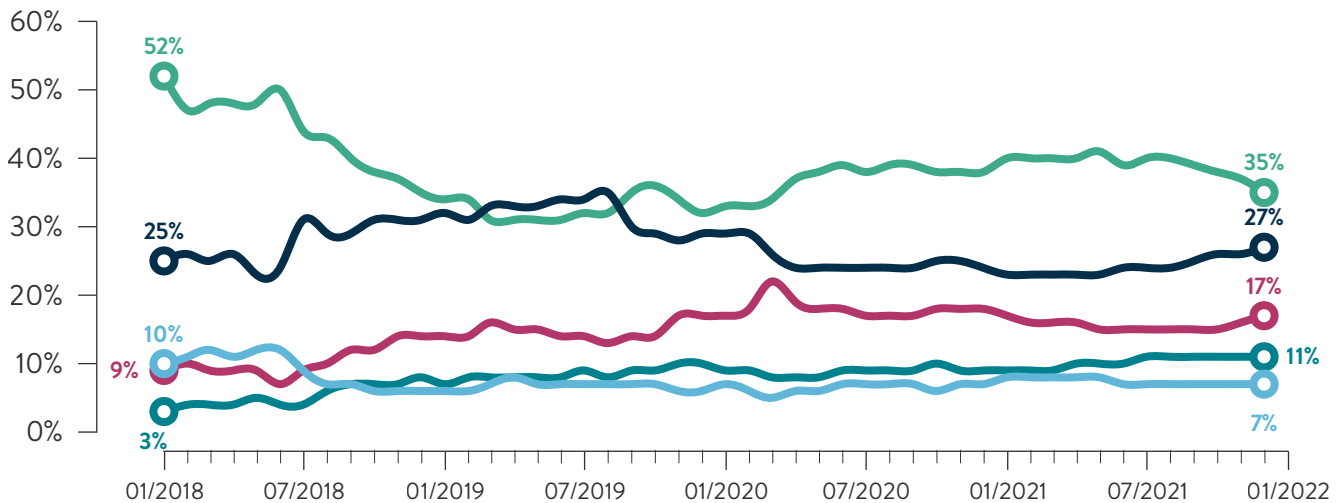
Average product market share 2018 vs. 2021



California: Monthly Share of Product Sales

Jan 2018-Dec 2021

● Flower ● Prerolls ● Vapes ● Edibles ● Extracts

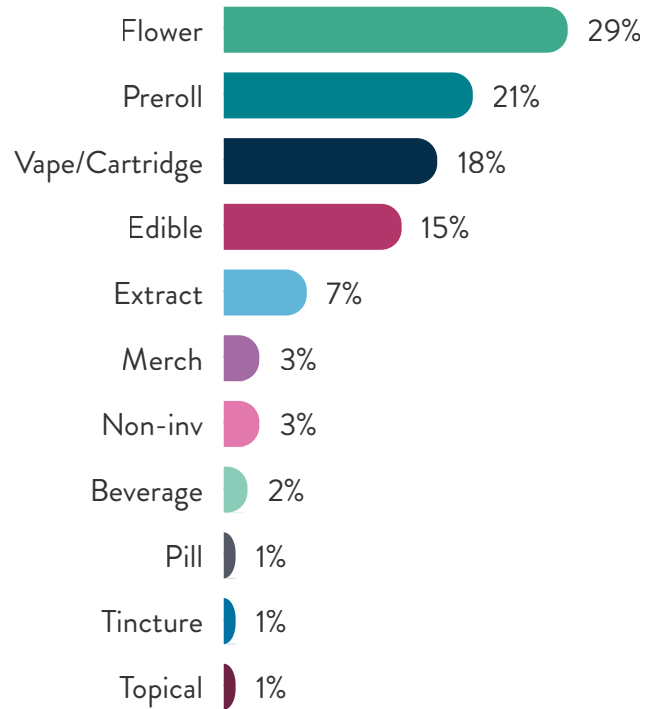


With flower being the largest and best-established product segment, the space is crowded. Flower brands make up 29% of all the brands in the state, with prerolls second at 21%. Pills, tinctures and topicals have significantly fewer players, with each category accounting for less than one percent of all the brands in the market.

The brand density in each product category is inversely correlated to how much share the largest brands have claimed within each category. In the two most crowded categories, flower and prerolls, the Top 10 brands have captured 23% and 45% of the category respectively. Whereas, in the categories with the fewest number of brands (topicals and pills) the Top 10 brands have claimed 87% and 97% respectively. The less crowded categories will become more competitive over time as these

California: Brand Density

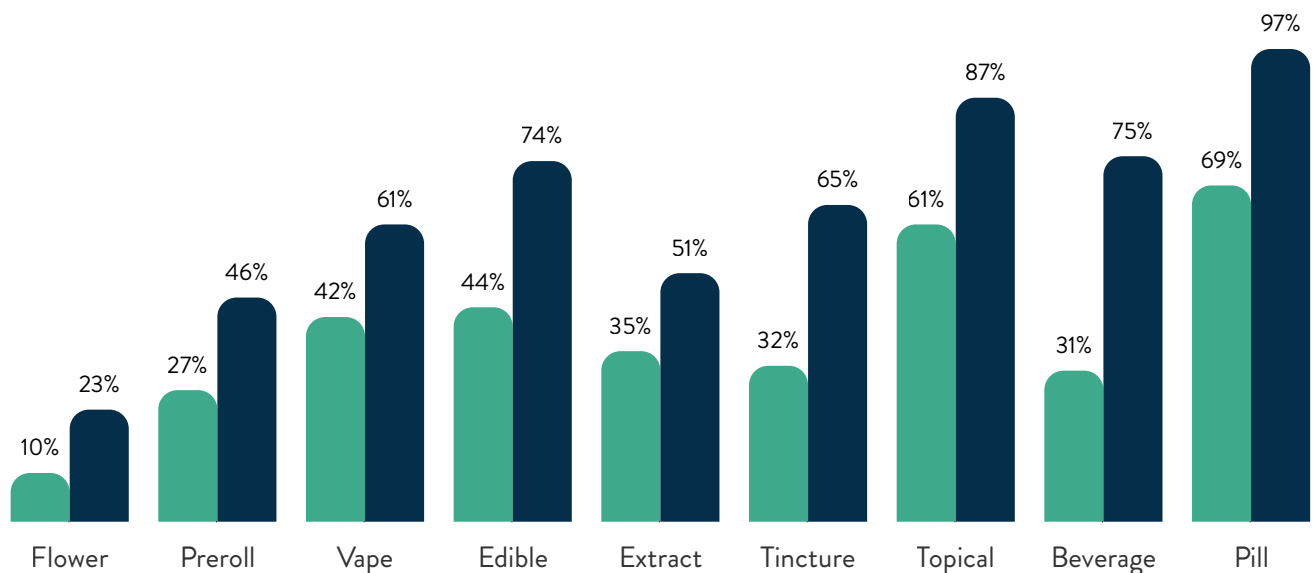
By product category



California: Market Share of Top 3 vs. Top 10 Brands

Per product category

● Sales Share of Top 3 Brands ● Sales Share of Top 10 Brands



California: Product Purchase Differences

Flower Purchases

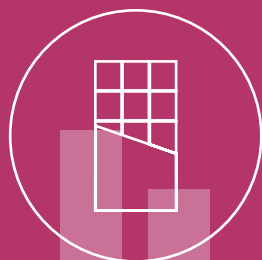


Men are

5%

more likely than women
to purchase flower

Edible Purchases



Women are

7%

more likely than men
to purchase edibles

Extract Purchases



Men are

2%

more likely than women
to purchase extracts

categories are primed for disruptive innovation including through novel combinations of cannabis and non-cannabinoid ingredients, effect specific applications, and shortened effect onset times.

Sales in most categories are evenly balanced between male and female consumers, but three categories, flower, edibles, and extracts show strong gender skews. Male consumers were significantly more likely to purchase flower and extracts while female consumers were more likely to buy solid edibles. The gender bias, especially for flower and extracts, are likely to persist as the product landscape continues to fragment, as demand for non-combustible products grows, and as more brands begin developing products specifically targeting women after the industry's long history of catering primarily to young men.

Qualitative Drivers of Investor Interest in Packaged Food Companies

Special Insert from:



By Greg Wank and Elana Tamas,
Anchin's Cannabis Industry Group

While the cannabis industry is unique and has its own distinct identity, when forging a path forward, it is wise to reflect upon others' similar journeys and glean insight from past successes and mistakes. As veterans in consulting with food and beverage, beauty and branded CPG companies ranging from start-up to acquisition stage, as well as their investors, and having helped make big dreams come true for our clients (in the form of successful partnerships and exits/acquisitions or sustained growth and longevity), we have noticed a few key indicators of the potential for a company in this industry to succeed.

Naturally, we are not comparing apples to apples. The non-cannabis food and beverage industry does not face certain challenges specific to cannabis, such as high taxation, marketing limitations imposed by mainstream platforms, or the interstate trafficking and logistics barriers. Because of the factors that make it harder to succeed in the cannabis space, it is critical to

execute well in the areas that can be controlled. These include financing considerations, strict adherence to regulatory requirements, proper planning for supply chain issues, and meticulous testing and quality control. Listed below are key areas that we have identified that showcase promise, even early on.

Operations - Keeping an Eye on the Horizon

- **Companies should have a vision** for the future, an experienced advisory team to leverage for prospective planning, and should be planting the seeds for growth from the outset.
- **Know how to scale.** From ingredient sourcing to warehousing and co-packing, vendors and operations should have the bandwidth to meet growth in demand. Many companies bring in veteran talent or lean upon consultants with experience successfully scaling a business.

- **Go deep before you go wide.** It can be very tempting to view modest success as a reason for expansion. A company may find that certain SKUs have gained traction and be tempted to expand offerings. In our experience, we have seen companies that offer a large variety of products too quickly drain the resources needed to grow those best performers to their fullest potential. Growing offerings at a thoughtful pace can help subsequent expansion by first building a loyal customer base to embrace it. This principle also applies to growth in sales channels and geographies.
- **Understand Social Demands of the Industry** – Consumers, retailers and investors in the Food and Beverage industry particularly favor companies that are Minority- and Women-Owned Business Enterprises (MWBES), make products that are better-for-you, embrace ESG principles including sustainability, diversity, social equity, inclusion and transparency, and are mission-driven. We have observed that companies that implement these attributes are more likely to succeed, appeal to investors and large retailers, and have better brand loyalty.
- **Demonstrating thoughtfulness around expansion of distribution – Demonstrated, consistent success in at least one prominent channel is essential.** If a company has an omni-channel presence, assurance is needed that they have pursued

this thoughtfully, and without sacrificing quality of distribution channels for quantity.

- **A pandemic supply chain lesson for all – don't put all the eggs in one basket.** When issues arise in the supply chain, we have seen serious disruption to business operations. It's essential for consumer products companies to have more than one option to fill production and other essential needs. Another differentiating factor for avoiding supply chain issues is constant communication with supply chain vendors. For example, our clients that maintained excellent communication with vendors during the pandemic were able to determine that one factory had only 1/3 of their workforce in place, and were able to pivot from plans that could disrupt their supply chain timing by working with a second option.
- **Futureproofing.** At present in cannabis, looking to the future is challenging without a legislative crystal ball. Expansion is burdensome due to the inability to cross state borders. For now, futureproofing could mean thinking creatively about revenue generation. For example, we have seen clients expand abroad and domestically by licensing their products and recipes, which may be a salient path towards efficient economies of scale. Those who have experience in more mature markets sometimes also offer advisory services to startups in emerging markets.

Looking Good Under the Financial Hood

Companies should have a pulse on their numbers and data.

- **Sales speak volumes.** Sometimes, an early indication that a company is ready for an investor is that their sales doubled or multiplied, year over year. Reasons for this will vary. Are they disrupting a stale category? Are they solving a problem?
- **Capital efficiency.** Spending has a business purpose, and money is spent effectively.
- **Moving towards achieving a self-sustaining business model.** A company that is fairly self-sustaining operates in as lean a way as possible, is not heavily reliant on outside capital, and does not offset all profits with costs such as advertising and trade spend. For this, it is essential to look at gross margin and contribution margin of all different products and sales channels—evaluating the entire supply chain.
- **Know your Numbers.** *(Particularly earlier stage entrepreneurs looking for investors and eventual exit).* There are many ways to measure a business: by SKU, customer, channel, net sales, gross margin, and contribution margin, to name a few. Companies tend to focus on gross sales instead of the gross profit on an item. Companies should track the true gross profit and operating margin by SKU to make informed decisions. Additionally, current and

potential future partners will want to make sure that net sales are properly reflected, and that proper accounting is in place.

- **Tax can be taxing.** Companies should have an awareness of their tax obligations and be documenting adherence to them. Tax saving strategies are available to mitigate the chokehold on profit margin that tax code section 280E represents, and early adoption of a taxation plan with experienced advisors can help with longevity and getting the right investor. Neglecting to do so has too often sunk otherwise promising businesses, whether from a structural standpoint that cannot be undone, or from an efficiency standpoint for tax savings. Proper understanding of tax ramifications of all aspects of financial planning must be incorporated. Additionally, state and local tax must be understood and incorporated, as well as municipality taxes, and sales tax.

Other Intangibles

- **Ready for the marathon and not just the sprint.** Companies should demonstrate long-term thinking. Whether it is their entity structure (some investors require conversion to a C-Corp which might not be as lucrative for startups, depending on certain factors), or knowing when to say no to a tempting opportunity that the company is not yet ready for (as it is better to decline than to over-promise and under-deliver, burning a bridge in the industry), company management should be thinking of the long-term picture.

- **Management should include and be surrounded by the right people.** Some of the strongest leaders we've seen in F&B demonstrated leadership early on by bringing the right talent into the equation. Before they could afford to bring in talent full time, many of them leaned upon industry consultants with relevant experience to free up the Founders to do what they do best. Because the growth of cannabis is happening in waves due to legislative barriers, there should be opportunities to engage successful players from more established markets as consultants or mentors.
- **Often early-stage companies are unable to pay advisors and instead implement equity compensation for essential advice.** Investors often commit to capital in tranches. Among other things, lean spending often must be demonstrated in order to receive further installments. There are creative ways to leverage a strong advisory team to help companies meet their investor standards, while also gaining access to advisory teams that can promote success.
- **Have the right advisors.** A growing company needs good, specialized advice. Having advisors who have worked alongside companies as they pursued and achieved the same dreams is invaluable. For instance, when considering what claims to make about your product's benefits, consulting with an attorney who can assess related

risks and help prevent class action lawsuits is pivotal. We always ask new clients what their goals are, and as they move down that path, we share relevant wisdom from prior Anchin clients that have made that pursuit.

- **Steadfast when life gives you lemons.** We also tell our clients that things can and will go wrong, and to plan with that in mind. For instance, the cannabis industry has challenges associated with quality control and potency claims. We saw a parallel first-hand with the kombucha space, as products were sometimes tested and found to have alcohol volumes in line with beer, resulting in law suits, legal fees and substantial fines. Having players on your bench to help you react quickly, put contingency plans in place, communicate with vendors and partners, and access any available reserve funds can help get a company on better footing.

We learned a great deal from being a part of the food and beverage revolution's humble beginnings, whereby an emerging market of underdogs went up against big, well-established companies, innovating in categories that were stale. We see a lot of the same drive and promise in the cannabis industry, and we feel strongly that growing companies need an accessible, experienced sounding board to help them with bumps along the road and to identify opportunities they may not be trained to see.

