CANNABIS PUBLIC POLICY CONSULTING

Virginia Adult-Use Cannabis Market: Licensing and Cultivation Capacity Analysis

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Executive Summary

Overview

Cannabis Public Policy Consulting (CPPC) conducted this study on behalf of the Virginia Cannabis Control Authority (CCA) to evaluate licensing and cultivation capacity needs for Virginia's developing adult-use cannabis market. The study responds to a statutory requirement directing the CCA to analyze whether limits should be placed on marijuana establishment licenses, evaluate potential adjustments to cultivation canopy limits, and report its findings to the General Assembly by November 1, 2026. The analysis was designed to provide the CCA with an empirical assessment of Virginia's projected regulated cannabis market and the retail and cultivation capacity necessary to support anticipated consumer demand to launch the market. The study evaluates alternative licensing scenarios, geographic distribution, market competition, and the potential implications of different licensing levels for consumer access, business conditions, public health and safety, and regulatory oversight. This analysis is intended to serve as an evidence-based planning framework to help the CCA establish a viable adult-use cannabis market aligned with its policy objectives, rather than predict how the market will behave once operational.

Methodology

This study integrates multiple data sources and analytical approaches to evaluate Virginia's current cannabis demand and projected adult-use market capacity. Analyses combined findings from CPPC's Virginia-specific Regulatory Determinants of Cannabis Outcomes Survey (VA-RDCOS), two years of Virginia's Behavioral Risk Factor Surveillance System (BRFSS), 12 months of medical cannabis sales and cultivation data, and comparative market and regulatory information from five states with operational adult-use markets. These data were used to estimate consumer expenditures and regulated market demand, evaluate the existing medical market's retail and production capacity, and model retail and cultivation license requirements under alternative market assumptions. Analytical methods included imputation, survey weighting, demand forecasting, economic modeling, market concentration analysis, geographic demand estimation, and comparative policy analysis. Because Virginia's commercial adult-use market has not yet launched, licensing estimates reflect projected market conditions rather than observed adult-use market performance.

Virginia Cannabis Demand Analysis

CPPC evaluated cannabis consumption and purchasing behaviors among Virginia residents, examining expenditures, product preferences, and participation across regulated medical, unregulated, and informal cannabis markets. The analysis also evaluated differences between registered medical patients and non-patient consumers, as well as the geographic distribution of projected regulated demand.

Key Findings:

- **Virginia's past-month cannabis consuming population is estimated at approximately 872,216 adults aged 21 and older.**
- **Current cannabis purchasing patterns differ substantially by medical registration status**. Registered medical patients report greater reliance on Virginia's medical dispensaries and home

cultivation, while non-patient consumers obtain cannabis from a broader range of sources, including out-of-state licensed dispensaries, unlicensed sellers, and gifting arrangements.

- **Flower represents the largest cannabis product category** by both quantity and consumer expenditure. Vape products and edibles are also substantial components of consumer demand, although purchasing and sourcing patterns differ between medical patients and non-patient consumers.

Retail Licensing and Market Capacity

CPPC evaluated Virginia's projected retail infrastructure needs using observed medical cannabis dispensary sales as a baseline. Estimated regulated adult-use expenditures were compared with alternative assumptions regarding monthly sales per retail location to identify ranges of retail capacity that could accommodate estimated consumer demand. The analysis also considered Virginia's statutory maximum of 350 stand-alone retail licenses and the additional retail capacity available through microbusinesses and dual-use pharmaceutical processors.

Key Findings:

- **Virginia's total cannabis market among cannabis consumers in Virginia twenty-one years and older is estimated to represent approximately $1.05 billion in annual consumer expenditures**, with a projected range of $835.7 million to $1.27 billion across all acquisition sources based on current cannabis spending. These estimates provide the basis for evaluating the retail capacity needed to accommodate existing cannabis demand as consumers transition into the regulated adult-use market. Importantly, these estimates reflect demand among Virginia residents and do not account for additional expenditures from tourists and out-of-state consumers, which could further increase the Commonwealth's potential retail market.
- Using the average sales performance of Virginia's existing medical cannabis dispensaries as a benchmark, the analysis estimates that **projected consumer demand could support approximately 107 to 163 retail access locations statewide**. The upper end of this range (163 locations) may provide a reasonable reference point for initial retail capacity, particularly when considering a phased licensing approach. The contribution of microbusinesses and dual-use pharmaceutical processors to total retail capacity should also be considered when determining the number of retail licenses to issue over time.
- An HHI analysis of the medical market's concentration of retail sales found relative and stable competition across the past year. As such, using this base for the adult-use modeling of retail license distribution, which assumes the operational efficiencies observed in Virginia's medical cannabis market as a baseline, **suggests that the modeled retail license base case would support competition at the facility level with low market concentration.** However, the number of retail licenses alone does not necessarily reflect the degree of market competition, as multiple licenses may be held by the same owner.
- **The analysis supports retaining Virginia's statutory maximum of 350 retail licenses**. The maximum is generally consistent with the upper bound of the higher-capacity licensing scenario (326 locations) and preserves flexibility to accommodate future market growth, including potential demand from out-of-state consumers.
- **A phased approach to retail licensing would allow the CCA to establish initial retail capacity while preserving opportunities for additional market entry as the adult-use market develops**. This approach is consistent with Virginia's statutory framework, which contemplates multiple

licensing rounds, and would allow subsequent license quantities to be informed by observed market conditions rather than relying exclusively on pre-market projections.

- **Continued market monitoring will be essential to evaluating the sufficiency of initial licensing levels and determining whether additional licenses are warranted**. Key indicators include regulated retail sales, license activation, geographic consumer access, market concentration, average sales per establishment, and the contribution of microbusinesses and dual-use pharmaceutical processors to total retail capacity.

Cultivation Licensing and Production Capacity

CPPC evaluated cultivation capacity needs by examining plant production and harvest activity within Virginia's existing medical cannabis market and extrapolating observed production requirements to the projected adult-use consumer population. These estimates were evaluated against the maximum authorized canopy associated with Virginia's five cultivation license tiers and alternative assumptions regarding cultivation efficiency and production capacity.

Key Findings:

- **The number and distribution of cultivation licenses necessary to meet projected demand depend substantially on the allocation of capacity across license types.** Different combinations of smaller and larger cultivation facilities, including microbusinesses, can provide comparable aggregate capacity while creating different conditions for competition, small-business participation, production efficiency, and regulatory oversight.
- **The analysis uses maximum potential indoor cultivation capacity to evaluate initial licensing requirements.** Because the relative productivity of indoor and outdoor cultivation cannot be reliably established using available data, the model assumes that all cultivation licenses operate at their maximum authorized indoor canopy. This approach is intended to reduce the risk of authorizing cultivation capacity that substantially exceeds projected demand, while recognizing that actual production will depend on licensee decisions, cultivation methods, and operational efficiency.
- **The analysis identifies issuing three Tier V cultivation licenses as an option worth considering for initial market implementation.** These licenses would authorize up to 105,000 square feet of indoor cultivation canopy, providing larger-scale production capacity while preserving opportunities for microbusinesses and smaller cultivation tiers. The equal-share and microbusiness-priority scenarios may provide suitable starting points for distributing the remaining cultivation capacity, depending on the CCA's policy objectives.
- **Microbusinesses and dual-use pharmaceutical processors will play important roles in determining total cultivation capacity.** Microbusinesses are incorporated into the modeled cultivation allocations because of their required vertical integration, while pharmaceutical processors may contribute additional production capacity beyond the modeled scenarios. However, the extent of pharmaceutical processor contributions will depend on existing medical production requirements, canopy utilization, and the amount of capacity available to serve adult-use demand.
- **A phased approach to cultivation licensing would allow the CCA to evaluate production capacity as Virginia's adult-use market develops.** Initial licensing decisions should consider the importance of issuing Tier V and microbusiness licenses at market launch, while preserving flexibility to adjust cultivation capacity through smaller license tiers in subsequent rounds.

Future licensing decisions should be informed by observed production, canopy utilization, inventory, wholesale prices, and downstream demand.

- **Cultivators should have the opportunity to scale into higher licensing tiers upon demonstrating that their existing canopy utilization and resulting sales are approaching capacity.** This approach would allow the CCA to maintain opportunities for smaller cultivators while providing a pathway for existing businesses to expand as their operations and market demand develop.
- **Continued market monitoring and data collection will be essential to evaluating future cultivation capacity needs.** Following market launch, observed production, sales, and market conditions should inform whether additional cultivation licenses or adjustments to canopy limits are warranted. The CCA should proactively establish data collection and reporting processes informed by the findings of this study to ensure the necessary data are collected in consistent formats and at appropriate intervals to support future assessments in 2027 and 2028.

Cultivation Canopy Limits

The analysis does not identify a sufficient empirical basis for adjusting Virginia's existing cultivation canopy limits prior to the launch of the adult-use market. Although the statutory tier structure establishes maximum authorized cultivation capacity, the proportion of canopy that future licensees will utilize and the production generated from that capacity cannot yet be reliably determined.

Key Findings:

- **Authorized canopy does not necessarily represent actual production capacity**, as cultivation facilities may initially operate below their maximum permitted canopy depending on capital availability, facility development, and operational conditions.
- **The existing canopy limits provide a consistent framework for evaluating initial cultivation license requirements**, but available pre-market data do not establish whether those limits will be sufficient or excessive once the adult-use market is operational.
- **The 2027 and 2028 statutory analyses will provide an opportunity to evaluate canopy utilization, production efficiency, inventory levels, transfers, and downstream demand using observed operational data, with THC grams produced (output of total canopy) as a standardized unit.**

Accordingly, the available evidence does not support adjustments to existing canopy limits prior to the launch of the adult-use market. Future assessments will benefit from observed data on cultivation production, canopy utilization, and market demand to determine whether adjustments to the existing limits are warranted.

Manufacturing and Other License Categories

CPPC evaluated the potential implications of numerical limits for manufacturing and other marijuana establishment license categories. Unlike retail and cultivation, manufacturing represents a specialized, value-added segment of the cannabis supply chain in which businesses compete through technical expertise, product innovation, and specialized services. Establishing numerical limits on manufacturing licenses could restrict entry by qualified businesses without providing a corresponding benefit to

managing primary cannabis supply or consumer access. Similar considerations apply to testing facilities, transporters, and delivery operators, which provide specialized services or facilitate product distribution rather than directly determine primary market capacity.

Introduction and Statutory Context

Purpose of the Report

This research was conducted by Cannabis Public Policy Consulting (CPPC) on behalf of the Virginia Cannabis Control Authority (CCA) to evaluate licensing and cultivation capacity needs for Virginia's developing adult-use cannabis market. The study is designed to provide the CCA and the Virginia General Assembly with an assessment of potential license limits, projected market capacity, and cultivation canopy needs under the Commonwealth's new adult-use cannabis regulatory framework. The study responds to a statutory requirement directing the CCA to: (i) analyze whether limits should be placed on the number of licenses issued to operate a marijuana establishment; (ii) analyze and identify any necessary adjustments to canopy limits for marijuana cultivation facility licensees; and (iii) report its findings to the General Assembly by November 1, 2026. The CCA is required to continue this analysis and submit updated findings by November 1 in each of the subsequent two years.[1]

The objective of this research is to provide Virginia policymakers and regulators with a comprehensive, data-driven analysis of projected adult-use cannabis demand and the licensing capacity necessary to support the future regulated market. The analysis evaluates projected consumer demand, retail access, cultivation production requirements, existing market competition, geographic distribution, and the potential market implications associated with different levels of licensing. The report also evaluates the existing cultivation canopy structure and identifies the market data that will be necessary to assess canopy utilization and production capacity as the adult-use market develops. Because Virginia's commercial adult-use market has not yet launched, the analyses presented in this report reflect projected market conditions rather than observed adult-use sales, production, and license utilization. The analyses also examine the potential implications of selecting license quantities toward different points within provided ranges, including considerations related to consumer access, competition, pricing, regulated market participation, business conditions, public health and safety, and regulatory oversight.

The 2026 report serves as the initial assessment required by statute. The subsequent 2027 and 2028 analyses will provide an opportunity to incorporate Virginia-specific operational data as the market develops, including information related to license activation, sales, production, inventory, prices, cultivation utilization, and other measures of market performance. These data will allow future analyses to evaluate whether initial license quantities and cultivation capacity are aligned with consumer demand and market conditions.

Policy Context for Virginia's Adult-Use Market

Virginia has a regulated medical marijuana market overseen by the CCA. The medical cannabis program is organized across five Health Service Areas (HSAs), with one licensed pharmaceutical processor operating in each HSA. The medical cannabis market is structured around vertically integrated pharmaceutical processors, which are the only businesses authorized to grow and dispense medical cannabis in the state. Pharmaceutical processors may cultivate and produce cannabis products and operate a dispensing area. Virginia law also allows Pharmaceutical Processors to operate up to five additional dispensing locations within their assigned HSA (for a total of six retail locations per Pharmaceutical

[1] 2026 Va. Spec. Sess. I, H.B. 30, Item 4-14, Additional Enactment 19

Processor license). Pharmaceutical processors may additionally be authorized to establish one additional cultivation location within the same HSA. Medical cannabis cultivation must occur indoors, and each pharmaceutical processor is subject to an aggregate cultivation canopy limit of 70,000 square feet. As a result, Virginia's regulated medical cannabis market is concentrated among a relatively small number of vertically integrated operators serving geographically defined areas. This existing market provides an important baseline for the analyses presented in this report because it provides observed information regarding regulated cannabis sales within a defined population, cultivation capacity, retail activity, and market structure prior to the introduction of a broader adult-use market.

In 2026, the Virginia General Assembly established a commercial adult-use cannabis framework that substantially expands the structure of the existing regulated cannabis market. The framework establishes separate licenses for marijuana cultivation facilities, marijuana processing facilities, retail marijuana stores, microbusinesses, marijuana transporters, marijuana delivery operators, and marijuana testing facilities. Existing pharmaceutical processors may also apply to exercise dual-use privileges, meaning they would hold the privileges applicable to a cultivation facility, processing facility, and retail marijuana store, while its associated cannabis dispensing facilities will hold the privileges applicable to retail marijuana stores.

Adult-Use Program Summary

The CCA may begin accepting marijuana establishment applications on or after February 1, 2027 and may begin issuing licenses on or after May 1, 2027. Commercial adult-use retail sales may begin July 1, 2027. The initial rollout also includes several statutorily directed licensing pathways. By May 1, 2027, the CCA may issue up to 100 microbusiness licenses and is directed to issue no more than 10 cultivation facility licenses and no more than 10 processing facility licenses through the pathway established for qualifying industrial hemp growers and processors. The CCA is also directed to issue at least 55 additional licenses distributed among impact licensees and other license types determined by the Board by July 1, 2027.

Table 1. Overview of Virginia Adult-Use Cannabis License Types[2]

License Type	Statutory Structure
Marijuana Cultivation Facility	Five cultivation tiers ranging from a maximum canopy of 5,000 square feet for Tier I to 35,000 square feet for Tier V. Tier I and II facilities may cultivate indoors or outdoors; Tiers III through V are indoor cultivation licenses. No more than five Tier V licenses may be issued before January 1, 2028.
Marijuana Processing Facility	Authorizes the processing, labeling, and packaging of marijuana and marijuana products and transfers to other licensed establishments. The statute does not establish a fixed statewide numerical cap.
Retail Marijuana Store	Authorizes retail sales of marijuana and marijuana products to consumers. The Board may not issue more than 350 retail marijuana store licenses statewide.
Microbusiness	May be authorized by the Board to conduct cultivation, processing, and retail activities. Cultivation is limited to 5,000 square feet of indoor canopy or 10,000 square feet of outdoor canopy. The initial rollout may include up to 100 microbusiness licenses.
Marijuana Transporter	Authorizes transportation and transfer of marijuana and marijuana products between licensed establishments.

[2] Virginia Code § 4.1-800 through 4.1-806

Marijuana Delivery Operator	Authorizes delivery of marijuana and marijuana products from retail marijuana stores or microbusinesses directly to consumers.
Marijuana Testing Facility	Authorizes cannabis testing, research, and related activities and is subject to independent ownership requirements.
Pharmaceutical Processor	Existing pharmaceutical processors may apply for dual-use privileges. Once verified, a pharmaceutical processor holds the privileges of a marijuana cultivation facility, marijuana processing facility, and retail marijuana store, while its associated cannabis dispensing facilities hold the privileges of retail marijuana stores. A pharmaceutical processor may operate up to five cannabis dispensing facilities and, if authorized by the Board, one additional cultivation location. Cultivation is limited to 70,000 square feet of aggregate indoor canopy across all cultivation conducted by the pharmaceutical processor.

The statutory framework provides the CCA with authority to determine the number of licenses issued by type or class in consideration of market supply, stability, competition, market dominance, small business participation, and the unregulated market. The statute establishes a statewide maximum of 350 retail marijuana store licenses and limits the initial number of Tier V cultivation licenses to five before January 1, 2028. For other license categories, the Board may determine the number of licenses necessary to support the regulated market.

The cultivation licensing structure establishes different production capacities across the five cultivation tiers. Tier I cultivation facilities may operate up to 5,000 square feet of canopy, Tier II up to 10,000 square feet, Tier III up to 15,000 square feet, Tier IV up to 25,000 square feet, and Tier V up to 35,000 square feet. The statute also authorizes the Board to evaluate canopy levels using market demand, utilization rates, sales, product transfers, inventory, and licensing activity.

Microbusinesses and existing pharmaceutical processors will provide additional capacity beyond the stand-alone licenses evaluated in this report. Microbusinesses will be authorized to participate in cultivation, processing, and retail activities, while pharmaceutical processors verified for dual-use privileges may participate in cultivation, processing, and retail. As such, the number of stand-alone licenses issued within a particular category will not represent the total retail, cultivation, or processing capacity available within Virginia's adult-use market.

This report does not separately evaluate numerical limits for marijuana transporter, marijuana delivery operator, or marijuana testing facility licenses. These license categories were not identified by the CCA as priorities for potential numerical limits and, unlike cultivation and retail licenses, their quantities do not determine the amount of cannabis supply or consumer-facing retail capacity available within the market. Transporter and delivery operator licenses primarily facilitate the movement and distribution of products within the regulated system and therefore have a limited relationship to statewide supply-demand balance comparatively. Testing facilities serve a different but similarly specialized function. Adequate laboratory capacity is necessary to support product testing and release throughout the supply chain, and insufficient testing capacity can create delays as market activity expands. Accordingly, the analysis does not identify a market-based rationale for establishing an initial numerical limit on these license categories and instead treats their development as responsive to operational demand within the regulated market.

Data Sources, Methodology, and Analytical Framework

Data Sources

VA-RDCOS Consumer Survey

The Virginia-specific Regulatory Determinants of Cannabis Outcomes Survey (VA-RDCOS) was developed by CPPC to measure cannabis consumption and purchasing behaviors among current cannabis consumers in Virginia. The RDCOS has been deployed nationally since 2022 and is designed to evaluate cannabis demand, consumer purchasing behavior, regulated and unregulated market participation, and behavioral responses to cannabis policy and market conditions. The Virginia survey was adapted to reflect the Commonwealth's existing cannabis market, statutory terminology, and anticipated adult-use regulatory framework. The VA-RDCOS measures cannabis purchasing and acquisition across product types and sources, including current regulated medical cannabis purchases, unregulated purchases, informal acquisition, home cultivation, and other sources relevant to Virginia's existing market. Survey measures capture consumer expenditures, frequency of cannabis use, product preferences, purchasing motivations, geographic access, and factors influencing source selection. The survey also includes measures of consumer responsiveness to regulatory and market conditions, including price and other factors expected to influence participation in a future regulated adult-use market.

The survey was hosted through Qualtrics and designed to recruit 600 Virginia adults 21+ reporting cannabis use within the past 30 days through Verasight's probability-formed panels. The margin of sampling error, which is calculated using the classical random sampling formula, is +/- 4.0%. The panel recruited 76.3% of respondents via text message from voter file records. An additional 23.6% of respondents were recruited via email from the Verasight Community, which is composed of individuals recruited via random address-based sampling, random person-to-person text messaging, and dynamic online targeting. All Verasight community members are verified via multi-step authentication, including providing an SMS response from a mobile phone registered with a major U.S. carrier (e.g., no VOIP or internet phones) as well as within-survey technology, including verifying the absence of non-human responses with technologies such as Google reCAPTCHA v3. Those who exhibit low-quality response behaviors over time, such as straight-lining or speeding, are also removed and prohibited from further participation in the community. Verasight Community members receive points for taking surveys that can be redeemed for Venmo or PayPal payments, gift cards, or charitable donations. Respondents are never routed from one survey to another and receive compensation for every invited survey, so there is never an incentive to respond strategically to survey qualification screener questions.

To further ensure data quality, the Verasight data team implements a number of post-data collection quality assurance procedures, including confirming that all responses correspond with U.S. IP addresses, confirming no duplicate respondents, verifying the absence of non-human responses, and removing any respondents who failed in-survey attention and/or straight-lining checks. Respondents who completed the survey in less than 30% of the median completion time were removed.

The survey was approximately 15 minutes long and used screening and adaptive survey logic to ensure respondents received questions applicable to their cannabis use and purchasing behaviors. The final fielded survey included 601 respondents, collected between September 9th and 25th 2026, with a final cleaned analytical sample of 507 past 30-day cannabis consumers. The VA-RDCOS serves as the primary source for estimating consumer-side cannabis demand in Virginia. Survey data are used to quantify

purchasing behaviors by product type, acquisition source, expenditure, and frequency of use and to estimate the portion of current cannabis demand that may transition into the regulated adult-use market under different market conditions. This consumer-side information provides the demand component of the licensing analysis and is subsequently evaluated alongside observed medical market sales and capacity data.

The survey was determined under Exempt Status by the Institutional Review Board at the Virginia Department of Health. CPPC appreciates the Department's assistance with the review process and its provision of Behavioral Risk Factor Surveillance System (BRFSS) data.

Behavioral Risk Factor Surveillance System (BRFSS)

The state's Behavioral Risk Factor Surveillance System (BRFSS) was provided to prepare raking weights for the state's cannabis population on several demographic and geographic variables, including cannabis consumption days. The BRFSS is a probability-based survey fielded by the U.S. Centers for Disease Control and Prevention and state health departments. It remains the world's largest continuously conducted health survey system monitoring health-risk behaviors and health conditions. States can opt in to fielding ancillary modules, including modules related to cannabis use. Virginia has fielded this module and provided the data for the years of 2023 and 2024.

The BRFSS provides population-based demographic and cannabis-use information used to improve the representativeness of the VA-RDCOS and estimate the size and geographic distribution of Virginia's cannabis-consuming population. BRFSS is used as a population reference because the target population for this study is not the general Virginia population, but adults who report cannabis use within the past 30 days, a data point of which BRFSS captures at large population levels. Additionally, BRFSS is fielded throughout the year, allowing questions about cannabis consumption frequency to reflect past-month consumers throughout a year's time. This distinction is vital, as it incorporates those who are casual consumers and not just consistent consumers. In other words, collecting data throughout the year helps capture occasional or intermittent cannabis consumers, including those who may use cannabis only a few times per year, rather than disproportionately representing individuals who consume cannabis regularly.

CPPC uses Virginia BRFSS data to derive marginal distributions for demographic and cannabis-use characteristics among past-month cannabis consumers. These measures include age, education, race and ethnicity, household income, sex, and frequency of cannabis use within the past month. Resulting distributions provided population targets against which the VA-RDCOS sample is weighted to and included interactions with regional distributions of cannabis consumers. To estimate these weights, first an inverse probability model was estimated, and the resulting weights were raked to BRFSS aggregate state and regional target margins. BRFSS also provided the population basis for estimating the number of past-month cannabis consumers in Virginia. Domain analysis is used to identify the population represented by respondents meeting the applicable age and past-month cannabis-use criteria. These population estimates are subsequently combined with weighted VA-RDCOS measures of consumer expenditures and regulated-market participation to estimate statewide adult-use demand.

By using BRFSS data to inform survey weighting, CPPC can better ensure that the VA-RDCOS results reflect the broader population of cannabis consumers in Virginia, including differences in demographics, geography, and consumption frequency. This approach helps reduce potential biases that may arise when certain groups of consumers are overrepresented or underrepresented in a survey sample. Incorporating

BRFSS data strengthens the reliability of the study's findings and provides a more representative foundation for estimating cannabis consumption, spending, and overall market demand across the state.

