Trends in U.S. Medical Cannabis Registrations, Authorizing Clinicians, and Reasons for Use From 2020 to 2022

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Abstract

Background: As medical cannabis availability increases, up-to-date trends in medical cannabis licensure can inform clinical policy and care.

Objective: To describe current trends in medical cannabis licensure in the United States.

Design: Ecological study with repeated measures.

Setting: Publicly available state registry data from 2020 to 2022.

Participants: People with medical cannabis licenses and clinicians authorizing cannabis licenses in the United States.

Measurements: Total patient volume and prevalence per 10 000 persons in the total population, symptoms or conditions qualifying patients for licensure (that is, patient-reported qualifying conditions), and number of authorizing clinicians.

Results: In 2022, of 39 jurisdictions allowing medical cannabis use, 34 reported patient numbers, 19 reported patient-reported qualifying conditions, and 29 reported authorizing clinician numbers. Enrolled patients increased 33.3% from 2020 (3 099 096) to 2022 (4 132 098), with a corresponding 23.0% increase in the population prevalence of patients (175.0 per 10 000 in 2020 to 215.2 per 10 000 in 2022). However, 13 of 15 jurisdictions with nonmedical adult-use laws had decreased enrollment from 2020 to 2022. The proportion of patient-reported qualifying conditions with substantial or conclusive evidence of therapeutic value decreased from 70.4% (2020) to 53.8% (2022). Chronic pain was the most common patient-reported qualifying condition in 2022 (48.4%), followed by anxiety (14.2%) and posttraumatic stress disorder (13.0%). In 2022, the United States had 29 500 authorizing clinicians (7.7 per 1000 patients), 53.5% of whom were physicians. The most common specialties reported were internal or family medicine (63.4%), physical medicine and rehabilitation (9.1%), and anesthesia or pain (7.9%).

Limitation: Missing data (for example, from California), descriptive analysis, lack of information on individual use patterns, and changing evidence base.

Conclusion: Enrollment in medical cannabis programs increased overall but generally decreased in jurisdictions with nonmedical adult-use laws. Use for conditions or symptoms without a strong evidence basis continues to increase. Given these trends, more research is needed to better understand the risks and benefits of medical cannabis.

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As of August 2023, 38 states and Washington, DC, have legalized medical cannabis and 23 states and Washington, DC, have legalized cannabis for nonmedical adult use for any purpose (1). However, under the federal Controlled Substances Act, cannabis is designated as a schedule I drug—a class with no accepted medical use (2). This designation has significantly contributed to barriers to research on the health effects of cannabis in the United States, leaving patients, health care professionals, and policymakers with minimal

evidence to make science-based decisions about cannabis (2). In addition, many physicians receive inadequate education on medical cannabis (3) and are uncomfortable working with patients who use cannabis (4). There is increasing cultural acceptance of cannabis, recognition of the harm of the "war on drugs" (for example, mass incarceration and related consequences, such as family separation, trauma, and economic loss) (5), and interest in the potential therapeutic properties of cannabis (2, 6, 7). With this backdrop, the Department of Health and Human Services recently recommended that cannabis be rescheduled to schedule III (8). Given this potential federal policy shift, which would acknowledge therapeutic potential of cannabis and reduce research barriers, understanding the current national landscape of medical cannabis use and authorization patterns is essential to help inform future public health efforts related to cannabis.

Our team previously showed that the number of U.S. patients licensed for medical cannabis has grown dramatically, from 678 408 patients in 2016 to nearly 3 million in 2020 (9). Jurisdiction-level data on medical cannabis programs became available in 1999, and chronic pain remained the most common medical symptom or condition for medical cannabis licensure from 1999 to 2020, typically accounting for more than 60% of all patients (9, 10). However, to better understand the rapidly expanding population of patients licensed for medical cannabis and the preponderance of licensure for pain, more nuanced jurisdiction-level data on clinicians recommending medical cannabis are needed across the country. In the current study, our goal was to provide an update to these previously reported trends and describe national trends in medical cannabis licensure through 2022 because 4 additional states have legalized medical cannabis and 10 have legalized nonmedical adult-use cannabis since 2020. We provide updates on the reported total number of patients licensed for medical cannabis, medical symptoms or conditions for which patients obtain licensure, and enrollment changes in states with and without nonmedical adult-use legislation. We also provide the first estimates (to our knowledge) of the number and specialties of clinicians authorizing medical cannabis per jurisdiction and overall in U.S. jurisdictions.