Looking Back at 7 Years of a Legal Cannabis Industry in Colorado

Colorado's Marijuana Enforcement Division's annual report continues to provide illuminating insights into the country's most mature legal cannabis market.

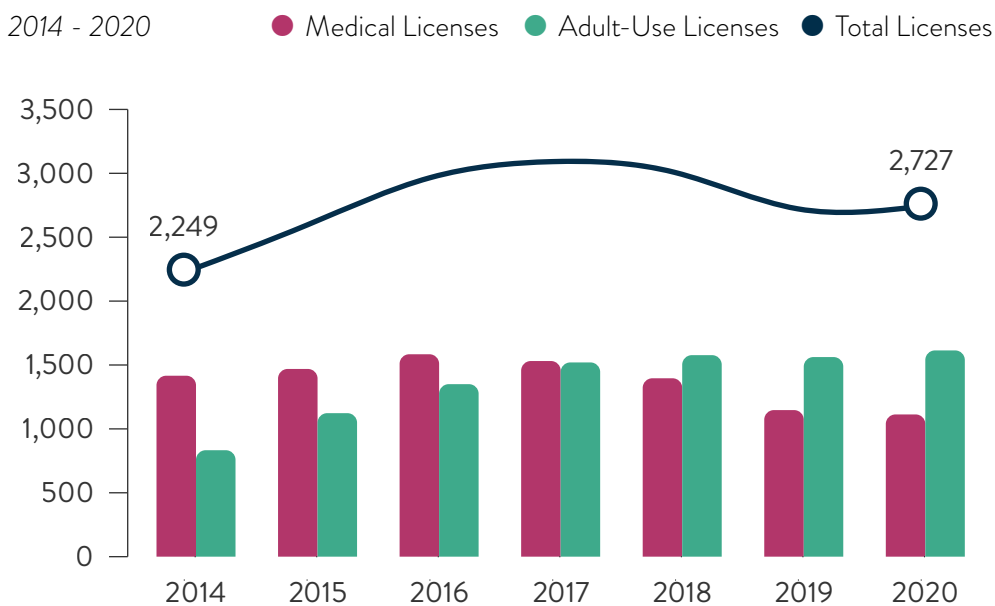
Since 2014, the total number of cannabis business licenses has increased 21% (from 2,249 to 2,727). During that period, the number of medical licenses fell 21% while adult-use licenses have increased by 94%.

The relatively sustained number of medical licenses reflects the continued strong partici-

pation of medical cannabis patients in the state, even as adult-use demand continues to drive the majority of sales in the state.

Adult-use manufacturing facilities have grown faster than any other license category, fueled in large part by strong demand for noncombustible consumer products. Adult-use retail (+87%) and cultivation facility licenses (+78%) have also grown significantly. On the medical side, only medical infused product manufacturers have increased since 2014, rising 32%. Medical cultivators saw the steepest decline, falling 39% since 2014.

Colorado: Medical and Adult-Use Total Licenses



Source: Colorado Marijuana Enforcement Division

Change Since 2014

TOTAL LICENSES

+21%

MEDICAL LICENSES

-21%

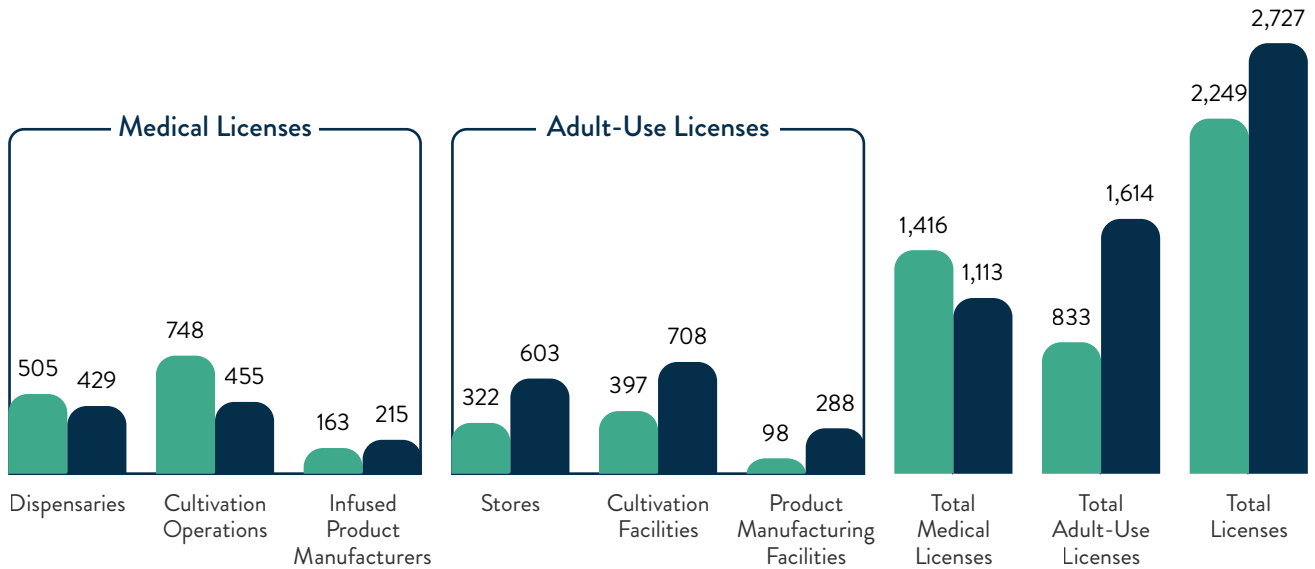
ADULT-USE LICENSES

+94%

Colorado: Medical and Adult-Use Total Licenses

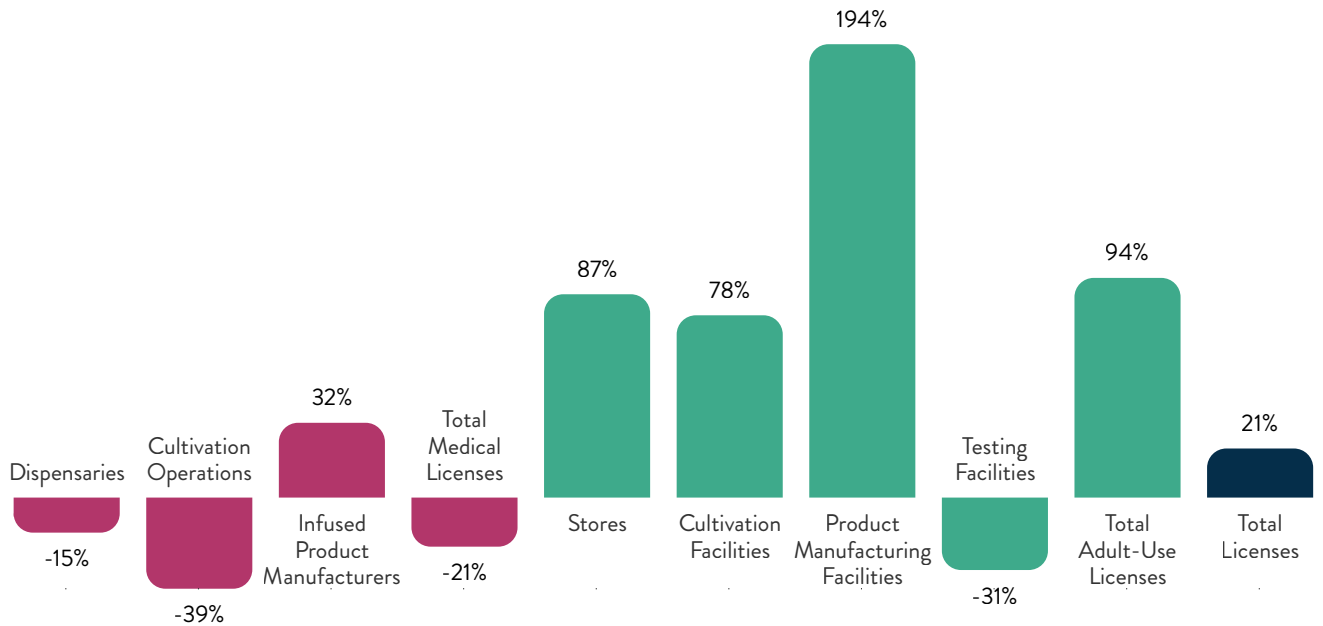
2014 - 2020

● 2014 ● 2020



Colorado: Change in Number of Cannabis Business Licenses Since 2014

● Medical ● Adult-Use ● Total



Source (this page): Colorado Marijuana Enforcement Division

CULTIVATION AND PRODUCTION

The monthly average number of plants grown in Colorado has nearly tripled since 2014, from 439,000 to 1.23 million. While the number of plants for the medical market has increased incrementally (+11%, from approximately 299,000 to 333,000), adult-use cultivation has grown nearly fivefold, from approximately 139,000 monthly to nearly 900,000 plants monthly throughout 2020.

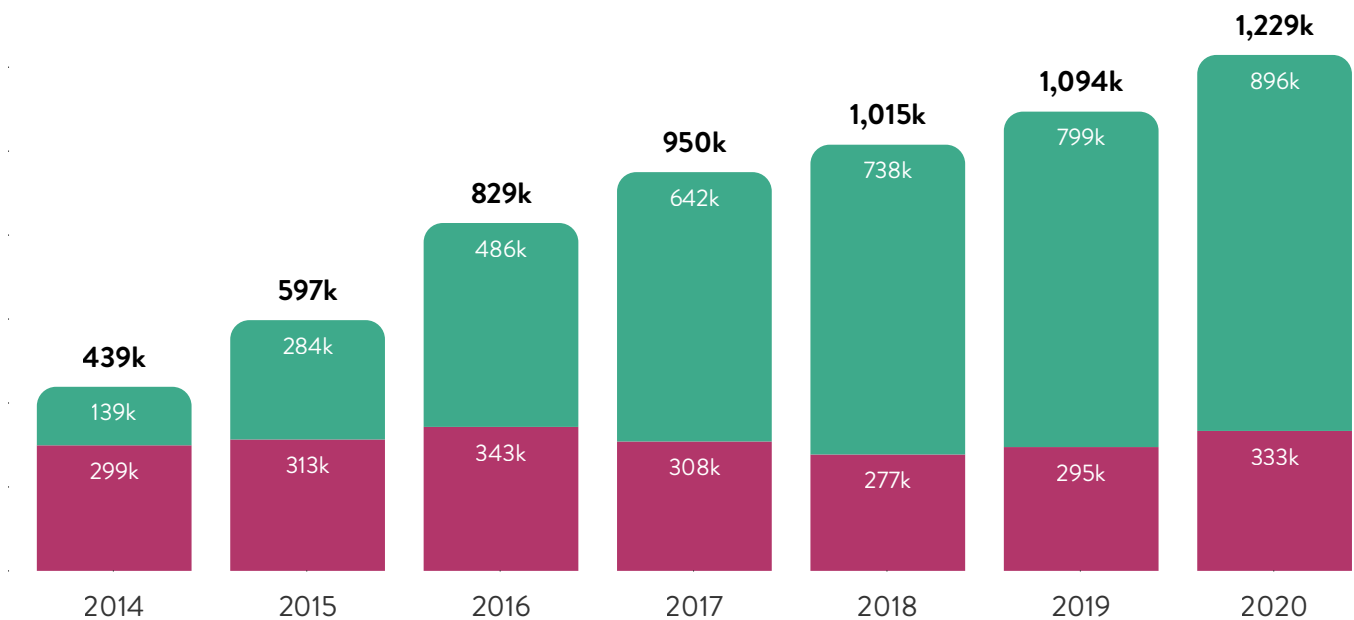
The seasonality in Colorado's flower sales has become more pronounced as the market has grown, with sales peaking annually in August and September before falling steeply in the winter months.

Between 2014 and 2020, Colorado sold 2.5 million pounds of flower, or the equivalent of 3.4 billion one-third gram joints.

Colorado: Plants Under Cultivation

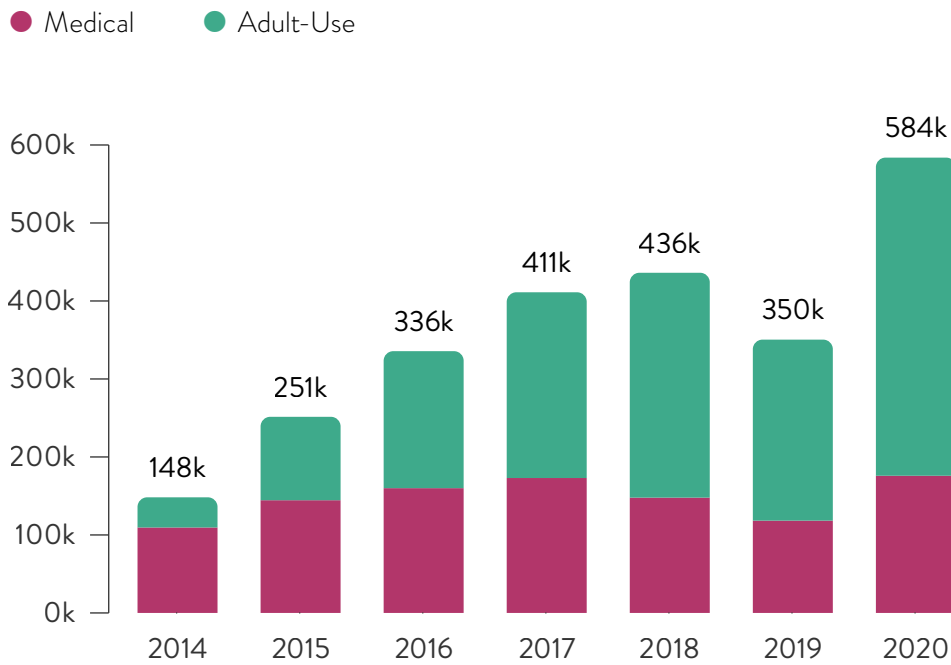
Monthly average (2014-2020)