Virginia Medical Cannabis Market Data

Virginia's existing medical cannabis market provides the baseline for evaluating regulated cannabis sales, consumer participation, and cultivation activity prior to the launch of adult-use sales. CPPC received medical cannabis market data from the CCA covering retail sales, number of unique purchasing patients, cultivation activity, harvests, and transfers for the last 12 months. These data provide observed measures of how Virginia's existing regulated market operates and are used alongside VA-RDCOS demand estimates to inform projections of future adult-use market capacity.

Monthly retail sales data were provided at the facility level, allowing CPPC to evaluate total regulated medical cannabis sales, differences in sales across dispensing locations, and changes in retail activity over time. Facility-level sales data are also used to calculate revenue per location and the distribution of sales across the existing medical retail system. These measures provide the empirical baseline for the retail license model and the market concentration analysis. Monthly patient data identify the number of unique medical cannabis patients who visited a dispensary and completed a purchase during each month. The purchasing-patient data allow regulated sales and market activity to be evaluated relative to the population actively participating in the medical market and provide a baseline for scaling observed market activity to the substantially larger population expected to participate in the adult-use market.

Cultivation data include monthly plant and harvest information for Virginia's pharmaceutical processors for the same 12 months. These data are used to evaluate the amount of cannabis currently produced to serve the medical market and the relationship between observed cultivation activity and active patient demand. Plant and harvest measures provide the principal production-side inputs for estimating the amount of cultivation output that may be required to serve projected adult-use demand.

Data Cleaning and Preparation

Prior to analysis, VA-RDCOS responses were subject to a series of data-quality and outlier procedures designed to reduce the influence of invalid or extreme responses on estimates of cannabis demand. Responses failing survey quality-assurance criteria, including incomplete responses, duplicate participation, non-human response checks, attention or straight-lining checks, and completion times below the established quality threshold, were removed from the analytical sample. Statistical analyses were conducted in RStudio.

Cannabis purchasing data are typically right-skewed and a small number of extreme expenditure or quantity responses can substantially affect statewide demand estimates, CPPC applied additional outlier procedures to product and source-specific demand measures. Quantity and expenditure variables for each cannabis product and acquisition-source combination were winsorized at the 99th percentile. Values above the 99th percentile were therefore capped at the corresponding percentile value rather than allowed to disproportionately influence the estimated mean for an individual product-source measure. In other words, this approach prevents a small number of unusually large purchases or reported expenditures from disproportionately influencing statewide estimates, while still accounting for these higher levels of cannabis consumption and spending.

Multivariate demand outliers were subsequently evaluated using the combined quantity and expenditure measures across product categories. Product-level demand measures were aggregated across acquisition sources, transformed using a log-plus-constant transformation to improve distributional properties, and evaluated using Mahalanobis distance. A shrinkage covariance estimator was applied to the resulting matrix to improve covariance estimation across correlated demand measures. Observations exceeding the multivariate outlier threshold based on a chi-squared distribution at $p < 0.05$ were removed from the analytical demand sample. This approach was selected because extreme combinations of cannabis quantity and expenditure can materially affect population-level demand estimates even when an individual response does not appear extreme on a single variable.

Survey Weighting

Survey weighting procedures were applied to improve the representativeness of the VA-RDCOS for Virginia's target population of past-month cannabis consumers. BRFSS was used to estimate the population distributions of demographic and cannabis-use characteristics among Virginia adults reporting cannabis use within the past 30 days. For analysis specific to potential adult-use market demand, population estimates were restricted to the age-eligible adult-use population.

Missing or non-substantive responses to weighting variables, including responses recorded as “don't know,” “not sure,” or “refused,” were addressed through imputation. To prepare BRFSS margins for use in inverse probability weighting and raking, item-missingness in three variables had to be imputed: education, household income, and cannabis use days. The imputation procedures utilized were sequential random adjustment-cell hot-deck imputation with progressive cell coarsening. The order of variables imputed was education, household income, and then cannabis use days. A number of auxiliary variables were used to classify and impute matching respondent missingness including: age, sex, race and ethnicity, employment status, if the participant was unable to pay for a doctor in the past year, health insurance status, marital status, urban versus rural location, housing arrangement, nicotine consumption, alcohol consumption in the past thirty days, whether the respondent had engaged in binge drinking in the past thirty days, the number of poor mental health days in the past month, and the provided final survey weights. Each imputed variable observation was matched along a varying number of variable combinations that were subsequently dropped to simpler combinations when matches were not found. Education contained nine levels, household income thirteen levels, and cannabis use days fourteen levels. Our imputation strategy estimated that there were 972,914 past-month cannabis consumers in Virginia ages 18 years or older. This estimate was only 14,914 higher than the 2023-2024 NSDUH Model-Based Estimated Totals, placing greater confidence in our imputation approach. This procedure was used to obtain complete marginal distributions for demographic and cannabis-use measures necessary for weighting, including education, household income, and past-month cannabis-use frequency. County-level geographic information from BRFSS was also incorporated into the Virginia weighting and demand-estimation process. County estimates were aggregated into regions, providing a geographic distribution of the estimated cannabis-consuming population that could be used to allocate statewide demand across regions. Upon creation of regions, region was interacted with a number of variables including sex, age group, race and ethnicity, and cannabis use days to produce regional target margins that are raked along state targets to increase representation by region.

Domain analysis was then used to estimate the marginal distributions of Virginia's past-month cannabis-consuming population. These distributions were used as population targets for the VA-RDCOS. The VA-RDCOS and BRFSS samples were stacked, and a weighted, multivariate logistic regression model was

estimated to predict selection into the BRFSS probability sample relative to the VA-RDCOS sample. The resulting probabilities were used to generate inverse probability weights. These weights were subsequently raked to the BRFSS-derived marginal distributions so that the weighted VA-RDCOS more closely reflected the demographic and cannabis-use characteristics of the target population.

Demand Methodology

The demand analysis was designed to estimate how much cannabis Virginia consumers currently purchase and consume, where they obtain it, and how much they spend, providing a foundation for projecting future regulated adult-use sales and informing retail and cultivation licensing needs. Descriptive analyses were first used to characterize cannabis consumption patterns among Virginia consumers. These analyses examined frequency of cannabis use, product utilization, quantities consumed, and other characteristics of current cannabis demand. Data collected through the VA-RDCOS were used to measure the proportion of cannabis obtained through different sources, including Virginia's regulated medical cannabis market, unregulated sellers, informal sources such as friends or family, home cultivation, and other acquisition channels. Consumer expenditures were analyzed by product type and acquisition source to estimate the distribution of cannabis spending across the current market. Weighted means, proportions, and population estimates were used throughout these analyses so that reported consumption, sourcing, and expenditure measures reflected the estimated characteristics of Virginia's past-month cannabis-consuming population rather than the unweighted survey sample.

Statewide adult-use demand was estimated by combining the estimated size of Virginia's age-eligible past-month cannabis-consuming population with weighted consumer expenditure and sourcing estimates from the VA-RDCOS. The analysis distinguishes total cannabis expenditures from expenditures expected to occur within the future regulated adult-use market. This distinction is necessary because legalization does not imply that all existing cannabis demand will immediately transition to licensed retailers; some demand may continue to be satisfied through home cultivation, informal acquisition, or unregulated sources. Demand estimates were developed across relevant product categories and acquisition sources before being aggregated to statewide annual estimates irrespective of markets, as one goal of legalization is to eventually absorb the vast majority of statewide cannabis expenditures through regulated channels. Where applicable, estimates of regulated market participation were incorporated into the expenditure model so projected adult-use sales reflect the portion of total consumer demand expected to be captured by licensed businesses rather than total cannabis consumption alone.

Geographic demand was estimated using the county-level weighting framework described above and aggregated to Virginia's regions. The resulting estimates represent the share of statewide adult-use demand expected within each region based on the geographic distribution and characteristics of Virginia's cannabis-consuming population. These regional demand estimates provide the primary geographic input for the retail licensing model.

The demand analysis provides the consumer-side foundation for the licensing analyses presented in this report. Statewide and regional estimates of regulated adult-use expenditures are used to evaluate retail capacity, while estimated consumer demand is translated into production requirements for the cultivation analysis. The analyses are therefore sequential: changes in estimated consumer population, expenditures, or regulated-market participation result in corresponding changes in estimated retail and cultivation capacity requirements.

License Modeling Methodology

CPPC developed separate quantitative models for retail and cultivation because the relationship between consumer demand and license capacity differs across the two sectors. In both analyses, projected adult-use demand was evaluated against observed data from Virginia's existing medical cannabis market. The medical market provides an empirical Virginia-specific baseline for evaluating how much consumer demand is currently served by operating retail locations and how much cannabis is currently produced for a known population of registered patients. This approach reduces reliance on assumptions derived solely from other states and allows licensing estimates to be anchored to observed performance within Virginia's existing regulated market. Given the nuances per modeling scenario, methodology and assumptions are provided in the respective section.

Comparative State Market and Regulatory Data

A comparative review of adult-use cannabis markets in Minnesota, Missouri, Maryland, Michigan, and New Jersey, including the rationale for selecting each state, comparisons of retail, cultivation, and manufacturing licensing structures, and observed market outcomes relevant to Virginia's licensing needs, is provided in ***Appendix A: Comparative State Market and Regulatory Analysis.***

Virginia Cannabis Consumer Perceptions and Sentiments About Regulated Cannabis

When retail options become available for cannabis, there will inevitably be consumers who choose to remain in other markets or diversify their sources of cannabis. To better understand how consumers may opt to participate in a future regulated marketplace, we examined their perceptions on regulated cannabis as well as sentiments they may have about certain policy elements. We began the following section of questions with the following notice: "Adult use cannabis will soon be legal for purchase at licensed retailers across the state."

Overall, consumers appear to show agreement with the sentiments listed in **Table 2** below. Respondents generally expressed favorable perceptions of cannabis products sold through licensed retailers, particularly regarding product safety, contaminant testing, labeling accuracy, and overall trust. More than two-thirds of respondents (69%) agreed that cannabis purchased from licensed retailers is safer than cannabis obtained from other sources, including 42% who agreed a great deal. Only 4% disagreed with this statement, while 27% neither agreed nor disagreed.

Perceptions of product quality and regulatory safeguards were similarly favorable. Approximately 76% of respondents agreed that licensed cannabis products are less likely to contain contaminants, with 44% agreeing a great deal and 32% agreeing a little. Likewise, 76% agreed that licensed cannabis products contain accurate THC labeling, although a smaller proportion expressed strong agreement (35%) compared with perceptions of contaminant protection (44%). Overall trust in licensed cannabis products was also high, with 74% of respondents agreeing that they trust products sold by licensed cannabis retailers, including 43% who agreed a great deal.

Despite these favorable perceptions of licensed cannabis products, concerns regarding the safety of cannabis obtained outside licensed retailers were less pronounced. Just over half of respondents (56%) agreed that they worry about contaminants, pesticides, and heavy metals in cannabis obtained from other sources, while 28% expressed neither agreement nor disagreement and 17% disagreed. This represents a notable distinction between perceptions of licensed product safety and concerns about products obtained through alternative sources. Although most respondents perceived licensed cannabis products as safer and less likely to contain contaminants, a smaller proportion expressed concern about potential contamination in products obtained outside the licensed market.

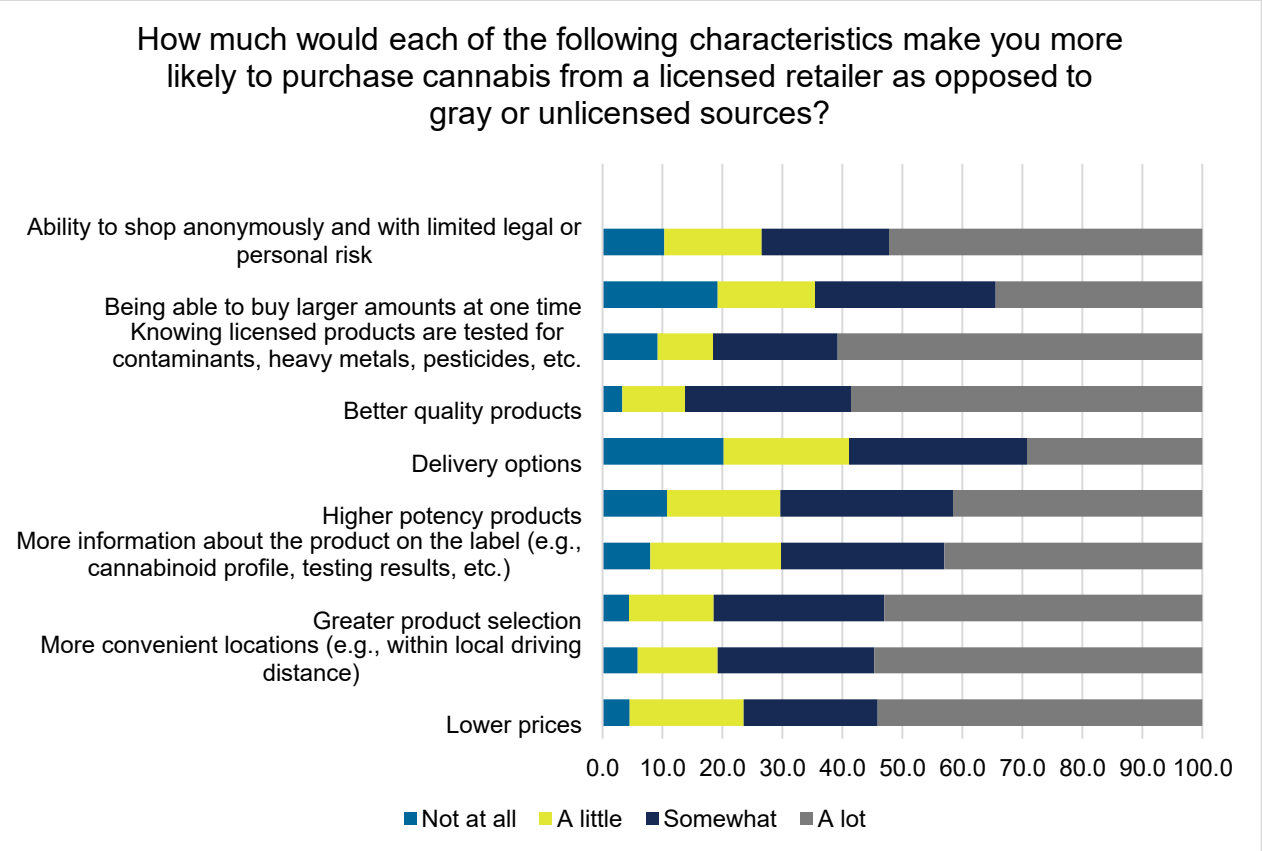
Table 2. Level of Agreement on Sentiments Related to Licensed Cannabis Among Past-Month Consumers

	Agree a great deal	Agree a little	Neither agree nor disagree	Disagree a little	Disagree a great deal
Cannabis purchased from licensed retailers is safer than cannabis purchased from other sources.	42%	27%	27%	2%	2%
Licensed cannabis products are less likely to contain contaminants.	44%	32%	18%	4%	2%

Licensed cannabis products contain accurate THC labeling.	35%	41%	17%	5%	1%
I trust products sold by licensed cannabis retailers.	43%	31%	19%	6%	1%
I worry about contaminants, pesticides and heavy metals in cannabis obtained outside of licensed retailers.	30%	26%	28%	11%	6%

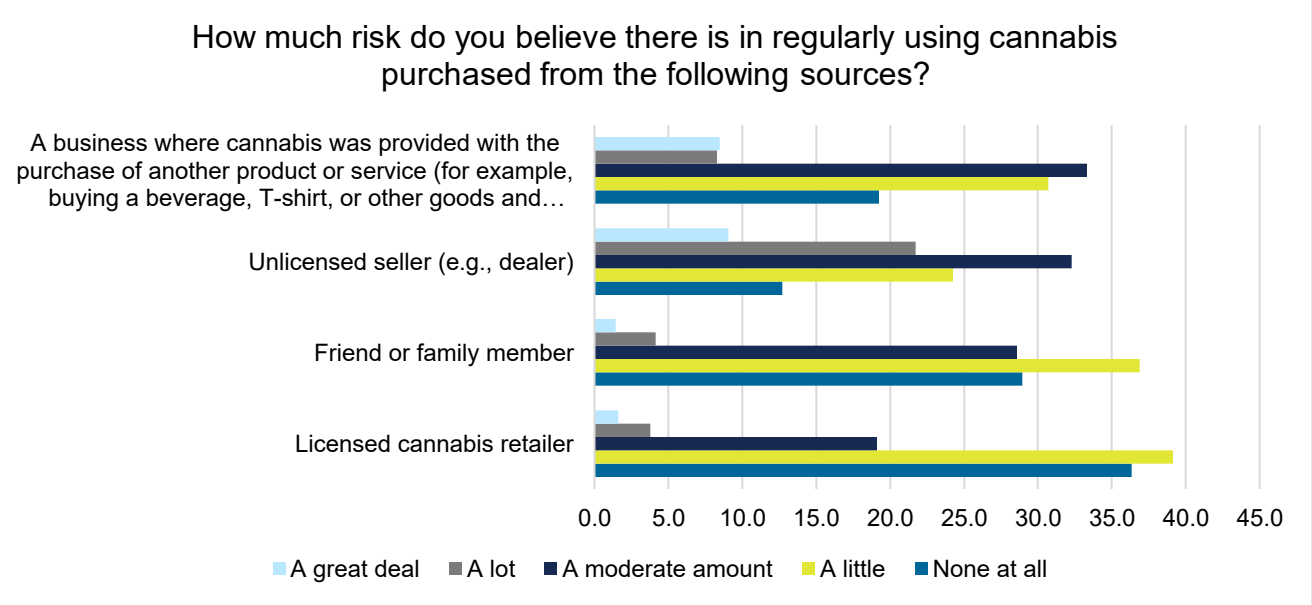
Respondents identified several factors that could increase their likelihood of purchasing cannabis from licensed retailers rather than gray or unlicensed sources, as seen in **Figure 1** below. Lower prices, greater product selection, more convenient retail locations, and more information about products on the label (i.e. cannabinoid profiles and testing results) were among the factors most frequently identified as influencing purchasing decisions. Better quality products, higher potency products, and delivery options were also important considerations. In contrast, the ability to shop anonymously and with limited legal or personal risk, purchase larger amounts at one time, and access products tested for contaminants, heavy metals, and pesticides were generally less influential. Consistent with findings from other adult-use markets, these results suggest that price and convenience play important roles in encouraging participation in the legal adult-use market. Regulators should also consider the importance of product selection, delivery options, product quality, and safety in bolstering the regulated industry.

Figure 1. Factors Influencing the Likelihood of Purchasing from Licensed Retailers Among Past-Month Consumers



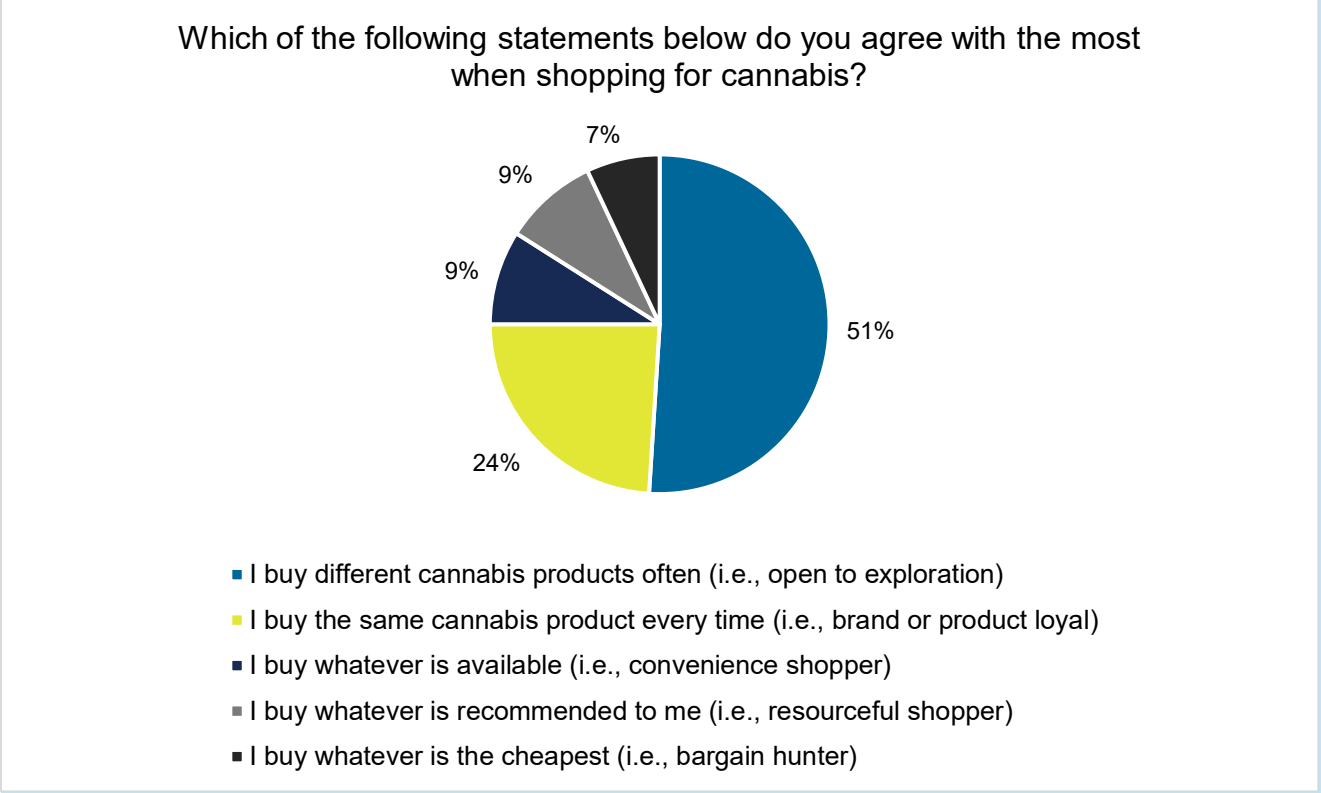
Respondents were also asked to assess the perceived risks associated with regularly using cannabis obtained from different sources, as shown in **Figure 2**. Respondents generally perceived cannabis purchased from licensed retailers as posing less risk than cannabis obtained from other sources, with a substantial majority indicating that regular use posed little or no risk. Cannabis obtained from friends or family members was also generally perceived as relatively low risk. In contrast, respondents were more likely to associate moderate or greater risk with cannabis obtained from unlicensed sellers or businesses providing cannabis with the purchase of another product or service.

Figure 2. Perceived Risk of Regularly Using Cannabis by Source Among Past-Month Cannabis Consumers



Respondents were asked to identify which statements they agreed with regarding shopping for cannabis, as seen in **Figure 3** below. Just over half of respondents (51%) indicated that they frequently purchase different cannabis products and are open to exploring new options, and approximately one-quarter (24%) reported purchasing the same cannabis product every time. Smaller proportions indicated that they purchase whatever is available (9%), follow product recommendations (9%), or prioritize the lowest-priced products (7%). These findings suggest that a majority of consumers frequently purchase different cannabis products, highlighting the importance of product variety within Virginia's regulated adult-use market. Overall, these findings are encouraging for consumer market entry into the regulated market upon launch.

Figure 3. Cannabis Shopping Preferences Among Past-Month Consumers



Virginia Cannabis Demand and Market Outlook

Estimates of Current Cannabis Purchasing and Sourcing in Virginia

Although Virginia does not yet have a regulated adult-use retail market, adults aged 21 and older may legally possess up to one ounce of cannabis in public and cultivate up to four plants per household at their primary residence, subject to statutory requirements. Cannabis consumption is permitted in private residences with the property owner's consent but remains prohibited in public places. Adults may also share up to one ounce of cannabis without compensation, although nonmedical cannabis sales remain illegal. Virginia maintains a regulated medical cannabis program through which registered patients may purchase cannabis products from licensed facilities. Consequently, Virginia operates under a partial legalization framework that permits adult possession, limited home cultivation, and private consumption, while commercial adult-use sales have yet to be implemented.

Provided the nuances of the state's current landscape, Virginians can procure cannabis from a number of sources, regardless of whether that source is legal or not. The VA-RDCOS survey asks consumers to quantify their spending and units for products by source for the past 30 days. Upon applying statistical treatments and consumer population weights, that past-month average figure is then extrapolated to monthly and annual estimates.