METHODS

Definitions

We drew from and expanded on the definitions used in previous reports (9, 10). *Patients* are people enrolled in medical cannabis programs. *Qualifying conditions* are state-, territory-, or district-recognized medical conditions for which *authorizing clinicians* (for example, with a Doctor of Medicine [MD], Doctor of Osteopathic Medicine [DO], or Nurse Practitioner [NP] degree, depending on the jurisdiction) may certify patients to obtain cannabis licenses, which allow patients to grow cannabis or purchase it in legal dispensaries. *Patient-reported qualifying conditions* refer to conditions or symptoms reported by patients to obtain their medical cannabis license. Authorizing clinicians may certify that a patient has 1 or more qualifying conditions, which may result in more patient-reported qualifying conditions than total patients in a given jurisdiction. All jurisdictions included in this analysis have medical cannabis laws and active medical dispensaries. Those with active, nonmedical, adult-use dispensaries as of 2022 or earlier are defined as *adult-use jurisdictions*, whereas those without such dispensaries are defined as *medical-only jurisdictions.*

Data Collection

As of June 2023, we collected medical cannabis registry data from publicly available reports, data requests (including Freedom of Information Act requests), and communications with departments overseeing medical cannabis programs (9, 10) from Washington, DC, and the 38 states with legal medical cannabis: Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Illinois, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Virginia, Washington, and West Virginia. Kentucky and Alabama had inactive programs during the study period and were excluded from further analyses. There were no data in the reporting period from Alaska or Louisiana. Mississippi, South Dakota, and West Virginia had programs become active during the study period and thus reported data only in 2022. Similarly, Virginia reported data only in 2021 and 2022 because the program became active during the study period. We excluded California because it has a voluntary registry that may not be accurate, demonstrated by the mere 113 862 patients reported cumulatively from program inception in 1996 through 2021. Unlike in previous reports (9, 10), data from Maine are now included because their reporting has subsequently improved. See Supplement Table 1 (available at Annals.org) for data sources.

The University of Michigan did not require institutional review board approval because this study used publicly available data sets without any identifiable information. This activity was reviewed by the Centers for Disease Control and Prevention and deemed not research, and its conduct was consistent with applicable federal law and Centers for Disease Control and Prevention policy.

Patient-Reported Qualifying Condition Classifications

As described previously and with assistance from a licensed physician (9, 10), we organized patient-reported qualifying conditions into categories of evidence for efficacy of a therapeutic effect of cannabis from the 2017 National Academies of Sciences, Engineering, and Medicine (NASEM) report on the health effects of cannabis and cannabinoids (2) (Supplement Table 2, available at Annals.org). Chemotherapy-induced nausea and vomiting, chronic pain in adults, and multiple sclerosis–related spasticity were the only conditions or symptoms that the NASEM report rated as having substantial or conclusive evidence of efficacy, with most other conditions rated as having limited (for example, anxiety and posttraumatic stress disorder [PTSD]) or insufficient (for example, cancer) evidence.

Authorizing Clinician Classifications

We classified authorizing clinicians by degree and by specialty, if known (Supplement Table 3, available at Annals.org).

Statistical Analysis

We first documented the total number of patients per jurisdiction from 2020 to 2022 and calculated patient enrollment rates per 10000 persons in the population using year-specific estimates of jurisdiction population from the U.S. Census (11). Given the documented

relationship between nonmedical adult-use cannabis laws and decreasing enrollment in medical cannabis programs (9), we compared enrollment per 10000 persons in the population in medical-only compared with adult-use jurisdictions. Next, we characterized patterns in patient-reported qualifying conditions from 2020 to 2022 by NASEM category (2), with special focus on conditions with substantial or conclusive evidence of efficacy (chemotherapy-induced nausea and vomiting, chronic pain, and multiple sclerosis), those with rapidly changing prevalence, and those with a medication approved by the U.S. Food and Drug Administration (such as Epidiolex [Jazz Pharmaceuticals] for treatment-refractory forms of epilepsy). Finally, we characterized the total number of authorizing clinicians per jurisdiction and per 1000 patients from 2020 through 2022. We also provide granular detail on physician degree type and specialty where available.

