

An Empirical Assessment of Oklahoma's Medical Marijuana Market

June 2023

Prepared For:

Oklahoma Medical Marijuana Authority
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Cannabis Public Policy Consulting LLC is the nations leading cannabis policy research and consulting firm. The methodology, survey questions and specific analysis used in this report has been peer-reviewed and validated by over a dozen published researchers.

This report was made in partnership with ERG Strategies.

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Executive Summary

This report was ordered by the Oklahoma Medical Marijuana Authority (OMMA) to examine the supply chain and demand of the medical cannabis market in Oklahoma. To our knowledge, it is the first statewide study that combines time-matched, within-state measures of cannabis supply and empirical market-specific demand, facilitating one of the most advanced cannabis market investigations. Moreover, this study recruited over 1,300 past-year cannabis consumers in Oklahoma in a demographically and geographically representative sample from 68 of 77 Oklahoma counties. The resulting survey-based demand output is one of the most methodologically generalizable and valid sets of findings to date.

The following highlights represent key findings and implications from this study:



Demand for cannabis from the regulated medical market in Oklahoma is a similar proportion of total demand as compared to other states.



The supply-to-demand ratio of regulated medical marijuana supply to regulated medical cannabis demand is 64:1. Using a general assumption that units of supply should not exceed two times the units of demand, the medical marijuana program has no less than 32 times more regulated marijuana necessary than licensed patient demand.



Key differences in subregion-specific supply and demand strongly suggest potential out-of-state diversion of cannabis and cannabis products, but future research is needed to verify such assertions.



The large oversupply observed in the regulated systems suggests that the licensed operators contributing to oversupply are very likely adding to an illicit market both at the point of cultivation and the point of retail sale.



The volume of oversupply within the regulated system coupled with low barriers to market entry suggest unlicensed/illicit cannabis cultivation operations are unlikely to be observed across the state, and that this illicit market may, in fact, be hiding in plain sight.



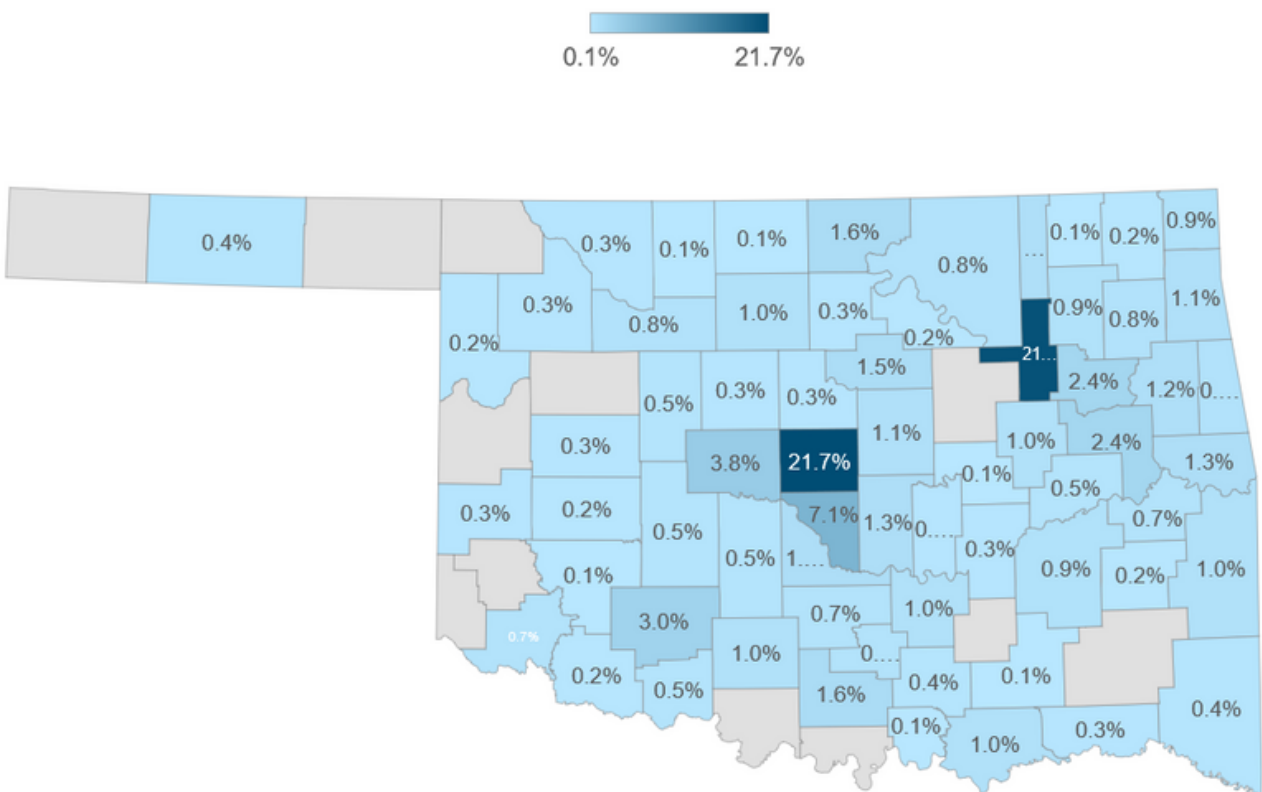
Future research assessing supply and demand at the same point in time (i.e., as done in the present study) will be needed to better evaluate improvements in the supply-to-demand ratios and to determine the extent to which such changes are a product of enforcement or other OMMA strategic efforts.

Section 1. Research Design

1.1 Survey Methodology

This report used data from a series of two survey timepoints conducted in March and April 2023. A total of 1,322 past-year cannabis consumers from 68 of Oklahoma's 77 counties participated in the survey. Figure 1 shows the geographic distributions of participants by county. The percent of survey participants residing in each county is almost perfectly correlated with the percent of actual Oklahoma residents in each county ($r = .99$), which suggests that our recruitment of Oklahoma residents is geographically consistent with actual county populations in the state. Demographic characteristics are highly correlated between survey respondents and actual Oklahoma residents, as shown in Table 1 below. Together, these correlations strengthen our confidence that the findings shown in this report are likely to accurately reflect trends in the state of Oklahoma.