The sources used in the VA-RDCOS are as follows:

1. Medical Cannabis Dispensary (i.e., Pharmaceutical Processor)

2. My Registered Agent (i.e., my medical cannabis caregiver)
3. A friend or family member at no cost or as a gift
4. An unlicensed seller (e.g., dealer, plug, street seller, unlicensed delivery service, etc.)
5. Grown by me (i.e., homegrow)
6. Purchased from a friend or family member
7. Purchased from a business where cannabis was provided with the purchase of another product or service (for example, buying a beverage, T-shirt, or other goods and receiving cannabis with that purchase). *Note*: *We refer to this in the tables as gifting loophole*.
8. Out-of-state licensed dispensary
9. Other (open-ended)

Table 3. Current Average Past 30-Day Cannabis Spending Across All Sources for Past-Month Consumers Residing in Virginia

Current Registered Medical Cannabis Patient Status	Total Avg Cannabis Spending Across all Sources	Total Avg Dispensary Spending	Total Avg Gifting Loophole Spending	Total Avg Unlicensed Seller Spending	Total Avg Caregiver Spending	Total Avg Purchased from Friends or Family Spending	Total Avg Homegrow Spending	Total Avg For Free or Gifted by Friends or Family Spending	Total Avg Other Spending	Total Avg Out of State Licensed Dispensary Spending
Patient	$114.08	$55.16	$20.04	$5.43	$0.00	$4.09	$12.81	$1.46	$2.96	$12.12
Non-patient	$96.69	$7.53	$18.86	$20.24	$0.00	$13.83	$2.35	$2.02	$7.87	$23.99

Total cannabis spending across the past-month cannabis consumer population across all sources, not grouped by patient status, is approximately $100.68 (SE = 10.6). As expected, and observed in other states, registered medical cannabis patients spend more on cannabis, on average ($114.08). Similarly, the majority of patient spending occurs within the medical dispensary system ($55.16). However, patients also report notable spending through gifting loopholes ($20.04), in which cannabis is provided alongside the purchase of another product or service. Patients also spend more on homegrown cannabis (e.g., the cost of growing) than non-patients ($12.81). Importantly, very little cannabis spending is allocated to unlicensed sellers by medical patients ($5.43).

Non-patients (i.e., adult-use consumers) appear to diversify their sources substantially. The leading source for cannabis spending among non-patients is licensed dispensaries out of state ($23.99). The majority of out-of-state spending likely comes from Maryland, the only neighboring state with regulated adult-use sales, though it may also include other states such as states visited for work or leisure. Following closely behind out-of-state dispensaries is unlicensed sellers ($20.24), and gifting loopholes ($18.86). Similarly, purchasing cannabis from friends or family is a relevant and illicit source under current law ($13.83). Dispensary ($7.53) and other source spending are rather low ($7.87) as expected, while homegrown and gifting from friends and family are nearly negligible sources for current adult-use consumers ($2.35, $2.02).

Current Consumer Demand by Product Type: Spending vs. Units

While overall cannabis spending provides insight into current purchasing and sourcing behaviors, examining both spending and units obtained by product type and source offers a more comprehensive understanding of cannabis demand. This distinction is important because cannabis products vary in price, and sources such as home cultivation or gifting may account for substantial quantities of cannabis despite relatively low associated expenditures.

Examining cannabis quantities and expenditures together, as presented in **Tables 4 and 5,** reveals several notable differences in consumption and purchasing patterns between medical patients and non-patients. Flower represented the largest product category by both quantity and expenditure for patients and non-patients. Registered medical patients reported obtaining an average of 25.45 grams of flower across all sources, compared with 18.00 grams among non-patients, while average expenditures were $69.21 and $61.19, respectively. Despite obtaining nearly 41% more flower, medical patients reported spending only 13% more than non-patients. This disparity may be partially explained by differences in sourcing behaviors, particularly the greater reliance on home cultivation among registered medical patients.

Medical patients reported obtaining an average of 12.33 grams of flower through home cultivation, accounting for approximately 48% of their total reported flower quantities, compared with 4.33 grams, or 24%, among non-patients. Medical patients also reported obtaining substantially greater quantities through dispensaries (4.19 versus 0.19 grams) and gifting loophole arrangements (3.30 versus 1.39 grams). Conversely, non-patients reported obtaining greater quantities from unlicensed sellers (3.88 versus 0.37 grams), purchases from friends or family (1.98 versus 0.76 grams), and out-of-state licensed dispensaries (2.34 versus 1.62 grams). These findings suggest that medical registration status may be associated with distinct sourcing patterns, with registered patients relying more heavily on medical dispensaries and home cultivation, while non-patients obtain greater quantities through alternative sources.

Differences in expenditures across sources further illustrate these patterns. Medical patients reported average flower expenditures of $25.69 at dispensaries, compared with $2.01 among non-patients. In contrast, non-patients reported considerably higher expenditures through unlicensed sellers ($16.95 versus $2.12), purchases from friends or family ($9.40 versus $3.46), and out-of-state licensed dispensaries ($13.03 versus $7.80). Notably, non-patients reported spending nearly eight times as much through unlicensed sellers while obtaining approximately ten times the quantity reported by medical patients. The relationship between quantities obtained and expenditures suggests that differences in acquisition channels may contribute to variation in the effective cost of cannabis across medical registration groups.

Similar differences were observed across other cannabis product categories. Medical patients reported obtaining greater quantities of traditional pre-rolls (1.44 versus 1.03 grams), infused pre-rolls (0.29 versus 0.28 grams), and edibles (1.24 versus 0.94 packages), accompanied by higher average expenditures for each category. Vape products, however, exhibited a different pattern. Non-patients reported obtaining approximately 73% more vape products than medical patients (1.80 versus 1.04 grams), despite reporting lower average expenditures ($16.74 versus $19.77). Medical patients reported spending $14.67 on vape products through dispensaries, compared with $4.80 among non-patients, suggesting that differences in sourcing and product pricing may contribute to this disparity. Non-patients also reported greater vape expenditures through gifting loophole arrangements, unlicensed sellers, and purchases from friends or family.

Table 4. Current Average Past 30-Day Cannabis Spending Across All Sources, By Product Type for Past-Month Consumers Residing in Virginia

Product Type	Current Registered Medical Cannabis Patient Status	Total Avg Spending Across all Sources	Total Avg Dispensary Spending	Total Avg Gifting Loophole Spending	Total Avg Unlicensed Seller Spending	Total Avg Caregiver Spending	Total Avg Purchased from Friends or Family Spending	Total Avg Homegrow Spending	Total Avg For Free or Gifted by Friends or Family Spending	Total Avg Other Spending	Total Avg Out of State Licensed Dispensary Spending
Flower	Patient	$69.21	$25.69	$15.94	$2.12	$0.00	$3.46	$12.73	$1.33	$0.16	$7.80
	Non-patient	$61.19	$2.01	$11.53	$16.95	$0.00	$9.40	$2.25	$1.56	$4.46	$13.03
Pre Rolls	Patient	$3.76	$3.09	$0.29	$0.00	$0.00	$0.16	$0.00	$0.07	$0.00	$0.14
	Non-patient	$3.18	$0.08	$0.97	$0.29	$0.00	$0.87	$0.00	$0.02	$0.00	$0.96
Infused Pre Rolls	Patient	$2.33	$1.75	$0.58	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Non-patient	$1.35	$0.07	$0.87	$0.24	$0.00	$0.01	$0.00	$0.00	$0.00	$0.16
Edibles	Patient	$17.24	$9.92	$2.56	$0.71	$0.00	$0.02	$0.08	$0.00	$2.78	$1.16
	Non-patient	$12.48	$0.53	$1.33	$0.32	$0.00	$1.64	$0.10	$0.32	$2.71	$5.54
Beverages	Patient	$0.61	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.02	$0.59
	Non-patient	$0.69	$0.00	$0.21	$0.00	$0.00	$0.00	$0.00	$0.00	$0.09	$0.39
Vape	Patient	$19.77	$14.67	$0.67	$1.50	$0.00	$0.44	$0.00	$0.07	$0.00	$2.42
	Non-patient	$16.74	$4.80	$3.63	$2.31	$0.00	$1.87	$0.00	$0.12	$0.61	$3.40
Concentrates	Patient	$1.16	$0.05	$0.00	$1.10	$0.00	$0.01	$0.00	$0.00	$0.00	$0.00
	Non-patient	$1.04	$0.04	$0.31	$0.14	$0.00	$0.04	$0.00	$0.00	$0.00	$0.51
Tinctures	Patient	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Non-patient	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Topicals	Patient	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Non-patient	$0.01	$0.00	$0.01	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Capsules	Patient	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Non-patient	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

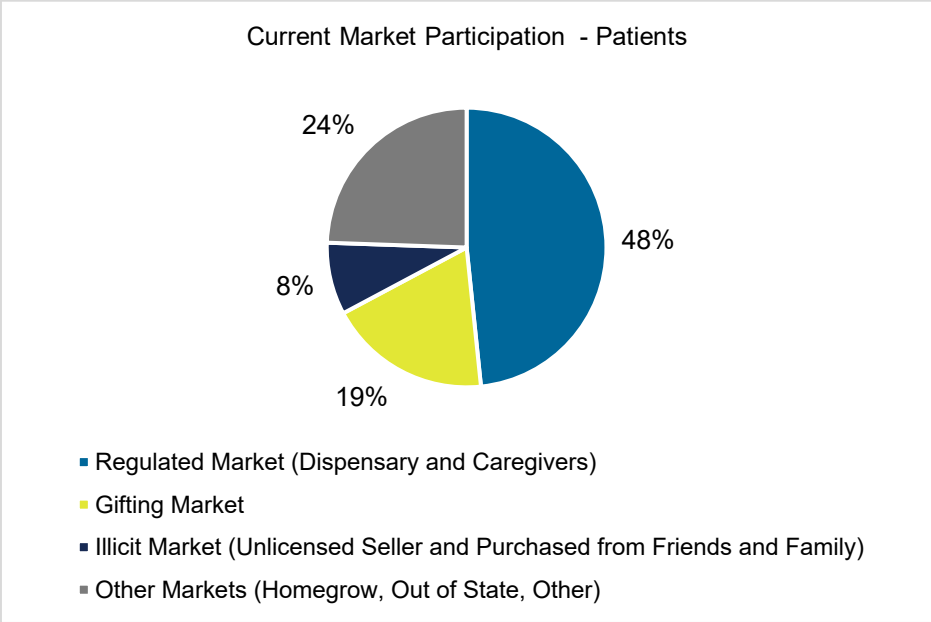
Table 5. Current Average Past 30-Day Cannabis Units Obtained Across All Sources, by Product Type for Past-Month Consumers Residing in Virginia

Product Type	Current Registered Medical Cannabis Patient Status	Total Avg Units Across all Sources	Total Avg Dispensary Units	Total Avg Gifting Loophole Units	Total Avg Unlicensed Seller Units	Total Avg Caregiver Units	Total Avg Purchased from Friends or Family Units	Total Avg Homegrow Units	Total Avg For Free or Gifted by Friends or Family Units	Total Avg Other Units	Total Avg Out of State Licensed Dispensary Units
Flower (grams)	Patient	25.45	4.19	3.3	0.37	0	0.76	12.33	2.78	0.09	1.62
	Non-patient	18	0.19	1.39	3.88	0	1.98	4.33	3.19	0.69	2.34
Pre Rolls (grams)	Patient	1.44	0.91	0.35	0	0	0.04	0	0.1	0	0.04
	Non-patient	1.03	0.02	0.37	0.03	0	0.2	0.01	0.21	0	0.19
Infused Pre Rolls *(grams)*	Patient	0.29	0.2	0.08	0	0	0	0	0	0	0
	Non-patient	0.28	0.02	0.18	0.04	0	0.01	0	0.03	0	0.02
Edibles (packages)	Patient	1.24	0.46	0.47	0.05	0	0	0.05	0.08	0.05	0.09
	Non-patient	0.94	0.04	0.14	0.02	0	0.17	0.06	0.17	0.07	0.27
Beverages (units)	Patient	0.1	0	0	0	0	0	0	0	0	0.09
	Non-patient	0.11	0	0.03	0	0	0	0	0.01	0.01	0.06
Vape (grams)	Patient	1.04	0.72	0.06	0.09	0	0.04	0	0.02	0	0.11
	Non-patient	1.8	0.57	0.37	0.18	0	0.17	0	0.21	0.06	0.25
Concentrates (grams)	Patient	0.07	0	0	0.06	0	0	0	0.01	0	0
	Non-patient	0.07	0	0.03	0.01	0	0	0	0	0	0.02
Tinctures (bottles)	Patient	0	0	0	0	0	0	0	0	0	0
	Non-patient	0	0	0	0	0	0	0	0	0	0
Topicals (bottles, tubes, etc.)	Patient	0	0	0	0	0	0	0	0	0	0
	Non-patient	0	0	0	0	0	0	0	0	0	0
Capsules (packages)	Patient	0	0	0	0	0	0	0	0	0	0
	Non-patient	0	0	0	0	0	0	0	0	0	0

Current Regulated Cannabis Market Participation

Examining cannabis spending across acquisition sources reveals that registered medical patients allocate less than half (48%) of their average past-month cannabis expenditures to the regulated market (i.e., dispensaries and caregivers), despite being the only consumers legally permitted to purchase cannabis from Virginia's licensed dispensaries. Home cultivation, out-of-state dispensaries, and other sources collectively account for the second-largest share of spending (24%), followed by the gifting market (19%). In contrast, only 8% of medical patient expenditures are allocated to illicit sources. These findings suggest that substantial cannabis spending among registered medical patients currently occurs outside Virginia's regulated market, presenting opportunities for both increased medical cannabis sales and additional demand within a future regulated adult-use market.

Figure 4. Market Participation Among Past-Month Medical Cannabis Patients



Current Hemp and Alternative Cannabinoids Consumption

Outside of the current cannabis market, hemp-derived and alternative cannabinoids are available in a secondary marketplace. Though this marketplace will be changing under federal laws, identifying current prevalence may provide additional context into complementary or substitute markets.

Table 6. Prevalence of Hemp and Alternative Cannabinoids Consumption of Past-Month Consumers

	I have used this in the past month	I have used this before, but not in the past month	I've never used this	I don't know if I've used this/I don't know what this is
Delta8	13.6%	45.5%	29.6%	11.3%
THCO	9.2%	22.8%	41.4%	26.6%
Delta10	6.2%	31.4%	41.7%	20.8%
THCP	6.9%	14.7%	40.5%	37.9%
THCV	4.4%	11.2%	46.5%	37.9%

CBN	4.6%	9.2%	49.9%	36.3%
HHC	3.7%	15.0%	44.5%	36.8%
CBD	24.4%	47.7%	22.2%	5.7%
CBG	5.7%	14.1%	44.2%	35.9%
THCA	16.1%	28.8%	29.2%	26.0%
Hemp Derived Delta9	12.1%	34.7%	35.2%	17.9%

As shown in **Table 6,** reported use of cannabinoid products varied considerably across product types, with CBD, Delta-8 THC, THCA, and hemp-derived Delta-9 THC demonstrating the highest levels of lifetime and past-month use. CBD was the most commonly reported product, with 24.4% of respondents indicating use in the past month and an additional 47.7% reporting previous use, resulting in 72.1% reporting lifetime use. Delta-8 THC followed, with 13.6% reporting past-month use and 59.1% reporting lifetime use. Hemp-derived Delta-9 THC and THCA also demonstrated relatively high levels of reported use, with 46.8% and 44.9% of respondents, respectively, indicating lifetime use.

Other cannabinoid products exhibited substantially lower levels of recent use. THCO was used by 9.2% of respondents in the past month, followed by THCP (6.9%), Delta-10 THC (6.2%), CBG (5.7%), CBN (4.6%), THCV (4.4%), and HHC (3.7%). Although past-month use was relatively limited, previous use was more common for certain products, particularly Delta-10 THC, for which 31.4% reported use prior to the past month.

On average, consumers reported spending $53.05 on hemp or alternative cannabinoid products. However, there is considerable uncertainty around that estimate (SE = 12.01) and it should be interpreted with caution.

Retail License Analysis

Review of the Existing Medical Market for Empirical Base Case

Virginia's existing medical cannabis market provides an empirical benchmark for estimating potential adult-use retail capacity. Because the Commonwealth has not yet established an operational adult-use retail market, the analysis relies on actual medical cannabis sales rather than revenue assumptions derived from other jurisdictions or arbitrarily selected performance targets. Specifically, the CCA provided dispensing facility-level sales data covering the preceding 12-month period (June 2025–June 2026), allowing CPPC to assess average retail performance within Virginia's existing regulated market.

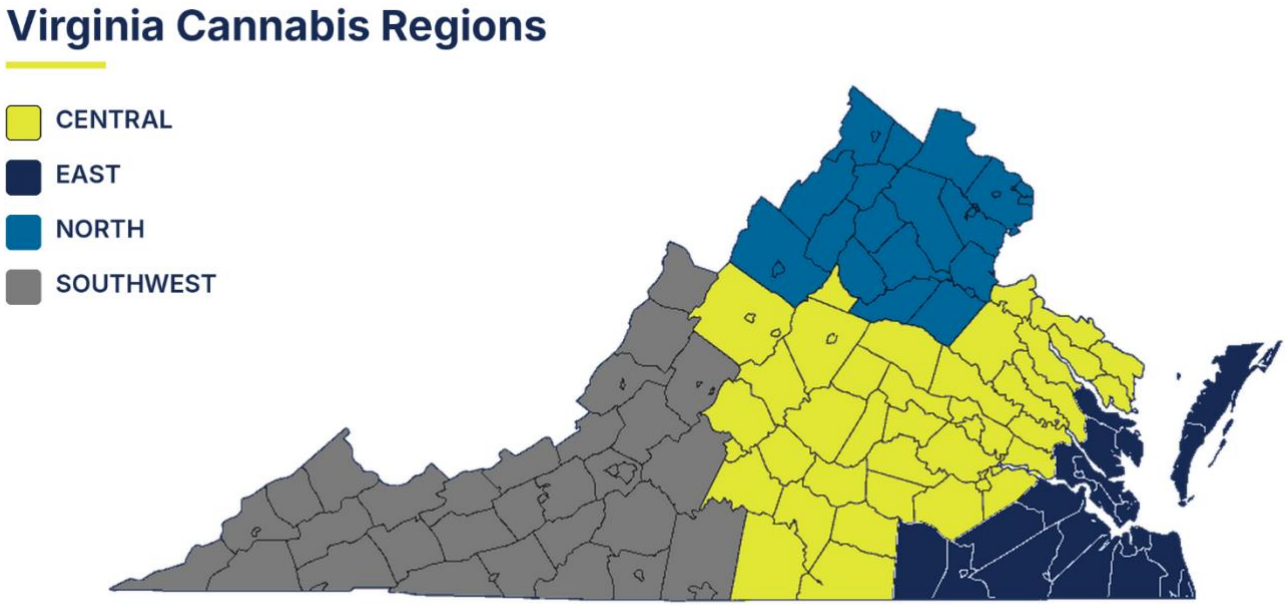
Average monthly gross sales across medical cannabis retail licenses were approximately $651,736 per license. This figure represents total medical cannabis sales divided by the number of retail licenses and does not account for differences in revenue across individual establishments or the costs of business operations. Accordingly, it should not be interpreted as a measure of profitability or a guarantee of financial viability. Rather, average medical market sales per retail location provide a standardized, locally grounded benchmark for translating estimated adult-use consumer demand into potential retail license performance.

The objective of this modeling is not to predict the precise revenue of individual adult-use retailers, but to estimate how many retail licenses could accommodate anticipated consumer demand under different assumptions about average sales per establishment. By holding estimated consumer demand constant and varying the medical market sales benchmark, the three scenarios provide a transparent and reproducible framework for evaluating alternative licensing structures. The resulting estimates are conditional on the assumptions of each scenario and should not be interpreted as prescribed sales targets, minimum revenue requirements, or guarantees of financial viability for prospective licensees.

The geographic analysis distributes Virginia's projected adult-use demand across the four regions identified for the CCA's proposed retail licensing lottery: Central, East, North, and Southwest. Statewide and regional demand estimates account for both the estimated number of unique cannabis consumers and their average past-month cannabis expenditures across all sources, expressed in U.S. dollars.

Although the VA-RDCOS was not designed to be representative of medical cannabis patients specifically and included only adults aged 21 years and older, its estimates closely aligned with objective medical cannabis sales data from Virginia's track-and-trace system. **The weighted survey-based estimate of regulated medical cannabis demand was $16,101,107 (CI 95%, $9,278,172-$22,921,836), compared with average monthly medical market sales of $15,630,848 for August and September, corresponding to the survey fielding period. This represents approximately 96.99% accuracy relative to observed sales, providing additional confidence in the survey-based demand estimates.**

Figure 5. Virginia Cannabis Control Authority's Proposed Four Geographic Regions for Adult-Use Cannabis Retail Licensing



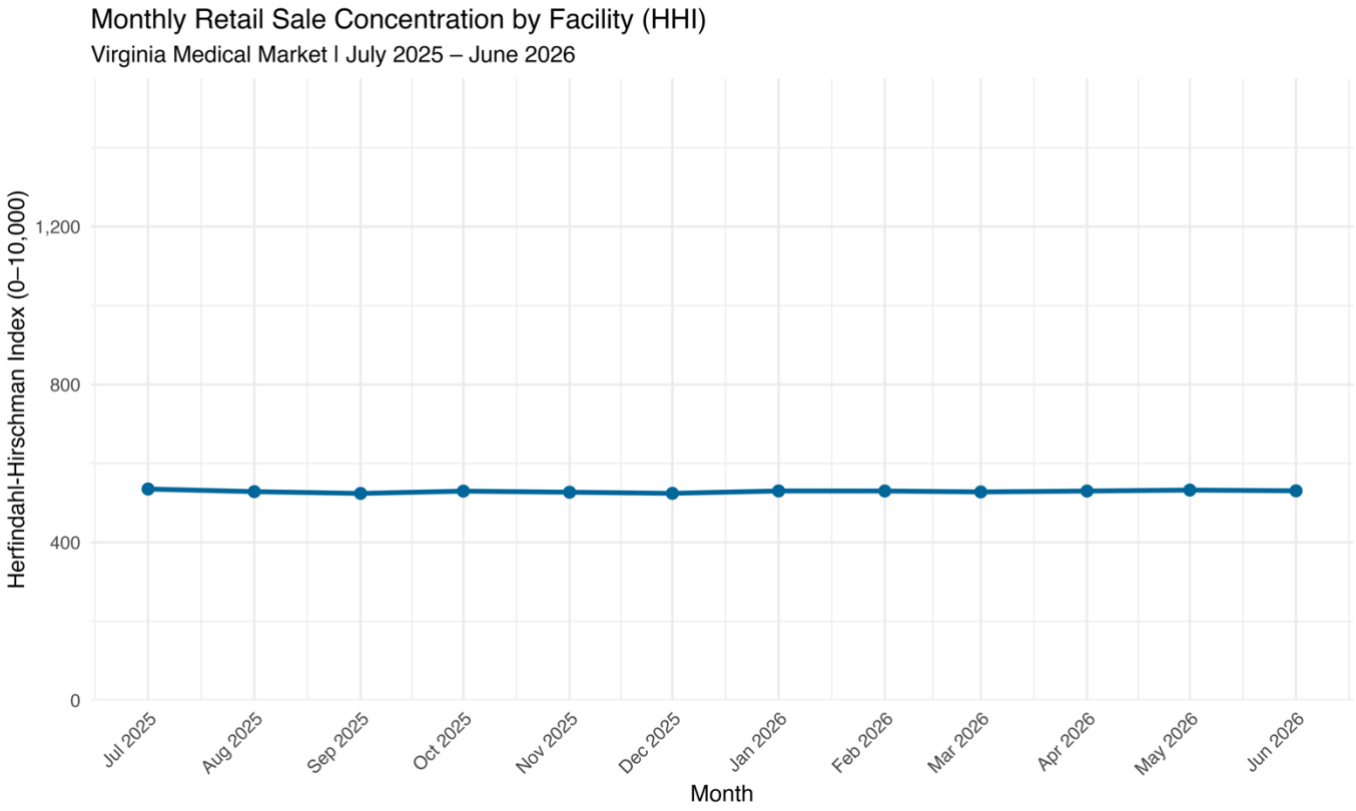
Regions as defined by the Virginia Cannabis Control Authority. Map: Cannabis Public Policy Consulting.