Of note, although some jurisdictions did not provide data for all time points in all analyses, we present results using all available data to provide an accurate, up-to-date picture of medical cannabis licensure and authorizing clinicians for licensure in the United States, even though the total number of jurisdictions fluctuated year by year.

Role of the Funding Source

The National Institute on Drug Abuse had no role in the design or conduct of the study; collection, management, analysis, or interpretation of data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

RESULTS

In 2022, of the 39 jurisdictions allowing medical cannabis use, 34 (87.2%) reported the number of patients (Table 1) and 18 (48.7%) reported the number of patient-reported qualifying conditions (Figure 1). However, some jurisdictions reported data only in certain years, did not report complete data (such as Illinois, which reported cumulative patient totals but not cumulative patient-reported qualifying conditions), or did not consistently publish reports. For example, New York published biennial reports in 2016, 2018, and 2022 but not 2020. Data sources are shown in Supplement Table 1.

Total patient number increased by 33.3% during the study period, from 3 099 096 in 2020 (in 30 reporting jurisdictions) to 4 132 098 in 2022 (in 34 reporting jurisdictions), with a 23.0% increase in the population prevalence of patients licensed for medical cannabis in this same period (175.0 per 10 000 in 2020 to 215.2 per 10 000 in 2022) (Table 1). In medical-only jurisdictions, the number of patients generally increased or stayed the same during this period; overall, it increased from 206.9 to 300.6 patients per 10 000 from 2020 to 2022 (Table 1). By contrast, only 2 adult-use jurisdictions had increasing enrollment (Massachusetts and Maine), whereas 13 (Arizona, Colorado, Illinois, Michigan, Montana, Nevada, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, and Washington) had decreasing enrollment by the end of the study period after the opening of adult-use dispensaries. Adult-use jurisdictions had 146.5 patients per 10 000 persons in the population in 2020 compared with 124.8 in 2022 (Table 1). This decreasing enrollment was most dramatic in Arizona, which had 295 295 patients in 2020 (411.3 per 10 000 persons in the population) and only 129 836 in 2022 (176.4 per 10 000) after the adult-use

law was implemented in 2021. Overall, the ratio of the prevalence of patients in medical-only to adult-use jurisdictions increased from 1.4 in 2020 (206.9 vs. 146.5 patients per 10 000 persons in the population) to 2.4 in 2022 (300.6 vs. 124.8 patients per 10 000).

Chronic pain remained the most common patient-reported qualifying condition during the study period but decreased from 1 119 678 instances (65.7% of all patient-reported qualifying conditions) in 2020 to 934 603 (48.4%) in 2022 (Figure 1). The second and third most common patient-reported qualifying conditions in 2022 were anxiety (14.2%) and PTSD (13.0%), respectively; reports of anxiety increased 53-fold from 2020 to 2022 (5067 to 274 556). Overall, the percentage of reported conditions for which cannabis has substantial or conclusive evidence of therapeutic value according to the 2017 NASEM report decreased from 70.4% in 2020 to 53.8% in 2022 (Figure 2). The number of conditions in the "other" category (such as Sjögren syndrome, cerebral palsy, muscular dystrophy, and psychiatric conditions) increased considerably, with substantial contributions from vague categories, such as "all other conditions."

In the United States, 29 of 39 jurisdictions with active programs (74.3%) reported data on authorizing clinicians in 2022 compared with 24 of 35 jurisdictions with active programs (68.6%) in 2020 (Table 2). There were 29 500 reported clinicians as of 2022 compared with 29 552 in 2020. When we limited states to those that released authorizing clinician data each year (2020 to 2022) and included states whose programs became active during the time frame, the number of authorizing clinicians increased from 24 252 in 2020 to 26 208 in 2022. Overall, in 2022 there were more authorizing clinicians per patient in nonmedical adult-use jurisdictions (12.9 clinicians per 1000 patients) than in medical-only jurisdictions (6.1 clinicians per 1000 patients). There was considerable heterogeneity in the number of authorizing clinicians per patient, ranging from 0.8 clinicians per 1000 patients in Oklahoma to 109 clinicians per 1000 patients in Mississippi (Table 3). In 2022, 53.5% of authorizing clinicians had an MD or DO degree (most of whom were described generally as "physician" in registry reports), 34.4% had an NP degree, and 11.0% were physician assistants. In the 4 jurisdictions that provided data on medical specialties, the most common in 2022 were family or internal medicine (63.4%), physical medicine and rehabilitation (9.1%), and anesthesia or pain (7.9%).