● Medical Plants ● Adult-Use Plants



Source: Colorado Marijuana Enforcement Division

Colorado: Pounds of Flower Sold



Change Since 2014

TOTAL **+294%**

MEDICAL **+61%**

ADULT-USE **+955%**

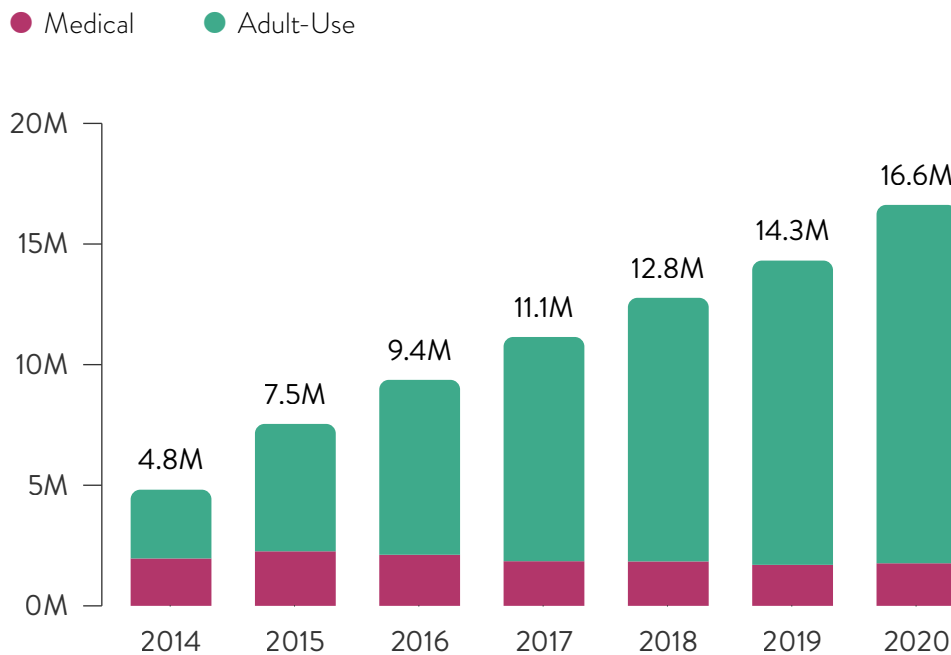
Total Pounds Sold 2014-2020

TOTAL **2.5M**

MEDICAL **1.0M**

ADULT-USE **1.5M**

Colorado: Edible Units Sold



Change Since 2014

TOTAL **+245%**

MEDICAL **-10%**

ADULT-USE **+421%**

Total Units Sold 2014-2020

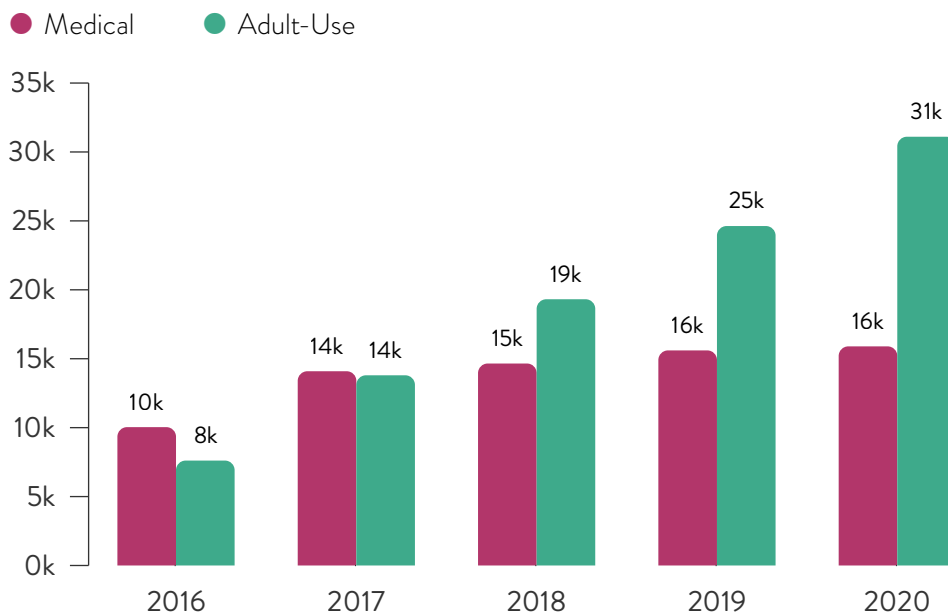
TOTAL **76.6M**

MEDICAL **13.5M**

ADULT-USE **63.1M**

Source (this page): Colorado Marijuana Enforcement Division

Colorado: Pounds of Concentrate Sold



Source: Colorado Marijuana Enforcement Division

Change Since 2016

TOTAL **+166%**

MEDICAL **+58%**

ADULT-USE **+309%**

Total Pounds Sold 2016-2020

TOTAL **166k**

MEDICAL **70k**

ADULT-USE **96k**

INVENTORY FLOWS

Transfer flows measure the volume of product that is produced by cultivators, pushed through the legal supply chain, and ultimately sold to end consumers. In the chart on [the following page](#), sales represent products sold through retail channels. Inventory represents products that remain in the supply chain at the end of the year. Residuals are calculated as total supply minus both sales and inventory, and include:

- Seizure or destruction of product by law enforcement;
- Wet-versus-dry weight entries (post-harvest curing and drying);
- Entry errors in the inventory's tracking system database;

- Extraction yield inefficiencies;
- Removal of product for quality-assurance purposes; and
- Supply-chain product losses.

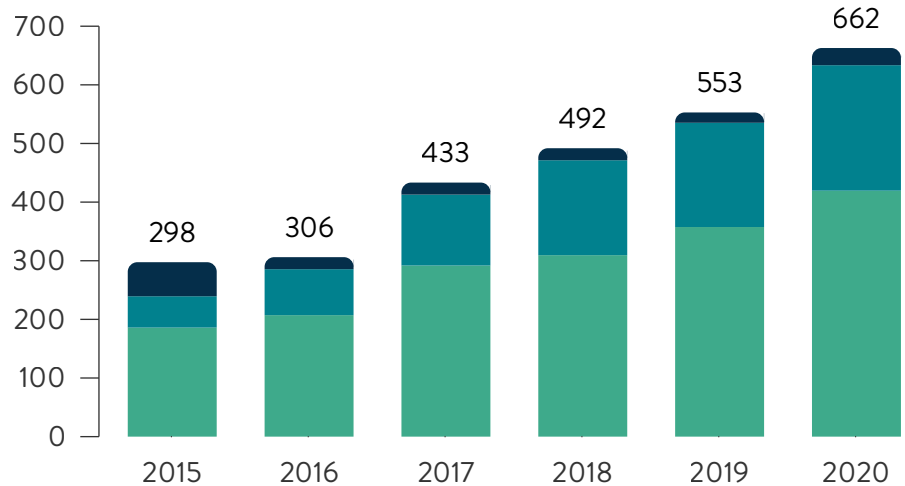
Since the market launched, Colorado's product transfers through the supply chain have remained quite consistent, with just less than two-thirds of products being sold to retailers, and one-third remaining in inventory by the end of the year. Each year, approximately 5% of products are unaccounted for in the supply chain, including products that are destroyed due to test failures, manufacturing malfunctions, or other issues which prevent the product from being brought to market.

Colorado: Transfer Flow Inventory and Residuals

In metric tons

● Sales ● Inventory ● Residual

86%
Increase in metric tons
of Colorado cannabis
products since 2015



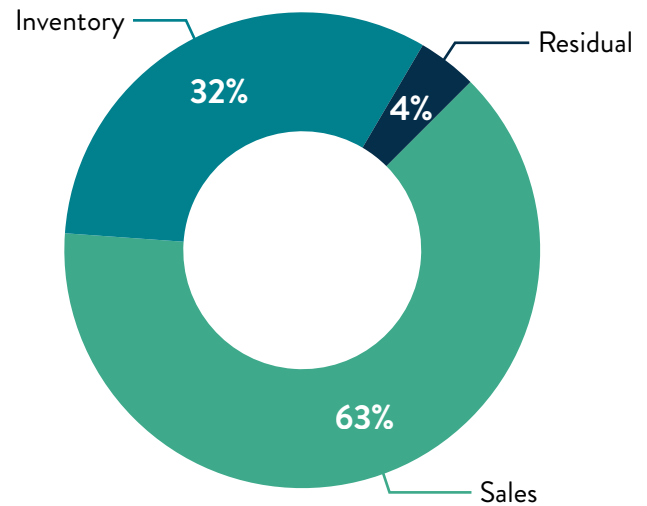
Loose flower remains the largest product category, though its share of market has fallen 20% percent (from 50% in 2017, to 40% in 2021). Over the same period, all other categories (except prerolls and topicals/tinctures) gained share: Vapes are up 66%, edibles 62%, and extracts 31%.

It is worth noting that despite changes in market share, revenues earned in each product category have increased (based on annual growth in overall consumer spending).

Since 2017, both the average consumer spending per month and the average spending per transaction have increased approximately 50%.

While average monthly consumer spending was on a steady upward trend, 2019 and 2020 saw the two highest increases in average monthly spend-

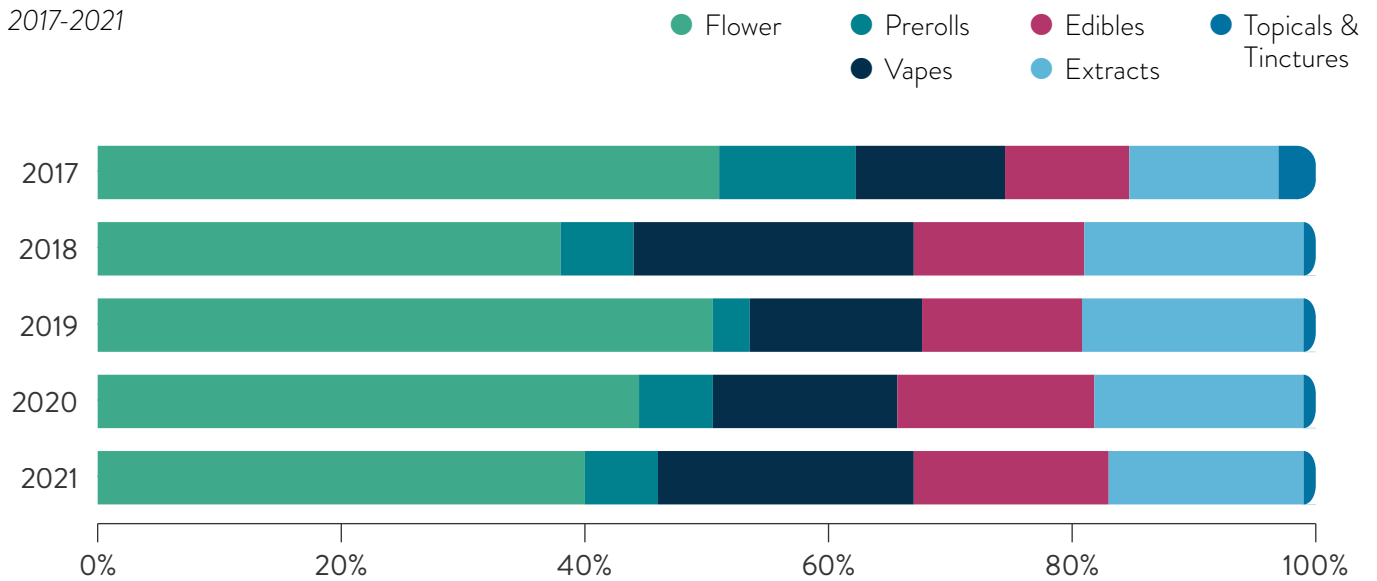
Colorado: 2020 Product Distribution



Sources (this page): Colorado Marijuana Enforcement Division, MPG Consulting, New Frontier Data

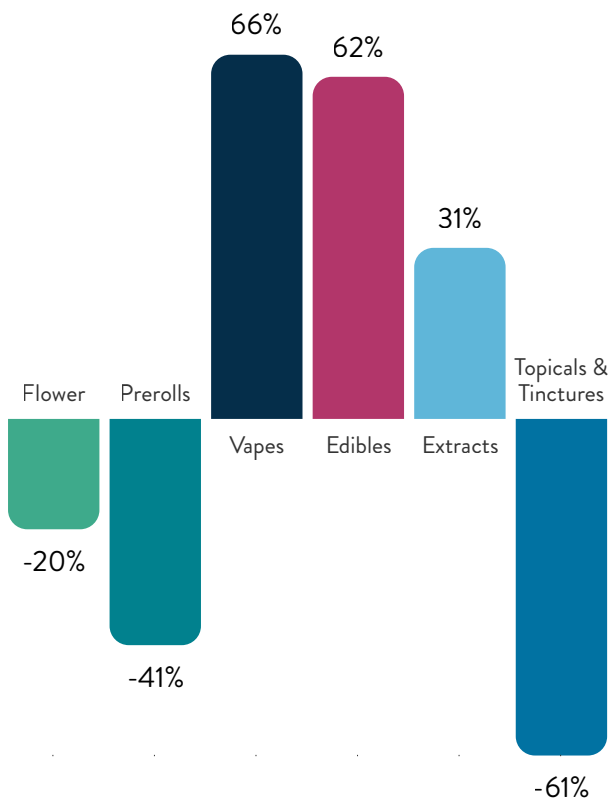
Colorado: Product Category Share of Sales

2017-2021



Colorado: Change in Share of Market

By product type, since 2017



ing. In 2019, average monthly spending increased 26%, while in 2020 it jumped another 19%. The start of the COVID-19 pandemic also led to a sharp increase in average spending per transaction, which jumped 24% from \$71/transaction in 2019, to \$88 in 2020.

Data tracked by the state also shows the average retail costs of different product categories. These data reveal a few notable differences among types of concentrates, as well as between medical and adult-use markets.

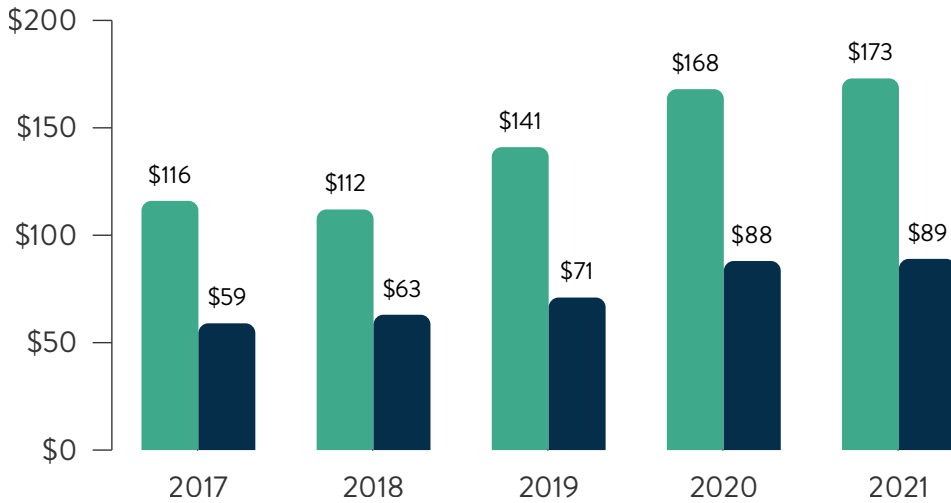
In the adult-use market, a gram of resin was the most expensive of the concentrate categories (retailing for \$23.11), with hash (\$22.52) and oil (22.23) being the second- and third-most expensive items, respectively (The state does not make a distinction between distillates and isolates). Shatter is the least-expensive concentrate, priced at \$14.54.