Current Market Concentration Analysis

CPPC conducted a market concentration analysis (**Figure 6)** using Virginia medical cannabis sales and licensing data to establish a baseline measure of market structure prior to the introduction of adult-use sales. The analysis incorporates descriptive measures of gross retail revenues, revenue per location, license activity, and the distribution of regulated sales across Virginia's existing medical market. Market concentration was measured using the Herfindahl-Hirschman Index (HHI), a commonly used economic measure of the degree to which market activity is concentrated among a relatively small number of market participants. HHI is calculated by summing the squared market shares of the units included in the analysis. Higher values indicate that market activity is concentrated among fewer facilities, while lower values indicate that activity is more broadly distributed.

For Virginia, each retail location's share of regulated medical cannabis revenue was used to calculate facility-level market concentration. HHI results were evaluated together with descriptive measures of total regulated revenue, the number of operating retail locations, average revenue per location, and the distribution of revenues across facilities. This combined approach allows changes in concentration to be interpreted within the context of the amount of demand being served and the number of establishments serving that demand.

Figure 6. Monthly Retail Sales Concentration by Facility



The HHI remained stable at approximately 530 throughout the 12-month period, indicating little change in the distribution of retail sales across medical cannabis facilities. This consistently low HHI suggests that sales are relatively dispersed across facilities, with no substantial concentration of market share among individual retail locations.

HHI is not used to directly determine the number of adult-use retail licenses but instead provides additional insight into the concentration of existing regulated market activity. Using the operational efficiencies observed in Virginia's medical cannabis market as a baseline, the adult-use market modeling suggests that the proposed starting license count could support a relatively competitive retail environment with low market concentration. However, the number of retail licenses alone does not necessarily reflect the degree of market competition, as multiple licenses may be held by the same owner. This distinction is particularly important for the CCA to consider when establishing adult-use ownership regulations, as ownership concentration may limit competition even in a market with a relatively large number of licensed retailers.

Estimated Adult-Use Retail License Scenarios and Ranges by Region

Total past-month cannabis demand across all sources for Virginia residents is estimated to be $87,811,710.98 (CI 95%: $69,638,083.08, $105,985,338.89). When extrapolating to an annual amount, cannabis spending by Virginia consumers exceeds $1B at an estimate of $1,053,776,813.25 (CI 95%, $835,656,996.92, $1,271,824,066.66) across all sources. As previously mentioned, this does not include

estimations of tourism demand, cross-border cannabis purchasers, or visitors which are all expected to be large sources of sales for the state.

Based on the model estimates from National Survey on Drug Use and Health 2023-2024[3], Virginia is bordered by Tennessee (829,000 estimated past-month cannabis consumers 18 plus), Kentucky (464,000 estimated past-month cannabis consumers 18 plus), North Carolina (1,040,000 estimated past-month cannabis consumers 18 plus), West Virginia (161,000 estimated past-month cannabis consumers 18 plus), and D.C. (121,000 estimated past-month cannabis consumers 18 plus), all of which do not have an adult-use market and are expected to increase retail sales through spill-over demand, similar to the experiences of other states**.** This estimate also does not calculate the expected percentage of sales that will ultimately be allocated towards the regulated market in comparison to total aggregate demand, nor evaluate the expected decline in sales due to a given tax rate. Both of which would lead to an estimated regulated figure that is lower than total aggregate demand for cannabis. Instead, demand estimates should be considered the pre-market total addressable market (TAM) for residents 21 years or older in Virginia.

Actual cannabis sales in Virginia are expected to exceed the monthly and annual demand estimates presented in **Table 7,** as these estimates reflect consumption among Virginia residents and do not account for potential purchases by out-of-state visitors. However, because the survey captures demand among Virginia residents only, the estimated monthly demand of $87,811,710.98[4] serves as the basis for modeling retail licensing scenarios.

Table 7. Estimated Monthly Cannabis Expenditures Across All Sources, Statewide and by Virginia Licensing Region

	Weighted Past-Month Average Total Cannabis Spending Across all Sources and Products	CI 95%, Lower Bound	CI 95%, Upper Bound	BRFSS Estimated Virginia Adult Consumer Population	Estimated Demand (Monthly)	CI 95%, Lower Bound	CI 95%, Upper Bound
Virginia Total	$100.68	$79.84	$121.51	872,216	$87,811,710.98	$69,638,083.08	$105,985,338.89
Central	$103.38	$55.96	$150.80	282,231	$29,177,191.88	$15,793,630.48	$42,560,753.27
East	$81.30	$57.89	$104.70	206,654	$16,800,060.50	$11,963,200.79	$21,636,920.20
North	$98.99	$71.01	$126.97	253,055	$25,048,836.08	$17,968,443.35	$32,129,228.80
Southwest	$128.85	$71.43	$186.26	130,277	$16,785,622.53	$9,305,155.57	$24,266,089.50

Using the medical market's average sales figure per store and adjusting license figures for adult-use cannabis spending, we arrive at three scenarios for consideration:

- **Scenario 1, Base Case:** Each license is expected to make the observed viable sales, defined as the current sales average per store in the operating medical market ($651,736.00).

[3] https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health/state-releases
[4] Note: This figure reflects rounding in calculations.

- **Scenario 2, Higher Shared Sales, Lower License Count:** Each license is expected to double the observed viable sales, defined as the current sales average per store in the operating medical market ($1,303,472.00).

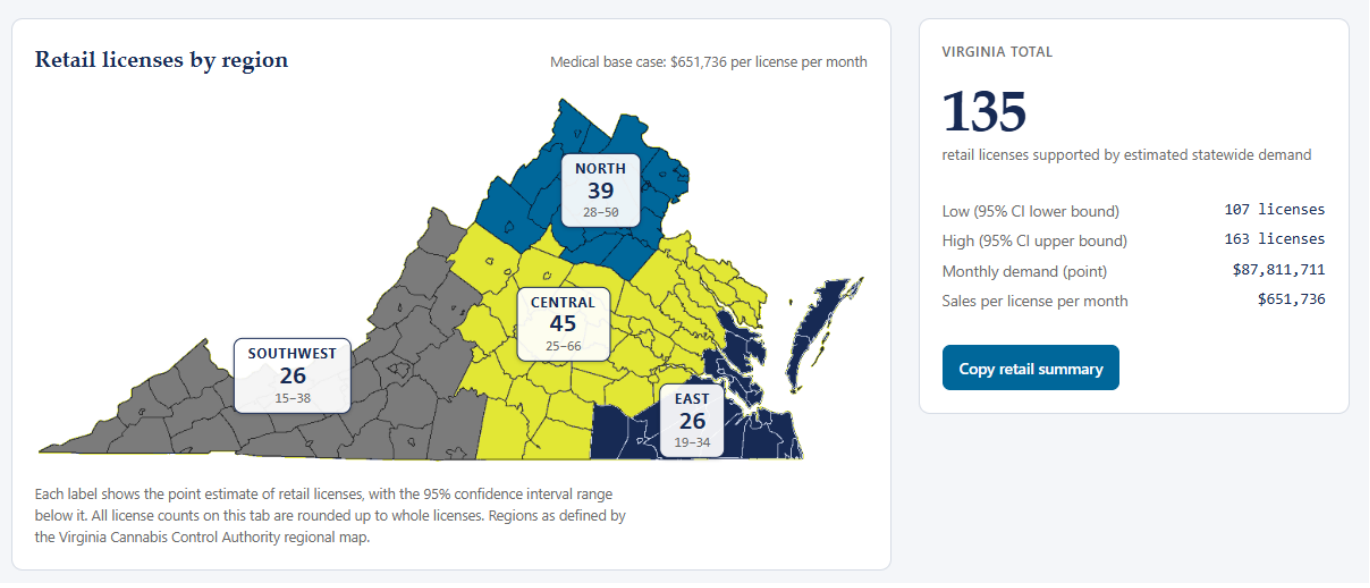
- **Scenario 3, Lower Shared Sales, Higher License Count:** Each license is expected to make half of the observed viable sales, defined as the current sales average per store in the operating medical market ($325,868.00).

All licensing scenarios operate under the same underlying assumptions, using average sales per license rather than modeling how sales may be *distributed* across individual establishments. The scenarios assume that 100% of estimated cannabis spending is captured by the regulated adult-use market, reflecting the long-term policy objective of transitioning existing demand into licensed channels and ensuring sufficient retail capacity to accommodate that demand. The modeling does not account for taxation, supply chain efficiencies, tourism, market leakage, or other factors that may influence retail sales, as discussed above. Rather, the scenarios translate observed medical market performance to a projected adult-use market, adjusting for estimated consumer demand by region. Accordingly, the modeling assumes that broad market conditions, competition levels, and per-unit pricing remain consistent with those observed in Virginia's existing medical cannabis market. In practice, these factors will likely differ following adult-use implementation, influencing both consumer purchasing behaviors and the share of cannabis spending captured by regulated retailers.

Note: Regional license estimates are rounded independently to the nearest whole number; therefore, the sum of regional estimates may differ slightly from the statewide total.

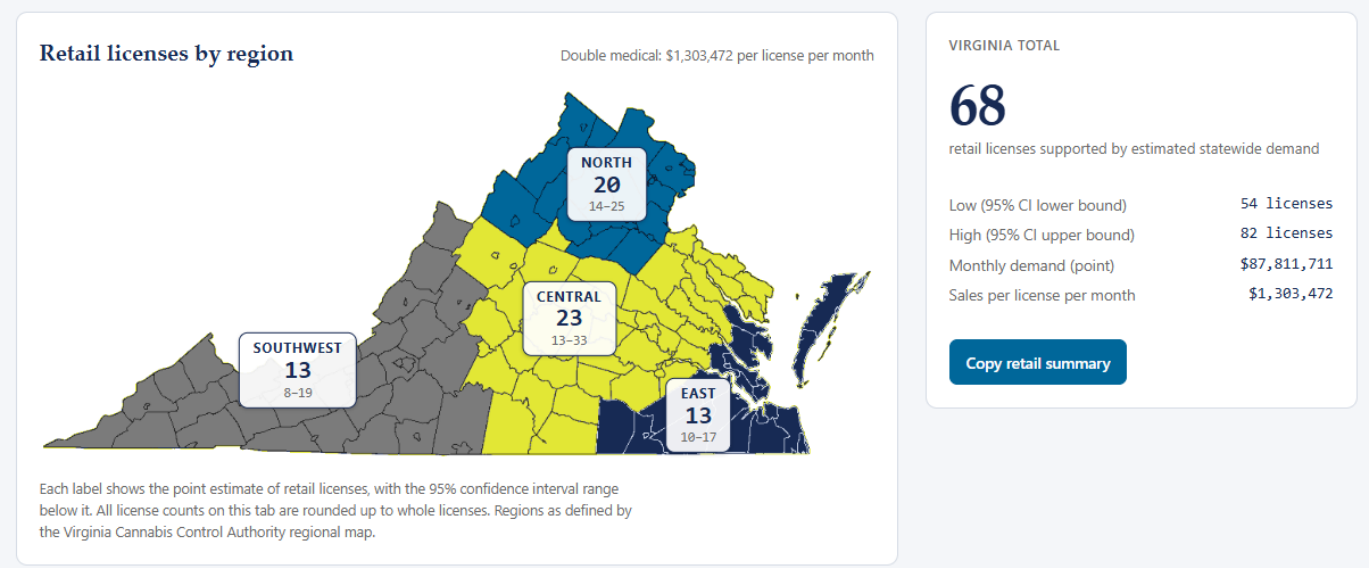
Scenario 1 (**Figure 7**) results in 135 licenses total, with a lower bound of 107 and an upper bound of 163 in total. The central region would hold the most licenses at 45, the northern region at 39, the eastern region and the southwest region both at 26. Confidence intervals for each region are displayed in the map below.

Figure 7. Estimated Retail Capacity by Virginia Licensing Region Using the Medical Market Sales Benchmark



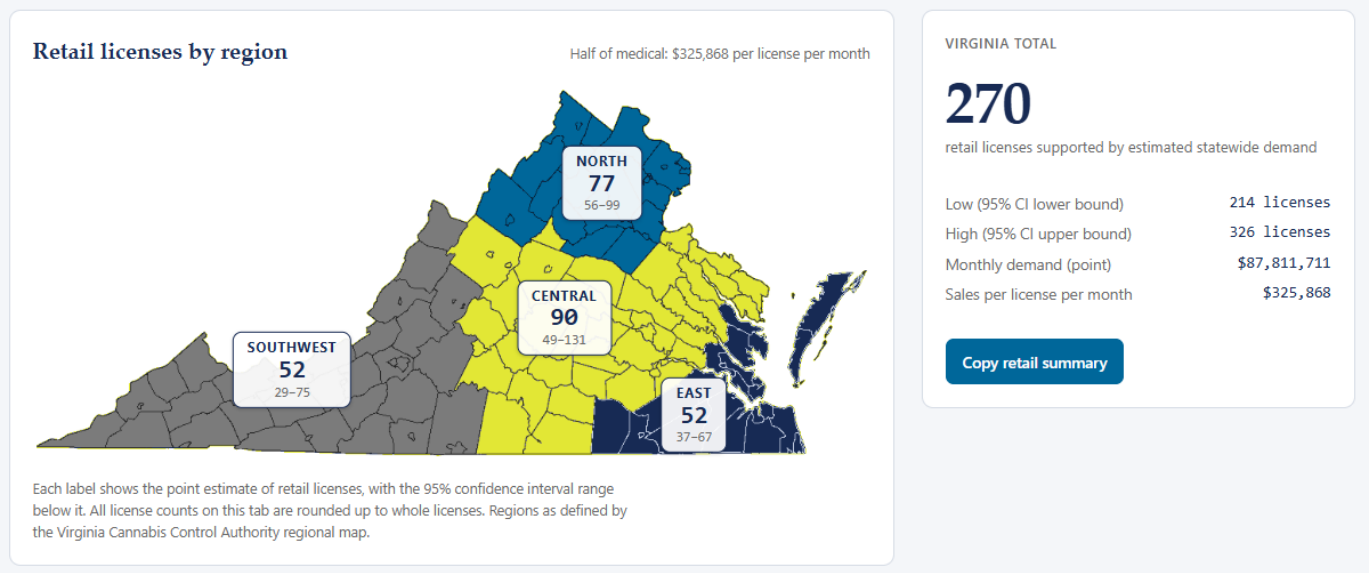
Scenario 2 (**Figure 8**) results in substantially fewer licenses total at 68, with a lower bound of 54 and an upper bound of 82 in total. The central region would hold the most licenses at 23, the northern region at 20, the eastern region and the southwest region both at 13. Confidence intervals for each region are displayed in the map below.

Figure 8. Estimated Retail Capacity by Virginia Licensing Region Assuming Double the Medical Market Sales Benchmark



Scenario 3 (**Figure 9**) results in the highest licenses total at 270, with a lower bound of 214 and an upper bound of 326 in total. The central region would hold the most licenses at 90, the northern region at 77, the eastern region and the southwest region both at 52. Confidence intervals for each region are displayed in the map below.

Figure 9. Estimated Retail Capacity by Virginia Licensing Region Assuming Half the Medical Market Sales Benchmark



The resulting license counts illustrate how the same estimated consumer demand could be distributed across different numbers of retailers under varying assumptions about average sales per license. These assumptions should not be interpreted as revenue targets, minimum sales requirements, or projections of individual business performance, nor as sole adult-use retail license access points and can include medical dispensaries and micro-dispensaries.

To further illustrate this distinction, the following hypothetical examples demonstrate how the same total market demand and average sales per license can produce substantially different distributions of revenue and market concentration. These examples are illustrative only and should not be interpreted as projections of Virginia's future retail market.

Figure 10. Illustrative Retail Revenue Distribution Under a Competitive Market with Relatively Equal Sales Across Establishments

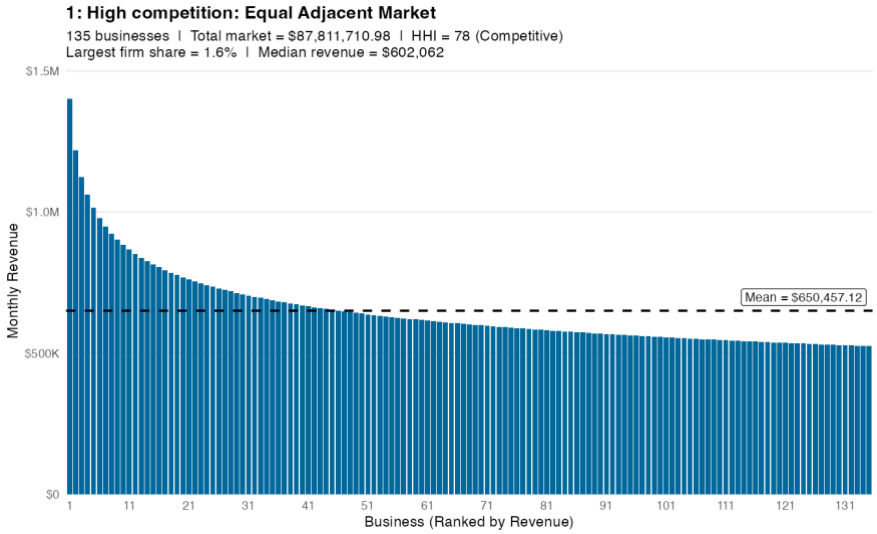


Figure 11. Illustrative Retail Revenue Distribution Under a Competitive Market with Mild Firm Leadership

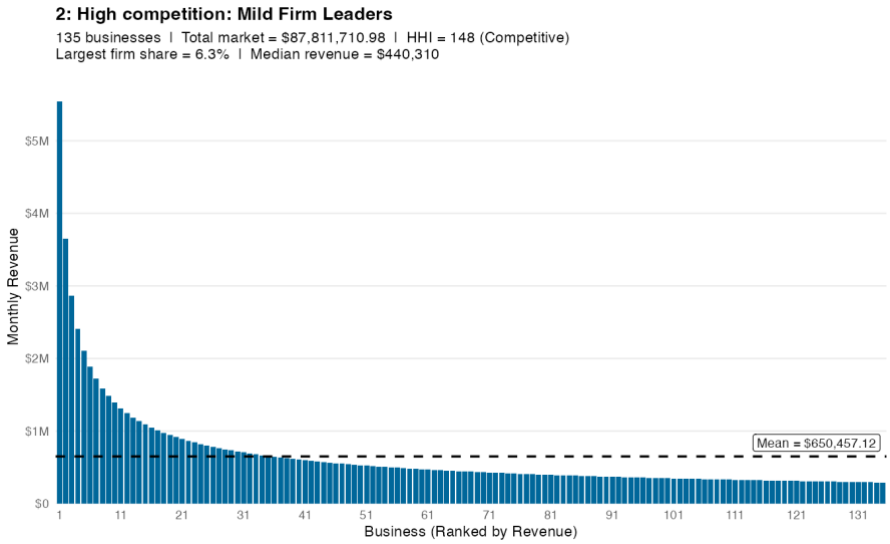


Figure 12. Illustrative Retail Revenue Distribution Under a Competitive Market with Several Strong Firms

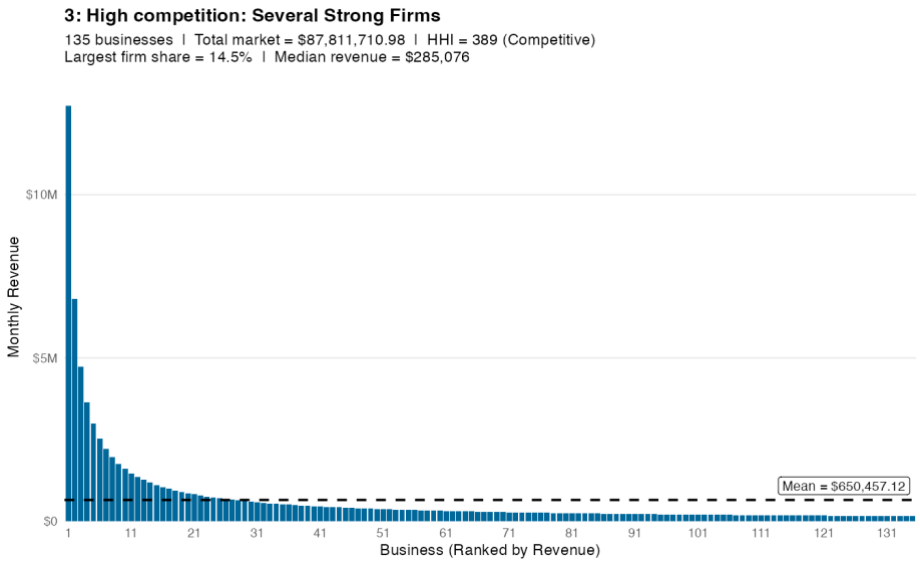
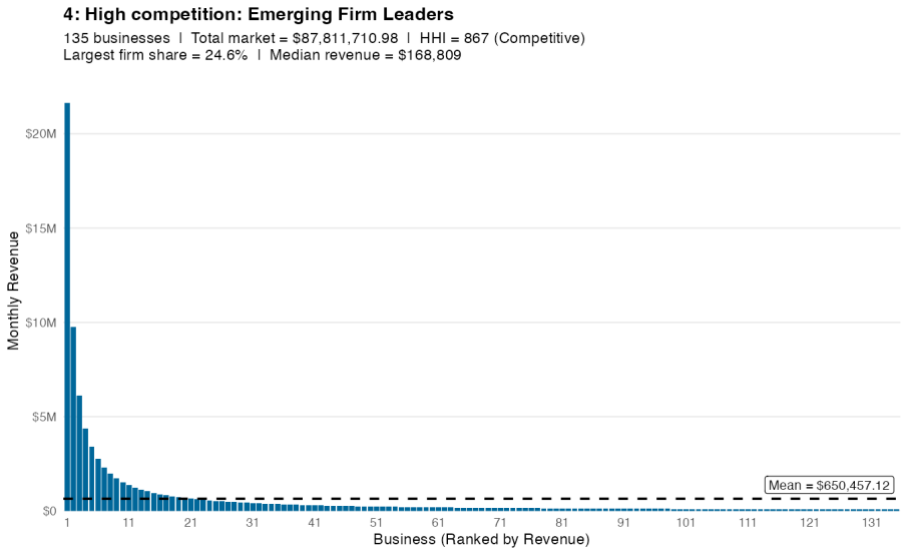


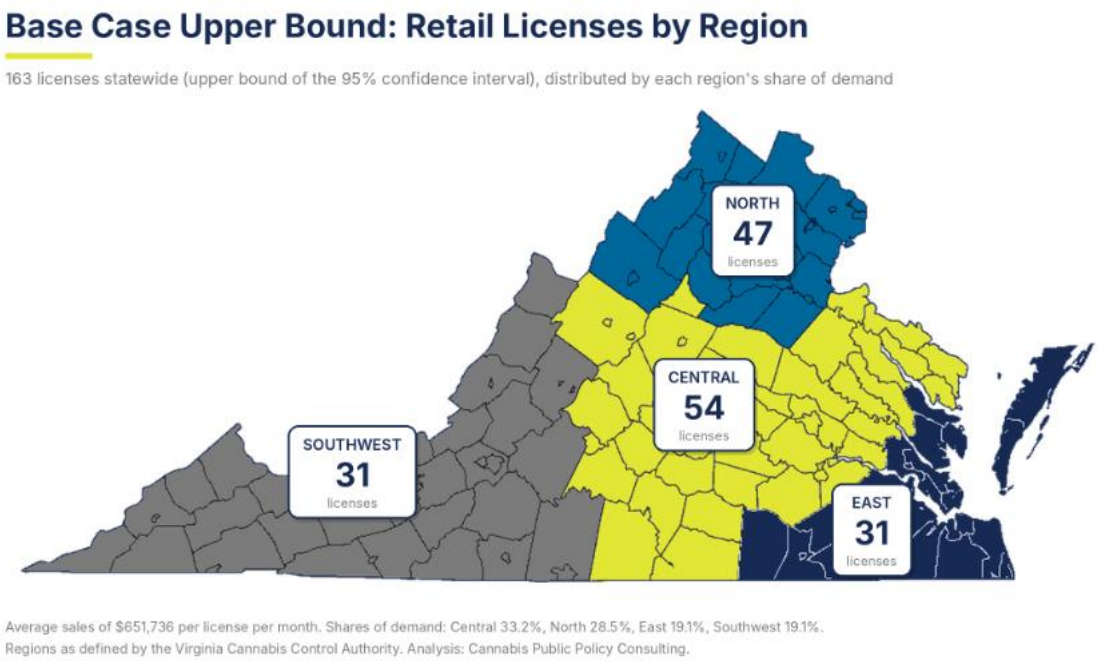
Figure 13. Illustrative Retail Revenue Distribution Under a Competitive Market with Emerging Dominant Firms



The selection of a licensing scenario should ultimately be guided by the policy objectives of the CCA. For example, if the goal is to establish a robust and competitive adult-use market that maximizes the proportion of cannabis spending captured by licensed retailers, the upper bound of Scenario 3 (326 licenses) may be most appropriate, as a larger retail network could expand geographic accessibility and promote competition among businesses. Notably, Virginia's statutory maximum of 350 retail licenses closely aligns with the upper bound of Scenario 3, suggesting that the existing legislative framework is broadly consistent with the higher-capacity licensing scenario. Alternatively, should the CCA prioritize a phased rollout of retail licenses, allowing for continued assessment of consumer demand, market participation, geographic accessibility, and competition before authorizing additional establishments, the

upper bound of Scenario 1 (163 licenses) may provide a suitable initial licensing target while retaining the statutory maximum of 350 licenses for future market expansion.