Figure 1. Geographic Distribution of Survey Participants

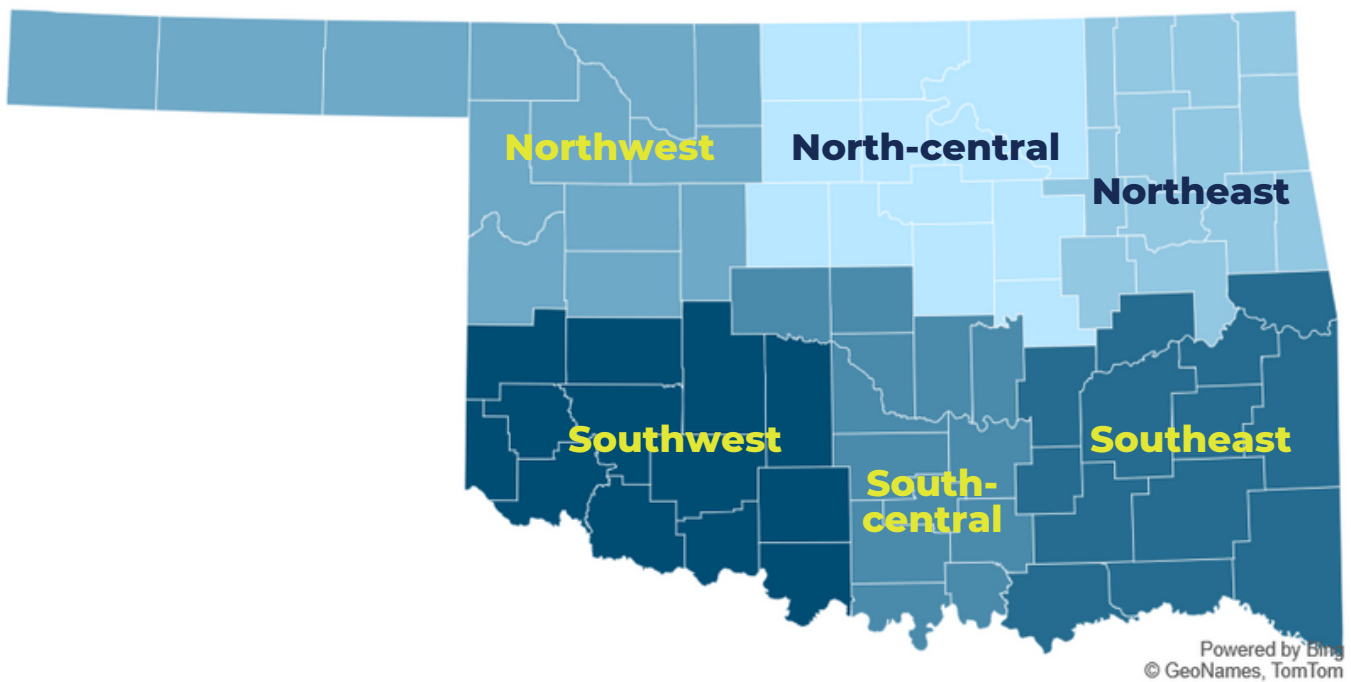


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1.2 County Subregion Assignment

Please note, due to small numbers of survey participants in many counties ($n < 10$), we grouped respondents into six predetermined subregions based on their reported county of residence.¹ This was done to strengthen the power of our statistical analyses and improve representativeness of our findings. Those subregion groupings are northwest, north-central, northeast, southwest, south-central, and southeast, as shown in Figure 2.

Figure 2. Oklahoma Counties Grouped into Subregions for Analysis



[1] Oklahoma State Bureau of Investigations. (n.d.) OSBI investigative regions map. Retrieved June 15, 2023, from <https://osbi.ok.gov/images/osbi-investigative-regions-map>

Section 2. Survey

Participant Characteristics

2.1 Demographic Characteristics

Most who were surveyed were white (63.4%), and the other race categories from our sample parallel those reported in 2021 U.S. Census data (see Table 1, right column). The mean education level of our sample also matched the census report. Females were slightly more common in our sample compared to the census.

Table 1. Demographic Distributions

Age (Mean)	Survey Sample	Oklahoma Population
	42	36.7 (median)

Race	Survey Sample	Oklahoma Population
American Indian, Native American, Alaskan Native	11.1%	9.7%
Asian	1.9%	2.5%
Black or African American	10.7%	7.8%
White	63.4%	63.8%

Race	Survey Sample	Oklahoma Population
Native Hawaiian or other Pacific Islander	0.2%	0.2%
Other	3.5%	--
Two or more races	6.7%	6.6%

Annual household income (median)	Survey Sample	Oklahoma Population
	\$35,000	\$56,956

Gender	Survey Sample	Oklahoma Population
Male	33.3%	49.5%
Female	64.6%	50.2%
Transgender female	0.3%	--
Transgender Male	0.4%	--
Non-binary	0.8%	--
Not included above	0.1%	--
Prefer not to answer	0.5%	--

High school degree
of higher

Survey Sample

Oklahoma Population

92.3%

88.7%

2.2 Regulated vs Illicit Cannabis Source Methodology

In this study, we assessed trends in cannabis demand from both illicit and regulated sources. We surveyed all cannabis consumers (patients and non-patients) on the amount (grams) of cannabis they obtained in the past month from several common sources. Specifically, we asked questions about licensed medical dispensaries, friends or family, a dealer, a delivery service, their own home-grow operations, another source, and adult-use dispensaries. We categorized the data as illicit or regulated based on patient status and source. In Oklahoma, regulated cannabis is available to licensed medical cannabis patients from two sources: 1) licensed medical dispensaries and 2) patients' own limited home-grow operations. Although Oklahoma issues permits for caregivers to acquire and cultivate plants for a single patient, due to the strict regulations governing their cultivation and purchases, they are considered part of patients' own limited home-grow operations for this report. All other sources from which patients and non-patients obtain cannabis are considered illicit. See Table 2 for a summary of source categorization. Please note, we asked survey participants to report the amount they obtained from adult-use dispensaries in order to figure that into total demand, but we do not classify it as illicit because Oklahoma residents may be traveling to a bordering adult-use state and buying it legally.