Colorado: Average Monthly Spending

Per consumer, per transaction

● Per User/Month

● Per Cart/Transaction



Change Since 2017

PER USER/MONTH

+49%

PER CART/TRANSACTION

+51%

Colorado: Average Concentrate Prices

Adult-Use				Medical				Price Differential
Product	2020	2019	Change	Product	2020	2019	Change	2020 Adult-Use vs. Medical
All Concentrates	\$16.55	17.06	-3%	All Concentrates	\$12.85	\$12.40	4%	29%
500mg Vaporizer Cartridge (each)	\$21.80	26.02	-16%	500mg Vaporizer Cartilage (each)	\$12.53	\$16.47	-24%	74%
Oil (g)	\$22.23	24.19	-8%	Oil (g)	\$16.55	\$18.38	-10%	34%
Resin (g)	\$23.11	22.21	4%	Resin (g)	\$18.46	\$16.57	11%	25%
Hash (g)	\$22.52	17.26	30%	Hash (g)	\$14.29	\$12.37	16%	58%
Sugar (g)	\$16.88	15.16	11%	Sugar (g)	\$12.82	\$11.28	14%	32%
Wax (g)	\$14.94	15.15	-1%	Wax (g)	\$11.38	\$11.62	-2%	31%
Butter (g)	\$14.75			Butter (g)	\$11.97			23%
Shatter (g)	\$14.29	14.54	-2%	Shatter (g)	\$11.06	\$10.78	3%	29%

Sources (this page): Colorado Marijuana Enforcement Division, MPG Consulting, New Frontier Data

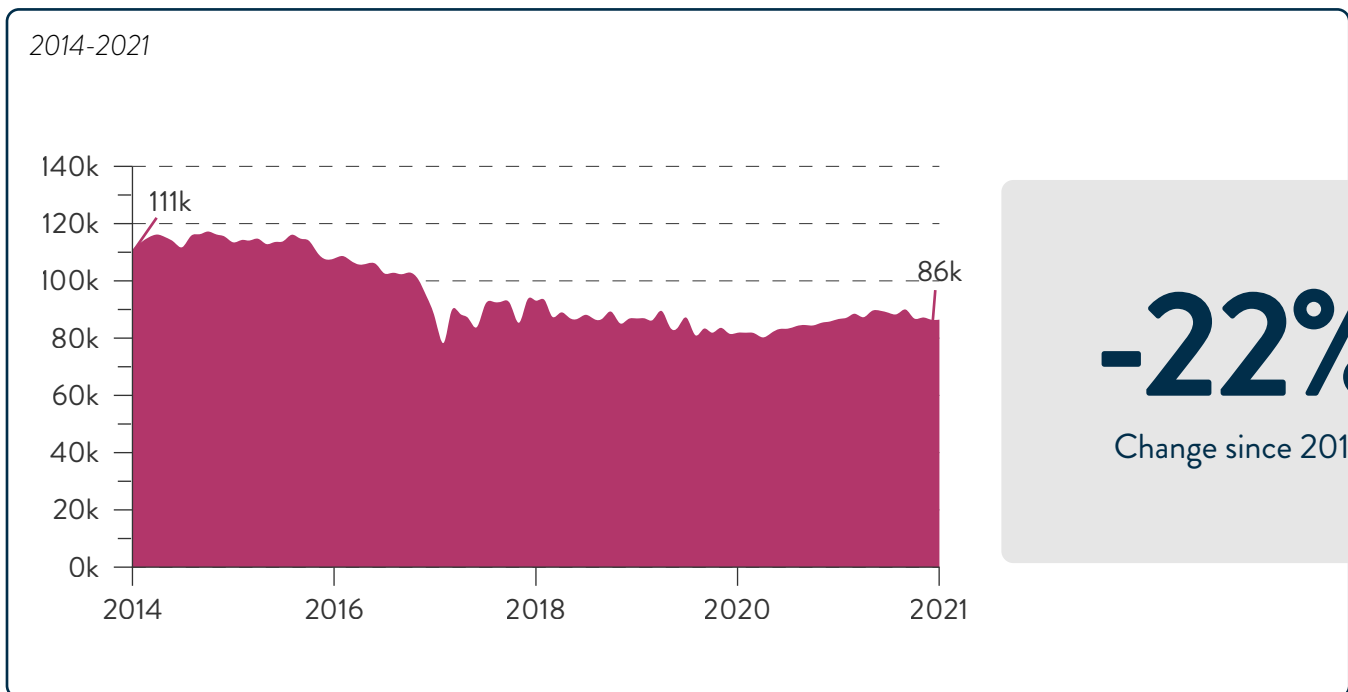
On average, concentrates were 29% more expensive in the adult-use market than in the medical one, with vape cartridges (+74%) and hash (+58%) having the greatest price differentials between the two markets.

The significantly higher prices in the adult-use market denote one reason why participation in Colorado's medical market has remained strong eight years since the state's adult-use sales began. For patients who require high doses of concentrates to manage their conditions, the cost differential between the medical and adult-use markets offers a savings that can add up quickly, based on the quantities consumed.

COLORADO: MEDICAL MARKET SNAPSHOT

Eight years since adult-use sales began in Colorado, the number of registered patients in the state has fallen 22%, from a little over 111,000 to just over 86,000. A few factors are driving such sustained participation in the medical market: Medical cannabis is not subject to the state's 15% cannabis excise tax, retail prices for medical products are (on average) significantly lower than those of the adult-use market (as shown above in the concentrate market), and medical patients with a physician's approval are permitted to purchase beyond the state's purchase limits, enabling high-consumption patients to benefit from economies of scale.

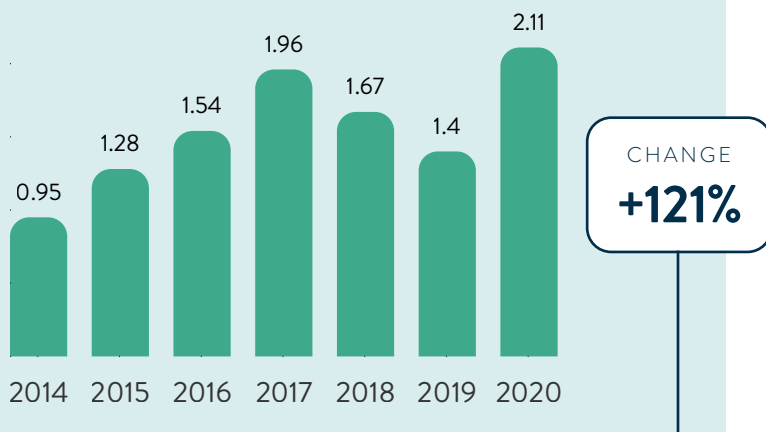
Colorado: Medical Cannabis Patient Population



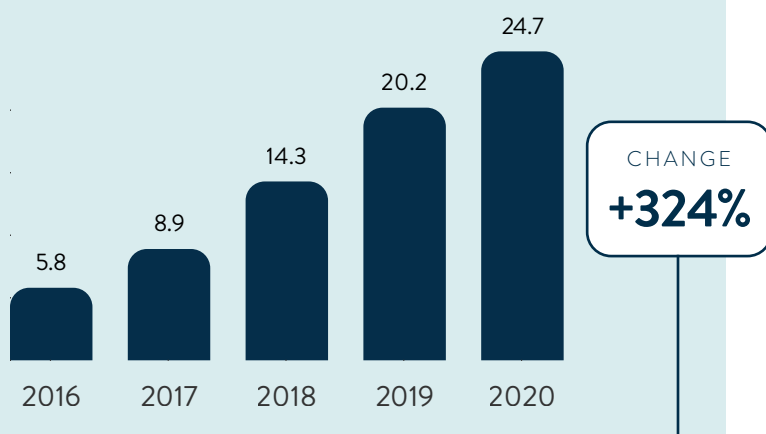
Source: Colorado Department of Public Health & Environment

Colorado: Product Sales per Patient

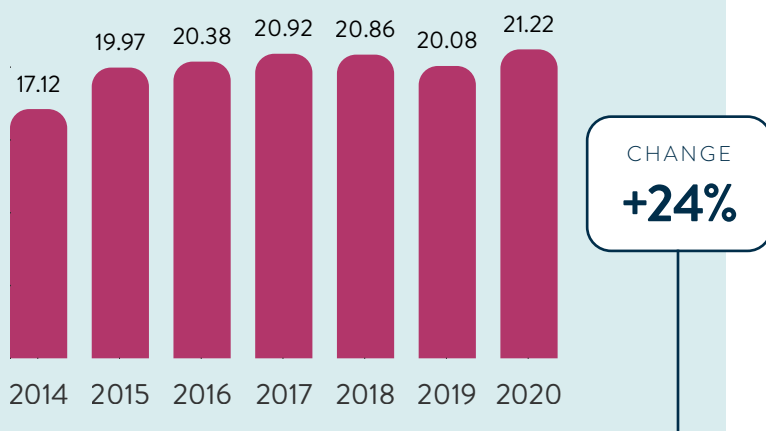
Pounds of Flower



Concentrate Units



Edible Units



Source: Colorado Marijuana Enforcement Division

The trend data on product volumes consumed per patient affirm that patients who choose to remain in the medical program stand to benefit most from lower-cost products and associated savings from not having to pay the excise tax.

For a medical patient who consumes cannabis intermittently and only spends \$100-\$200 per year on cannabis, cost may be a less pertinent factor in their purchase decision than either convenience of their purchase location or the quality of service at their chosen dispensary.

However, the patients annually spending hundreds or thousands of dollars are far more likely to be price-sensitive, making them more likely to remain in the medical market in order to select the products and purchase sources offering lower prices.

The greatest change seen since 2014 is among average concentrate units consumed per patient per year, which have increased more than threefold (from approximately 6 units per patient to nearly 25 units). Meanwhile, flower demand more than doubled (from 0.95 pounds per patient, to more than 2.1 pounds).

Edibles saw a more incremental gain, up 24% from approximately 17 units per patient to 21 units.

CANNABIS TRENDS IN COLORADO LAW ENFORCEMENT

Colorado’s landscape for cannabis law enforcement has changed dramatically since 2012, when the state first legalized cannabis for adult use. With cannabis-related arrests down nearly 70% since, the state has made dramatic changes in its enforcement priorities.

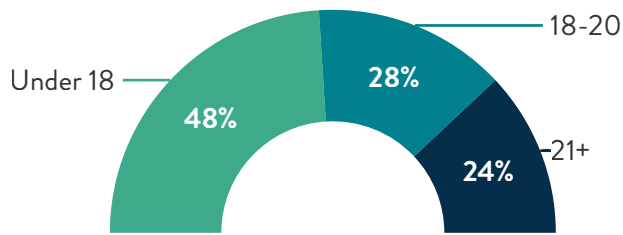
The gender and racial makeup of those arrested has remained consistent since the state legalized cannabis, but there has been a dramatic

uptick in the number of arrests among minors, due to a law enacted post-legalization that criminalizes underage possession and use. As a result, arrests of people younger than 21 years old jumped 292% since 2014, and represented three-quarters (76%) of all arrests in 2019 (the most recent year for which data is available). Arrests for cannabis manufacturing also increased 61%, the second-largest increase.

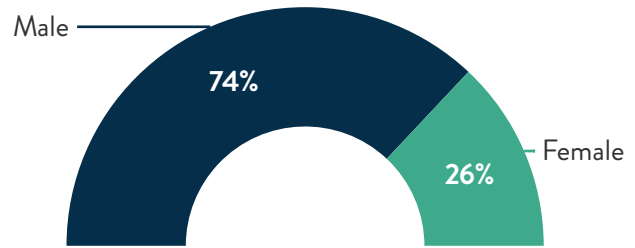
Most other major arrest categories have fallen sharply, with arrests for possession seeing the steepest decline (down 95% since 2008).

Colorado: 2019 Cannabis Arrests

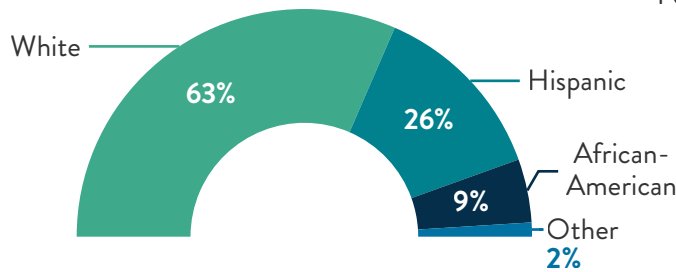
Age



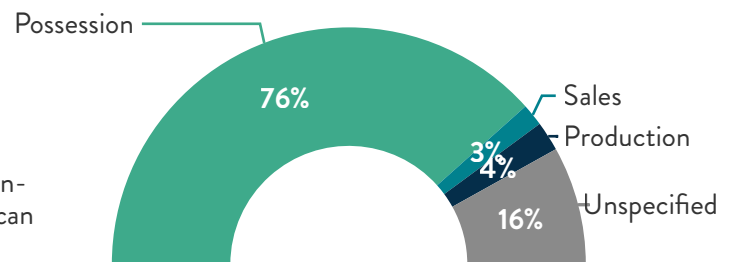
Gender



Race/Ethnicity



Crime Type



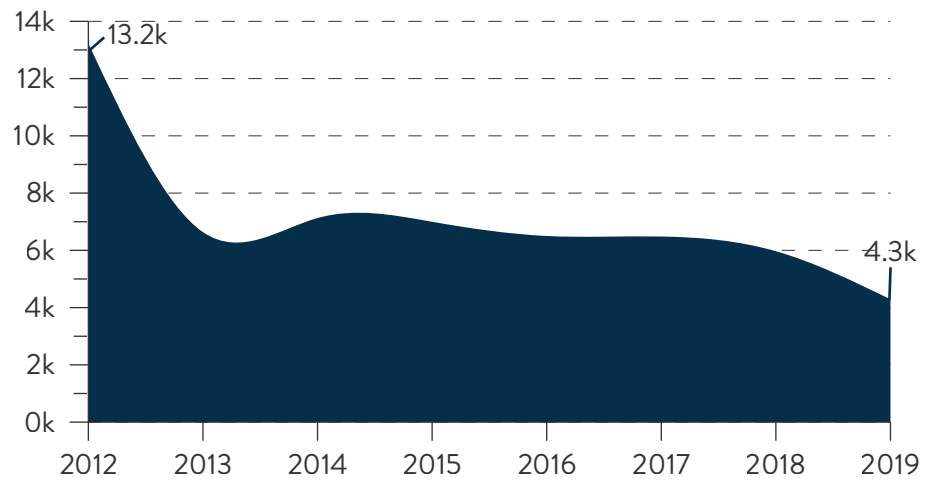
Sources: Colorado Department of Public Safety Division of Criminal Justice