Figure 14. Regional Licensing in Total License Upper Bounds[5]



Additional support for the plausibility of the Scenario 1 upper bound sales benchmark can be found in Missouri's operational adult-use cannabis market. In a recent market assessment conducted by the same authors of the current report for the Missouri Department of Health and Senior Services, average annual retail sales per establishment were approximately $6.49 million in Year 1, $6.91 million in Year 2, and $6.87 million in Year 3, averaging approximately $6.76 million across the three years.[6] Importantly, the same assessment found that Missouri's regulated cannabis market captured approximately 93% of reported consumer expenditures, with no evidence of excessive statewide or regional retail market concentration. These findings suggest that Missouri has maintained a competitive and well-functioning retail market alongside relatively stable average annual sales per establishment.

The observed sales figures provide an additional comparative benchmark for Virginia's Scenario 1, which assumes approximately $7.82 million in annual sales per retailer based on the existing medical market. Although differences in state market conditions preclude treating Missouri's experience as a direct prediction of Virginia's future retailer revenues, the relative proximity of these figures provides external support for the reasonableness of the base-case assumption. Taken together, the Virginia medical market and Missouri adult-use market provide two independent operational reference points for evaluating potential retail licensing capacity based on similar sales per store figures.

[5] Regional confidence intervals cannot be summed to produce a statewide range, because sampling error in individual regions partly offsets when combined. The statewide upper bound of 163 licenses is therefore distributed across regions in proportion to each region's share of estimated demand.
[6]https://health.mo.gov/sites/health/files/media/pdf/2026/10/missouri_cannabis_market_study_report_202610.pdf

Retail establishments may disproportionately concentrate near Virginia's borders, particularly in areas adjacent to states without operational adult-use cannabis markets. This pattern has been observed in other state cannabis markets, where retailers strategically locate near state borders to capture additional demand from out-of-state consumers. Consequently, the geographic distribution of retail establishments may not directly correspond to the distribution of demand among Virginia residents, as cross-border purchasing could substantially influence retail activity and market concentration in certain regions. The same logic applies to cross-region demand. If businesses cannot enter a region because a cap has been met, close placement on the other side of the regional border close to a population center of another region could lead to locally-contextual clustering. This provides additional justification for considering the higher licensing scenarios or intervals. To the extent that this additional demand materializes, the Commonwealth's total retail market capacity may exceed the estimates presented herein, particularly in regions bordering states without operational adult-use markets. However, stand-alone retail licenses are not the only license type to account for. Microbusinesses and existing pharmaceutical processors will contribute to the figures represented above.

Additional Retail Capacity Outside Stand-Alone Retail Licenses

The number of stand-alone retail marijuana store licenses issued by the CCA will not represent the total number of adult-use retail storefronts in Virginia. Two additional license pathways can expand consumer-facing retail capacity: microbusinesses and existing pharmaceutical processors exercising dual-use privileges. Virginia's initial licensing framework authorizes the CCA to issue up to 100 microbusiness licenses by May 1, 2027. Microbusinesses will be authorized to conduct cultivation, processing, and retail activities.

Existing pharmaceutical processors represent a second source of retail capacity. Each pharmaceutical processor may operate its primary dispensing location and up to five additional cannabis dispensing facilities, creating potential capacity for as many as six retail locations per pharmaceutical processor, or 30 locations statewide. Pharmaceutical processors verified for dual-use privileges may participate in the adult-use market, and their associated dispensing facilities may exercise retail marijuana store privileges. Virginia currently has 24 medical cannabis dispensing locations. If all existing locations transition to adult-use sales, they would provide a substantial amount of retail capacity at market launch without requiring new stand-alone retail licenses. The existing statutory authority also leaves capacity for six additional pharmaceutical-processor retail locations if all five processors ultimately operate the maximum of six locations available within their respective HSAs. Comparison state experience indicates that existing medical infrastructure can provide a substantial share of initial adult-use retail capacity. In Missouri and Maryland, for example, much of the retail network available at adult-use launch consisted of preexisting medical dispensaries that transitioned into the adult-use market.

At the statutory maximum for the initial microbusiness licensing round, microbusinesses and pharmaceutical processors could therefore account for up to 130 adult-use retail storefronts outside the stand-alone retail marijuana store license category, comprising as many as 100 microbusiness retail locations and up to 30 pharmaceutical-processor and cannabis-dispensing-facility locations. This figure represents maximum potential retail authority for these license types rather than a prediction that all 130 locations will operate at market launch.

Importantly, the licensing scenarios presented in the preceding section estimate potential retail market capacity rather than the number of stand-alone retail licenses that must be issued. Accordingly, retail

establishments operating under microbusiness licenses or pharmaceutical-processor dual-use privileges may contribute toward satisfying the estimated market capacity under each scenario, potentially reducing the number of additional stand-alone retail licenses needed. The extent of this offset will depend on the number of operational microbusinesses, the participation of existing medical operators in the adult-use market, and the geographic distribution of these establishments. Therefore, the CCA may consider the combined retail capacity of all authorized licensing pathways when determining the appropriate number and distribution of stand-alone retail licenses.

The distinction becomes increasingly important after the initial licensing period. The statutory framework appears to permit the CCA to conduct additional microbusiness licensing rounds without establishing a permanent numerical cap on that license category. If microbusiness licensing remains uncapped, the number of retail-capable businesses will continue to increase independently of the 350-license maximum applicable to stand-alone retail marijuana stores.

Evaluation of the 350-License Statutory Maximum

Virginia's statutory limit of 350 retail marijuana store licenses represents the maximum number of stand-alone retail marijuana store licenses the CCA may issue statewide. It is not a requirement that the full number be made available during the initial licensing period and is not a cap on all consumer-facing retail locations, because microbusinesses and dual-use pharmaceutical processors also hold retail privileges. An evaluation of the limit must therefore distinguish between the total number of possible retail locations and the quantity of stand-alone licenses made available through the licensing process.

Based on the findings presented herein, there is evidence that Virginia should retain the statutory maximum of 350 stand-alone retail marijuana store licenses while adopting a phased approach to license issuance. This will allow for the CCA to consider the anticipated contribution of these additional retail pathways when determining the initial number of stand-alone licenses to issue, with particular attention to geographic distribution and consumer accessibility. As the adult-use market becomes operational, subsequent licensing rounds should be informed by observed retail sales, regulated-market participation, geographic access, competition, and the extent of demand generated by out-of-state consumers. Retaining the statutory maximum of 350 stand-alone retail licenses would preserve the CCA's ability to respond to evolving market conditions without prematurely constraining future retail capacity. This approach balances initial market development with regulatory flexibility, allowing licensing decisions to be refined as empirical evidence of adult-use market performance becomes available.

Cultivation License Analysis

Cultivation Tier Structure

Virginia's adult-use cannabis framework establishes five cultivation license tiers differentiated primarily by maximum authorized canopy and whether cultivation may occur indoors or outdoors. Under Virginia Code § 4.1-800, Tier I and Tier II cultivation facilities may cultivate indoors or outdoors, while Tier III through Tier V facilities are limited to indoor cultivation. Maximum authorized canopy ranges from 5,000 square feet for Tier I facilities to 35,000 square feet for Tier V facilities.

Table 8. Virginia Marijuana Cultivation Facility Tiers

Cultivation Tier	Maximum Canopy	Indoor Cultivation	Outdoor Cultivation
Tier I	5,000 sq. ft.	Yes	Yes
Tier II	10,000 sq. ft.	Yes	Yes
Tier III	15,000 sq. ft.	Yes	No
Tier IV	25,000 sq. ft.	Yes	No
Tier V	35,000 sq. ft.	Yes	No

For purposes of the statutory cultivation limits, "canopy" is defined as the space used to produce flowering marijuana plants. The calculation includes areas between plants and space used for pathways, airflow, lighting, watering, trimming, and other cultivation activities. It does not include areas used for mother plants, clones, immature or nonflowering plants, processing, drying, curing, storage, offices, or other nonproduction uses. For vertically stacked cultivation systems, the surface area of each cultivation level is included in the canopy calculation.[7]

The tier structure creates substantial differences in the amount of production capacity that may be represented by an individual cultivation license. At the statutory maximum, one Tier V license authorizes seven times the canopy of one Tier I license, while a Tier IV license authorizes five times the canopy of a Tier I license. Consequently, the number of cultivation licenses issued cannot be interpreted independently of the distribution of those licenses across tiers. A market composed primarily of smaller-tier cultivators could require substantially more licenses to provide the same nominal canopy as a market containing a greater proportion of Tier IV or Tier V facilities. Virginia's framework also distinguishes between lower-tier licenses that may cultivate outdoors and higher-tier licenses that are limited to indoor cultivation. Tier I and Tier II facilities may cultivate either indoors or outdoors, while Tier III, Tier IV, and Tier V cultivation must occur indoors. This distinction is important because an equivalent amount of authorized canopy does not necessarily represent equivalent production capacity across indoor and outdoor cultivation. Differences in growing environment, harvest frequency, seasonality, climate exposure, plant density, and cultivation practices can result in materially different annual output per square foot. Accordingly, indoor and outdoor canopy cannot be treated as directly interchangeable when estimating the production capacity represented by Virginia's cultivation tiers. Virginia law also limits outdoor cultivation by providing that no more than one cultivation facility license authorizing outdoor cultivation may be issued for a single parcel or for contiguous parcels under common ownership or control.[8]

The statute provides the CCA Board with additional authority to manage cultivation capacity as the market develops. In considering market demand, utilization rates, sales, product transfers, inventory, and licensing activity, the Board may adjust authorized canopy within the maximum square footage established for each tier. The Board may also authorize canopy beyond the statutory tier maximum when it determines that doing so would assist or encourage participation by impact licensees. This structure therefore establishes maximum potential capacity for each tier while allowing actual authorized cultivation capacity to respond to observed market conditions.

The initial market is subject to an additional restriction on the largest cultivation facilities. The enacted 2026 legislation provides that no more than five Tier V cultivation facility licenses may be issued before January 1, 2028. Beginning January 1, 2028, the Board is directed to determine the number of Tier V licenses to make available consistent with statutory objectives related to supply, market stability,

[7] Va. Code § 4.1-600
[8] Va. Code § 4.1-800

competition, small business participation, and the unregulated market. Importantly, stand-alone cultivation licenses will not represent all cultivation capacity available within Virginia's adult-use market. Microbusinesses may also conduct cultivation within the parameters established for that license category, and existing pharmaceutical processors may contribute cultivation capacity if authorized to exercise dual-use privileges. Microbusiness cultivation is limited to 5,000 square feet of indoor canopy or 10,000 square feet of outdoor canopy. Pharmaceutical processors are subject to an aggregate cultivation canopy limit of 70,000 square feet across all of their cultivation facilities. The cultivation license analysis therefore evaluates the distribution of cultivation capacity across Virginia's five stand-alone cultivation tiers and microbusiness license category, while separately accounting for potential production capacity contributed by dual-use pharmaceutical processors

Estimated Adult-Use Cultivation License Scenarios and Ranges

The cultivation model translates projected adult-use demand into an estimate of the amount of cannabis production necessary to serve the regulated market. Similar to the retail assessment, Virginia's existing medical cannabis market provides the empirical baseline for this analysis. CPPC evaluated the average number of unique medical cannabis patients per month served by Virginia's existing regulated market alongside observed cultivation output per year. This relationship provides an estimate of the quantity of regulated cannabis production per year associated with a known average consumer population size per month, across the entire year. Per year production is utilized because cultivation grow cycles are not standardized to a single time frame, and production decisions are based on supply produced in prior months. From the average unique number of medical patients per month and year totals of harvest production, a ratio is calculated for use in scaling this production across the entire expected consuming population.

Table 9. Estimated Annual Indoor Cannabis Plant Requirements Based on Virginia Medical Market Harvest Activity and Projected Adult-Use Consumer Demand

Ratio of Harvested Indoor Unique Plants Per Year to Average Monthly Unique Patients	BRFSS Past-Month 21+ VA Cannabis Consumer Estimate	Estimated Indoor Plants Harvested Per Year
2.311043	872,216	2,015,729.31

Using Virginia's existing medical cannabis market as a benchmark allows the analysis to reflect actual production activity and market conditions within the Commonwealth, rather than relying on assumptions drawn from other states. This approach accounts for Virginia-specific factors, including existing cultivation practices and industry expertise that may carry over into the adult-use market. However, it also assumes that the conditions influencing production decisions in the medical market, including cannabis prices, consumer demand, competition, production costs, and regulations, will remain similar under adult-use legalization. In practice, these conditions are expected to change. Most importantly, cultivation decisions are influenced by the relationship between cannabis prices and consumer demand, both of which will evolve as the adult-use market develops and competition increases. Despite these limitations, the observed medical market ratio provides a useful starting point for estimating potential cultivation capacity and evaluating the maximum number of licenses that could be supported within each licensing tier under the modeled assumptions.

Cannabis is sold across multiple product forms and production stages, all of which require different levels of THC to be input to produce each unit output. Because the plant ratio is based on total medical-market harvests, it implicitly reflects the mix of products sold in that market (flower, extracts, edibles and others), without requiring separate conversion factors for each product form.

The existing medical supply chain data does not capture cultivation square footage, utilization rates of that square footage, outdoor yields as cultivation for the existing market is limited to indoors, or how often canopy is harvested each year. Tier I and Tier II licenses are permitted to cultivate indoors or outdoors, with the square footage of canopy remaining the same irrespective of grow method, apart from Microbusinesses. Because of this, the indoor and outdoor cultivation square foot is the same but not *equivalent* in production contribution. To model outdoor production would require assumptions of square foot equivalency for one indoor plant to one outdoor. No validated literature establishes this equivalency, or the square footage needed per indoor plant. The most referred to ratios found in online forums about cultivation are listed in **Table 10.** Importantly, these are not corresponding figures; they are independent of each other, leaving 9 options for modeling a tradeoff between indoor and outdoor production, all of which would be equally defensible without existing data.

Table 10. Possible Assumptions to Calibrate for Grow Space

Different Indoor Square Footage Needed Per Indoor Plant	Different Outdoor Square Footage Needed Per Outdoor Plant
0.5 sq ft	4 sq ft
1 sq ft	6 sq ft
2 sq ft	8 sq ft

Perhaps most important to this exercise is that though the adult use cultivation tiers allow for indoor and outdoor cultivation (i.e., one or the other), there is no distinction of license types based on grow method. Put simply, there are only cultivation or Microbusiness licenses available for issuance; how a licensee within a Tier I or II or Microbusiness decides to grow is at their discretion after being awarded a license. Neither the relative productivity of indoor and outdoor cultivation nor license equivalency can be established. The number of possible combinations of production output and licenses needed between indoor vs. outdoor is effectively unlimited. If licenses were sized assuming some licensees grow outdoors, and those licensees instead chose indoor cultivation, the market would produce significantly more cannabis than projected demand requires. Given this, our approach reflects the highest-supply case: because indoor cultivation produces the most plants per square foot, sizing every license as indoor ensures that supply cannot exceed estimated demand, whatever grow method licensees ultimately choose.

What we can derive from the available data is limited to unique indoor plants harvested annually for the total addressable adult use market. That number is 2,015,729.31. Because the square footage used to cultivate plants and the harvest cycles needed from the square footage cannot be established from Virginia data, we have to assume both figures for an adult use market. For our model, we selected 1 sq foot per plant, and 4 harvest cycles per year. One square foot per plant is the midpoint of the commonly referenced range (Table 10), and four harvests per year represent frequent indoor cultivation[9]. Together, they produce

[9] https://lcb.wa.gov/sites/default/files/publications/Cannabis/BOTEC%20reports/5a_Cannabis_Yields-Final.pdf

the highest plausible supply per square foot, consistent with sizing licenses so that supply does not exceed demand estimates for market launch. Because licensed canopy is the physical area under cultivation at any one time and each square foot is harvested four times a year, the canopy required to meet annual demand is:

2,015,729 plants per year × 1 sq ft per plant ÷ 4 harvests per year = 503,932 square feet of licensed indoor canopy

Because supply below demand can be addressed by issuing additional licenses in later rounds, while supply above demand cannot be reversed once licenses are issued, every license is sized at its maximum indoor capacity. Licensees who cultivate outdoors, harvest less often, or do not build out fully can only bring supply below estimated demand. In later rounds, existing licenses should be counted at maximum indoor capacity rather than current output, so that a licensee changing its cultivation method cannot raise total supply above demand.

We begin by allocating the required canopy across the license types for indoor scenarios. We begin allocation with consideration to Tier V. Tier V licenses are the largest cultivation license type, at 35,000 square feet each, and each represents roughly 7% of the canopy needed. Because each Tier V license adds a large block of supply at once and requires the longest time to build out, the number of Tier V licenses is best determined at market launch rather than added in later rounds. Additional licenses in later rounds can then be drawn from smaller license types, which allow finer adjustment. The analysis presents scenarios for zero through five Tier V licenses, the statewide maximum.

Microbusinesses are counted at their maximum indoor canopy of 5,000 square feet. Because Tier V and microbusinesses draw from the same fixed canopy, each Tier V license not issued leaves room for approximately seven additional microbusinesses (35,000 ÷ 5,000). Three approaches to sizing microbusinesses are presented in Table 11:

- **Equal share:** Microbusinesses and each of Tiers I through IV receive one-fifth of the canopy remaining after Tier V.
- **Microbusiness priority:** Microbusinesses receive half of the remaining canopy, and Tiers I through IV share the other half equally.
- **Microbusiness maximum:** All remaining canopy is allocated to microbusinesses, up to the 100 available.

Microbusinesses are required to be vertically integrated, meaning their retail operations will largely depend on their own cultivation. For the microbusiness license to work as intended, microbusiness licenses should be issued at market launch, so that they can compete across all supply chain activities while relying on their own supply. However, we also understand that because there is a requirement of vertical integration, that this license type may be less appealing than stand alone cultivators. For those primarily interested in cultivation, a Tier I license would be more attractive without compromising indoor square footage.

Table 11. Cultivation Licensing Scenarios

Tier V	Microbusiness approach	Micro	Tier I	Tier II	Tier III	Tier IV	Total licenses	Share of need met
5	Equal share	13	13	6	4	2	43	94.3%
	Micro priority	32	8	4	2	1	52	93.3%
	Micro maximum	65	0	0	0	0	70	99.2%
4	Equal share	14	14	7	4	2	45	91.3%
	Micro priority	36	9	4	3	1	57	94.3%
	Micro maximum	72	0	0	0	0	76	99.2%
3	Equal share	15	15	7	5	3	48	94.3%
	Micro priority	39	9	4	3	1	59	90.3%
	Micro maximum	79	0	0	0	0	82	99.2%
2	Equal share	17	17	8	5	3	52	93.3%
	Micro priority	43	10	5	3	2	65	95.3%
	Micro maximum	86	0	0	0	0	88	99.2%
1	Equal share	18	18	9	6	3	55	93.3%
	Micro priority	46	11	5	3	2	68	92.3%
	Micro maximum	93	0	0	0	0	94	99.2%
0	Equal share	20	20	10	6	4	60	97.2%
	Micro priority	50	12	6	4	2	74	95.3%
	Micro maximum	100	0	0	0	0	100	99.2%

As with the retail licensing decision, the mix of license types depends on agency goals. Scenarios weighted toward microbusinesses and lower tiers produce more licenses and more competition, which tends to place downward pressure on prices. Scenarios with more Tier V licenses favor operational scale and business stability. The equal-share approach balances these objectives and may be most appropriate for an iterative licensing approach. Each scenario in Table 11 is consistent with estimated demand. The choice among them reflects policy priorities rather than a single correct answer.

The adult-use market is expected to be more competitive than Virginia's existing medical cannabis market due to the anticipated increase in licensed operators, potentially generating greater production efficiencies over time. As competition increases and prices decline, cannabis consumption may also increase, potentially changing the current estimate of 2.3 plants per consumer, holding other factors constant. The matrix-based licensing approach provides a starting point for determining cultivation capacity using production benchmarks demonstrated in Virginia's medical market. However, these estimates should not be interpreted as fixed production requirements, as firms will adjust their production decisions over time in response to market prices, consumer demand, and competitive conditions. Further, we provide these with the recommendation of allowing for evaluation and future licensing rounds based on market need.

Accordingly, we recommend issuing sufficient cultivation licenses, under the preferred combination of tiers, to accommodate the estimated demand identified in this report. Issuing three Tier V licenses may be worth consideration for several reasons. For one, this is likely to be the most attractive Tier as it will garner the most interest from investors. However, limiting to three instead of five allows for availability of the license while not compromising all the square footage all five would absorb from other license types. Additionally, in understanding that the Pharmaceutical Processors may have comparable supply, it will

allow for competition against those already established. From this decision point, either the equal share or microbusiness priority scenarios would be suitable to start the market. Though they both fall to below 95% of demand needs met, because Pharmaceutical Processor production is not included in these estimates, any adult-use supply from Pharmaceutical Processors would be in addition to the canopy modeled here. Their participation should be considered when setting the final license counts.

Following market launch, additional analysis of the following should be strongly considered:

- Indoor vs. outdoor determinations
- Observed production in both square footage utilized and unique harvested plants
- Regulated sales, prices and share of total addressable market spending; and
- Market conditions

These data points should inform whether expanding cultivation capacity, through additional licenses or increased canopy allowances, would benefit the market. We recommend that the VA CCA engage in data collection planning efforts that are informed by this research to ensure all necessary data is collected in the necessary format, during the necessary timeframes.

We further recommend allowing cultivators to scale into higher licensing tiers when they can demonstrate that their existing capacity is approaching full utilization and that licensee sale data supports expansion. This approach would provide opportunities for businesses to grow while preserving a role for smaller cultivators during initial market implementation.

Pharmaceutical Processor Cultivation Capacity

Similar to the retail licenses, stand-alone cultivation licenses and microbusiness licenses will not represent all cultivation capacity available within Virginia's adult-use market. Existing pharmaceutical processors will also contribute cultivation capacity and need to be considered when estimating the amount of stand-alone cultivation capacity necessary to serve projected demand. Virginia's five pharmaceutical processors are each subject to an aggregate cultivation canopy limit of 70,000 square feet across their cultivation facilities. Collectively, this represents up to 350,000 square feet of authorized indoor canopy outside the stand-alone cultivation license structure and microbusiness. Importantly, this capacity serves the combined medical and adult-use market if pharmaceutical processors exercise dual-use privileges and therefore should not be interpreted as 350,000 square feet of newly available adult-use canopy. The amount of pharmaceutical processor production ultimately available to adult-use consumers will depend on existing medical-market utilization, future medical demand, and the extent to which processors expand or reallocate production following implementation of dual-use sales. These figures are unable to be predicted. The amount of pharmaceutical processor capacity available to the adult-use market will be important indicators for evaluating total cultivation capacity after market launch.

Cultivation Canopy Limits

The 2026 legislation directs the CCA to analyze and identify any necessary adjustments to canopy limits for marijuana cultivation facility licensees and to provide updated findings in 2027 and 2028. Because the 2026 report precedes the launch of Virginia's adult-use market, the current analysis is necessarily limited

to the cultivation capacity established in statute, projected adult-use demand, and available information from the existing medical cannabis market. The 2027 and 2028 reports will provide an opportunity to evaluate canopy limits using observed adult-use cultivation, production, inventory, and sales data.