Table 2. Categorization of Regulated vs Illicit Sources

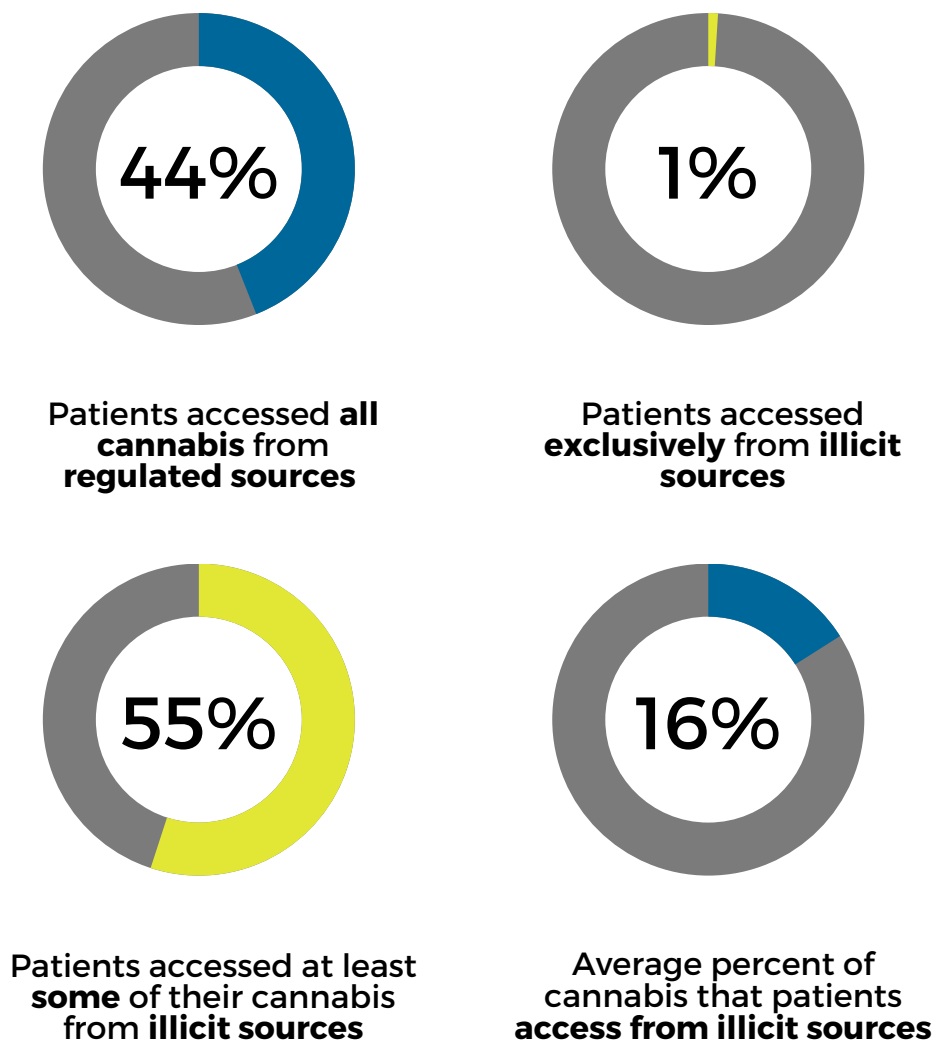
Sources		Medical Dispensary	Home Grow	Delivery	Friends & Family	Dealer	Other Source
Patient Status	Patient	Regulated	Regulated	Illicit	Illicit	Illicit	Illicit
	Non-patient	Illicit	Illicit	Illicit	Illicit	Illicit	Illicit

2.3 Trends in Cannabis Sourcing

Per Patient

Most (55%) licensed patients typically access cannabis from a mix of regulated and illicit sources, as shown in Figure 3. Almost half (44%) obtain all of their cannabis from regulated sources, and 1% exclusively utilize illicit sources. A total of 16% of patients' cannabis is accessed from illicit sources each month.

Figure 3. Patient Trends on Accessing Cannabis

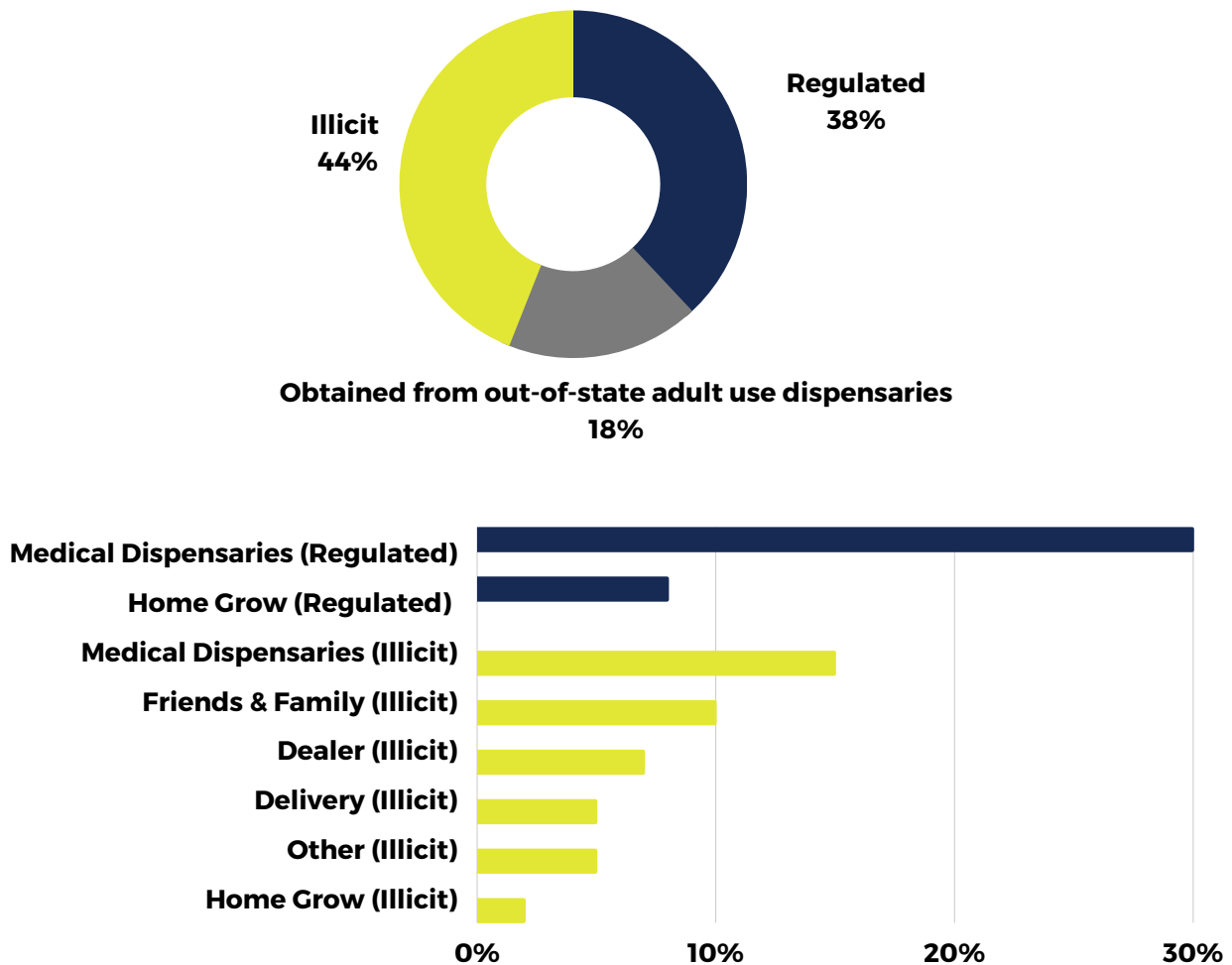


Statewide

Figure 4 shows the percentages by source of all cannabis accessed by Oklahomans, with distinction between regulated and illicit sources. Nearly one-third of cannabis (30%) is legally sourced from medical dispensaries by medical patients and 8% was home grown by medical patients, presumably within the amount permitted by statute. Over 43% was obtained from illicit sources, where medical dispensary

purchases by non-patients (15%) was most common and non-patient home-grown was the least common (2%). The remaining 18% was from out-of-state adult-use dispensaries.