Colorado: Cannabis Arrests

2012-2019

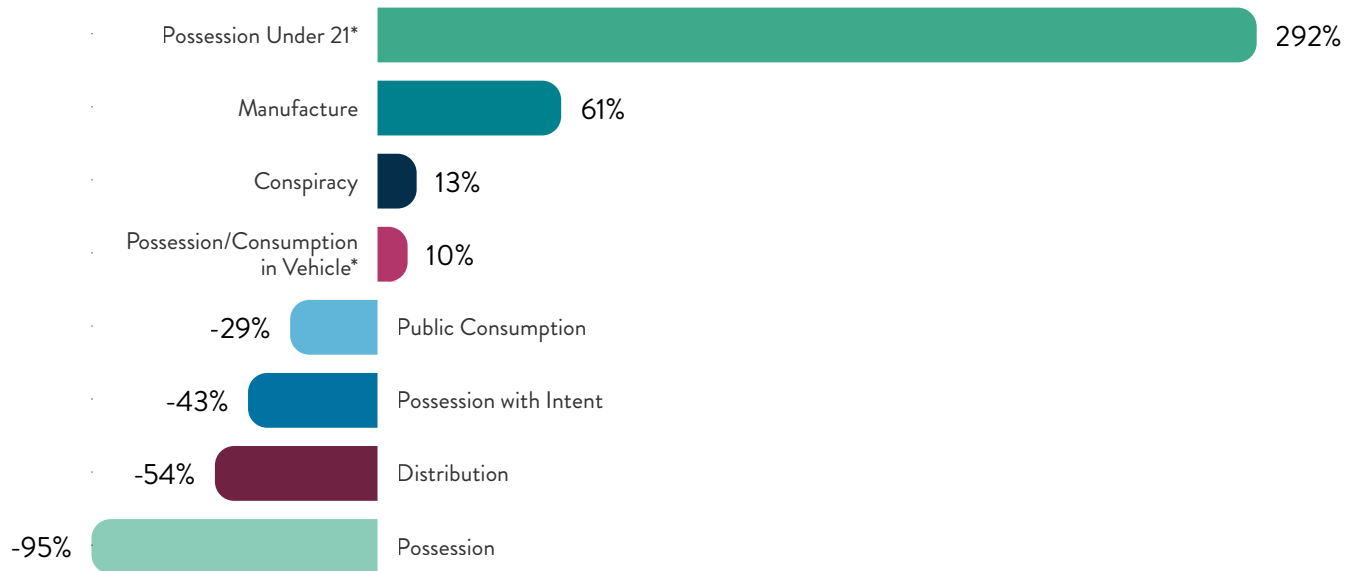
-68%

Decline in arrests since 2012



Colorado: Change in Marijuana Charges Filed

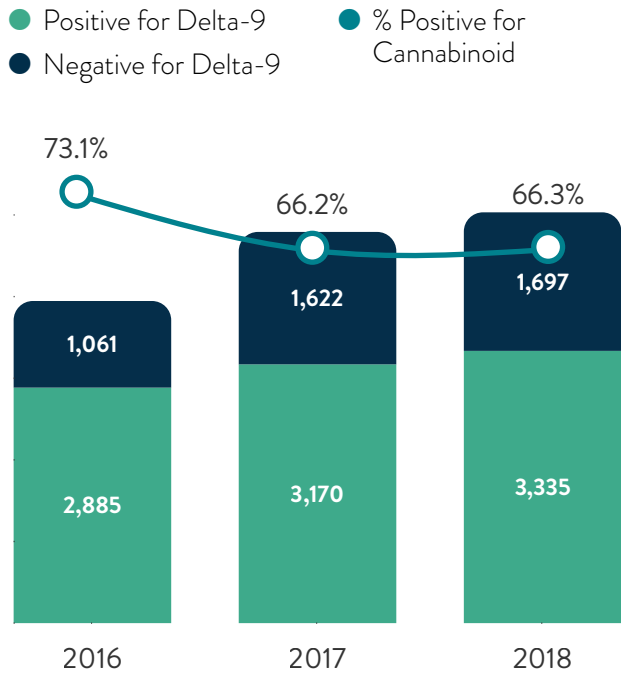
2008-2019*



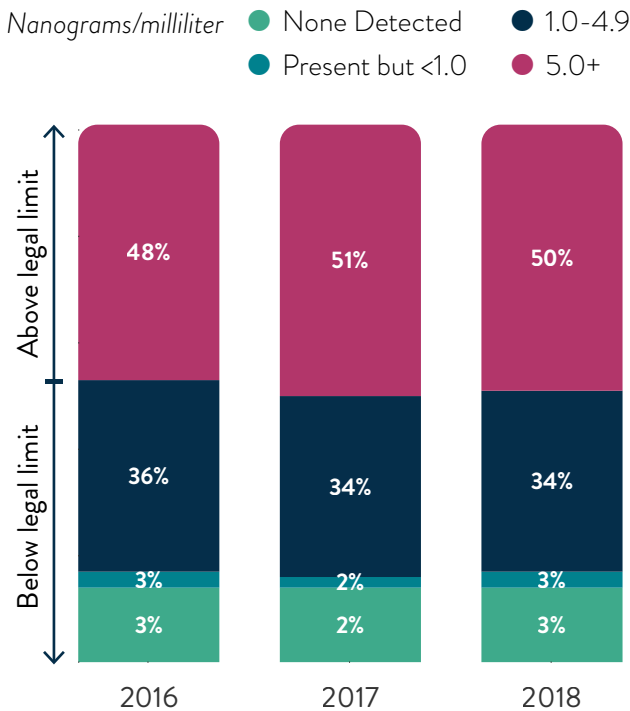
*Begins when new laws were enacted post-legalization in 2014

Source (this page): Colorado Department of Public Safety Division of Criminal Justice

Colorado: Cannabis DUI Positivity Rates



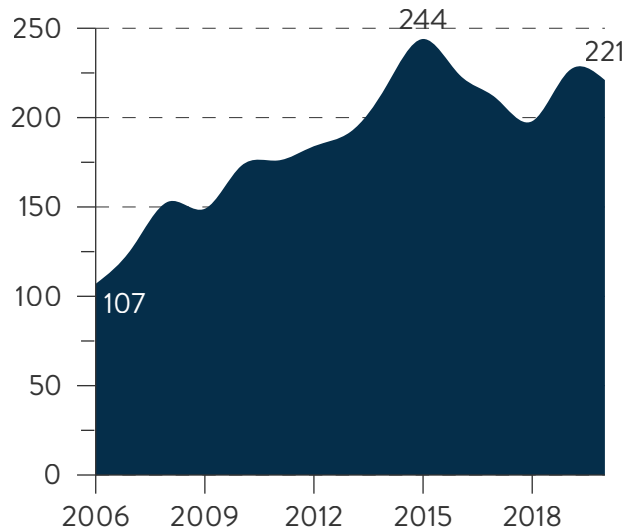
Colorado: Levels of Delta-9 THC Detected in DUI Cases



Colorado continues to invest in improving its drugged-driving protocols, doubling the number of certified drug-recognition experts (from 107 in 1996, to 207 in 2020). Of the 5,032 drivers screened for cannabinoids, 66% tested positive, among which half tested above the state limit of 5 nanograms per milliliter of blood.

Colorado: Certified Drug Recognition Experts

2006-2020



107%
Increase since 2006

Source (this page): Colorado Department of Public Safety Division of Criminal Justice

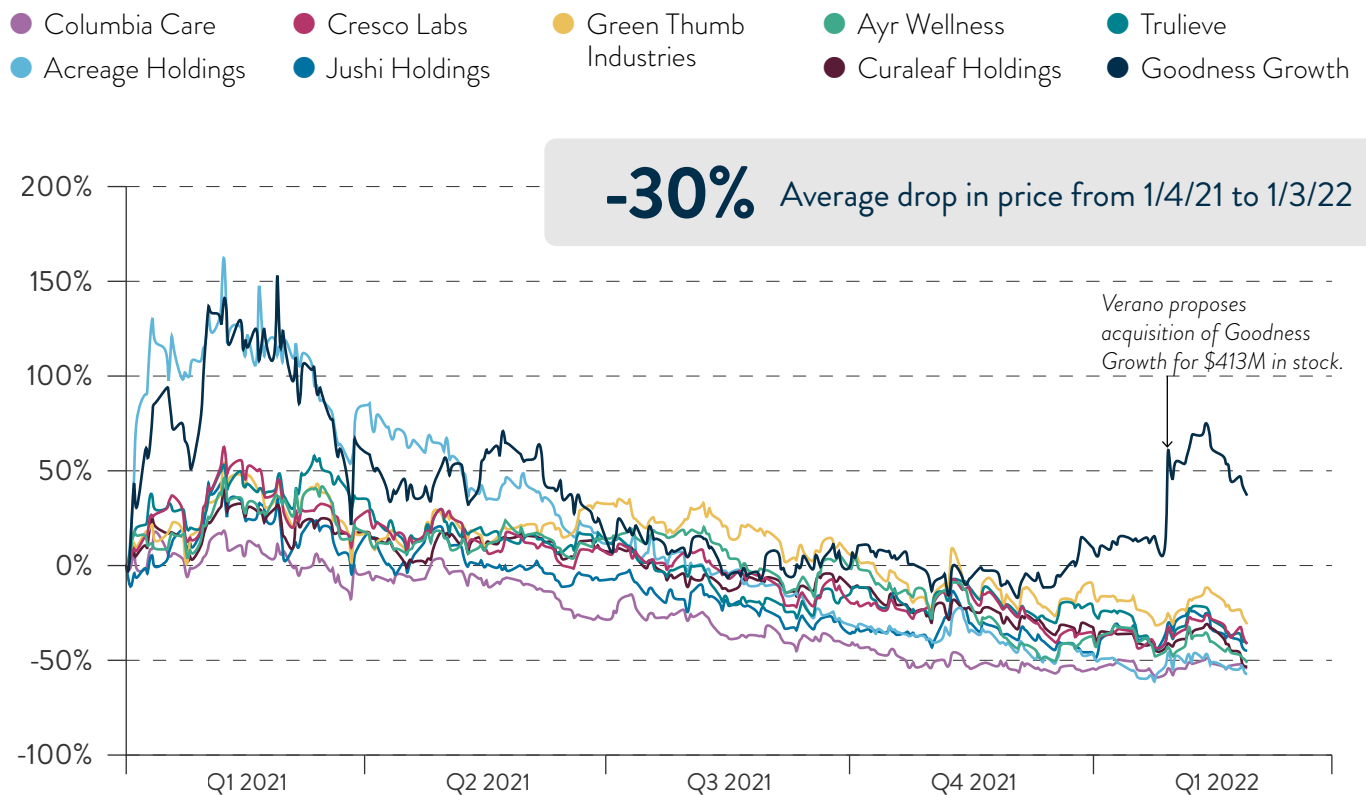
Increasing Competition Among Multi-State Operators

2021 WAS a landmark year for some of the larger Multi-State Operators (MSOs) in the United States. A turbulent market led several stocks to spike in Feb. '21. Acreage Holding (ACRHF) and Goodness Growth Holding (GDNSF) saw their stock price rise more than 161% and 153% respectively at various points during the Q1 '21 compared to the beginning of

the year. However, a lack of forward momentum on the federal front led to an average decline of 30% over 2021.

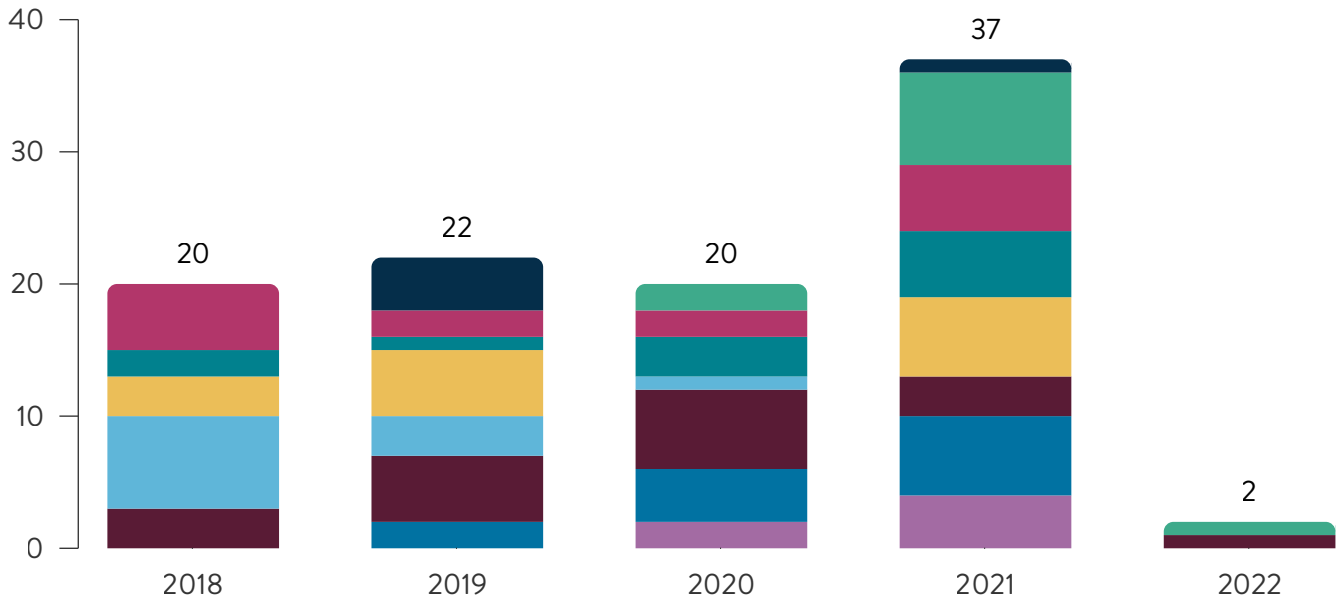
Despite this decline in stock price, MSOs were keenly focused on raising capital and strategic acquisitions. M&As among the largest publicly traded M&As nearly doubled from 2020 to

Largest Publicly-Listed U.S. MSOs Price Change (Q1 2021 - Q1 2022)

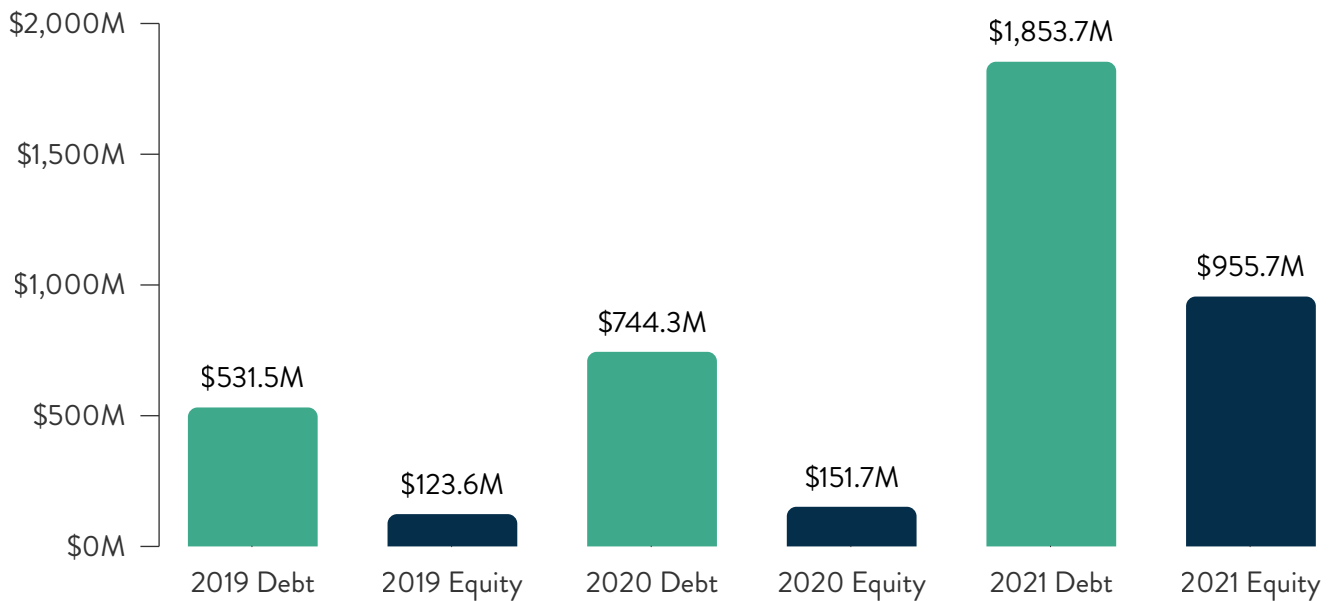


Source: FactSet financial data and analytics

Largest Publicly-Listed U.S. Multi-State Operators Mergers and Acquisitions (M&As)



Largest Publicly-Listed U.S. Multi-State Operators Capital Raised



Source (this page): FactSet financial data and analytics

Big Pharma Coming into Cannabis

● Jazz Pharmaceuticals completed its acquisition of GW Pharmaceuticals plc in May '21. GW Pharmaceuticals develops cannabinoid-based prescription medicines including Epidolex. **The cash-and-stock deal totaled \$7.6 billion.**

● In December '21 Pfizer announced a proposed **acquisition of Arena Pharmaceuticals for \$6.7 billion.**

Smoking the Competition

● Trulieve acquired Harvest Health & Recreation, **expanding their retail network to 149 dispensaries in 11 states.**

● Verano announces deal to acquire Goodness Growth Holdings. **The deal would expand Verano's footprint to 18 states** as well as allow Verano to acquire vertically integrated licenses in Minnesota and New York.

2021. Notably, in Oct. 2021 Trulieve completed its billion-dollar acquisition of Harvest Health & Recreation, expanding its retail footprint to 11 states.