Current Canopy Structure

As described in the preceding section, Virginia's adult-use cannabis framework establishes five cultivation tiers with maximum authorized canopy ranging from 5,000 square feet for Tier I facilities to 35,000 square feet for Tier V facilities. Tier I and Tier II cultivation may occur indoors or outdoors, while Tier III through Tier V cultivation is limited to indoor production. The tier structure results in substantial differences in potential capacity across cultivation licenses. At the statutory maximum, a Tier V facility may operate seven times the canopy authorized for a Tier I facility, while a Tier IV facility may operate five times the Tier I maximum. As a result, cultivation capacity depends not only on the number of licenses issued but also on how those licenses are distributed across tiers. Importantly, these limits establish maximum authorized canopy rather than required operating canopy. A licensee is not required to immediately develop or cultivate the full amount of canopy available under its license. The amount of capacity that ultimately becomes operational will depend on facility development, capital availability, production strategy, market demand, and other business conditions. The Board also retains authority to adjust authorized canopy within the statutory tier limits based on market demand, utilization rates, sales, product transfers, inventory, and licensing activity. Virginia's framework therefore provides a mechanism for cultivation capacity to respond to market conditions as operational data become available.

Stand-alone cultivation facilities will also represent only a portion of total adult-use cultivation capacity. Microbusinesses may conduct cultivation within the limits applicable to that license type, and pharmaceutical processors exercising dual-use privileges may also contribute production to the adult-use market. These sources of production must be considered alongside stand-alone cultivation facilities when evaluating total market capacity.

Limitations of Pre-Market Canopy Analysis

The primary limitation of this analysis is that there is no information regarding how much authorized canopy future adult-use cultivators will use nor how much square footage is needed to produce indoor or outdoor plants. The existing canopy limits establish the maximum amount of cultivation space available to each licensee but do not indicate how much of that capacity will be developed or actively cultivated once businesses begin operating. This distinction is particularly important during the initial market period. Developing cultivation capacity requires substantial investment in facilities, equipment, labor, utilities, and working capital. Some cultivators may not have the capital or operational capacity to immediately develop their full authorized canopy, while others may intentionally phase production as they establish operations and evaluate wholesale demand. As a result, a license authorizing 25,000 square feet of canopy does not establish that 25,000 square feet will be actively cultivated when the facility begins operating.

Canopy utilization is unknown prior to market launch. A market with a relatively large amount of authorized canopy may initially operate at a substantially lower level of actual cultivation if licensees have not fully developed their facilities. Conversely, production may increase over time without any change to the number of licenses or statutory canopy limits as existing businesses expand toward their authorized capacity or become more efficient. Canopy also does not provide a direct measure of production.

Cultivators using the same amount of flowering canopy may produce different harvest volumes depending on cultivation methods, harvest frequency, plant density, genetics, environmental conditions, and operating efficiency. Maximum square footage alone cannot establish how much cannabis will ultimately enter the regulated market.

An additional limitation is that cultivation license quantity and canopy limits are interdependent components of market capacity. Estimating the number of cultivation licenses necessary to serve projected demand requires an assumption regarding the amount of production capacity represented by each license. Under Virginia's tiered structure, that capacity is determined in substantial part by the canopy available within each cultivation tier. Changing canopy limits would therefore change the number and combination of cultivation licenses necessary to provide the same amount of potential market capacity. This relationship makes it difficult to independently recommend both cultivation license quantities and changes to canopy limits before the market becomes operational. For example, a market structure consisting of a smaller number of licenses with larger canopy allowances could provide similar aggregate authorized capacity as a structure consisting of a larger number of licenses with smaller canopy allowances. Without observed information regarding how much canopy businesses actually utilize and how much cannabis they produce from that canopy, there is not yet an empirical basis for determining whether differences in projected cultivation needs should be addressed through the number of licenses issued, the amount of canopy authorized per license, or some combination of the two. For this reason, the 2026 cultivation license analysis requires a defined canopy structure as an analytical starting point. CPPC therefore evaluates cultivation license needs using the existing canopy limits rather than simultaneously modifying the capacity represented by each license. This allows the analysis to estimate the number and combination of cultivation licenses necessary under a consistent set of capacity assumptions while preserving the ability to evaluate the underlying canopy limits once actual utilization and production data become available.

Several additional components of total cultivation capacity are also unknown. The extent to which microbusinesses will utilize their available cultivation canopy, as well as the production contributed by dual-use pharmaceutical processors, will not be fully observable until the adult-use market becomes operational. These sources of production may reduce the amount of cultivation capacity that must be supplied through stand-alone cultivation facility licenses. Taken together, these limitations make it difficult to determine whether the existing canopy limits provide excess, insufficient, or generally appropriate capacity before adult-use cultivation begins. An adjustment in 2026 would require assumptions regarding canopy utilization, cultivation productivity, and the relationship between license quantity and capacity that cannot yet be evaluated against observed Virginia market performance.

CPPC does not recommend adjusting the existing canopy limits prior to market launch. This finding should not be interpreted as evidence that the current limits represent the appropriate long-term level of cultivation capacity. Rather, the available evidence does not indicate that an adjustment is warranted before actual canopy utilization, production, and market demand can be observed. The 2026 cultivation license analysis uses the existing tier limits to estimate potential authorized capacity under different license configurations. These estimates provide a consistent basis for evaluating initial cultivation license needs but should not be interpreted as forecasts that all licensed cultivators will immediately operate at their maximum authorized canopy. The 2027 and 2028 analyses will provide a stronger basis for evaluating both components of the cultivation structure together: how much capacity should be available under each license and how many licenses are necessary to support market demand?

Framework for 2027 and 2028 Analysis

The 2027 and 2028 reports will provide an opportunity to evaluate canopy using observed market data rather than maximum statutory capacity alone. Once cultivation facilities become operational, the analyses can examine whether cultivators are using the capacity already available to them and whether the resulting production is generally aligned with downstream demand.

Canopy utilization should be a central component of this analysis. At the license level, actual flowering canopy can be compared with authorized canopy to determine how much available capacity is actively being used. Utilization can then be evaluated by cultivation tier and statewide to determine whether unused capacity remains within the existing licensing structure. However, utilization should not be interpreted independently. Low utilization may indicate that the market has substantial unused cultivation capacity, but it may also reflect businesses that remain under development, have found a business optimal point of supply at a given price level, or are gradually increasing production. Similarly, high utilization does not necessarily indicate insufficient canopy if existing cultivators are producing enough cannabis to meet market demand. Production and market conditions must therefore be evaluated alongside canopy utilization. If cultivators are consistently operating near their authorized limits while inventories remain low and downstream demand exceeds available production, those conditions may indicate that additional cultivation capacity should be evaluated. Conversely, if substantial authorized canopy remains unused, inventories increase, or production grows more quickly than downstream demand, the existing structure may contain sufficient capacity without an adjustment to canopy limits.

The analysis should also distinguish between increases in production resulting from greater canopy utilization and increases resulting from improved cultivation efficiency. A market may increase production substantially without increasing authorized canopy if existing cultivators use a greater proportion of available capacity or produce more cannabis from each square foot of utilized canopy. Because of this, no single utilization rate or production measure should be treated as a stand-alone indicator that canopy limits are too high or too low. The 2027 and 2028 analyses should evaluate canopy utilization alongside production, inventory, product transfers, wholesale and retail sales, prices, and licensing activity. Together, these measures will provide a more complete assessment of whether cultivation capacity is generally aligned with Virginia's adult-use market.

Data Needed to Evaluate Canopy Limits

Future analysis will require data that distinguish authorized capacity, utilized capacity for growing for each stage of the plant lifecycle (e.g., sq ft used for immature vs. mature plants), grow type (indoor versus outdoor), and actual production and allow each measure to be evaluated against downstream market demand. At a minimum, the CCA should be able to identify the amount of canopy authorized for each cultivation facility, the amount of flowering canopy actually in use, and the amount of cannabis produced from that canopy. These data should be maintained at the license level so that utilization and productivity can be evaluated across cultivation tiers and aggregated statewide. Future analysis should also incorporate harvest frequency and harvested weight, average THC potency of plant material, plant inventory, cultivator inventory, cultivation transfers, and production per square foot of utilized canopy. These measures will allow the CCA to determine whether changes in supply reflect additional canopy entering production, increased use of existing capacity, or changes in cultivation productivity.

The 2026 report therefore establishes the baseline for future canopy analysis rather than a final determination regarding the appropriate long-term limits. Current canopy limits provide a consistent basis for estimating potential capacity during the initial licensing analysis, while the collection of utilization, production, inventory, transfer, sales, and pricing data will allow future reports to evaluate actual market performance. Once these data are available, the 2027 and 2028 analyses can determine whether production remains aligned with demand and whether changes to the existing canopy structure warrant consideration.

Manufacturing License Analysis

Manufacturing represents a distinct component of the cannabis supply chain, as manufacturers may engage in substantially different activities and operate at varying scales. Manufacturing decisions are influenced by the expected costs of raw plant material and the anticipated sale price of finished products. Unlike retail and cultivation, manufacturing licenses are not associated with a consistent or standardized unit of production capacity. Similarly, the raw plant material used in manufacturing varies considerably in terms of cultivation methods, quality, grade, and THC potency, all of which can influence wholesale prices and processing yields. These differences make it difficult to establish a consistent relationship between consumer demand, raw material inputs, and manufacturing capacity. Consequently, this analysis does not estimate a specific range of manufacturing licenses for Virginia. Instead, it examines manufacturing's role within the cannabis supply chain, the limitations of applying a demand-based licensing model, manufacturing market development in comparison states, and key considerations for establishing a potential license limit.

Role of Manufacturing in the Cannabis Supply Chain

Manufacturing serves as an intermediate stage between cultivation and retail, transforming cannabis into concentrates, infused products, and other finished or intermediate products. However, manufacturing can encompass substantially different activities. Some manufacturers may conduct extraction, converting cannabis plant material into concentrates through various extraction processes. The resulting extract may be sold as a finished product or used as an ingredient in another cannabis product. Other manufacturers may not conduct extraction at all. Instead, they may purchase extract from another licensed processor and use it to produce edibles, vape products, or other infused products. A facility may also conduct multiple stages of processing within the same operation. As a result, manufacturing businesses can differ substantially in their inputs, equipment, facility requirements, production processes, and output.

Given the wide range of activities within the manufacturing sector, it is more prone to specialization to maximize comparative advantage (i.e., maximizing profits by doing what the business does best rather than engaging in less efficient business activities). An extraction facility processing large quantities of plant material represents a different operation from a manufacturer purchasing prepared extract and using it to produce finished products, even though both participate in the manufacturing portion of the supply chain. The amount and type of manufacturing activity required within the market will also depend on consumer product preferences. Demand for flower requires relatively little additional processing, while demand for concentrates, vape products, edibles, and other manufactured products creates additional processing requirements. Manufacturing needs may change as consumer purchasing shifts among product categories.

Why Manufacturing Should Not Be Modeled Like Retail or Cultivation

The economic rationale for establishing numerical licensing targets differs considerably across cultivation, retail, and manufacturing activities. For cultivation, consumer demand can be translated into physical production requirements, allowing regulators to evaluate the amount of licensed cultivation capacity necessary to supply the market while considering the economic implications of overproduction and undersupply. For retail, licensing decisions directly influence geographic accessibility, consumer participation in the regulated market, and the distribution of sales across establishments. Accordingly, both license types have measurable relationships to consumer demand that can inform regulatory planning.

Manufacturing, however, serves a different economic function. As a specialized, value-added segment of the supply chain, manufacturing encompasses a diverse range of production activities, technical capabilities, and product formulations. Similar to cannabis testing laboratories, the economic contribution of manufacturing businesses is not adequately represented by the number of licensed establishments alone. Rather, these businesses compete through specialized expertise, technological capabilities, product innovation, and the provision of services to other licensed operators. Imposing a numerical limit on manufacturing licenses could therefore restrict entry by qualified and innovative businesses without providing a corresponding benefit to consumer accessibility or the management of primary cannabis supply.

For these reasons, while cultivation and retail licensing capacity can be meaningfully evaluated in relation to estimated consumer demand, we do not recommend establishing a predetermined numerical ceiling for manufacturing licenses. Instead, manufacturing market entry should be governed by technical qualifications, regulatory compliance, and commercial demand, allowing specialized businesses to develop in response to the evolving needs of Virginia's adult-use cannabis industry.

Economic and Regulatory Considerations of Manufacturing Caps

A manufacturing license cap primarily determines how many businesses may enter the processing market rather than establishing a defined limit on total processing capacity. The effect of a cap will therefore depend on the scale, specialization, and utilization of the businesses operating under those licenses. A lower license limit may concentrate manufacturing activity among fewer operators. Where those businesses have sufficient capacity, a relatively small number of manufacturers may still support substantial market activity. However, limited processing capacity could create constraints if cultivation output or consumer demand for manufactured products grows faster than existing manufacturers can accommodate. A higher limit provides additional opportunities for market entry and may support greater specialization among extractors, infused-product manufacturers, and other processors. At the same time, additional licenses do not necessarily produce proportional increases in manufacturing capacity because individual businesses may differ substantially in size and output. License quantity also has implications for competition and regulatory oversight. Fewer manufacturers may result in greater dependence on individual processors within the supply chain, while a larger number of businesses may distribute manufacturing activity across more operators. Additional licensees also increase the number of facilities subject to licensing, inspections, product compliance requirements, and ongoing regulatory monitoring.

Following market launch, manufacturing transfers, processing volumes, product-category sales, facility utilization, and market concentration will provide a stronger empirical basis for evaluating manufacturing capacity. These measures can be used to determine whether available processing capacity is generally

aligned with market activity and whether future adjustments to manufacturing license availability should be considered.

Implications of License Levels

The retail and cultivation analyses presented in this report identify estimated ranges of license quantities that could support Virginia's projected adult-use cannabis market under different assumptions regarding consumer demand, regulated-market participation, business performance, and production capacity. These ranges are intended to reflect uncertainty in pre-market projections rather than identify a single license quantity at which the market would necessarily reach equilibrium. The implications of selecting license quantities within these ranges depend not only on market capacity, but also on the policy outcomes the CCA seeks to prioritize. Retail licensing decisions affect consumer access, competition, business conditions, and the geographic distribution of establishments, while cultivation licensing decisions affect production capacity, market participation, and the distribution of supply across different license tiers.

The following analyses evaluate the implications of different retail licensing levels and cultivation capacity allocations using quantitative market indicators and related policy considerations. These comparisons are intended to illustrate the conditions associated with different licensing approaches, rather than identify a single structure as optimal across all objectives. These comparisons are intended to illustrate the conditions associated with different licensing approaches, rather than identify a single structure as optimal across all objectives.

Retail License Range Tradeoff Analysis

Retail license quantity affects the amount of consumer-facing capacity available within the regulated market and the distribution of projected demand across retail establishments. The number of stand-alone retail licenses should also be considered in conjunction with retail capacity provided through microbusinesses and dual-use pharmaceutical processors. The analysis evaluates total potential retail access points rather than stand-alone retail licenses alone. Because the CCA plans to allocate stand-alone retail licenses through regional lotteries, these tradeoffs are evaluated both statewide and within the individual regions used for licensing. Regional allocation provides a mechanism for aligning retail capacity more directly with projected demand and access needs across different areas of the Commonwealth.

The lower portion of the estimated range would distribute projected regulated demand across fewer retail access points. Under this structure, projected demand per establishment would be higher, all else held constant, and a smaller number of stand-alone retailers would enter the regulated market during the initial licensing period. Moving toward the higher portion of the range would distribute the same projected market demand across a larger number of retail establishments, increasing potential consumer access while reducing projected demand per establishment. The appropriate position within the estimated retail range will depend in part on the market outcomes the CCA seeks to prioritize within each licensing region. A lower allocation may provide a larger potential customer base and greater projected sales opportunity for each establishment, which may support business viability during the initial market period. However, fewer retailers may also reduce competitive pressure and leave consumers with fewer purchasing options, particularly in geographically large regions where establishments are dispersed across substantial distances. Moving toward the higher portion of a regional range may support different

objectives. A larger number of independently operating retailers can increase opportunities for competition on price, product selection, service, and convenience and may improve the ability of the regulated market to compete with unregulated sources. Additional licenses may also allow retail establishments to be distributed across more communities within a region rather than concentrated around a limited number of population centers. These outcomes are not determined by license quantity alone, however. Ownership concentration, local land-use decisions, license activation, and the specific locations selected by successful businesses will continue to influence actual consumer access and competition.

There is also a potential tradeoff between competition and individual business performance within each region. If the number of retail establishments substantially exceeds the level of demand available within a regional market, projected sales will be divided across a larger number of businesses, particularly as businesses compete for consumers. Increased competition may benefit consumers through lower prices, greater choice, or improved service, but sufficiently low sales per establishment may also contribute to business closures, delayed activation, and consolidation. Conversely, allocating too few licenses may support stronger revenues per establishment while limiting competition or consumer choice. The preferred allocation therefore depends on the balance the CCA seeks to achieve among consumer access, competition, pricing, regulated market participation, and business stability.

The regional lottery structure provides the CCA with an additional mechanism for managing these tradeoffs. Rather than relying on a statewide license total and allowing businesses to determine where retail capacity develops, the CCA can establish different license quantities across regions based on projected cannabis demand and population characteristics. This approach can help prevent the statewide license count from disproportionately concentrating retail capacity in the most commercially attractive areas while other regions remain comparatively underserved. It also allows the appropriate level of retail competition to differ across regions rather than assuming that a single retailer-to-population or retailer-to-demand ratio is optimal throughout Virginia. However, regional allocation does not eliminate the possibility of within-region-clustering. Retailers can still be expected to favor locations with larger population bases, higher traffic volumes, stronger commercial activity, and greater anticipated consumer demand. As a result, establishments may cluster around population centers, major transportation corridors, or near the boundaries of adjacent licensing regions where a business may be positioned to draw consumers from more than one market area. The regional lottery structure provides greater control over the broad geographic distribution of licenses, but it does not by itself ensure even distribution of storefronts within each region. Post-launch monitoring of actual store locations, travel distances, and retail density within regions will remain important for determining whether the licensing structure is producing the intended access outcomes.

For Virginia, the regional retail capacity indicators provide a consistent framework for comparing how projected demand and consumer access would be distributed across the four licensing regions under different license scenarios. Projected demand per retail access point and retail access points per 100,000 adults age 21 and older should not be interpreted as requiring identical values across regions. Differences may be appropriate where population distribution, geographic size, projected cannabis demand, or access objectives justify different levels of retail capacity. Rather, these measures allow the CCA to identify where proposed allocations would create materially different market conditions and determine whether those differences are consistent with its policy goals related to competition, consumer access, regulated-market participation, and business viability. Following market launch, these modeled indicators can be supplemented with observed store locations, sales, license activation, travel distance, and within-region

retail density to evaluate whether the regional licensing structure is producing the intended distribution of retail access.

Cultivation License Range Tradeoff Analysis

The cultivation licensing scenarios presented in this report evaluate different distributions of authorized canopy across cultivation tiers and microbusinesses while maintaining a consistent estimated production requirement. Although these scenarios provide comparable aggregate capacity, the distribution of that capacity may create different market conditions. The implications of different cultivation licensing approaches should be evaluated not only in relation to potential production capacity, but also their effects on market competition, business viability, production efficiency, and opportunities for market participation.

The distribution of cultivation capacity across a larger number of independently operating businesses may increase competition among suppliers and reduce the concentration of production within the market. Greater competition could place downward pressure on wholesale cannabis prices as cultivators compete for processor and retailer demand. Depending on downstream market conditions, lower wholesale prices may contribute to lower retail prices, potentially improving the regulated market's ability to compete with unregulated sources. However, the relationship between license quantity and competition is not necessarily direct. Ownership concentration, differences in production capacity, and the distribution of actual sales across cultivators will ultimately influence the degree of competition within Virginia's cultivation market.

Conversely, allocating a greater proportion of cultivation capacity to larger facilities may provide opportunities for economies of scale, allowing cultivators to achieve lower production costs through more efficient operations. A market composed primarily of smaller cultivators and microbusinesses may support broader business participation but could also result in higher average production costs and greater financial pressures on individual operators. Microbusinesses face additional considerations associated with vertical integration, as businesses must establish operations across multiple portions of the supply chain. While this structure may provide opportunities to capture value through direct retail sales, it may also create additional capital and operational requirements that influence business viability. The ultimate effect on prices and market stability will depend on the interaction between production efficiency, market concentration, operating costs, and downstream demand rather than the number of licenses alone.

Different licensing allocations may also influence the resilience of the regulated supply chain. Concentrating a substantial portion of cultivation capacity among fewer, larger operators may increase the market consequences of operational disruptions or changes in production decisions at individual facilities. Alternatively, distributing production across a larger number of businesses may reduce reliance on individual suppliers while introducing greater variation in production efficiency, operational readiness, and business performance. These considerations are particularly relevant during initial market implementation, when licensed businesses may enter production at different rates and operate below their maximum authorized capacity.

The appropriate allocation of cultivation licenses therefore involves balancing competing policy objectives rather than identifying a single configuration that is optimal across all outcomes. A licensing structure designed to maximize competition and small-business participation may differ from one emphasizing production efficiency, business stability, or regulatory manageability. The CCA should

evaluate these tradeoffs alongside the potential risks of excess or insufficient production, recognizing that authorized canopy does not necessarily translate into equivalent operating capacity. As Virginia's adult-use market develops, observed market conditions will provide a stronger empirical basis for determining whether the initial distribution of cultivation capacity is achieving the Commonwealth's policy objectives.

Public Health and Safety Implications

License quantity may affect public health and safety indirectly through the market conditions that licensing decisions help create. Retail availability, product access, price, regulated-market participation, product potency, and competition may all be influenced by the number and distribution of licensed businesses. These relationships are interconnected, and the available evidence does not provide a basis for predicting a specific public health outcome from a particular number of Virginia retail or cultivation licenses. Because of this, the public health implications of licensing are better evaluated through the conditions that different licensing structures may produce than through license quantity alone.

Retail availability represents one potential pathway between licensing and public health. Greater availability can reduce the time and distance required for consumers to access regulated cannabis, but higher concentrations of retail establishments may also increase exposure to cannabis retail environments and make cannabis purchasing more convenient. Existing research generally indicates that greater physical access to cannabis retailers is associated with some measures of more frequent adult cannabis use and cannabis-related healthcare utilization, although findings vary across populations and outcomes and do not establish a specific retailer-density threshold at which harms occur.[10] Retail access should be evaluated in relation to both statewide capacity and geographic distribution. A statewide number of stores that appears reasonable in aggregate may produce substantially different public health conditions depending on whether those stores are broadly distributed or concentrated within particular communities.

At the same time, sufficient access to licensed businesses is necessary for the regulated market to compete with existing unregulated sources. Consumers who face greater travel distances, inconvenience, or substantial price differences may continue purchasing cannabis outside the regulated system. Research from legal cannabis markets indicates that proximity to legal retailers is associated with greater use of legal storefronts and that price and convenience remain important barriers to regulated-market participation.[11,12] The number of participating businesses may also influence the ability of the regulated market to compete on price. A licensing structure with too few market participants may limit competitive pressure among retailers, while a sufficient number of businesses can provide greater opportunity for competition on price, product selection, convenience, and service. Because price is an important consideration in consumer purchasing decisions, maintaining competitive conditions may therefore be relevant to encouraging consumers to purchase through the regulated market rather than from lower-cost unregulated sources. However, license quantity alone does not determine competition; geographic distribution, ownership concentration, operating costs, taxation, and other market conditions also influence retail prices and consumer choice. This suggests that reducing unregulated-market participation does not necessarily require maximizing retail density. Rather, a licensing structure must provide sufficient physical access and sufficient market participation to support competitive conditions, while

[10] Cantor, N., et al. "The association between physical availability of cannabis retail outlets and frequent cannabis use and related health harms: a systematic review." *The Lancet Regional Health – Americas* 32 (2024): 100708.
[11] Wadsworth, E., et al. "Proximity to Legal Cannabis Stores in Canada and Use of Cannabis Sources in the First Three Years of Legalization, 2019–2021." *Journal of Studies on Alcohol and Drugs* 84, no. 6 (2023): 852–862.
[12] Goodman, S., Wadsworth, E., & Hammond, D. "Reasons for Purchasing Cannabis From Illegal Sources in Legal Markets: Findings Among Cannabis Consumers in Canada and U.S. States, 2019–2020." *Journal of Studies on Alcohol and Drugs* 83, no. 3 (2022): 392–401.

avoiding unnecessary geographic concentration or levels of retail capacity that substantially exceed consumer demand.