Figure 4. Percent of All Cannabis Obtained from Regulated and Illicit Sources in Oklahoma



Per Subregion

Table 3 shows how the percentages of cannabis obtained from illicit and regulated sources (from Figure 4 above) are further distributed across the six subregions. Examining demand distributions across the state may help inform region-specific policy strategies, enforcement priorities, educational campaigns, or other programmatic efforts.

➤ For example, the south-central region showed the highest percent (3.33%) of illicit medical dispensary demand (i.e., non-patients reporting accessing from this source). This finding suggests that dispensaries in this region may be less strict about checking patient IDs before selling medical cannabis to customers.



The south-central and southeast regions report the highest percentages of cannabis use relative to other regions; ~30% of the cannabis use reported stems from these two regions.

Table 3. Percentages of Cannabis Procured, by Subregion and Source

Subregion	Regulated Medical	Home Grow Regulated	Medical Dispensary Illicit	Friends & Family	Dealer	Delivery	Other	Home grow Illicit
Northwest	4.17	1.98	2.04	1.52	1.15	0.17	0.43	0.00
North-central	4.51	1.36	1.97	1.93	1.25	0.76	0.97	0.04
Northeast	5.08	1.12	2.07	1.51	1.10	0.66	0.60	0.43
Southwest	4.99	1.03	2.5	1.73	1.37	1.35	0.79	0.68
South-central	5.18	0.98	3.33	1.87	1.36	0.87	0.92	0.63
Southeast	6.42	1.72	2.51	1.56	0.83	0.79	0.90	0.24
Totals	30	8	15	10	7	5	5	2

*Yellow notes the region with the highest percent of cannabis procured from each source

Section 3. Cannabis Demand

3.1 Regulated Medical Demand

Total yearly regulated medical cannabis demand is estimated to be about **50 million grams**. This figure refers to cannabis purchased from regulated medical dispensaries by licensed medical cannabis patients. This was measured by multiplying the number of medical patients licensed at the time of the survey in April 2023 (369,515 patients) by the mean grams of cannabis that patients reported obtaining per month (11.28 grams), and then multiplied by 12 (months) to get the annual figure of 50,017,550 regulated grams of flower products.

3.2 Total Demand in Oklahoma

Total yearly cannabis demand in Oklahoma is estimated to be **340 million grams** of cannabis across all sources (illicit and regulated) and all cannabis consumers (patients and non-patients).

➤ The first calculation was the mean number of grams per month per individual who reported using cannabis in the past year in Oklahoma (19.7 g per month).

➤ We then multiplied Oklahoma’s population that is over 18 years of age (3,051,000 individuals)² by our empirically derived percent of Oklahoma’s population who are estimated to have used cannabis in the past year (47.2%), which equates to 1,440,750 residents who used cannabis at least once in the past year.

➤ We then multiplied 1,440,750 residents by 19.7 grams by 12 months to arrive at 340,593,300 total grams of estimated cannabis demand across all consumers and sources.

3.3 Supply Needed to Meet Demand

The pounds and number of cannabis plants needed to meet patient and total cannabis demand are shown in Table 4. To reach these figures, we first converted regulated medical cannabis demand from grams to pounds, resulting in a figure of about 110,270 pounds of cannabis. Next, empirical supply data has shown that it takes approximately 1.49 plants to produce one pound of cannabis conservatively,³ thus we multiplied the number of pounds of cannabis by 1.49, equaling about 164,302 cannabis plants. It is also important to consider the amount of waste that may be discarded as cannabis moves its way down the supply chain and is converted into product forms other than flower. To do this, we multiplied the total number of cannabis plants by 2, operating under a generous assumption that an amount equal to the weight of one out of every two plants will need to be discarded during harvesting, drying, or curing or will be required for production of other products, equaling about 328,604 cannabis plants. We conducted the same calculations for total demand.

Table 4. Annual Supply Needed to Meet Demand: Cannabis Grams to Pounds and Plants

	Regulated medical demand [^]	Total demand ⁺
Total Grams of Cannabis	50,017,550	340,593,300
Pounds of Cannabis	110,270	750,880
Total Cannabis Plants	328,604	2,237,623

[^] Regulated demand = licensed patients’ demand from regulated medical sources
⁺ Total demand = all Oklahoma cannabis consumers’ demand, including non-patients

[2] U.S. Census Bureau. (n.d.). QuickFacts: Oklahoma. Retrieved June 15, 2023, from [1] Oklahoma State Bureau of Investigations. (n.d.) OSBI investigative regions map. Retrieved June 15, 2023, from <https://osbi.ok.gov/images/osbi-investigative-regions-map>.

[3] Hudak, J., Freedman, A., & Koski, L. (2019). A snapshot of demand for adult-use cannabis in Illinois. Freedman & Koski. [1] U.S. Census Bureau. (n.d.). QuickFacts: Oklahoma. Retrieved June 15, 2023, from [1] Oklahoma State Bureau of Investigations. (n.d.) OSBI investigative regions map. Retrieved June 15, 2023, from <https://osbi.ok.gov/images/osbi-investigative-regions-map>.

Section 4. Supply

4.1 Supply Data

The supply estimates for this report were obtained from OMMA’s track-and-trace system, which tracks the movement of all medical cannabis in the state from seed to sale. Commercial licensees are required to be credentialed in the track-and-trace system and submit data on an ongoing basis. The types of data required of licensees depends on the type of license held; for example, licensed growers are required to tag and assign an ID code to each plant and document the activity of each plant through the stages of operation (seeding, growth phases, harvest, product weights, location changes, etc.). It should be noted that track-and-trace data is typically not wholly reflective of the entire market because it is based on licensee self-report data and therefore vulnerable to inaccurate reporting and data entry errors. Also, track-and-trace systems are regulatory tools, not business solutions, so they do not auto-analyze entries to check for validity or accuracy of data from aggregate entries. Despite these issues, track-and-trace data still provide strong estimates and key insights to aid our understanding of general market trends.

In analyzing Oklahoma cannabis supply data, we reviewed grower-reported weights taken at various timepoints after harvest. We selected the three weights that best fit the needs of this report, listed below by the order in which they occur in the supply chain:



Based on input from operators of the track-and-trace system, we assessed supply by taking into account data from early on in the supply chain (i.e., wet weight), in the middle (i.e., after waste is removed), and towards the end (i.e., packaged weight). This approach allows us to account for potential error and accurate estimates at multiple points in the supply chain. This in turn provides a more stable baseline measure of supply from which to compare to in the future.

4.2 Actual Oklahoma Supply Estimates

Supply estimates were provided for quarter 1 of 2023 as this was the most recent period where the track-and-trace system was wholly implemented across the state, and we then translated those figures to annual estimates (see Table 5). About 4.9 billion grams of wet-weight cannabis is estimated to be grown and harvested in 2023, from which 1.07 billion grams of plant waste will be removed, leaving about 3.8 billion grams of buds before drying and 884 million grams of packaged cannabis.