While the pandemic initially led to hesitancy to invest in the cannabis industry, MSOs found substantial success in 2021. According to data collected from FactSet, these 9 MSOs were able to raise nearly \$2.8 billion in 2021 compared to just \$896 million in 2020. Markedly, debt has become more affordable for these larger operators. Green Thumb industries secured \$217m in a private placement at 7% this year compared to a 12% rate for \$105m in 2019. Likewise, Curaleaf announced a private placement of 8% Senior Secured Notes for \$425m in December 2021. In 2019, the company secured \$275m Senior Secured Term Loan Facility for 13%.

The increasing scale and reach of these MSOs is likely to have an outsized impact on the legal markets throughout the United States. While a federal wholesale tax like the one outlined in the Cannabis Administration & Opportunity Act could negate a key cost efficiency advantage of vertically integrated cannabis businesses, continued inaction at the federal level ensures that these companies will have the opportunity continue to jockey for position.

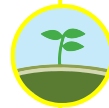
Emerging Trends in Sustainability in the Cannabis Industry

CLIMATE CHANGE DRIVES NEW URGENCY FOR SUSTAINABILITY AS DROUGHT CONDITIONS INCREASE RISK IN AMERICA'S MOST PRODUCTIVE CANNABIS REGIONS

According to NASA, 2020 was the hottest year recorded in the United States since recordkeeping began in 1880; globally, the seven-warmest years recorded have all occurred since 2014. Meanwhile, the U.S. is experiencing its worst drought conditions in decades, accelerating water scarcity in many parts of the country while driving heightened urgency to address water use in cannabis cultivation.

Ideal environmental conditions have historically made the Western states well suited for outdoor cannabis cultivation, but those states now face the country's most acute drought conditions. Arizona, California, Colorado, Nevada, New Mexico, and Oregon, (which collectively account for 71% of the nation's total cannabis supply, both legal and illicit) are facing severe-to-exceptional drought conditions, according to the National Oceanic and Atmospheric Administration's Drought Monitor.

U.S. Drought Intensity Categories



D0: Abnormally Dry

- Soil is dry; irrigation delivery begins early
- Dryland crop germination is stunted
- Active fire season begins



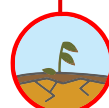
D1: Moderate Drought

- Dryland pasture growth is stunted; producers give supplemental feed to cattle
- Landscaping and gardens need irrigation earlier; wildlife patterns begin to change
- Stock ponds and creeks are lower than usual



D2: Severe Drought

- Grazing land is inadequate
- Producers increase water efficiency methods and drought-resistant crops
- Fire season is longer, with high burn intensity, dry fuels, and large fire spatial extent; more fire crews are on staff



D3: Extreme Drought

- Livestock need expensive supplemental feed, cattle and horses are sold; little pasture remains, producers find it difficult to maintain organic meat requirements
- Fruit trees bud early; producers begin irrigating in the winter
- Federal water is not adequate to meet irrigation contracts; extracting supplemental groundwater is expensive

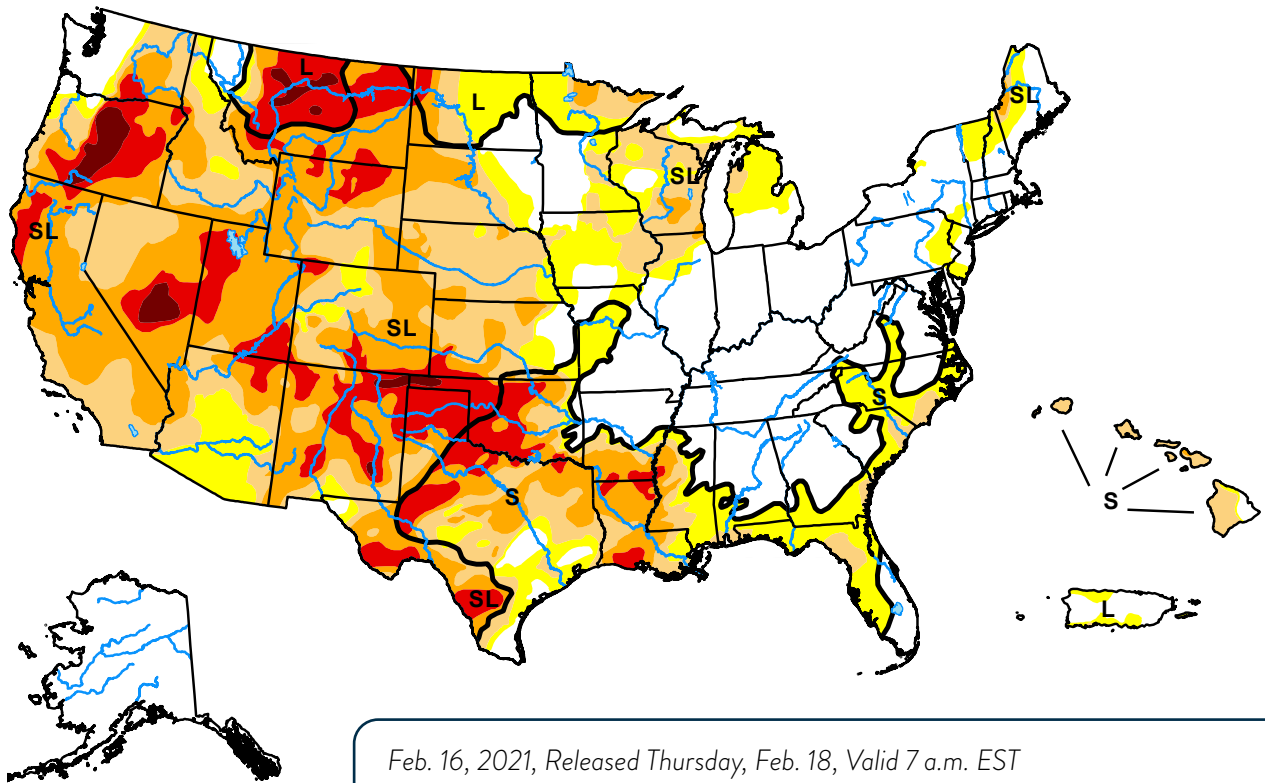


D4: Exceptional Drought

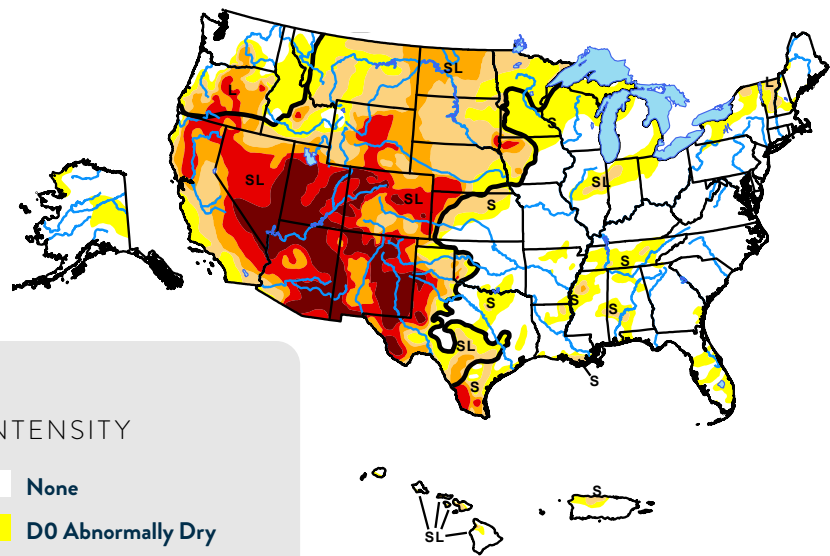
- Fields are left fallow; orchards are removed; vegetable yields are low; honey harvest is small
- Fire season is very costly; number of fires and area burned are extensive
- Many recreational activities are affected

Drought Conditions in the United States


Feb. 22, 2022, Released Thursday, Feb. 24, Valid 7 a.m. EST









Feb. 16, 2021, Released Thursday, Feb. 18, Valid 7 a.m. EST



DROUGHT IMPACT TYPES

-  Delineates dominant impacts
- S** Short-Term, typically less than 6 mo. (e.g. agriculture, grasslands)
- L** Long-Term, typically greater than 6 mo. (e.g. hydrology, ecology)

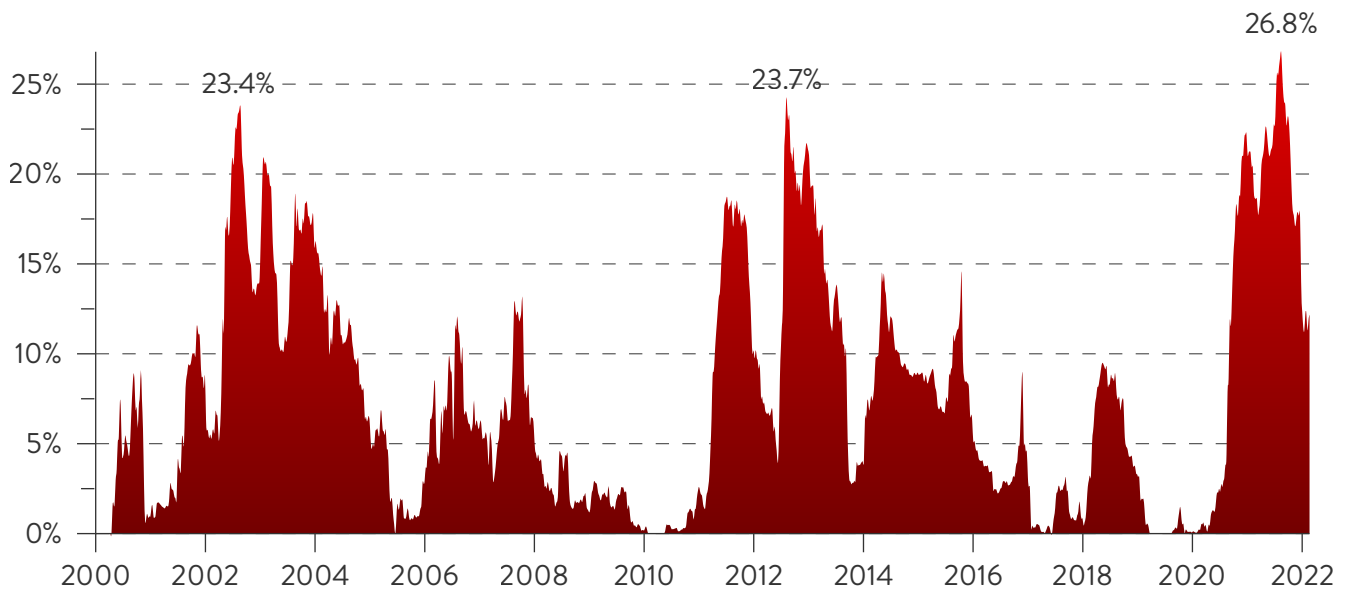
INTENSITY

-  None
-  **D0 Abnormally Dry**
-  **D1 Moderate Drought**
-  **D2 Severe Drought**
-  **D3 Extreme Drought**
-  **D4 Exceptional Drought**

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary.
Source: [United States Drought Monitor](https://www.drought.gov/)

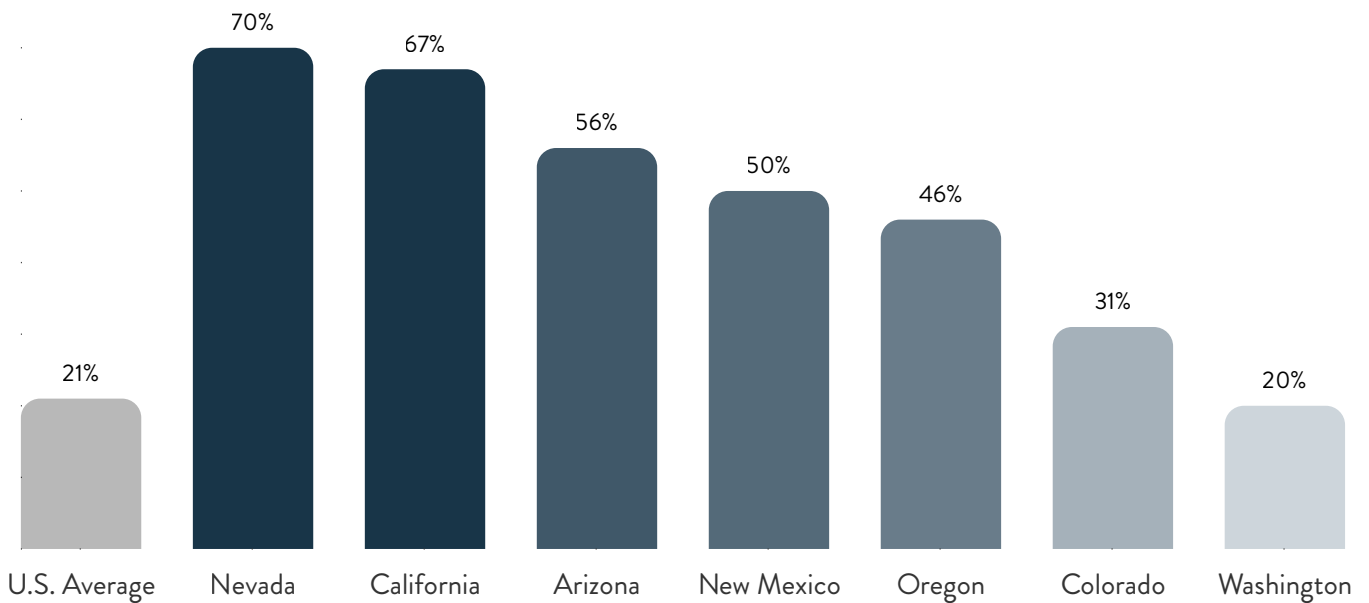
U.S. Historical Drought Conditions

Percent of the country experiencing D3/D4 conditions



Western States Experiencing Extreme or Exceptional Drought Conditions

In 2021



Source (this page): United States Drought Monitor

Nationally, during peak drought cycles approximately one-quarter of the country experiences extreme or exceptional drought, as seen in 2002 (23%), 2012 (24%), and early 2021 (22%).

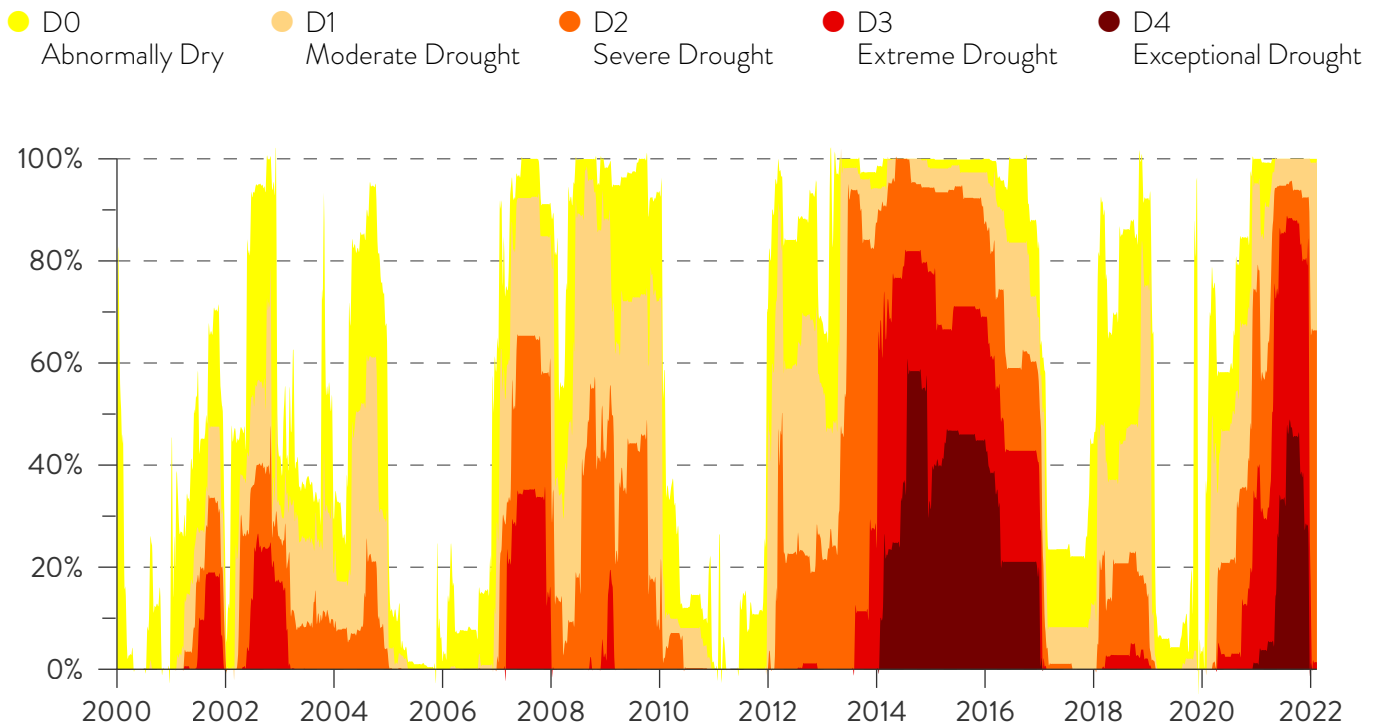
Amidst the current, historically prolonged drought, a future of rising costs and tightening access to water make its use efficiency an increasingly urgent priority.