Regulated market participation also has implications for product safety. Cannabis sold through licensed businesses is subject to testing, labeling, tracking, and other regulatory controls that do not apply to products obtained through unregulated supply chains. Evidence from the EVALI outbreak illustrates the potential importance of this distinction. States with operational adult-use markets experienced lower EVALI case rates than prohibition states, although the observational nature of the evidence prevents a causal conclusion.[13] This relationship provides an example of how the public health effects of retail access may operate in competing directions: increased access may increase exposure to cannabis products generally, while access to regulated products may reduce exposure to some hazards associated with unregulated production and distribution. Price creates a similar tradeoff. Increased supply and competition may reduce regulated cannabis prices, which can improve the ability of licensed businesses to compete with unregulated sellers. Lower prices, however, may also increase the quantity of cannabis purchased. Evidence from British Columbia indicates that regulated cannabis demand is price responsive, with lower prices associated with increased quantities purchased.[14] Price should be treated as both a market performance indicator and a public health indicator. A market in which regulated products remain substantially more expensive than unregulated alternatives may have difficulty transitioning consumers into the licensed system, while substantial price compression may increase overall purchasing or consumption.

Product potency and product composition represent an additional public health consideration. The available literature indicates that use of higher-potency cannabis is associated with greater risk of cannabis use disorder and some other adverse mental health outcomes, although the strength and certainty of the evidence varies.[15,16] This distinction is important because the public health implications of market expansion depend not only on the total amount of cannabis sold but also on the types of products available and the concentrations of THC contained in those products. Cultivation capacity may indirectly affect this product environment. When cultivation output substantially exceeds demand for cannabis flower, additional biomass may be available for processing into extracts, concentrates, and other manufactured products. From an economic perspective, lower-cost or excess plant material may increase the viability of processing cannabis into higher-value manufactured products. The existing literature does not establish that greater cultivation capacity directly causes increased production or consumption of high-potency products, and this report does not assume such a causal relationship. However, the potential relationship between upstream production, wholesale prices, manufacturing activity, and downstream product potency represents an important market condition for the CCA to monitor.

This consideration is particularly relevant because cultivation oversupply may affect public health through pathways that are not apparent from canopy or plant counts alone. Excess production may place downward pressure on wholesale prices, alter the relative economics of flower and manufactured products, and contribute to changes in the product mix available to consumers. Given the association

[13] Wing, C., Bradford, A. C., Carroll, A. E., & Hollingsworth, A. "Association of State Marijuana Legalization Policies for Medical and Recreational Use With Vaping-Associated Lung Disease." *JAMA Network Open* 3, no. 4 (2020): e202187.
[14] Dodd, T., Colistro, T., & Maillet, M. A. "Price elasticity of demand for cannabis: post-legalization estimates of the regulated cannabis market in British Columbia, Canada." *International Journal of Drug Policy* 142 (2025): 104838.
[15] Petrilli, K., et al. "Association of cannabis potency with mental ill health and addiction: a systematic review." *The Lancet Psychiatry* 9, no. 9 (2022): 736–750. PubMed
[16] Lake, S., et al. "High-Potency Cannabis Use and Health: A Systematic Review of Observational and Experimental Studies." *American Journal of Psychiatry* 182, no. 7 (2025): 616–638.

between higher-potency cannabis use and cannabis use disorder, future assessments of cultivation capacity should consider not only whether production is sufficient to meet demand, but also how production levels relate to inventory accumulation, wholesale pricing, manufacturing transfers, product-category sales, and THC potency.[17,18]

Overall, the public health implications of licensing involve competing considerations. Insufficient retail access or comparatively high regulated prices may reduce participation in the licensed market and preserve reliance on unregulated sources. Conversely, very high retail availability, substantial price compression, or changes in product composition toward higher-potency products may increase other forms of public health risk. The available evidence does not support identifying either the lower or higher portion of Virginia's estimated license ranges as preferable based on public health outcomes alone. Rather, licensing decisions should be evaluated in conjunction with the market conditions they produce. Following market launch, future analyses would benefit from monitoring retailer density and proximity, regulated and unregulated purchasing, retail and wholesale prices, frequency of use, product potency and product mix, cannabis use disorder indicators, cannabis-related healthcare utilization, poison-control events, impaired-driving indicators, cultivation output, inventory, and manufacturing transfers. Evaluating these measures alongside changes in licensing and market structure will provide a stronger Virginia-specific basis for assessing whether future adjustments to license quantities are associated with meaningful changes in public health and safety.

Regulatory Oversight Capacity

The number and timing of licenses issued will affect the scale of the regulated market and the administrative resources required to oversee it. Each operating establishment generates recurring regulatory responsibilities associated with licensure, inspections, compliance monitoring, inventory and seed-to-sale oversight, renewals, investigations, enforcement, and technical assistance. As a result, differences across the estimated licensing ranges represent not only differences in market capacity, but also differences in the size and complexity of the regulated population overseen by the CCA.

Regulatory workload is not expected to increase uniformly across license types. Retail establishments primarily require oversight of consumer-facing sales and operating requirements, while cultivation facilities require additional monitoring of canopy, plant inventory, harvests, transfers, and production activity. Processing facilities may require oversight of manufacturing processes, sanitation, product formulation, packaging, and other product-specific requirements. Microbusinesses will exercise privileges across multiple portions of the supply chain and therefore may generate oversight responsibilities associated with more than one type of activity. Consequently, the total number of licenses provides only a partial measure of regulatory workload; the composition of those licenses and the activities conducted under each license are also relevant. The regulatory implications of different licensing structures need to be considered in relation to the CCA's implementation priorities. Market structures capable of providing similar levels of retail access or production capacity may require substantially different levels of regulatory effort. For example, distributing cultivation capacity across a larger number of smaller operators may increase the number of businesses requiring application review, inspections, renewals,

[17] Petrilli, K., et al. “Association of cannabis potency with mental ill health and addiction: a systematic review.” *The Lancet Psychiatry* 9, no. 9 (2022): 736–750. PubMed
[18] Lake, S., et al. “High-Potency Cannabis Use and Health: A Systematic Review of Observational and Experimental Studies.” *American Journal of Psychiatry* 182, no. 7 (2025): 616–638.

compliance monitoring, and technical assistance, while concentrating comparable capacity among fewer larger operators may reduce the number of regulated entities. Fewer licensees, however, do not necessarily correspond to simpler oversight.

The timing of license issuance presents an additional implementation consideration. Issuing a larger number of licenses during the initial market period would concentrate application review, eligibility verification, facility onboarding, inspections, and compliance activity within a relatively short period of time. This approach would make more market capacity available earlier but would require the CCA to establish and apply regulatory procedures across a larger regulated population while the adult-use program is still developing. A phased approach would distribute some of this initial workload over a longer period and provide an opportunity to incorporate operational experience and observed market data into subsequent licensing decisions. However, repeated licensing rounds also create recurring administrative responsibilities associated with application intake, evaluation, selection, and onboarding. The relative workload associated with either approach therefore depends on both the number of licenses issued and the cadence through which they enter the market. Accordingly, the preferred pace of licensing may differ depending on the CCA's objectives for initial implementation. If rapid development of regulated capacity and consumer access is prioritized, issuing more licenses earlier may be appropriate but would require sufficient staffing, inspection capacity, information systems, and compliance infrastructure to support that expansion. If the CCA instead prioritizes a more controlled initial implementation, phased licensing may allow regulatory capacity and market activity to develop together and provide an opportunity to identify operational issues before additional businesses enter the market. Neither approach is inherently preferable from an oversight perspective; the relevant consideration is whether the licensing strategy is aligned with the regulatory resources and level of implementation risk the CCA is prepared to manage.

These considerations are particularly important during the initial period of adult-use implementation because regulatory systems, inspection procedures, seed-to-sale monitoring, and compliance practices will be operating within a new and substantially larger market structure. The existing medical cannabis program provides Virginia with regulatory experience and an operational foundation, but the adult-use framework will introduce additional license categories, businesses, and supply-chain relationships. Accordingly, the regulatory implications of initial licensing should be evaluated in relation to the number and types of establishments expected to become operational, rather than the statutory number of licenses available alone. Following market launch, administrative data will provide a stronger basis for evaluating the relationship between licensing levels and regulatory workload. Relevant measures include the number of issued and active licenses by type, application and renewal volumes, application processing times, inspection frequency and duration, compliance findings, enforcement activity, technical assistance requests, license activation timelines, and staff time associated with different regulatory functions. These measures can be evaluated alongside changes in the regulated population to determine whether increases in licensing activity are accompanied by meaningful changes in administrative workload or regulatory performance.

Overall, the regulatory implications of licensing depend on both the scale and structure of the market. Higher licensing levels would increase the number of businesses subject to ongoing oversight, while lower licensing levels would reduce the initial regulated population but would not necessarily eliminate the need for future licensing rounds as demand develops. As with other licensing considerations evaluated in this report, the appropriate approach will depend in part on the outcomes the CCA seeks to prioritize. A structure intended to maximize the speed of market development may create different administrative requirements than one intended to emphasize phased implementation and regulatory manageability.

Continued monitoring of administrative workload and market conditions will allow the CCA to evaluate whether future license expansion can be implemented while maintaining effective and consistent regulatory oversight.

Summary of Findings and Recommendations

Retail Licensing

The findings support retaining Virginia's statutory maximum of 350 stand-alone retail marijuana store licenses while considering a phased approach to initial license issuance. Based on the average sales performance of Virginia's existing medical cannabis dispensaries, the analysis estimates that projected consumer demand could support approximately 107 to 163 retail locations statewide. The upper end of this range (163 locations) may provide a reasonable reference point for initial retail capacity, particularly when considered alongside the broader licensing scenarios and the potential for additional demand from tourists and out-of-state consumers. The existing statutory maximum of 350 licenses is broadly consistent with the upper bound of the higher-capacity licensing scenario (326 locations), preserving the CCA's flexibility to expand the regulated retail market as demand develops. Importantly, the estimated retail ranges represent potential market capacity rather than the number of stand-alone retail licenses that must be issued. Microbusinesses and pharmaceutical processors exercising dual-use privileges will provide additional consumer-facing retail locations outside the 350-license maximum. The CCA should therefore consider the anticipated contribution of these establishments when determining the number of stand-alone retail licenses to make available. Initial licensing decisions should also account for projected regional demand, geographic accessibility, competition, and the potential implications of different licensing levels for business sustainability.

Virginia's planned regional lottery structure provides an opportunity to distribute retail licenses in relation to projected demand across the Commonwealth's four licensing regions. However, regional allocation alone will not ensure equitable geographic access, as individual establishment locations will also be influenced by local market conditions and business decisions. Following market launch, observed retail sales, license activation, geographic distribution, market concentration, and regulated-market participation should inform subsequent licensing decisions. Retaining the statutory maximum while issuing licenses in phases would allow the CCA to respond to market growth without requiring the full amount of authorized retail capacity to enter the market during the initial licensing period.

Cultivation Licensing

The cultivation analysis estimates that approximately 503,932 square feet of indoor cultivation canopy would be necessary to accommodate Virginia's projected adult-use demand under the modeling assumptions evaluated. This estimate is based on observed medical-market harvest activity, assuming one square foot per plant and four harvest cycles annually. Because the existing medical market does not provide sufficient information to establish production equivalencies between indoor and outdoor cultivation, the analysis evaluates initial cultivation licensing scenarios using maximum potential indoor production capacity. This approach provides a consistent framework for allocating cultivation capacity while reducing the risk of authorizing supply substantially exceeding projected demand. However, the amount of actual production entering the adult-use market will depend on cultivation methods, canopy utilization, production efficiency, and market conditions.

The findings support evaluating different combinations of cultivation licenses based on the CCA's objectives for competition, small-business participation, production efficiency, and market stability. Issuing three Tier V cultivation licenses may provide a reasonable starting point for initial market implementation, allowing for larger-scale production capacity while preserving opportunities for microbusinesses and smaller cultivation tiers. Under this approach, the equal-share and microbusiness-priority scenarios provide potential frameworks for distributing the remaining cultivation capacity. Because microbusinesses are required to be vertically integrated, their cultivation capacity is incorporated directly into the modeled licensing allocations rather than treated as additional production outside the stand-alone cultivation structure. The contribution of dual-use pharmaceutical processors, however, remains uncertain and may provide additional cultivation capacity beyond the modeled scenarios. Accordingly, the CCA should consider the potential production contributed by existing medical operators when determining the final number and distribution of cultivation licenses.

The findings support a phased approach to cultivation licensing that distinguishes between initial market needs and longer-term production capacity. The initial allocation should consider the importance of establishing Tier V and microbusiness licenses at market launch, while preserving opportunities for additional licensing and expansion into higher cultivation tiers as market conditions develop. Following market launch, observed canopy utilization, harvest volumes, inventory, wholesale prices, and downstream demand should inform whether additional cultivation licenses or adjustments to canopy limits are warranted. The CCA should proactively establish data collection and reporting processes informed by this analysis to ensure the necessary information is available to support future assessments in 2027 and 2028.

Manufacturing and Other Licensing

The analysis does not identify a sufficient market-based rationale for establishing a predetermined numerical limit on marijuana processing facility licenses. Unlike retail and cultivation, manufacturing represents a specialized, value-added segment of the cannabis supply chain in which businesses may differ substantially in their technical capabilities, product specialization, and operational scale. Establishing a numerical limit on manufacturing licenses could restrict entry by qualified businesses and reduce opportunities for specialization and product innovation without providing a corresponding benefit to managing primary cannabis supply or consumer access. Accordingly, manufacturing market entry should be governed primarily by technical qualifications, regulatory compliance, and commercial demand rather than a fixed numerical ceiling. Similar considerations apply to marijuana testing facilities, transporters, and delivery operators, which provide specialized services and support the operation of the regulated supply chain. As Virginia's market develops, the CCA should monitor manufacturing activity, product-category sales, processing volumes, transfers, and facility utilization to evaluate whether processing capacity is aligned with market demand. These indicators would provide a stronger empirical basis for assessing the manufacturing sector than license quantities alone.

Canopy Limits

The available evidence does not support adjustments to Virginia's existing cultivation canopy limits prior to the launch of the adult-use market. The current tier structure establishes defined maximum cultivation capacities and provides a consistent framework for estimating cultivation license requirements. However, authorized canopy does not necessarily represent utilized cultivation capacity or actual production. The amount of canopy future licensees, including microbusinesses, will utilize, their production efficiency, and

the additional cultivation capacity contributed by dual-use pharmaceutical processors remain uncertain. The existing canopy limits should therefore serve as the basis for initial cultivation licensing decisions, with adjustments evaluated as operational data become available. This finding should not be interpreted as establishing that the current limits represent the appropriate long-term cultivation structure. Rather, the pre-market analysis does not provide sufficient empirical evidence to determine whether changes to the existing limits would better align production capacity with consumer demand.

The CCA's subsequent analyses in 2027 and 2028 should evaluate actual canopy utilization and production alongside inventory, product transfers, wholesale and retail sales, and market demand. Particular attention should be given to distinguishing authorized canopy from actively utilized flowering canopy and the production generated from that capacity. These measures will allow the CCA to assess whether future capacity needs are better addressed through additional cultivation licenses, adjustments to canopy limits, or more efficient utilization of existing authorized capacity.

Initial Market vs Future Licensing Rounds

Virginia's statutory framework contemplates multiple rounds of licensing rather than requiring the full amount of potential market capacity to be authorized during the initial licensing period. This approach is reflected in several time-limited licensing provisions, including the restriction of no more than five Tier V cultivation licenses before January 1, 2028, and the authorization of up to 100 microbusiness licenses as part of the initial market rollout. These provisions establish limits on initial license issuance while preserving opportunities for the CCA to evaluate additional market entry as the adult-use industry develops.

The findings of this report support considering a phased approach to licensing that distinguishes between initial market needs and longer-term market capacity. Issuing a portion of licenses initially would preserve opportunities for additional market entry in subsequent rounds, allowing the CCA to assess whether further capacity is warranted based on observed market performance. However, the timing of license issuance must also account for the time required for businesses to develop facilities and begin operations, as issued licenses do not necessarily translate immediately into consumer access or production capacity. A phased licensing approach would also allow the CCA to consider the contribution of microbusinesses and dual-use pharmaceutical processors before authorizing additional stand-alone retail and cultivation licenses. Because these businesses may participate in multiple segments of the supply chain, their eventual operating capacity will influence the number of additional licenses necessary to support demand. Similarly, consumer purchasing behavior, geographic retail access, market competition, and demand from out-of-state consumers may evolve differently than projected during the pre-market analysis.

The CCA can evaluate the need for subsequent licensing rounds using the analytical framework established in this report, updated with observed information regarding regulated sales, sales per active retail location, license activation, geographic access, cultivation production, inventory, pricing, and market concentration. Public health and safety indicators and the regulatory resources necessary to oversee additional businesses should also inform future licensing decisions. The statutory requirement to update this analysis in 2027 and 2028 provides an opportunity to incorporate these measures into future determinations of market capacity. This approach would allow Virginia to balance initial market development with continued opportunities for business entry while preserving the flexibility to adjust license quantities as empirical evidence of adult-use market performance becomes available.

Conclusion

Virginia's transition to a regulated adult-use cannabis market presents a complex set of policy and implementation decisions. While the analysis presented in this report provides an empirical foundation for evaluating initial licensing needs, the development of the market will ultimately depend on how consumer demand, business participation, production capacity, and regulatory implementation interact over time. License quantities alone will not determine market outcomes. The distribution of licenses, the types of businesses authorized to operate, and the extent to which licensed establishments can effectively serve consumers will all influence the structure and performance of Virginia's regulated cannabis market.

The findings underscore the importance of establishing a licensing framework that balances initial market development with the flexibility to respond to changing conditions. As the adult-use market becomes operational, Virginia will have an opportunity to move beyond projections and evaluate how its regulatory structure performs in practice. Continued data collection and market evaluation will be essential to identifying emerging challenges, assessing whether licensing capacity remains aligned with demand, and informing future regulatory decisions. Ultimately, the value of the framework established through this analysis will lie not only in supporting the Commonwealth's initial licensing decisions, but also in providing a consistent, evidence-based approach to evaluating and adapting Virginia's cannabis market as it matures.

Appendix A. Comparative State Market and Regulatory Analysis

To provide additional context for Virginia's projected market and licensing analyses, CPPC conducted a targeted review of adult-use cannabis markets in Minnesota, Missouri, Maryland, Michigan, and New Jersey. Comparative state data are used to evaluate how different licensing structures have developed in operational adult-use markets and to provide external benchmarks for interpreting Virginia-specific findings. Comparative state data are not used as direct substitutes for Virginia-specific demand or market data, nor are license quantities in other states treated as estimates of the number of licenses Virginia should issue. Cannabis markets vary substantially in population, consumer demand, taxation, medical cannabis infrastructure, local government authority, home cultivation policies, vertical integration, market maturity, and the timing and structure of license issuance. As a result, similar license counts may produce vastly different market outcomes across states. Instead, comparative findings are used to assess whether Virginia's modeled ranges are reasonable within the broader context of observed adult-use markets and to identify market conditions associated with different regulatory approaches. The comparative review relies primarily on publicly available information published by state cannabis regulatory agencies, statutes and regulations, licensing dashboards, annual reports, market reports, and other government publications.

Comparator State Selection

The five comparator states were selected to provide variation in market maturity, licensing structure, market-entry approach, and integration of existing medical cannabis businesses. Collectively, the states provide examples of capped and uncapped licensing systems, phased and more open market expansion, vertically integrated and separately licensed supply chains, microbusiness participation, and differing approaches to cultivation capacity. The review is intentionally targeted rather than intended to represent every adult-use cannabis market in the United States.

Minnesota
Minnesota was selected because its adult-use licensing framework includes several structural features that are particularly relevant to Virginia's developing market. Like Virginia, Minnesota permits microbusinesses to participate in multiple parts of the cannabis supply chain, including cultivation, manufacturing, and retail, depending on the endorsements held. Minnesota's initial licensing structure placed numerical limits on stand-alone cultivator and retailer licenses while microbusiness licenses were not subject to the same numerical cap. This structure may make the microbusiness pathway particularly relevant when evaluating market development, because microbusinesses can provide additional cultivation and retail capacity outside the numerical limits applied to stand-alone license categories. Minnesota's microbusiness structure is useful for examining whether applicants use the more flexible microbusiness license to conduct activities that are otherwise subject to license limits. Minnesota also entered adult-use legalization with a comparatively limited medical cannabis market centered on two vertically integrated medical operators with multiple dispensing locations. Those existing operators have continued to participate in the adult-use market through integrated licensing, providing an additional parallel to Virginia's existing pharmaceutical processor structure. In particular, Minnesota provides an opportunity to examine how many microbusinesses ultimately elect to conduct cultivation or retail activities, how much capacity those businesses contribute relative to stand-alone licensees, and how that capacity interacts with limits placed on other license categories. Because Minnesota's adult-use market is also relatively new, it provides a useful comparison for evaluating early-stage license activation.

Missouri
Missouri was selected as a more established adult-use market operating under a comparatively limited licensing structure and serving a substantial rural population. Approximately 30.5% of Missouri's population was classified as rural in the 2020 Census, compared with 24.4% of Virginia's population, making Missouri particularly relevant to Virginia's consideration of geographic access outside major population centers.[19] Missouri transitioned its existing medical cannabis businesses into the adult-use market through comprehensive licenses and subsequently added a separate microbusiness licensing program. The state also maintains administrative controls over the number of comprehensive cultivation, manufacturing, and dispensary licenses while requiring geographic distribution of certain licenses. Missouri provides a valuable comparison for evaluating how a limited license market serves both urban and rural areas and how geographic allocation requirements interact with consumer access and regional market demand. Missouri also publishes market sales, licensing, and other regulatory data that allow license quantities to be evaluated alongside observed market activity.

Maryland
Maryland was selected because of its geographic proximity to Virginia and because its transition to adult-use cannabis began with an established medical cannabis market, providing a useful structural comparison for Virginia's planned transition. At the start of Maryland's adult-use market in July 2023, existing medical cannabis businesses that elected to convert were authorized to cultivate, process, or dispense cannabis for both medical patients and adult-use consumers. Maryland subsequently expanded the market through additional licensing rounds for standard and micro cultivation, processing, and dispensary licenses, with geographic allocation incorporated into the licensing structure. Maryland provides an applicable comparison for evaluating how a nearby state transitioned existing medical cannabis infrastructure into an adult-use market while introducing new market participants over time.

Michigan
Michigan was selected to provide a mature market comparison characterized by substantially greater licensing and production capacity. Michigan's adult-use market includes multiple cultivation classes, processors, retailers, and microbusinesses, and the state publishes recurring licensing and statistical reports that allow market development to be evaluated over time. Michigan provides a useful contrast to more restrictive licensing systems because its experience allows the analysis to examine market conditions under a relatively expansive licensing structure, including changes in license counts, sales, production, and consumer prices as the market has matured.

New Jersey
New Jersey was selected because it represents a large adult-use market with a population similar in size to Virginia's but uses a substantially different licensing approach. As of July 2025, New Jersey had an estimated population of approximately 9.55 million residents, compared with approximately 8.88 million in Virginia.[20] New Jersey does not currently establish a statewide numerical limit on cannabis business licenses and accepts applications on a rolling basis. The state licenses standard and microbusiness cultivators, manufacturers, and retailers and permits certain forms of vertical integration, while municipalities retain an important role in approving cannabis businesses. New Jersey therefore provides a valuable comparison for evaluating how a similarly sized state market develops under a system in which

[19] https://www.ncsl.org/elections-and-campaigns/voting-for-all-americans-rural-voters
[20] Census.gov

statewide license quantity is not managed through a fixed numerical cap and business entry can continue over time.

Comparative State Retail Licensing Benchmarks

CPPC examined retail licensing structures and market development in other states to provide additional context for evaluating Virginia's future retail licensing needs. The five states demonstrate substantial variation in how adult-use retail markets have been structured and expanded. Minnesota and Maryland establish numerical limits on stand-alone retail licenses, Missouri operates under a minimum licensing floor with authority to issue additional licenses, and Michigan and New Jersey do not have fixed statewide retail license caps. The states also differ in the extent to which existing medical operators, microbusinesses, and other license categories contribute additional retail capacity. These differences are important when comparing license counts across states.