Table 5. Oklahoma Supply Estimates

Steps of Calculations	Outputs
1. Wet Weight	
Estimated Total Annual Plants	10,234,676
Wet Weight Grams Per Plant	480
Total Annual Wet Weight Grams (Wet Weight Grams Per Plant x Annual Plants)	4,912,644,480
2. Waste	
Waste Grams Per Plant	104.7
Total Annual Weight Grams of Waste (Waste Grams Per Plant x Annual Plants)	1,071,979,964
2.1 Post-Waste Removal	
Total Supply After Waste is Removed (Total Annual Wet Weight - Waste Grams)	3,840,664,516
3. Packaged Weight	
Packaged Grams Per Plant	86
Total Annual Packaged Supply (Packed Weight Grams Per Plant x Annual Plants)	884,862,417

4.3 Supply-to-Demand Ratios

Cannabis supply at a state level is typically defined and measured as a single output of cannabis material at a single stage in the supply-chain process. Such definitions represent overly simplified approaches to estimating cannabis supply.

One approach calculates how much cannabis could be supplied at a given time to all patients to last them 60 days.⁴ A second method assesses wet weight only.⁵ A third approach estimates the potential cannabis production that could be derived based on the number of land areas that hold state-sanctioned licenses to cultivate cannabis.⁶ Such approaches typically lead to inaccurate and biased calculations and interpretations that fail to consider the fact that legal cannabis has become an agricultural commodity.

Because cannabis is a commodity, assessing cannabis supply at a single outcome contradicts decades of supply-chain research⁷ and practice⁸ in global commodities markets. Scientific studies describing cannabis supply also typically specify the cannabis supply as “supply chains.”⁹ Moreover, references to those who manage cannabis supply-chain processes as “supply-chain managers”¹⁰ serve to highlight that there are individuals or groups of individuals within cannabis cultivation organizations who must make pivotal decisions in how to organize and maximize the staged preparation of cannabis materials from seeds to packaged products. Supply-chain management activities provide value, both to individual licensees and to the market as a whole, in many ways. For example, effective supply-chain management helps licensees reduce operating costs by reducing the extent of unnecessary supply. Improvements in quality assurance and reductions in the time it takes for cannabis to transition from seed to sale also provide potential value to individual licensees and help support regulatory processes designed to protect public safety.

Key reasons for the poor measurement of supply-chain processes (e.g., supply-chain efficiencies, key performance outcomes, etc.) include the newness of many state legal cannabis markets; confusion regarding what actions by industry operators are allowed by local, state, and federal law; the lack of sophisticated track-and-trace technologies; and the dearth of states that implement modern data pipeline activities using track-and-trace data in order to assess multiple stages of cannabis supply processes.¹¹

We used estimates of Oklahoma demand based on the Regulatory Determinants of Cannabis Outcomes Survey (RDCOS) and supply-chain data from Oklahoma track-and-trace to determine the approximate ratio of supply to demand in the state. This metric is used in testing the health and balance of the cannabis market. High ratios (that is, ratios with a large difference between the numbers) indicate an over- or undersupply of cannabis, and either can lead to problems in the market. Other states have demonstrated that a healthy supply-to-demand ratio is typically no more than 2:1 (i.e., 2 grams of supply for every 1 gram of demand). In fact, our evolving research has

[4] New York State Office of Cannabis Management. (2022). Inaugural Annual Report. <https://cannabis.ny.gov/system/files/documents/2023/01/ocm-annual-report-2022.pdf>

[5] Oregon Liquor and Cannabis Commission. (n.d.) Harvest, price, & sales market data. Retrieved June 15, 2023, from <https://www.oregon.gov/olcc/marijuana/pages/marijuana-market-data.aspx>

[6] Sheeler, A. (2019). California is growing so much marijuana it could crash the market. *The Sacramento Bee*. [2] Oregon Liquor and Cannabis Commission. (n.d.) Harvest, price, & sales market data. Retrieved June 15, 2023, from <https://www.oregon.gov/olcc/marijuana/pages/marijuana-market-data.aspx>

[7] Melo, M.T., Nickel, S., & Saldanha de Gama, F. (2006). Dynamic multi-commodity capacitated facility location: a mathematical modeling framework for strategic supply chain planning. *Computers & Operations Research*, 33(1). <https://doi.org/10.1016/j.cor.2004.07.005>

[8] RSM. (2023). 5 steps for overcoming supply chain challenges: Strategies for building resiliency. https://rsmus.com/insights/services/business-strategy-operations/supply-chain-challenges-guide.html?cmpid=ppc:443204-global-operations-supply-chain-g:bb01&gad=1&gclid=CjwKCAjwyeyjBhA5EiwA5WD7_UKWVwXmVUR2ytDpZg59zHcLJ5DnD2xr-azaaHz8yjilbNDIGMJYFB0CnxYQAvD_BwE

[9] Pookkaman, W., & Samanchuen, T. (2022). An innovation framework of medical organic cannabis traceability in digital supply chain. *Journal of Open Innovation: Technology, Market, and Complexity*, 8 (4), 196. <https://doi.org/10.3390/joitmc8040196>

[10] Krause, D., & Pullman, M. (2021). Fighting to survive: How supply chain managers navigate the emerging legal cannabis industry. *Journal of Supply Chain Management*, 57(3), 50–71. [3] Pookkaman, W., & Samanchuen, T. (2022). An innovation framework of medical organic cannabis traceability in digital supply chain. *Journal of Open Innovation: Technology, Market, and Complexity*, 8 (4), 196. <https://doi.org/10.3390/joitmc8040196>

[11] Given the need for real-time analysis on individualized and aggregated supply chain data, ancillary regulatory technologies have recently emerged. OMMA currently utilizes the leading technology firm, [NCS Analytics](#), to better analyze and understand their supply chain.

indicated that while there is no “optimal” value of supply, ratios of 1.3:1 to 1.5:1 may be more appropriate for sustainable markets. By contrast, Table 6 shows supply-to-demand ratios obtained using each of the three previously mentioned approaches to estimating supply. Each supply estimate was compared to estimates of the regulated medical demand and total demand in Oklahoma. The average of the ratios is 64 grams of supply for every gram of demand if only examining regulated medical demand, and 9 grams of supply for every gram of demand if assessing all cannabis demand in Oklahoma. Compared to the 2:1 ratio observed as a healthy supply-to-demand ratio across other markets, this would imply that the medical cannabis market is oversupplied by about 32 times and could serve all cannabis consumers (patients and non-patients) 4.5 times over.