Discussion

These findings provide the most up-to-date estimates of the number of patients licensed to receive medical cannabis in the United States, as well as the most complete data set on clinicians who authorized medical cannabis. From 2020 to 2022, the total number of reported patients increased 33.3%. Combined with data from our previously published report (9), this analysis indicates a 610% increase in patient number in the United States from 2016 to 2022. The increased number of patients since 2020 was likely driven by the passage of new medical cannabis laws and increasing enrollment in existing programs —largely medical-only programs (9). Indeed, most jurisdictions with active laws allowing nonmedical adult use reported decreased enrollment. This decrease may result from patients opting out because they no longer need legal cover for nonmedical adult use, because of licensing fees or the inconvenience of certification visits, or because they are using

nonmedical adult-use products medically (12). Rapid growth in patient numbers also likely reflects increasing acceptance of cannabis: A 2022 national Pew poll reported that 88% of Americans agreed that cannabis should be legal for medical purposes (13). Further, the study period encompassed the COVID-19 pandemic, during which many medical cannabis markets were designated "essential" industries, thereby increasing access through curbside pickup, delivery services, and telemedicine visits for licensure (14).

The proportion of patient-reported qualifying conditions with a substantial or conclusive evidence basis decreased from 70.4% (2020) to 53.8% (2022), partly driven by increasing licensure for anxiety and PTSD in 2022 (limited evidence; 14.2% and 13.0% of conditions, respectively). In addition, incomplete reporting of medical conditions for licensure (that is, "other conditions" in Figure 2) resulted in increased numbers of patients indicating conditions that lacked a substantial or conclusive evidence basis because vague categories, such as "all other medical conditions," cannot be evaluated for efficacy. The COVID-19 pandemic may have affected the number of people who obtained cannabis licensure for anxiety and PTSD because pandemic-related stress often resulted in worsened mental health conditions (15). Some studies have suggested associations between the pandemic and increased cannabis use, especially among people with mental health conditions (16, 17). The increase in licensure for anxiety (5067 in 2020 to 274 556 in 2022) is likely also due to jurisdictions with large patient populations and newer laws, such as Pennsylvania, allowing licensure for anxiety. Chronic pain remained the most common patient-reported qualifying condition, constituting 65.7% of total conditions in 2020 and 48.4% in 2022. This finding may be due to the high population prevalence of chronic pain (18) and the fact that it is commonly comorbid with other patient-reported qualifying conditions, such as cancer or multiple sclerosis (19). Further, inadequate relief from conventional pain medications (20, 21), including opioids (22, 23), has led some patients to seek alternative treatment options (24). Indeed, a growing body of observational literature shows that some people substitute cannabis for pain medications, largely because of fewer reported adverse effects and better symptom management (24–26). These findings have contributed to legislative updates allowing cannabis in place of opioids or other pain medications (27).

The authorizing clinician data in the current study provide a complementary angle to view national medical cannabis trends. The range in number of clinicians per jurisdiction may reflect differential requirements for authorizing cannabis. For instance, an analysis of the 34 jurisdictions (33 states and Washington, DC) with medical cannabis laws in 2019 showed that only 9 states and Washington, DC, required clinicians to register with a state or jurisdiction program to certify patients and only 9 jurisdictions required the clinician to complete a course or training to certify patients (28). The clinical support received by medical patients from their authorizing clinician may also differ because authorization volumes vary widely, exemplified by data from Colorado's registry in 2021, where 67.8% of authorizing clinicians (221 of 326) recommended cannabis for 20 or fewer patients and 7.7% (25 of 326) authorized it for 1000 or more patients (29). The top 3 clinicians in Colorado wrote 6538, 6340, and 6170 recommendations for medical cannabis in 2021 alone. Last, we note that on average, medical-only jurisdictions have substantially fewer authorizing clinicians per 1000 patients: 6.1 in 2022 compared with 12.9 in adult-use jurisdictions. This may be because medical-only jurisdictions have more licensed patients on average.

It may also be a function of program longevity: Adult-use jurisdictions typically have longer-standing programs, and clinicians may become comfortable authorizing cannabis due to the more accepting cultural context.