Table A. Comparative Adult-Use Retail Licensing Benchmarks

State	Adult-Use Sales Launch	Retail License Structure	Existing Medical Retailers/Operators Transitioned to Adult-Use Sales at Launch	Current Active Adult -Use Retail Licenses	Other Retail-Capable License Types	Current Active Adult-Use Retail Locations	Geographic or Local Distribution Controls	Active Adult-Use Retail Locations per 100,000 Adults Age 21+
MN	Sept. 13, 2025[21]	150 cannabis retailer licenses; cap does not include all other retail-capable license types[22]	2 medical licensees; 16 converted medical retail locations[23]	16 stand-alone retail licenses[24]	Microbusinesses, mezzobusinesses, medical combination businesses, and municipal stores[25]	211[26]	No statewide allocation requirement; local governments may limit registrations to one per 12,500 residents[27]	4.94[28]

[21] https://mn.gov/ocm/media/news-releases/?id=1202-705993&
[22] Minn. Stat. § 342.14
[23] Minn. Stat. § 342.515, subd. 4
[24] https://mn.gov/ocm/data-reports/dashboards/cannabis-market-monitor.jsp
[25] Minn. Stat. § 342.14
[26] https://mn.gov/ocm/data-reports/dashboards/cannabis-market-monitor.jsp
[27] Minn. Stat. § 342.13(h)
[28] https://data.census.gov/table?q=%22age+by+sex%22+minnesota&g=040XX00US27

MO	Feb. 3, 2023[29]	No fixed maximum; minimum floor of 192 comprehensive/medical dispensary licenses[30]	196 existing medical dispensaries[31]	224 medical/adult-use retail licenses[32]	Microbusiness dispensaries[33]	227[34,35]	Minimum of 24 comprehensive/medical dispensaries per congressional district[36]; local jurisdictions may prohibit retail[37]	4.89[38]
MD	July 1, 2023[39]	Cap of 300 standard dispensary licenses[40]	98 existing medical dispensaries[41]	127[42]	Micro dispensaries are permitted but are delivery-only[43]	127[44]	Geographic allocation requirements apply[45]; local jurisdictions may not prohibit retail[46]	2.72[47]

[29] https://health.mo.gov/news/missouri-cannabis-facilities-cleared-cultivate-manufacture-and-dispense-products-adult?
[30] Mo. Const. art. XIV, § 1.3(17); art. XIV, § 2.4(2)
[31] https://health.mo.gov/news/missouri-cannabis-facilities-cleared-cultivate-manufacture-and-dispense-products-adult?
[32] https://health.mo.gov/business-professionals/cannabis-regulation/licensee-common-relationships?
[33] Mo. Const. art. XIV, § 2.4(4)
[34] Cunningham, G., Slade, M., Fox, S., & Khatun, M. (2026). *Missouri cannabis market study: Phase 1 report*. Cannabis Public Policy Consulting.
[35] Reflects licenses issued; Missouri does not publicly report active retail locations
[36] Mo. Const. art. XIV, § 2.4(2)
[37] Mo. Const. art. XIV, § 2.5(1)(a)-(b)
[38] https://data.census.gov/table?q=%22age+by+sex%22+missouri&g=040XX00US27
[39] https://cannabis.maryland.gov/pages/adult-use-cannabis-implementation.aspx
[40] Md. Code, Alcoholic Beverages & Cannabis § 36-401(d)(1)(iii), (d)(2)(iii)
[41] https://cannabis.maryland.gov/Documents/2025_PDF_Files/Reports%202025/2025%20Maryland%20Cannabis%20Use%20Biannual%20Study%20Summary%20Report%20-%20vF1.pdf?
[42] https://cannabis.maryland.gov/Pages/Data-Dashboard.aspx
[43] Md. Code, Alcoholic Beverages & Cannabis § 36-401(c)(2)(iii)
[44] https://cannabis.maryland.gov/Pages/Data-Dashboard.aspx
[45] Md. Code, Alcoholic Beverages & Cannabis § 36-401(b)(1)(iv)
[46] Md. Code, Alcoholic Beverages & Cannabis § 36-405(a)–(c), 36-410(b)–(e)
[47] https://data.census.gov/table?q=%22age+by+sex%22+maryland&g=040XX00US27

MI	Dec. 1, 2019[48]	No statewide numerical retail cap	6 existing medical operators[49]	845[50]	Microbusinesses [51]	851[52]	No statewide geographic allocation requirement; local jurisdictions may prohibit retail[53]	11.14[54]
NJ	Apr. 21, 2022[55]	No statewide numerical retail cap	12 existing medical operators[56]	352[57,58]	Retail microbusinesses and expanded medical operators[59]	352[60]	Impact Zone prioritization[61]; municipalities may prohibit retail[62]	4.94[63]

[48] https://www.michigan.gov/lara/-/media/Project/Websites/lara/about/Legislative-Reports/Boilerplate-Required-Reports/FY2023/Section-1002-Cannabis-Market-Taxation-and-Regulatory-Compliance-Analysis-Pilot-Program.pdf?rev=551bf4057805438eb771438e4b60c628&

[49] https://www.michigan.gov/cra/-/media/Project/Websites/cra/Agency-Reports/Licensing-Reports/AU-Licensing-Reports/Licensing_Report_111719_-_112319.pdf?hash=B3AD179E87016DAAB90CAEBE99A28BE4&rev=cc985e1a0cb5481aa29b695f6fc1d212

[50] https://www.michigan.gov/cra/resources/cannabis-regulatory-agency-licensing-reports/cannabis-regulatory-agency-statistical-report

[51] MCL 333.27960(1)(f)

[52] https://www.michigan.gov/cra/resources/cannabis-regulatory-agency-licensing-reports/cannabis-regulatory-agency-statistical-report

[53] MCL 333.27956(1)

[54] https://data.census.gov/table?q=%22age+by+sex%22+michagan&g=040XX00US27

[55] https://www.nj.gov/cannabis/news-events/20220419a.shtml?

[56] N.J.S.A. 24:6I-46(a)(3)(a)(ii)

[57] https://www.nj.gov/cannabis/businesses/permitted/index.shtml?

[58] Published agency data do not separately identify microbusiness and standard retail licensees

[59] N.J.A.C. 17:30-6.7

[60] https://www.nj.gov/cannabis/businesses/permitted/index.shtml?

[61] N.J.S.A. 24:6I-36(e)(1)–(2)

[62] N.J.S.A. 24:6I-45(b)

[63] https://data.census.gov/table?q=%22age+by+sex%22+new+jersey&g=040XX00US27

The comparative findings indicate that statewide license limits alone do not determine the amount of retail capacity that develops within an adult-use market. Minnesota, Missouri, and New Jersey currently have similar levels of retail availability, at approximately five retail locations per 100,000 adults age 21+, despite operating under substantially different licensing structures. By comparison, Michigan has developed considerably greater retail density, while Maryland remains below the other comparison states. These differences show that operating retail capacity reflects the interaction of license limits, the privileges available to other license types, existing medical-market infrastructure, license activation, and local controls rather than any single component of the licensing framework.

The comparison also demonstrates the importance of existing medical-market infrastructure during the transition to adult-use sales. Missouri and Maryland entered adult-use sales with established medical retail networks that could immediately serve adult-use consumers, resulting in a smaller difference between initial and current retail capacity. Michigan and New Jersey began with considerably less existing retail infrastructure and subsequently experienced greater expansion as new businesses entered the market. This suggests that the number of new licenses required during the early stages of an adult-use market depends in part on how much consumer-facing capacity is already available when sales begin. Minnesota provides an additional example of why stand-alone retail license counts should not be interpreted as equivalent to total market capacity. Although relatively few stand-alone retailer licenses are currently active, other license categories account for a substantial share of operating retail locations. This is particularly evident within Minnesota's microbusiness program, which has a structure similar to Virginia's in allowing licensees to participate in multiple parts of the supply chain. Approximately 86% of currently licensed Minnesota microbusinesses include retail operations, indicating that retail has been a commonly selected activity among businesses using this flexible license structure.[64] This finding suggests that microbusinesses can contribute meaningful retail capacity outside the stand-alone retailer license category, particularly where stand-alone retail licenses are subject to numerical limits. For Virginia, the number of microbusinesses that ultimately elect to conduct retail activity will be an important component of total consumer-facing capacity and should be considered alongside the number of stand-alone retail marijuana store licenses.

The findings also indicate that statewide retail density does not necessarily reflect geographic access within a state. Each comparison state uses a different combination of statewide allocation requirements, local limitations, local prohibitions, or geographic prioritization. As a result, a state may have sufficient retail capacity in aggregate while still experiencing substantial variation in access across regions. This distinction is particularly important when evaluating rural access and the potential concentration of stores within higher-demand population centers.

Comparative State Cultivation Structures and Market Outcomes

CPPC examined cultivation licensing structures to provide additional context for evaluating Virginia's cultivation license needs. The comparison demonstrates substantial variation in how states regulate cultivation capacity. Some states limit the total number of cultivation licenses, while others allow continued market entry. States also differ in whether cultivation capacity is regulated through canopy limits, plant limits, license tiers, or combinations of these approaches. These structural differences are important because the number of cultivation licenses alone does not indicate the amount of production capacity available within a market. A single license may authorize substantially different production

[64] https://mn.gov/ocm/data-reports/dashboards/cannabis-market-monitor.jsp

capacity depending on the applicable canopy or plant limit, and additional cultivation may occur through microbusinesses or existing medical operators. Accordingly, the comparative analysis considers both the number of cultivation licenses and the production authority associated with those licenses.

Table B. Comparative Adult-Use Cultivation Structures

State	Primary Cultivation Structure	Statewide Cultivation License Limit	Initial Adult-Use Cultivation Base	Current Cultivation Licenses	Additional Cultivation Capacity
MN	No tiers; up to 30,000 sq. ft. indoor canopy or 2 acres of mature flowering plants outdoors[65]	50 stand-alone cultivation licenses[66]	2 medical operators transitioned into adult-use market[67]	20 active cultivation licenses[68]	Microbusinesses may cultivate up to 5,000 sq. ft. indoors or ½ acre outdoors[69]; Medical combination businesses may also cultivate adult-use, canopy authorized based on prior-year medical cultivation[70]
MO	No tiers; up to 30,000 sq. ft. indoor flowering canopy or 2,800 flowering plants outdoors[71]	Administratively limited; no permanent fixed statutory maximum[72]	56 cultivation licenses converted at adult-use launch[73]	68[74]	Microbusiness wholesale facilities may cultivate up to 250 flowering plants[75]; comprehensive license (dual license) does not get separate allocations
MD	>10,000 to 300,000 sq. ft.; outdoor capacity calculated using a 4:1 equivalent[76]	75 standard growers and 100 micro growers[77]	18 existing medical growers converted to dual-use; 40 additional cultivation	27[79]	Micro growers may cultivate up to 10,000 sq. ft. or 40,000 sq. ft. outdoor equivalent[80]

[65] Minn. Stat. § 342.30, subd. 2
[66] Minn. Stat. § 342.14
[67] https://mn.gov/ocm/data-reports/dashboards/cannabis-market-monitor.jsp
[68] https://mn.gov/ocm/data-reports/dashboards/cannabis-market-monitor.jsp
[69] Minn. Stat. § 342.28
[70] Minn. Stat. § 342.515, subd. 2
[71] 19 CSR 100-1.160(2)(A)
[72] Mo. Const. art. XIV, § 1.3(15); art. XIV, § 2.4(2)
[73] https://health.mo.gov/news/missouri-cannabis-facilities-cleared-cultivate-manufacture-and-dispense-products-adult?
[74] https://health.mo.gov/news/missouri-cannabis-facilities-cleared-cultivate-manufacture-and-dispense-products-adult?
[75] https://health.mo.gov/business-professionals/cannabis-regulation/microbusiness-information/microbusiness-license-faqs?
[76] Md. Code, Alcoholic Beverages & Cannabis § 36-401(c)(1)(i)
[77] Md. Code, Alcoholic Beverages & Cannabis § 36-401(d)(1)(i), (d)(2)(i)
[79] https://cannabis.maryland.gov/Pages/Data-Dashboard.aspx
[80] Md. Code, Alcoholic Beverages & Cannabis § 36-401(c)(2)(i)

			licenses made available through the first post-launch social equity round[78]		
MI	Plant-based classes: Class A 100 plants; Class B 500; Class C 2,000; Excess Grower 2,000 per additional license[81]	No statewide cap	6 initial Class C licenses issued to two existing medical-license-holding operators[82]	11 Class A, 79 Class B, 815 Class C, and 51 Excess Grower licenses[83]	Standard microbusinesses may cultivate 150 mature plants and Class A microbusinesses up to 300 mature plants[84]
NJ	Six canopy tiers ranging from >2,500–10,000 sq. ft. for Tier I to >100,000–150,000 sq. ft. for Tier VI; indoor and outdoor cultivation permitted[85]	No current statewide cap; initial 37-cultivator cap expired in 2023[86]	37 cultivation licenses initially authorized[87]	73[88]	Microbusiness cultivators may operate up to 2,500 sq. ft. of mature canopy and up to 1,000 mature plants per month[89]

Cross-state comparisons of cultivation capacity are further limited by differences in both regulatory structure and publicly available production data. States do not consistently measure or report cultivation activity using the same units. Depending on the jurisdiction, available data may include authorized canopy, utilized canopy, total plant inventory, flowering plant counts, plants harvested, harvested weight, or other production measures. States also differ in how they define the plants or cultivation area subject to regulatory limits. For example, some measures apply only to mature or flowering plants, while others may distinguish among immature, vegetative, and flowering stages or define canopy according to the physical area occupied by plants at a particular stage of production. These differences are compounded by variation in licensing structures, including single-license systems versus tiered licenses, canopy-based versus plant-based limits, and different treatment of indoor and outdoor cultivation. As a result, the available data do not support a standardized conversion that would allow the amount of canopy, number of plants, or

[78] https://cannabis.maryland.gov/pages/cannabis-business-licensing.aspx
[81] Mich. Admin. Code R 420.102
[82] https://cannabismichigan.org/learn/michigan-cannabis-history
[83] https://www.michigan.gov/cra/-/media/Project/Websites/cra/Agency-Reports/Statistical-Reports/monthly-report/February-2026-Monthly-Report.pdf?hash=2BE211C082223AB9619FBA72F92D841E&rev=ea9eb35f91494dfc986a925afcc4e93e&
[84] Mich. Admin. Code R 420.105, Mich. Admin. Code R 420.105a
[85] N.J.A.C. 17:30-10.4
[86] N.J.S.A. 24:6I-46(a)(1)(b)
[87] N.J.S.A. 24:6I-46(a)(1)(b)
[88] https://www.nj.gov/cannabis/businesses/permitted/index.shtml?utm
[89] N.J.A.C. 17:30-10.4

number of cultivation licenses in one state to be directly compared with the production capacity of another. The comparative analysis is therefore most useful for evaluating how different states structure and manage cultivation capacity and how those markets have developed over time, rather than for identifying a cross-state benchmark for the amount of canopy or plant capacity necessary to meet a given level of consumer demand.

The comparison demonstrates that states use substantially different mechanisms to manage cultivation capacity. Minnesota and Missouri use relatively uniform production limits for stand-alone cultivation licenses rather than multiple cultivation tiers. Maryland separates cultivation primarily between micro and standard growers, with a substantial difference in maximum capacity between the two categories. Michigan uses plant-count classes, while New Jersey uses six canopy tiers ranging from relatively small cultivation facilities to facilities authorized for as much as 150,000 square feet. For Virginia, this variation demonstrates why cultivation license counts are less directly comparable across states than retail license counts. Twenty cultivation licenses operating under one state's framework may represent substantially different production capacity than the same number operating under another state's framework. This distinction is particularly important for Virginia because its five-tier structure allows maximum canopy to range from 5,000 to 35,000 square feet. The distribution of Virginia licenses across tiers will be as important to total authorized capacity as the overall number of licenses issued.

Observed market conditions vary across these structures. Minnesota's market remains relatively new, and supply and market saturation are still developing. Missouri's more established market continues to evaluate overall license sufficiency and market stability. Maryland presents a different condition: despite operating under statutory cultivation caps, the state's assessment indicates that production only minimally exceeds demand and that additional cultivation capacity is expected to be necessary as the market develops.[90] Michigan provides the clearest example within the comparison of production capacity expanding substantially over time. The state currently has 815 Class C grower licenses, the 2,000-plant cultivation class, in addition to Class A, Class B, Excess Grower, and microbusiness cultivation capacity. Michigan represents a mature market in which increasing production and substantial price compression have occurred alongside indications of oversupply. Average flower prices declined from $376.35 per ounce during the first year[91] of the adult-use market to $59.85 per ounce by February 2026.[92] These observations do not establish that the absence of a statewide cultivation cap caused the decline in prices, but they demonstrate the market conditions that can occur when production capacity expands substantially relative to market demand. New Jersey similarly illustrates how cultivation capacity may continue expanding after an initial restriction is removed. The state initially authorized 37 cultivation licenses, but the statutory cultivator cap expired in February 2023. Following the expiration of the cultivation license cap, New Jersey has 73 active cultivation licenses under its current uncapped structure. During the broader period of market expansion, average flower prices declined from $13.33 per gram in August 2023 to $6.51 per gram in June 2026.[93]

Another consistent feature across the comparison states is that stand-alone cultivation licenses do not represent all available production capacity. Minnesota, Missouri, Maryland, Michigan, and New Jersey each permit some form of cultivation through microbusinesses. Several states also incorporated existing

[90] https://cannabis.maryland.gov/Documents/Annual%20Reports/MCA%20Annual%20Report%202024-r12_spread.pdf?
[91] https://www.michigan.gov/-/media/Project/Websites/cra/Agency-Reports/Statistical-Reports/monthly-report/November_2020_Monthly_Report.pdf?rev=186549cb99884d9098e739c13c53be21&utm
[92] https://www.michigan.gov/cra/-/media/Project/Websites/cra/Agency-Reports/Statistical-Reports/monthly-report/February-2026-Monthly-Report.pdf?

[93] https://nj.gov/cannabis/documents/meetings/2026-07-16/July%2016%202026%20slides.pdf

medical cultivation operators into the adult-use supply chain. Maryland began with 18 existing medical growers contributing adult-use production, New Jersey identified seven medical operators contributing cultivation capacity, and Minnesota's two medical combination businesses may continue cultivating alongside the new adult-use license structure. As a result, the amount of cultivation capacity available at market launch may be meaningfully greater than the capacity associated with newly issued stand-alone cultivation licenses.

The comparative findings suggest that Virginia's cultivation analysis should focus on total production capacity rather than cultivation license quantity alone. Under Virginia's tiered structure, the same number of licenses can produce materially different amounts of authorized canopy depending on the combination of Tier I through Tier V licenses issued. Microbusiness cultivation and cultivation conducted by dual-use pharmaceutical processors will further increase capacity beyond that represented by stand-alone cultivation licenses. The experiences of the comparison states also demonstrate the importance of distinguishing between authorized capacity and utilized capacity. A license may authorize a specified canopy or plant count without the operator immediately utilizing the maximum amount available. Conversely, continued issuance of larger cultivation licenses can substantially increase potential supply even when the total number of cultivation businesses changes relatively little. This distinction is particularly relevant to Virginia's initial market, where actual utilization of the new cultivation tiers will not be observable until businesses begin operating.

Finally, the comparison demonstrates that cultivation needs can change as adult-use markets mature. Maryland's current market assessment indicates potential need for additional production capacity, while Michigan provides an example of a mature market characterized by increasing production and indications of oversupply. Because cultivation structures and production measures are not standardized across states, these experiences do not provide a direct basis for determining how many plants, how much canopy, or how many cultivation licenses Virginia will require. Rather, they provide context for understanding the range of market conditions that can develop under different regulatory structures. These differing outcomes support evaluating Virginia's initial cultivation structure against projected demand while establishing ongoing measures of production, canopy utilization, inventory, pricing, and sales that can be used to reassess capacity after market launch.

Manufacturing Market Development in Other States

Table C. Comparative Manufacturing Licensing Structures

State	Manufacturing License Limit	Current Number of Manufacturing Licenses	Manufacturing Through Other License Types	Manufactured Products as Share of Retail Sales
Minnesota	Initial limit of 24[94]	3[95]	Microbusiness manufacturing permitted, no limits on production capacity[96]	48.2% (2025 Adult-Use Sales)[97]

[94] Minn. Stat. § 342.14
[95] https://mn.gov/ocm/data-reports/dashboards/cannabis-market-monitor.jsp
[96] Minn. Stat. § 342.28, subd. 1
[97] https://mn.gov/ocm/data-reports/dashboards/cannabis-market-monitor.jsp

Missouri	Administratively limited; no permanent fixed maximum[98]	87[99]	Microbusiness wholesale facilities may manufacture, no limits on production capacity[100]	51.49% (2025 Adult-Use Sales)[101]
Maryland	100 standard; 100 micro[102]	30[103]	Micro Processor License Type, can process no more than 2,000 pounds of cannabis per year[104]	44% (Aug 2026 Adult-Use Sales)[105]
Michigan	No statewide numerical cap	275[106]	Microbusiness manufacturing permitted, can only process and manufacture cannabis products using cannabis cultivated on its own premises[107]	50.2% (Feb 2026 Adult-Use Sales)[108]
New Jersey	No statewide numerical cap	82[109]	Microbusiness manufacturing permitted, can process no more than 1,000 pounds of usable cannabis per month[110]	47.4% (2025 Adult-Use Sales)[111]

As shown in Table C, manufacturing licensing structures vary substantially across the comparison states. Minnesota and Maryland establish numerical limits on manufacturing or processing licenses, Missouri operates under an administratively limited structure without a permanent fixed maximum, and Michigan and New Jersey do not impose statewide numerical caps. The number of active manufacturing licenses also varies considerably across states. In addition, each comparison state permits some form of manufacturing through other license categories, including microbusiness structures. Despite these differences in licensing structure and license quantity, manufactured products account for a relatively consistent and substantial share of adult-use retail sales across the comparison states. Across the five states, manufactured products represent approximately 44% to 51.5% of reported adult-use retail sales. This relatively narrow range is notable given the substantial variation in the number of manufacturing licenses operating within each market.

The comparative findings should not be interpreted as demonstrating that manufacturing license limits have no effect on market development. Rather, they indicate that the relationship between license quantity

[98] Mo. Const. art. XIV, § 2.4(2)
[99] https://health.mo.gov/business-professionals/cannabis-regulation/licensee-compliance-guidance/licensed-facilities
[100] https://health.mo.gov/business-professionals/cannabis-regulation/microbusiness-information/microbusiness-license-faqs#accordion-item-title-11536
[101] https://health.mo.gov/business-professionals/cannabis-regulation/data-and-reports
[102] Md. Code, Alcoholic Beverages & Cannabis § 36-401(d)(1)(ii) and (d)(2)(ii)
[103] https://cannabis.maryland.gov/Pages/Data-Dashboard.aspx
[104] Md. Code, Alcoholic Beverages & Cannabis § 36-401(c)(1)(ii), § 36-401(c)(2)(ii)
[105] https://cannabis.maryland.gov/Pages/Data-Dashboard.aspx
[106] https://www.michigan.gov/cra/-/media/Project/Websites/cra/Agency-Reports/Statistical-Reports/monthly-report/February-2026-Monthly-Report.pdf?
[107] MCL 333.27960(1)(f)
[108] https://www.michigan.gov/cra/-/media/Project/Websites/cra/Agency-Reports/Statistical-Reports/monthly-report/February-2026-Monthly-Report.pdf?
[109] https://www.nj.gov/cannabis/businesses/permitted/index.shtml?utm
[110] N.J.A.C. 17:30-6.7
[111] https://www.nj.gov/cannabis/documents/meetings/2025-06-05/June%2012%202025%20Public%20Meeting%20Slides.pdf

and manufacturing capacity is less direct than for retail or cultivation. States with substantially different numbers of manufacturing licenses report similar shares of retail sales attributable to manufactured products, suggesting that license count alone is insufficient to determine whether manufacturing capacity is aligned with consumer demand. The comparison provides evidence that manufactured products are likely to represent a significant component of adult-use cannabis sales, but it does not establish a consistent relationship between manufactured-product demand and the number of processing licenses required to serve that demand. Future evaluation of Virginia's manufacturing sector would benefit from observed information on product-category sales, transfers into and out of processing facilities, manufacturing throughput, facility utilization, and the distribution of manufacturing activity across stand-alone processors, microbusinesses, and dual-use pharmaceutical processors. These measures would provide a stronger basis for evaluating whether manufacturing capacity remains aligned with market demand as Virginia's adult-use market develops.