Table 6. Ratio of Supply to Demand

Output	Output Value
Total Regulated Medical Cannabis Demand Grams	50,020,955 g
Total Cannabis Demand Grams	339,944,028 g
Demand as Proportion of Wet Weight Supply	
Regulated Medical Cannabis Demand	98 g
Total Cannabis Demand	14 g
Demand as Proportion of Supply After Waste Removal	
Regulated Medical Cannabis Demand	77 g
Total Cannabis Demand	11 g
Demand as Proportion of Packaged Supply	
Regulated Medical Cannabis Demand	18 g
Total Cannabis Demand	3 g
Average Supply to Demand Ratio for Regulated Medical Cannabis	64 g
Average Supply to Demand Ratio for All Cannabis	9 g

4.4 Key Differences in Supply and Demand Distribution

We examined supply and demand trends across the state, and two findings stood out as particularly important and informative from the data (Please refer to the heatmaps in Figure 5 for visual representation of these findings.):

1

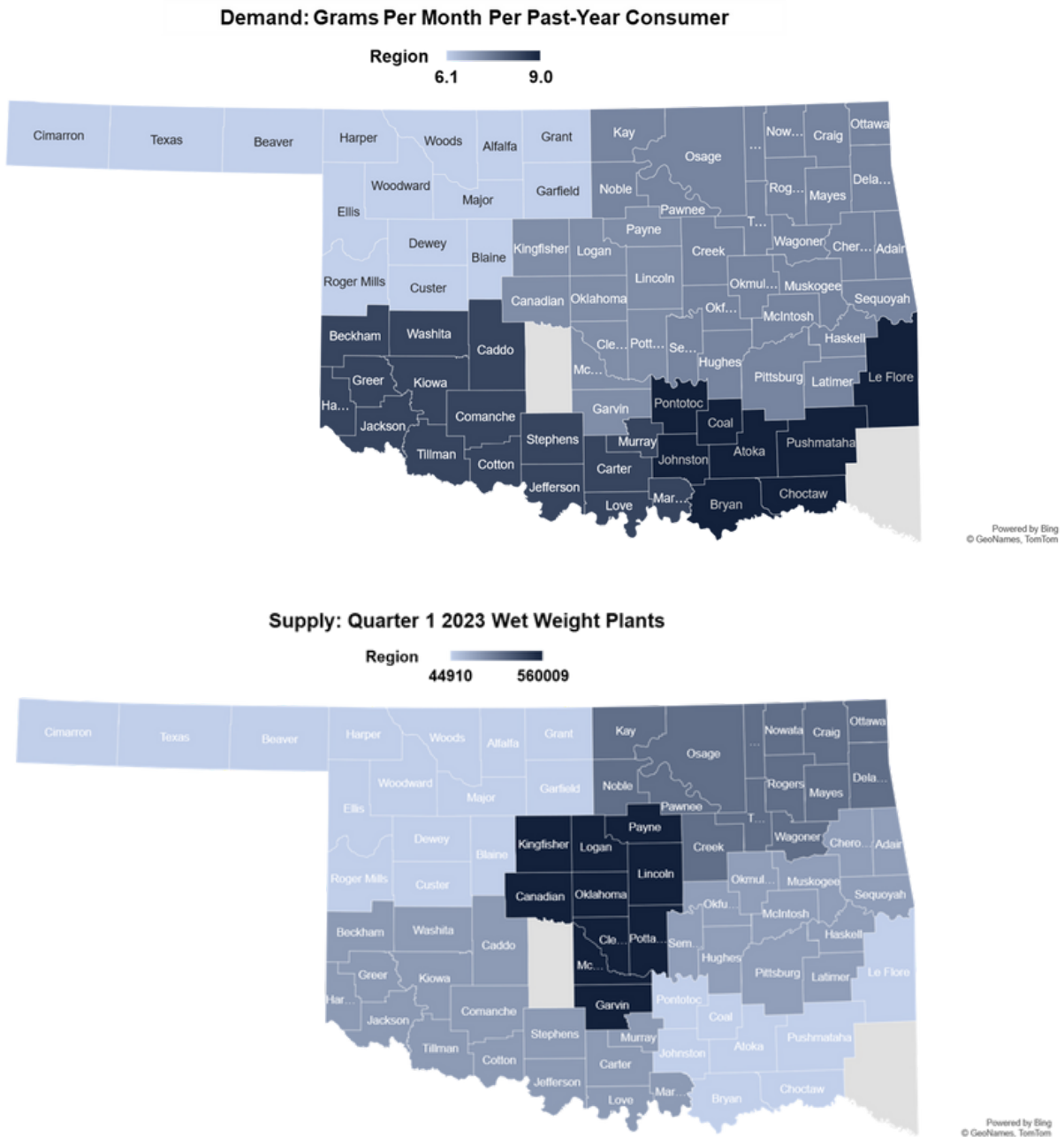
Consumer demand is relatively consistent across the state, even in regions where local origination of supply is low. In the top panel of Figure 5, average grams of cannabis purchased per week illustrates demand trends across the state. The relative lack of differences observed in the coloring between many of the regions compared to the supply heatmap shown below is reflective of the relative consistency in demand across Oklahoma. The highest demand is in the southeast region (9 grams/week), and the lowest demand is in the northwest region (6.1 grams/week). Notably, the overall range of average grams per week differs by just 2.9 grams at most from region to region, again suggesting that there is relatively consistent demand occurring across the state. This pattern of demand is consistent with the data reported in Table 4 regarding the percentages of consumption per subregion.

2

Cultivation (i.e., supply) is highly concentrated in the central region of the state. In the second map of Figure 5, average cannabis harvest weight reported by licensed growers in quarter 1 illustrates supply trends across the state. Notice that the largest amount of cannabis supply is generated in the central region (560,009 lbs.) and the lowest is in the southeast region (44,910 lbs.). Notably, the central region produced much higher amounts of cannabis, at over six times the amount produced in the other regions, on average.

Together, these findings highlight key differences between levels of supply relative to levels of demand that warrant further investigation. There are several possible explanations for these findings. For one, the land and real estate available in this region may be more conducive and less expensive for industrial facilities required for cultivation. Additionally, utilities such as electricity, gas, and water may be less expensive in this region. What may be more likely, or at least a confounding possibility, is that growers in the central region may be producing such large amounts of cannabis because they are fulfilling statewide demand. This level of product dispersion would require a robust transportation network operating out of central Oklahoma. Further, it is worthwhile to consider that the dispersion mechanisms needed to support such cross-state supply could also be utilized in transporting cannabis to supply out-of-state illicit markets, especially when considering this region serves as a major highway corridor with I-35, I-40, I-44, and US-69/75 running through it. Historically, these roads have served as important pathways for interstate trucking traffic. This may align with the narrative among Oklahoma residents and legislatures that substantial amounts of Oklahoma-cultivated cannabis are supplying out-of-state illicit markets.