Our results highlight the need for better surveillance methods to adequately understand outcomes of medical cannabis use and thoughtful strategies and public health efforts to reduce harms from increased cannabis availability. The Food and Drug Administration has not approved any cannabinoid-based products for the most common patient-reported qualifying conditions. Therefore, real-world data collection on health outcomes among patients licensed for medical cannabis (for example, in Florida [30], Minnesota [31], and the United Kingdom [32]) could aid in the development of cannabis therapeutics, such as by increasing understanding of which formulations or cannabinoid content are useful or harmful in specific populations. To limit negative health effects associated with cannabis use, the following could be considered: implementing appropriate safety and delta-9-tetrahydrocannabinol concentration testing for cannabis products, clarifying the uncertain boundaries between medical and nonmedical markets, and increasing education and training for clinicians and cannabis dispensary employees (33). In addition, despite increased use of cannabis for medical and nonmedical purposes, enforcement of cannabis prohibition continues to disparately affect groups that have been marginalized for racial or socioeconomic reasons (5, 34).

This study has some limitations. Contents of registry reports are inconsistent and may vary by year (for example, Illinois did not report the number of authorizing physicians after 2020). The limited jurisdictions included may not generalize to other jurisdictions in the United States, especially for reports of patient-reported qualifying conditions. We also drew data from varied sources, such as Freedom of Information Act requests and program websites, which may affect data quality. California's lack of reliable data and omission from the current analysis biases our results because it has the oldest medical cannabis program and the largest population of any jurisdiction. Because we used aggregated reports rather than individual-level data, we have no information on the primary patient-reported qualifying condition for each patient, outcomes of use, or why some patients chose not to renew their licenses after nonmedical adult-use laws were implemented. We classified the specialty of authorizing clinicians on the basis of their most advanced clinical training, which may lose some granularity in aggregate. Last, although the NASEM report is the most comprehensive data source on cannabis efficacy for health conditions, these categories are imperfect for the following 3 reasons. First, they are broad. Second, the studies included in the 2017 NASEM report used products that do not generalize to those in the legal cannabis marketplace because products in the existing market generally do not meet standards for pharmaceutical-grade manufacturing practices, they have different formulations (for example, no dispensaries sell synthetic delta-9-tetrahydrocannabinol [that is, dronabinol]), and the delta-9-tetrahydrocannabinol and cannabidiol concentrations in cannabis flower in existing clinical trials are far lower than what is found in the marketplace. And third, as research continues, cannabinoids are being shown to be effective for more conditions, such as cannabidiol for Lennox–Gastaut syndrome and Dravet syndrome (35, 36). This categorization scheme is especially imperfect for chronic pain given the heterogeneity of

clinical presentations and the variability in treatment response depending on underlying mechanism (37).

In conclusion, among jurisdictions with available data, medical cannabis licensure has increased since 2020, from 3 099 096 patients (175.0 per 10 000 persons in the population) to 4 132 098 patients (215.2 per 10 000) in 2022. However, licensure decreased in 13 of 15 adult-use jurisdictions. The number of authorizing clinicians varied widely by jurisdiction, with approximately 7.7 authorizing clinicians per 1000 licensed patients overall. The percentage of patient-reported qualifying conditions without a substantial evidence basis increased from 29.6% (2020) to 46.2% (2022). Although chronic pain remains the most common patient-reported qualifying condition, this finding should be interpreted with caution given the broad nature of this category and the heterogeneity of chronic pain (38). Improved reporting efforts from states on patient characteristics (such as cannabis use patterns and length of use) as well as clinician credentials and training may help enhance understanding of this rapidly shifting medical cannabis use landscape. Much work is needed to enhance research and develop clinical guidance for appropriate medical cannabis use.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Grant Support:

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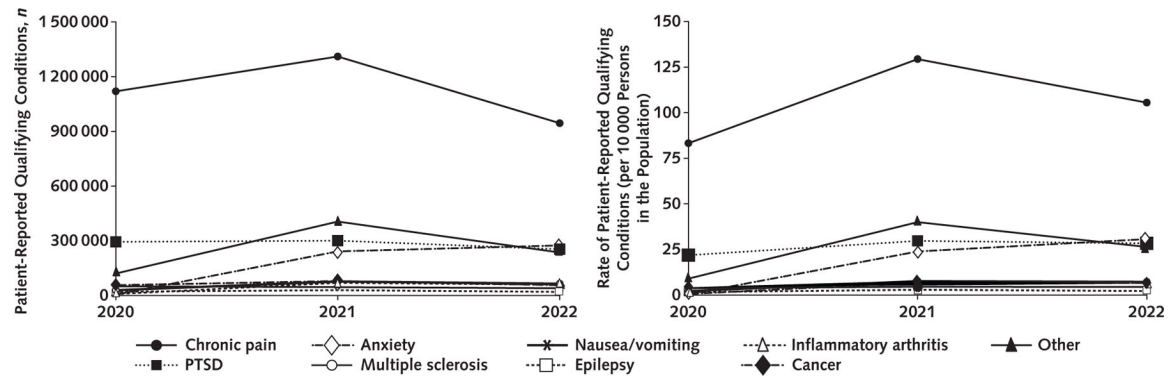
Figure 1. Changes in patient-reported qualifying conditions, 2020–2022.

In some states, patients could report >1 qualifying condition or symptom. The years for which each state contributed data are as follows. 2020: Alaska (AK), Arizona (AZ), Arkansas (AR), Colorado (CO), Connecticut (CT), Delaware (DE), Florida (FL), Hawaii (HI), Illinois (IL), Maryland (MD), Michigan (MI), Minnesota (MN), Missouri (MO), Montana (MT), Nevada (NV), New Hampshire (NH), New Jersey (NJ), New Mexico (NM), North Dakota (ND), Ohio (OH), Oregon (OR), Pennsylvania (PA), Rhode Island (RI), Utah (UT), Virginia (VA), Washington, DC (DC), and Washington (WA). 2021: AZ, AR, CO, DE, HI, IL, MD, MI, MN, MO, MT, NV, NH, NM, ND, OH, OR, PA, RI, and UT. 2022: AZ, AR, CO, DE, HI, MD, MI, MN, MT, NV, NH, NM, New York (NY), ND, OR, PA, RI, and UT. PTSD= posttraumatic stress disorder.
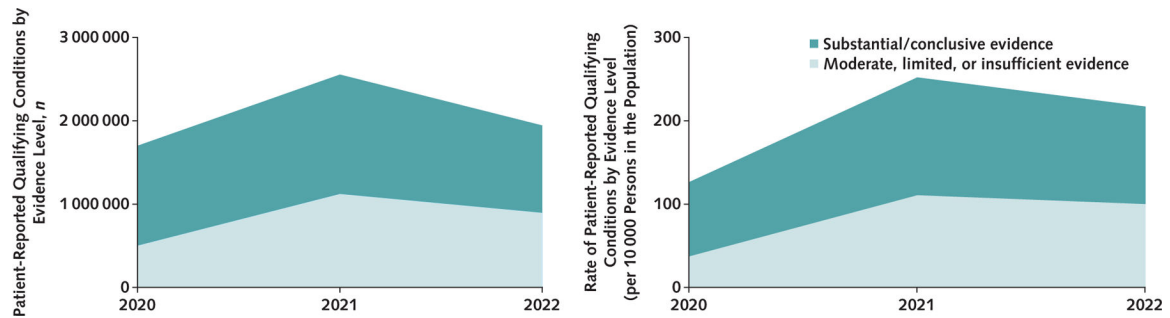
Figure 2. Trends in conditions or symptoms for medical cannabis use, 2020–2022, by strength of evidence per the 2017 NASEM report.

Conditions with substantial or conclusive evidence per the 2017 NASEM report are shown in dark green; other conditions have moderate, limited, or insufficient evidence. These classifications are contested, especially for chronic pain. The years for which each state contributed data are as follows. 2020: Alaska (AK), Arizona (AZ), Arkansas (AR), Colorado (CO), Connecticut (CT), Delaware (DE), Florida (FL), Hawaii (HI), Illinois (IL), Maryland (MD), Michigan (MI), Minnesota (MN), Missouri (MO), Montana (MT), Nevada (NV), New Hampshire (NH), New Jersey (NJ), New Mexico (NM), North Dakota (ND), Ohio (OH), Oregon (OR), Pennsylvania (PA), Rhode Island (RI), Utah (UT), Virginia (VA), Washington, DC (DC), and Washington (WA). 2021: AZ, AR, CO, DE, HI, IL, MD, MI, MN, MO, MT, NV, NH, NM, ND, OH, OR, PA, RI, and UT. 2022: AZ, AR, CO, DE, HI, MD, MI, MN, MT, NV, NH, NM, New York (NY), ND, OR, PA, RI, and UT. NASEM= National Academies of Sciences, Engineering, and Medicine.