As California is the country's largest cannabis producer, the extent of its drought over the past decade has been especially noteworthy. Since 2010, not only has the entire state experienced

multiple consecutive years of severe drought, but between 2014 and 2017 nearly half of the state suffered exceptional drought conditions. While the drought's intensity has eased slightly over the past three years, cannabis growers should assume that the trend toward longer, more acute droughts will be sustained well into the future.

The perennial drought presents a challenge both for water and energy supplies among the leading Western states. According to the U.S. Energy Information Agency, the Pacific Coast states are the three leading producers of conventional

California Drought Monitor Categories



Source: United States Drought Monitor

hydroelectric power, accounting for half of the country's net summer hydroelectric generation in 2020, led by Washington (27%), California (13%) and Oregon (10%).

The protracted drought and falling water levels will therefore not only destabilize water sources, but also increase energy-production costs in key markets, driving up electricity costs – a particular point of vulnerability for indoor and mixed-light greenhouse facilities.

Cultivation facilities should accordingly design their operations to reflect the changing climate, assuming:

- Longer, hotter and drier summers;
- New restrictions on water access, water-discharge volumes, and minimum effluent quality standards/monitoring as groundwater sources become more scarce;
- That states like California will iteratively tighten building codes to increase energy efficiency, reduce waste, and preserve indoor and outdoor air quality via mechanisms like Title 24 (the state's triennially updated Building Energy Efficiency Standards regulations with implications for HVAC, humidity control, and other environmental management systems which impact water use in the grow environment);
- More expensive water supply from public systems;

- Increased cooling demand for indoor and greenhouse growers to offset higher loads; and
- Higher operational expenses for temperature control and water management systems.

The imperative for energy and water efficiency has already led many growers to invest in optimizing their operations, not only to benefit the environment, but because lowering production costs also provides a key advantage in an increasingly competitive market.

Over the past decade, the cultivation sector has made dramatic strides in lowering its energy demands. The use of LED lights over high-pressure sodium and metal halide fixtures, the transition to greenhouses supplemented with artificial light over fully indoor facilities, and the integration of

The imperative for energy and water efficiency has already led many growers to invest in optimizing their operations.

sophisticated technological systems which precisely monitor the conditions within the grow environment (including temperature, humidity, air circulation, and carbon dioxide levels), have all dramatically lowered the energy requirements to grow cannabis at scale.

While water is a less costly input into cannabis facilities, growers are finding ways to reduce water use through water-conserving irrigation techniques, including drip irrigation and sensor-based micropulse irrigation systems, the capture and recirculation of leachate (water runoff not absorbed by plants during irrigation), reclamation of HVAC condensate in indoor and greenhouse facilities, and reverse osmosis of all reclaimed water to minimize contamination risk in the recirculated water supply.

While many growers operate on legacy systems, competitive advantages gained by reducing energy and water use (especially in high-cost/limited resource markets) are driving greater adoption of efficiency technologies within the grow environment.

Sustainability Trends in Cannabis

ADVANCING SUSTAINABILITY AND RESOURCE EFFICIENCY BEYOND CULTIVATION

Looking forward, it is important to consider environmental impacts across the cannabis supply chain. Manufacturing, processing, and transportation each carry impacts, and it would be shortsighted not to consider how each piece of the supply chain might be made more sustainable. Traditional ways of approaching those activities remain a useful guide to making the entire industry greener heading into the future.

Manufacturing

Traditional methods of extracting cannabinoids from the plant involved the use of temperature, agitation, and immersion. Products like cold-water hash, pressed kief and alcohol-based tinctures were common products. However, as technology and consumer profiles began to change, and investment into the industry ramped up, more energy and chemically intensive methods that delivered more standardized and efficiently produced products began to gain traction. Those included the use of solvents like butane. And while regulations have improved the safety of operations by imposing strict compliance standards, the costs and energy required to run the operation and adhere to good manufacturing practices are significant. On the contrary, more traditional methods of manufacturing have smaller carbon footprints. For example, the cold-water method of produc-

tion uses 0.57 kWh of energy per pound, while supercritical CO₂ extraction uses 14.91. This equates to 0.89 vs. 23.24 lbs. of CO₂ emissions per pound of extract.

Manufacturing facilities should be mindful of their environmental impacts, and instill measures to offset their respective carbon footprints while ensuring that their use of chemicals does not impact their facility's surroundings.

Processing

Like cultivation and manufacturing, traditional processing methods like drying in a shed and trimming by hand had negligible impact on the environment. As cannabis businesses have scaled, regulations around drying and packaging (and the opportunity to expedite the processes via automation) have resulted in a factory-style assembly line model that uses machines to gain efficiency and protect margins. While this has been a win for innovation, the move from a hand-crafted product to an automated consumer packaged good does have its impact on the operation's environmental footprint.

Drying cannabis at scale is a precise process, with a risk of cross-contamination if not done properly. A drying room uses a humidifier, dehumidifier, and oscillating fans. It is estimated that drying accounts for 1% of an indoor cultivation facility's carbon footprint at 90 kWh per kg, which equates to 60 kg of CO₂ per kg. Processing facilities should consider the benefits of hand-trimming and packing, and evaluate the environmental impact of moving to automation as they scale.

Transportation

For now, cannabis must stay within state lines, but interstate commerce is coming. While it makes environmental sense to grow cannabis outside where the climate is appropriate, and to send it out similarly to produce, there are very real costs involved in moving products around the country. Every year the United States expends 1.4 quadrillion BTUs's shipping produce around the country, which accounts for 14% of the overall energy needed for food production.

Even in the current intrastate model, transportation vehicles are limited by how much product they can carry due to robbery risks, requiring more trips to complete their task. Since there is not yet an established method for moving cannabis around the country, it makes sense to anticipate an Earth-friendly system.

It is possible that maintaining small indoor gardens adjacent to dispensaries where the cannabis is trimmed and packed by hand might be more environmentally friendly an option than shipping sun-grown cannabis across the country. Therefore, it is important to consider the entire supply chain when crafting a sustainable industry, since every piece contributes to its impact.

BRINGING REASON TO PACKAGING FOR FLOWER AND PRE-ROLLS

During the legalization debate, one issue often taking front and center is child-proof packaging. The issue is so central because it represents one of the key fears about legalization, making cannabis more accessible to kids. Yet, data collected

since legalization (with the most recent shared by SAMHSA) shows a use rate among 12-17 year olds of 10.1%, compared to 13.5% in 2012.

The concession around requiring childproof packaging on every cannabis form factor has very real impacts. Cannabis packaging produces about 150 million tons of waste every year. A standard container for 1/8th of an ounce of cannabis weighs 6 times what its contents do. While there is a case to make for childproof packaging on edible products, it is fair to question the validity of excessive packaging on raw cannabis flower and prerolls, and consider the three primary goals of cannabis packaging.

PREVENTING UNINTENDED ACCESS

As cited above, a primary aim of childproof packaging is to prevent vulnerable minors from accessing the product. That is given emphasis regarding edibles, since many of those consist in sweet formulations and forms commonly recognized by children (e.g., gummies). Also, edibles are activated, meaning that the contained THC is psychoactive (due to decarboxylation). If such a product is ingested, it is intoxicating. However, for flower and prerolls, those issues do not exist. Raw cannabis flower is not pleasant-tasting, nor is it easy to chew or swallow. It does not convey a familiar shape or smell for a child. Secondly, even should raw cannabis flower be ingested, it is not intoxicating. THC present in flower is still THCA, i.e., its acid form. It would need to be heated to become psychoactive. When considering ac-

cidental ingestion of cannabis among children, edibles account for most instances. Adolescents interested in accessing the products can easily do so regardless of childproof packaging.

LABELING PRODUCT INFORMATION, INCLUDING HEALTH WARNINGS AND TRACKING CODES

Another function of extensive packaging is to provide complete product information, including tracking codes and health warnings. Considering the lengths of warning materials for pharmaceutical drugs, perhaps a onetime insertion from a dispensary would suffice. Product and tracking information could be displayed near the product via QR code.

**Cannabis
packaging
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of waste every year.**

Consider cigarettes, which contain a psychoactive substance (nicotine) and are activated, meaning that to swallow one would provide the effects of nicotine. Nevertheless, reports of accidental ingestion of cigarettes by children are low, with just over 200,000 reports throughout 27 years, including one fatality related to co-ingestion of diazepam. They have extensively proven health harms, yet are commonly packaged 20 within a flimsy cardboard box. To proactively and effectively address the comparative packaging waste from flower and prerolls, bulk spices may be relevant: They are offered by weight, each with its own value. Consumers are often invited to utilize personal jars to collect them. Rethinking the sale of flower and prerolls in similar terms could reduce waste and help advance past the premise that cannabis is a fearfully dangerous substance.

PROVIDING A VISUALLY APPEALING CONTAINER IN A RETAIL ENVIRONMENT

With cannabis contents generally being very small by weight and volume, brands typically resort to packages much larger than required of their contents, in order to be eye-catching when displayed on store shelves. Often, packaging is designed to make the product feel more substantive than it is while on store shelves, even though it serves no other utility in preserving the quality of the product or in aiding in its consumption.

As brands struggle to build consumer familiarity and brand recognition, many have chosen creative and novel package types to maximize visual impact when displayed in store. However, as the legal market grows, the environmental costs of manufacturing and disposing of all the packaging should be more responsibly considered within the industry.

Many brands aim to source post-consumer recycled materials for their packaging, and while that is an important first step, the bulk spice model may represent a better approach here, too. One where the consumer can view the packaged display model on the floor, but a more simply packaged version is given at checkout. This approach would enable brands to retain the creative flourishes of their package design, without unduly creating an increasingly unsustainable volume of packaging that gets immediately discarded by a consumer.

Key Takeaways

Record support for legalization is a leading indicator of a seismic shift in normalization of cannabis in American society.

According to the most recent Gallup Poll, support for cannabis legalization maintained its all-time high of 68% in October 2021. Notably, according to the National Opinion Research Center's General Social Survey, for the first time, majorities among all age groups – as well as majorities among self-described liberals and conservatives – support legalization.

While support was slightly below the majority threshold among Republicans specifically, more Republicans support legalization than oppose it. The change in public attitudes is fueled in part by the growing exposure that Americans have to legal, regulated cannabis. Four new states passed measures to legalize adult-use cannabis and two legalized medical cannabis since the start of calendar year 2021. Nearly three-quarters (74%) of the country now have access to legal medical cannabis in some form. As Americans have seen cannabis businesses emerge in their communities, and witnessed the therapeutic

benefits cannabis has had for their friends and family members. The long standing stigma around cannabis use and pejorative caricatures of cannabis consumers have eroded. In their place, a more nuanced and sympathetic understanding of consumers, and deepening conviction that the punitive approach to prohibition should end.

As social acceptance is rising, more consumers are finding ways to integrate cannabis into their lives, pushing self-reported usage rates to record highs.

Roughly 12% of American adults aged 18+ report using cannabis at least once per month, and 18% report having used cannabis in the previous year – both new records for U.S. National Survey on Drug Use and Health. An estimated 52 million U.S. adults will consume cannabis at least once in 2022 across both legal and unregulated markets, and that number is projected to grow by roughly 4% per year over the next eight years, reaching an estimated 71 million consumers by 2030. The scale of total regular cannabis

usage across the United States, in the context of the numerous restraints that currently exist on existing legal markets, underscores the scale of opportunity that still remains for the legal market to expand into in the coming years.

Liberalizing cannabis policies brings consumers out of the shadows.

Oklahoma best illustrates how many consumers are unwilling to admit their use in markets where cannabis is illegal, but become comfortable doing so after the laws in their market changes. Oklahoma historically had one of the lowest self-reported usage rates in the country. However, after the state legalized medical cannabis and implemented one of the most expansive medical programs in the country, the number of registered medical patients in the state quickly exceeded the total number of self-reported consumers on NSDUH. This underscores the continued undercounting of consumers in the government's data, but also confirms that the increased usage rates seen in recent years, especially in the states with the most liberalized markets, are not just from new consumers starting to use cannabis for the first time, but are driven as much by existing, closeted consumers coming out of the shadows. This pattern is further affirmed by the 2021 NSDUH which showed that the states which saw the highest increases in self-reported use – Vermont, Washington, Oregon, Nevada, and DC, were also the states with some of the longest history of progressive cannabis reforms.

As usage rates rise, more consumers will substitute cannabis for alcohol.

One potentially significant implication of the quickening growth of cannabis consumers is the long-term impact it will have on demand for alcohol. There are far more alcohol consumers than current cannabis consumers – according to the National Institutes of Health, 55% of American adults consume alcohol at least once a month, compared to 12% who report consuming cannabis. However, if the current pace of cannabis demand growth is sustained, over the next decade we will see monthly usage increase to 16% nationally by 2030, with some states reaching 25% or more. According to our last cannabis consumer survey, 81% believed that cannabis was safer than alcohol, and 47% said they had replaced at least some of their drinking with cannabis. Within an environment where cannabis is more accepted in social settings, with new form factors, such as high quality beverages, that are readily substituted for alcohol, and where the health effects of drinking are an growing point of concern for young adults, the likelihood of cannabis displacing alcohol will only grow stronger in the long term.

Despite broad consensus that the industry's benefits are not being equitably distributed, few states have been effective in closing the participation disparity in poor and economically disadvantaged communities.

New York will be a true test: a new model for comprehensive integration of equity considerations at the advent of the industry.

Sales in currently legal states are forecast to reach \$57 billion by 2030; but legalization expansion will push revenues even higher.

The legal cannabis market was worth an estimated \$26.5 billion in 2021, and is expected to reach \$32 billion in annual sales in 2022. Fueled by strong consumer demand and an influx of newly operational legal state markets in the last few years, annual legal sales of cannabis in the U.S. are projected to grow at a compound annual growth rate (CAGR) of 11%, to reach more than \$57 billion by 2030 in just the markets where it has already been legalized. The more than doubling of sales revenues between 2021 and 2030 underscores the strong growth opportunity that the cannabis industry will present for strongly positioned companies well beyond the next decade.