Figure 5. Demand vs Supply Heatmaps



It is crucial to note that other factors that were not assessed may be contributing to these findings, and additional research and investigatory efforts are required before any clear statements can be made regarding illicitly diverting products out of state. Future research should use multiple timepoints of data for both demand and supply to identify the key factor(s) influencing the supply and demand differences we are seeing across regions.

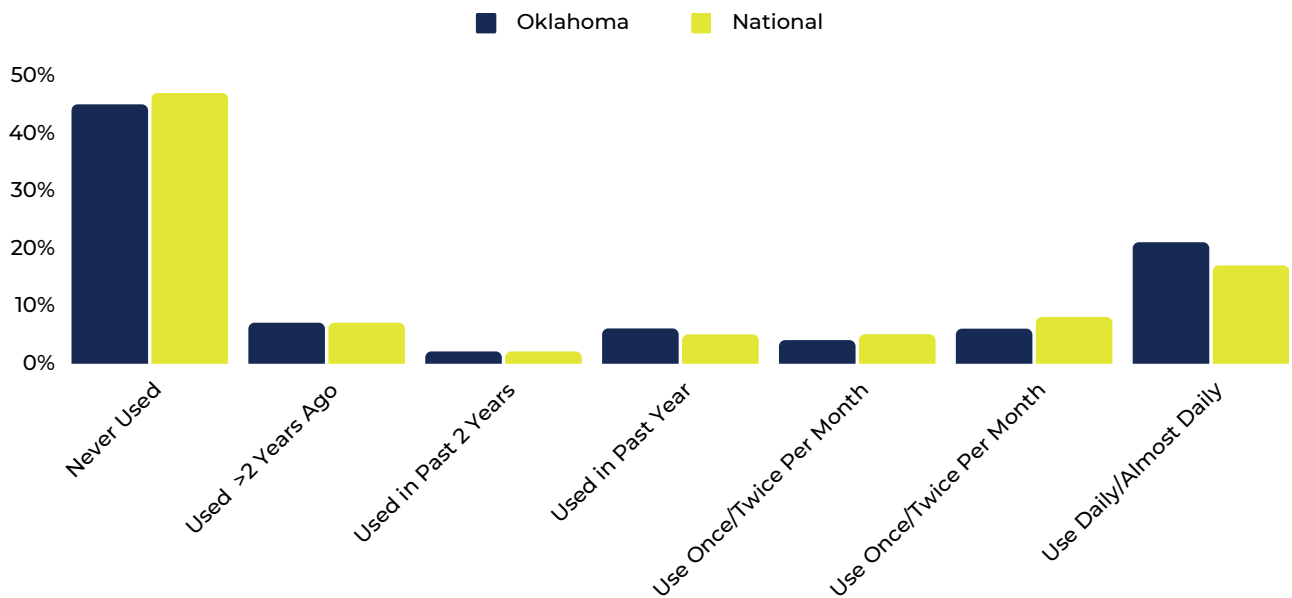
Section 5. Discussion

5.1 Interpretation of Demand Findings

The findings outlined in this report indicate a number of relevant takeaways that prompt further analysis and discussion. Additionally, many of the findings prepared in this study invalidate the veracity of narratives commonly expressed regarding the Oklahoma medical cannabis market. It is important to begin this discussion with the foundational understanding that demand in the state is generally behaving as expected, such that the distribution of cannabis demand across all sources does not noticeably deviate from other medical cannabis states analyzed by the investigators of this study. Importantly, the illicit medical market (non-patients using regulated cannabis sources) may reflect less demand than that of other states.¹² Additionally, cannabis use prevalence in Oklahoma is very similar to that of the United States in general. This can be seen in Figure 6 below, which provides an additional metric of total demand that suggests consistent demand in Oklahoma relative to the rest of the nation. However, the number of licensed medical cannabis patients reflects about 10% of the state population.

Figure 6. Cannabis Use Prevalence Benchmark

Cannabis Use Prevalence in General Population In Oklahoma and U.S.
(March 2023)



[12] Sofis, M., & Slade, M. (2022). *Maine office of cannabis policy cannabis markets & associated outcomes - Survey findings and implications*. Advocates for Human Potential, Inc. [1] *New York State Office of Cannabis Management. (2022). Inaugural Annual Report.* <https://cannabis.ny.gov/system/files/documents/2023/01/ocm-annual-report-2022.pdf>; https://maine.gov/dafs/ocp/sites/maine.gov.dafs.ocp/files/inline-files/Maine%20OCP%20AHP%20Report%2006-22_0.pdf

Though this percentage is still far less than the total past-year cannabis use prevalence and reflects less than half of daily consumers, this figure is very high compared to other state programs.¹³ These data points together suggest that the common narrative that Oklahoma has a “quasi–adult-use” cannabis market is likely untrue. However, the high number of patients is likely to be a direct result of not having a qualifying medical conditions list and therefore providing opportunities for potentially illegitimate medical patients to receive a license. We also know that 15% of illicit demand is satiated by licensed medical cannabis dispensaries, showing a gray market leak. However, that is only a portion of total illicit demand.



Cannabis demand in Oklahoma is generally behaving as expected, such that the distribution of cannabis demand across all sources does not noticeably deviate from other medical cannabis states analyzed by the investigators of this study.

5.2 Interpretation of Supply Findings

Regulated cannabis supply outpaces regulated medical cannabis demand by at least 32 times and could supply the total state demand 4.5 times over. To our knowledge, this is the largest oversupply of cannabis any state has demonstrated, including Oregon, which made headlines in 2019 for its significant oversupply issue.¹⁴ The oversupply issue observed in Oklahoma’s medical cannabis program is not a recent development. The design of the guiding medical cannabis program statute allowed such a problem to occur. Attempts to promote a free market in cannabis programs often result in the misguided establishment of cannabis programs without production management tools that can prevent or mitigate oversupply or undersupply issues. In this case, the absence of caps for cannabis cultivation licenses has contributed to an early and ongoing influx of growers despite a demand ceiling. Moreover, the inability to set limits on the volume of plants each grower may produce has contributed greatly to the issue of oversupply. A cannabis program void of any statutory or regulatory authority to place parameters on a supply chain is likely to experience oversupply to an exponential degree. Such is the case for Oklahoma.

In addition to the absence of production management tools embedded in laws, the barriers to entry and historical lack of enforcement may have worsened the oversupply problem. An application to become a grower in Oklahoma costs only \$2,500, well below other states. Importantly, this is the only fee associated with the license. Other states with legal cannabis programs include licensing fees in addition to application fees.¹⁵ As a license holds monetary value for resale, the license fee is typically much higher than the application fee, adding an additional barrier to entry. The cost of becoming licensed is significantly higher in legalized cannabis states with limited production management tools, reducing casual entry. While removing barriers to entry is typically a celebrated and encouraged policy for cannabis programs, when production management tools are absent it can contribute to a larger and unnecessary volume of licenses.