Table 1.

Patients Licensed for Medical Cannabis and Number of Patients per 10 000 Persons in the Population, by Jurisdiction, 2020–2022

State[*]	Patients (Rate), *n*[†]		
	2020	**2021**	**2022**
Medical-only states			
Arkansas	66 638 (221.1)	92 417 (305.2)	85 192 (279.7)
Connecticut	49 562 (137.8)	53 607 (147.9)	50 068 (138.1)
Delaware	15 495 (156.2)	19 672 (195.8)	23 939 (235.1)
Florida	456 594 (211.5)	656 370 (300.7)	778 781 (350.1)
Hawaii	30 868 (212.7)	34,125 (235.8)	33 424 (232.1)
Louisiana	ND	ND	ND
Maryland	121 994 (197.6)	146 836 (237.8)	162 863 (264.2)
Minnesota	28 522 (50)	29 420 (51.5)	39 577 (69.2)
Mississippi	PI	PI	1321 (4.5)
Missouri	69 397 (112.8)	156 008 (252.9)	204 165 (330.5)
New Hampshire	10 688 (77.5)	12 237 (88.2)	13 634 (97.7)
North Dakota	3233 (41.5)	5754 (74)	7958 (102.1)
Ohio	176 387 (149.5)	237 613 (202)	330 280 (280.9)
Oklahoma	367 053 (925.8)	384 500 (963.4)	374 077 (930.6)
Pennsylvania	306 291 (235.7)	389 147 (299.1)	712 421 (549.2)
South Dakota	PI	PI	5619 (61.8)
Utah	16 096 (49.0)	37 683 (112.9)	61 991 (183.4)
Virginia	PI	35 832 (41.4)	45 000 (51.8)
Washington, DC	9618 (143.4)	12 368 (184.9)	26 120 (388.8)
West Virginia	PI	PI	11 489 (64.7)
Total patients in medical-only states	1 728 436 (206.9)	2 303 589 (248.8)	2 967 919 (300.6)
Adult-use states			
Alaska	ND	ND	ND
Arizona	295 295 (411.3)	266 850 (367.3)[‡]	129 836 (176.4)
California	VR	VR	VR
Colorado	85 814 (148.3)	86 460 (148.8)	71 536 (122.5)

State*

	Patients (Rate), *n*[†]		
	2020	**2021**	**2022**
Illinois	121 775 (95.2)[‡]	161 059 (127.0)	138 231 (109.9)
Maine	96 046 (704.4)[‡]	105 143 (763.4)	106 164 (766.3)
Massachusetts	92 240 (131.9)	97 003 (138.8)	97 003 (138.9)
Michigan	243 372 (241.7)	237 741 (236.9)	179 863 (179.3)
Montana	41 638 (383.0)	40 147 (362.9)	26 886 (239.4)[‡]
Nevada	13 303 (42.7)	13 733 (43.6)	12 806 (40.3)
New Jersey	81 111 (87.5)	122 337 (132.0)	114 401 (123.5)[‡]
New Mexico	104 655 (494.0)	129 248 (610.6)	112 426 (532.0)[‡]
New York	133 362 (66.3)	151 653 (76.4)	124 421 (63.2)[‡]
Oregon	22 603 (53.2)	21 876 (51.4)	17 957 (42.4)
Rhode Island	19 803 (180.6)	19 369 (176.6)	16 552 (151.3)[‡]
Vermont	4749 (73.9)	4767 (73.7)	3975 (61.4)[‡]
Washington (state)	14 894 (19.3)	14 092 (18.2)	12 122 (15.6)
Total patients in adult-use states	1 370 660 (146.5)	1 471 478 (157.5)	1 164 179 (124.8)
Total patients	3 099 096 (175.0)	3 775 067 (203.0)	4 132 098 (215.2)

ND = no data available from active program; PI = program inactive, resulting in no data; VR = voluntary registry, resulting in unreliable data.

*
States are classified as adult-use states if nonmedical adult-use sales began in 2022 or earlier.

[†]
Reported as total number of patients (number of patients per 10 000 persons in the state population). Rates are reported using U.S. Census population estimates each year. For row column totals, rates are calculated weighting by state-level populations.