With 18 additional states positioned to legalize either medical or adult-use over the next decade, legal sales could top \$72 Billion by 2030.

Based on our analysis of state legalization efforts, we have identified nine states with strong likelihood to legalize adult-use cannabis, and nine states that are likely to legalize medical use prior to 2030. If all 18 potential states are successful in pushing forth legalization measures over the next 8 years, it would not only add an additional \$14.5 billion annually to legal retail sales by 2030 (\$72 billion in annual sales by 2030), but would also increase the percentage of Americans living in states with some form of legal cannabis access to 96%, and that of Americans living in states with legal access to adult-use cannabis to 64%, undoubtedly adding immeasurable pressure to the push for federal reform.

If all 18 potential states pass legalization measures over the next 8 years, the percentage of Americans living in states with some form of legal cannabis access would increase to 96%.

Flower remains largest consumer product category in legal markets, but value-added products continue to gain share.

While flower products (loose flower and prerolls) remain the single largest product category by a significant margin, vapes, edibles, and tinctures continue to see strong growth; in part due to the flexibility they give consumers to use cannabis in a wide variety of contexts. Since 2019, vapes, extracts, and tinctures have all experienced moderate decline in market share (though they continue to see revenue growth) while edibles' have grown. Edibles can present a lower barrier to entry for new consumers, and recent advances in technology have made edible products more competitive with combustible alternatives by introducing significantly improved flavor profiles, reducing the effect onset time, as well as creating a more consistent user experience.

Sweeping federal reform is dead for now, but incremental changes are likely before the end of Biden's administration.

While it is difficult to pinpoint when federal legalization may occur, and what form it might take, it seems clear that the success and projected growth of sales in existing legal state markets, taken with the continued strong expansion of state markets, would only heighten pressure on the federal government to reform national cannabis policy. However, even with the Democrats in control of both the White House

and Congress, and their party largely in agreement that the time has come for federal reform, there remain some key issues on important divisions which could derail a path to reform, including:

LEGALIZATION VS. DECRIMINALIZATION

Legalization would grant the federal government broad powers to regulate a national cannabis industry, while federal decriminalization would perpetuate the current patchwork model with some states making cannabis fully legal, others permitting medical use only, and others maintaining a blanket prohibition. Both approaches would have major implications for the U.S. market, with a nationally legal model greatly favoring the MSOs, Canadian LPs, and non-cannabis consumer packaged goods (CPG) companies, while decriminalization would benefit smaller, single-state operators by maintaining a highly fragmented market.

BANKING AND FINANCE REFORM

Two primary financial issues facing the industry are the inability for plant-touching businesses to access traditional capital markets (including federal business-funding programs), and the significantly higher taxes which cannabis businesses pay – both being caused by the federal prohibition of cannabis. While legalization would broadly address both issues, anything short of full legalization will require separate legislation to address the capital issues in the cannabis market. Lawmakers remain divided about whether and when to grant the cannabis industry full and fair access to the national and global financial markets, and the lack of consensus could stymie near-term reform efforts.

SOCIAL EQUITY AND GOVERNMENT SUPPORT FOR THE INDUSTRY

Another area of division is the extent to which the federal government should actively support the industry's growth, particularly with programs aimed at poor, minority, and disadvantaged communities who have borne the burden of cannabis prohibition yet are now being excluded from the emerging legal industry. Reaching consensus on how the federal government can support the development of an equitable cannabis industry after decades of racially inequitable prohibition enforcement will likely remain a key point of division between progressive and more conservative lawmakers.

Ultimately, without strong backing from the White House, it is unlikely that Congress will be able to muster the votes or political will to advance sweeping national reforms. Those issues illustrate the complexities which lawmakers will face as they work to establish a framework for national reform. Significant proposals are under development, including a long-awaited proposal from Democratic Senate Majority Leader Chuck Schumer, who, though having declared cannabis reform to be a high priority, has not yet shared specifics about the nature of the proposed framework.

The low likelihood of a sweeping measure passing congress has increased the likelihood that a more incremental move, like addressing cannabis banking, will clear Congress in the near term. The parties are more closely aligned on the urgency of removing the prohibitions on

cannabis businesses using the financial systems, the state markets have matured sufficiently to show significantly improved business compliance, and the dramatic revenue growth of the industry makes the lack of access to banking services increasingly untenable. However, even with this strong consensus, it is unlikely that banking reform would happen until well after the 2022 midterm elections.

Despite broad public backing and increasing self-reported use, political opposition in historically conservative states will forcefully resist legalization efforts.

While we believe as many as 18 states could legalize medical or adult-use within the next 8 years, the strong resistance by conservatives in Mississippi and South Dakota to legalizing cannabis are likely a bellwether of the type of resistance that efforts to legalize will face in the south and Midwest – the most socially conservative regions of the country. It is worth noting that, the resistance will be from each state's political class, and not from the general public where majorities now support legalization. Given these local political dynamics, businesses hoping to pursue opportunities in these markets as they liberalize should not only be following public opinion in the state, but also very closely monitoring the attitudes of each state's powerbrokers who might have the ability to reverse popularly backed reform measures.

Medical market participation increases in states bordering adult-use markets.

The total number of registered medical cannabis patients nationwide surpassed 4.4 million in 2021. Just in the states where cannabis has been legalized for medical use (with no assumptions for any new markets by 2030), New Frontier Data projects that there will be a combined 5.7 million registered medical cannabis patients by 2030, representing nearly 2% of the entire U.S. population. As newly legal adult-use state markets begin to take off, and additional states choose to legalize cannabis for adult-use through 2030, New Frontier Data

expects to see strong upticks in legal medical market participation in legal medical states bordering newly legalized adult-use states. Patients who live in a medical-only market and are registered with the state's program recognize that they can buy products in an adult-use market, and have an affirmative defense for possessing cannabis at home. It is expected for that medical registration/ adult-use participation model to be most visible in the Northeast, where legalized adult-use markets states (i.e., New York, New Jersey, and Virginia) either border or are otherwise accessible for people in more than a dozen medical-only markets. Additionally, as New Frontier Data's consumer research has shown that medical patients consume and spend more than do recreational consumers, the regional demand of medical patients in adult-use markets will drive significantly higher revenues than will nonresident recreational consumer demand.

Competition heating up among MSOs - fueling M&A activity.

Despite the downward trend in stock prices of public cannabis companies over the year, the biggest multi-state operators (MSOs) were keenly focused on raising capital and making strategic acquisitions. Merger and acquisition activity among the largest publicly traded MSOs nearly doubled from 2020 to 2021. Additionally, debt has become more affordable for the well-established MSOs, with secured coupons on a continuous decline across operators. The increasing scale and reach of these

We project that there will be a combined 5.7 million registered medical cannabis patients by 2030, representing nearly 2% of the entire U.S. population.

MSOs is likely to have an outsized impact on the legal markets throughout the United States. While action on taxation and banking could negate a key cost efficiency advantage of vertically integrated cannabis businesses, the continued general inaction on cannabis policy reform by the federal government ensures that these companies will have the opportunity to continue to grow market share.

Climate change is driving new urgency for sustainability in cannabis as drought conditions increase risk in America's most productive cannabis regions.

Ideal environmental conditions have historically made the western states well suited for outdoor cannabis cultivation, but those states now face the most acute drought conditions in the country. The protracted drought and falling water levels will not only destabilize water sources but also increase energy production costs in key markets, driving up electricity costs – a particular point of vulnerability for indoor and mixed-light greenhouse facilities. The imperative for energy and water efficiency has led many growers to invest in optimizing their operations to lower production costs and gain advantage in an increasingly competitive market.

Broader macro factors portend a potentially turbulent year ahead for the industry.

The beginning of 2022 has seen a convergence of macro-economic developments that could create significant turbulence for the cannabis industry in the year ahead. Inflation has soared to 7.9% in the 12 months ending in February, the highest level recorded since 1982. Concurrently, Russia's invasion of Ukraine has sent fuel prices soaring (and is forecast to similarly spike wheat prices) further impacting consumer spending power. Efforts to contain a new COVID-19 outbreak led China to lock down the port city of Shenzhen, the world's fourth largest port city and a major manufacturing hub, threatening disruptions to the global supply chain. And across Europe, spiking COVID-19 cases may force governments to reinstitute containment protocols that had begun to ease coming into the year. Collectively, these developments are sending shockwaves across the market, with several potential implications for the cannabis industry:

TESTING THE RECESSION RESILIENCE OF CANNABIS SPENDING

While New Frontier Data's research has repeatedly shown cannabis consumer demand to be largely immune to economic shocks, an acute and protracted change in consumer's economic fortunes could drive major changes in where consumers are spending their money. In an economic downturn, we would expect to see a shift away from value added products to flower, as

well as a surge in demand for value over premium brands. In anticipation of this, retailers should be carefully monitoring their sales distributions over the coming months and be prepared to adjust their retail mix to reflect the needs of a more price-conscious consumer.

DISRUPTING THE SUPPLY CHAIN

If the lockdowns in China are sustained (which is a distinct possibility given the virulence of the COVID-19 strain they are trying to arrest) critical operational inputs for many product manufacturers and brands could be acutely disrupted. Vapes are especially vulnerable to these disruptions since most vape hardware is manufactured in China. Consequently, companies which many have begun to return to just-in-time sourcing following the pandemic's initial supply chain disruptions should begin accumulating inventory in anticipation of supply chain disruptions going into the second quarter, and exploring for manufacturers in other countries that may be able bridge their needs while Shenzhen remains offline.

CONSTRICTING CAPITAL FLOWS INTO CANNABIS

A major economic shock could dampen investor interest in cannabis, as investors may choose to sit on their cash, or invest in assets viewed to be lower risk, until broader economic conditions stabilize. This could prove to be especially challenging for the new adult-use states (New York, New Jersey, Virginia) due to the highly capital-intensive nature of establishing a recreational market. Reduced capital access will increase borrowing costs, limiting how quickly businesses will be able to scale, and how profitable they can be once operational. Consequently, companies seeking funding should be working aggressively to secure as much capital as they need before economic conditions deteriorate further, and before the competition for the available capital intensifies.

Methodology



Data Overview

New Frontier Data's analysis in this report represents a new threshold of modeling in the evolving cannabis industry. The forecasts presented herein leverage data collected over 13 years, both spanning the breadth of the cannabis industry and including insights gained from dozens of state, national, and global forecasting iterations. The term "cannabis" here (i.e., also commonly referred to as marijuana) refers to high-THC cannabis and cannabis products sold in both legal and illicit markets. Legal cannabis refers to products sold in regulated channels, including dispensaries and delivery services. The illicit market is defined as sales of cannabis and cannabis products outside of regulated and taxed dispensaries or retail sales.

NOTE: Legal sales through dispensaries can include a small percentage of marijuana-derived CBD products; however, the sales and revenue forecasts do not include the hemp-derived CBD products sold in mainstream retail and nutritional supplement stores. New Frontier Data has sepa-

rate models for hemp and CBD sold in mainstream (i.e., non-dispensary) channels, based on newly collected national cultivation and consumer demand data. We recently released our revised U.S. CBD market estimates in [U.S. CBD Consumer Report Series: Spending & Market Size \(Vol 2\)](#).

The data included in this report is drawn from a wide range of sources, including:

GOVERNMENT AGENCIES

We obtained data from federal, state, and municipal agencies ranging from tax revenues and medical cannabis patient participation rates, to rates of illicit cannabis use, and general demographic data.

RETAIL SALES

Point-of-sale data from strategic partnerships with industry-leading technology platforms provide visibility into retail sales trends, including evolving product demand, pricing and sales trends, and variability across markets.

ANCILLARY COMPANIES

Non-plant-touching businesses have been critical sources for insights into the evolving needs and multi-sectoral impacts of the cannabis industry. Data ranging from capital flows to cultivation supply sales provide valuable indicators into the leading edges of the market. Interviews with strategically placed stakeholders, including leading investors, business owners, regulators and lawmakers further hone our insights into emerging legal, regulatory, and industrial developments that will impact the industry.

CANNABIS LAW REFORM ADVOCATES

Projections for the states most likely to legalize in the next four years were based on extensive discussions with leading drug law reform advocates who have been central in the national and state-level campaigns to legalize cannabis. Their input was critical in informing our understanding of the arc of the national legalization movement, as well as the local political and legislative dynamics that could influence the growth and performance of each market.

ACADEMIC, RESEARCH & MEDICAL INSTITUTIONS

Research conducted by a broad range of academic institutions, medical centers, think tanks, and universities provided rich insight into issues including health effects of cannabis consumption, medical applications of the plant, and the socioeconomic costs and outcomes of both cannabis prohibition and legalization.

Market Projection Methodology

New Frontier Data has developed proprietary models for estimating the size of both the legal and illicit cannabis markets in the U.S. The models are continually refined based on new data inputs, expansion of legalization into new markets, changes in state regulations, and other market-disrupting events. The market growth projections for legal sales included in this report reference both adult-use and medical markets, and are focused exclusively on retail sales to medical patients and adult-use consumers. These projections do not include wholesale transactions between producers, processors, and retailers, or revenues collected by state governments. Nor do they include revenues from the ancillary (non-plant touching) sectors of the industry. The growth models were developed based on analysis of key inputs including:

- Size and growth of the total population within each state;
- Size and growth of the adult population within each state;
- Growth of cannabis usage rates in each state market;
- Monthly changes in legal medical and adult-use cannabis sales in legal state markets;
- Size and growth of the tourism population in states with adult-use sales, as well as in medical-use states that offer reciprocity to cardholding medical patients from other states;

- Monthly changes in patient registrations in each medical market since the activation of a medical program;
- Number and types of qualifying medical conditions accepted in the states which track patient registration growth;
- Monthly changes in medical cannabis expenditures per patient in the states which track this data;
- Monthly changes in expenditures per person in adult-use states which track this data;
- Interplay between medical and adult-use sales in states where adult-use sales are legal (specifically including demand elasticity to price differences in open-access markets);
- Time between passage of each state's respective legalization measure and launch of sales; and
- Analysis of each state's regulatory model to identify similarities and differences in each market's structure, to apply appropriate proxy estimations for more accurate variable predictions in new markets.

Based on such inputs, an economic growth model was applied to project the sizes of legal and illicit state markets through 2025. The projections depend on estimated sales per capita in both medical and adult-use markets, and the model is iteratively refined as additional data is collected on each market.

DOMESTIC CANNABIS CONSUMER ESTIMATIONS

The number of estimated cannabis consumers in a given state depends heavily on both the state's total adult population, and reported cannabis usage rates compiled by the U.S. Department of Health and Human Services from its annual Nation Survey on Drug Use and Health (NSDUH) – which New Frontier Data has adjusted to account for underreporting errors, and projected growth in usage rates according to each state's unique legal status and regulatory environment.

TOURISM CANNABIS CONSUMER ESTIMATIONS

New Frontier Data aggregates data from private data partnerships and publicly available sources that provide transparency into spending and consumption rates, as well as monthly sales share attributable to in-state residents vs. out-of-state visitors across all legal operating adult-use markets. This data is ingested and analyzed on a monthly basis in conjunction with respective overall state tourism visitation data, and provides the foundation for the development of expected participation and spending rates by tourist visitors in markets that have legalized adult-use sales but have yet to become operational. The tourism consumer projection models are updated iteratively to reflect changes in industry regulation that are pertinent to tourism participation, i.e.: product restrictions, rules surrounding delivery to non-private residences/hotels, allowance for public social-use spaces, and subsequent legalization of adult-use cannabis in a bordering state.

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