[13] Marijuana Policy Project. (n.d.) Medical cannabis patient numbers. Retrieved June 15, 2023, from <https://www.mpp.org/issues/medical-marijuana/state-by-state-medical-marijuana-laws/medical-marijuana-patient-numbers>

[14] Oregon Liquor Control Commission. (2019). 2019 Recreational marijuana supply and demand legislative report. [https://www.oregon.gov/olcc/marijuana/Documents/Bulletins/2019%20Supply%20and%20Demand%20Legislative%20Report%20FINAL%20for%20Publication%20\(PDFA\).pdf](https://www.oregon.gov/olcc/marijuana/Documents/Bulletins/2019%20Supply%20and%20Demand%20Legislative%20Report%20FINAL%20for%20Publication%20(PDFA).pdf)

[15] Skodzinski, N. (2021). Your state-by-state guide to cannabis cultivation business application and licensing fees. Cannabis Business Times. [1] Oregon Liquor Control Commission. (2019). 2019 Recreational marijuana supply and demand legislative report. [https://www.oregon.gov/olcc/marijuana/Documents/Bulletins/2019%20Supply%20and%20Demand%20Legislative%20Report%20FINAL%20for%20Publication%20\(PDFA\).pdf](https://www.oregon.gov/olcc/marijuana/Documents/Bulletins/2019%20Supply%20and%20Demand%20Legislative%20Report%20FINAL%20for%20Publication%20(PDFA).pdf)

Importantly, production management policies and low barriers to entry are not the only reasons oversupply may be so significant. In many cannabis markets, we are witnessing a supply glut that brings³³into question decision-making biases of growers, a theory that we are calling the Baggage Claim Problem.

In this behavioral economics and social dynamics theory, growers contribute to oversupply in an effort to remain competitive, without understanding that each increase in supply leads to a reckless chain reaction that effectively causes both the individual and the system to suffer. This is akin to picking up luggage at baggage claim at an airport. At a baggage claim, passengers tend to systematically inch closer to the rotating baggage carousel, which then induces others to do the same. This process creates a cycle wherein each passenger needs to keep moving closer in order to see sufficiently well enough to identify whether their luggage is coming close to their position. Growers may take such steps in increasing supply to attempt to advance their own positioning in the market, but by doing so, end up inducing or indirectly incentivizing others to take similar steps. However, once a few folks on a given end of the baggage claim move forward, those near those individuals need to do so as well to be able to also see the luggage going around the carousel. Then, those next to those second individuals must do the same, until there is a chain reaction, and everyone has moved up enough to prompt the first individual or individuals to do so again. At the end of this chain reaction, individuals closest to the carousel who recently found themselves at an advantage of being up front, are now caught in the congestion of others seeking to do the same. In the case of a baggage claim, inefficiencies ensue. In the case of growers, supply quickly becomes oversupply, and a state-confined market begins to weaken.



The design of Oklahoma's medical cannabis program statute enabled the issue of oversupply. Attempts to promote a free market in cannabis programs often result in the misguided establishment of cannabis programs without production management tools that can prevent or mitigate oversupply or undersupply issues.



Growers could be contributing to oversupply in an effort to remain competitive without understanding that each increase in supply leads to a chain reaction that effectively causes both the individual and the system to suffer.

5.3 Interpretation of Supply-to-Demand Ratio Findings

When analyzing the supply and demand for cannabis across the state of Oklahoma, there is one critical insight that warrants additional discussion. Regulated supply is outpacing demand so significantly that it is highly unlikely for there to be a local illicit cultivation market competing against the licensed growers. The sheer volume of regulated oversupply, paired with the low barriers to entry and absence of production management tools, suggests that the illicit market suppliers, whether supplying in or out of state, are much more likely to be licensed than unlicensed.

There are behavioral justifications for this assumption as well. Our “hiding in plain sight” theory revolves around perception filters. A grower may feel much less exposed to risk of enforcement if licensed, for a few reasons. For one, historical enforcement of the medical cannabis program had been minimal under prior OMMA leadership. From some accounts provided, regulatory capture may have been an ongoing issue. Regulatory capture is a political and economic term describing scenarios in which compliance and enforcement efforts of regulators become contaminated by stakeholder influence of the industry being regulated. While these accounts are hearsay, they remain plausible.

Additionally, at the time of writing this paper, there are close to 7,000 cultivators spanning almost 70,000 square miles. The amount of enforcement staff and funding necessary to regularly oversee these businesses is unattainable. As such, the perceived risk of being “caught” is likely low. Data from Oklahoma’s Bureau of Narcotics and Dangerous Drugs (OBND) support this theory, estimating that about 2,000 licensees are obtained fraudulently or are masking illicit sales.¹⁶



The sheer volume of regulated oversupply, paired with the low barriers to entry and absence of production management tools, suggests that the illicit market suppliers, whether supplying in or out of state, are much more likely to be licensed than unlicensed.

[16] *MJBizDaily*. (2023). *Illicit medical marijuana operators in Oklahoma targeted by new law*. <https://mjbizdaily.com/illicit-medical-marijuana-operators-in-oklahoma-targeted-by-new-law/>

Conclusion

This study suggests that cannabis demand is behaving as expected across Oklahoma; however, oversupply is so significant that it is likely to pose an immediate threat to public safety. Since the installation of new program leadership, and since the date of recruitment of this study (April & March 2023), OMMA, OBNDD, and the legislature have taken multiple actions to address the main issues identified in the discussion section of this report, including but not limited to the following:

-  Pursuing production management tools such as extending the moratorium on cultivation licenses until 2026
-  Incorporating a tiering system of cultivation to better track and account for supply
-  Using sophisticated regulatory technology to identify priority areas for enforcement and the use of enforcement staff ¹⁷
-  Increasing enforcement and program staff presence regionally to address license sprawl
-  Authorizing officers to seize and destroy cannabis product that is unaccounted for in track-and-trace systems
-  Permitting unscheduled inspections from state policy officers
-  Authorizing the investigation and enforcement of any violations of the laws regarding medical marijuana, including medical marijuana business licenses held by commercial growers, processors, transporters, researchers, education facilities, and waste disposal facilities

These vast efforts are anticipated to improve the supply-to-demand ratios observed in this study. Using the outcomes identified in this study as a baseline, OMMA plans to test and evaluate the effectiveness of these efforts over multiple time periods. Such research is vital not only for Oklahoma, but for other programs that are likely to encounter similar issues.

[17] NCS Analytics (n.d.). Retrieved June 15, 2023, from [1] [MJBizDaily, \(2023\), Illicit medical marijuana operators in Oklahoma targeted by new law, https://mjbizdaily.com/illegal-medical-marijuana-operators-in-oklahoma-targeted-by-new-law/](https://mjbizdaily.com/illegal-medical-marijuana-operators-in-oklahoma-targeted-by-new-law/)