[‡]
Adult-use dispensary sales began in this jurisdiction in this year. Sales began before 2020 in Colorado (2014), Massachusetts (2018), Michigan (2019), Nevada (2017), Oregon (2015), and Washington (state) (2014).

Table 2.

Number of Authorizing Clinicians and Number of Clinicians per 1000 Patients, by Jurisdiction, 2020–2022

State[*]	Clinicians (Rate), $n^{\dagger}$		
	2020	**2021**	**2022**
Medical-only states			
Arkansas	819 (12.3)	960 (10.4)	989 (11.6)
Connecticut	1358 (27.4)	1509 (28.1)	1606 (32.1)
Delaware	478 (30.8)	467 (23.7)	610 (25.5)
Florida	2733 (6)	2838 (4.3)	2634 (3.4)
Hawaii	189 (6.1)	363 (10.6)	380 (11.4)
Louisiana	ND	ND	ND
Maryland	2046 (16.8)	1511 (10.3)	1544 (9.5)
Minnesota	1831 (64.2)	2080 (70.7)	2303 (58.2)
Mississippi	PI	PI	144 (109)
Missouri	600 (8.6)	457 (2.9)	593 (2.9)
New Hampshire	1231 (115.2)	1273 (104)	1336 (98.0)
North Dakota	275 (85.1)	297 (51.6)	340 (42.7)
Ohio	672 (3.8)	667 (2.8)	648 (2)
Oklahoma	ND	282 (0.7)	286 (0.8)
Pennsylvania	1349 (4.4)	1337 (3.4)	1812 (2.5)
South Dakota	PI	PI	184 (32.7)
Utah	560 (34.8)	781 (20.7)	895 (14.4)
Virginia	PI	950 (26.5)	1110 (24.7)
Washington, DC	645 (67.1)	602 (48.7)	643 (24.6)
West Virginia	PI	PI	104 (9.1)
Total clinicians in medical-only states	14 786 (10.9)	16 374 (7.1)	18 161 (6.1)
Adult-use states			
Alaska	ND	ND	ND
Arizona	962 (3.3)	702 (2.6)	801 (6.2)
California	ND	ND	ND
Colorado	439 (5.1)	326 (3.8)	306 (4.3)

State[*]	Clinicians (Rate), n[†]		
	2020	**2021**	**2022**
Illinois	5300 (43.5)	ND	ND
Maine	611 (6.4)	649 (6.2)	824 (7.8)
Massachusetts	366 (4)	358 (3.7)	358 (3.7)
Michigan	1525 (6.3)	1363 (5.7)	1199 (6.7)
Montana	399 (9.6)	353 (8.8)	253 (9.4)
Nevada	849 (63.8)	924 (67.3)	979 (76.4)
New Jersey	ND	ND	1464 (12.8)
New Mexico	ND	ND	ND
New York	3087 (23.1)	3482 (23)	3859 (31)
Oregon	1228 (54.3)	1199 (54.8)	1296 (72.2)
Rhode Island	ND	ND	ND
Vermont	ND	ND	ND
Washington (state)	ND	ND	ND
Total clinicians in adult-use states	14 766 (12.9)	9356 (9.2)	11 339 (12.9)
Total clinicians	29 552 (11.8)	25 730 (7.7)	29 500 (7.7)

ND = no data available from active program; PI = program inactive, resulting in no data.

[*] States are classified as adult-use states if recreational sales began in 2022 or earlier.

[†] Reported as total number of authorizing clinicians (number of clinicians per 1000 patients).

Table 3.

Authorizing Clinician, by Degree and Specialty, 2020–2022[*]

Variable	Clinicians, n (%)		
	2020	**2021**	**2022**
Authorizing clinician degree type			
Physician unspecified (MD or DO)	3098 (44.5)	2746 (33.3)	5025 (40.3)
MD	218 (3.1)	1335 (16.2)	1305 (10.5)
DO	45 (0.6)	339 (4.1)	351 (2.8)
Dentist	139 (2.0)	85 (1.0)	101 (0.8)
Physician assistant	1283 (18.4)	1099 (13.3)	1379 (11.0)
Nurse (NP, APRN, or midwife)	2152 (30.9)	2632 (31.9)	4293 (34.4)
Other/unspecified	22 (0.3)	22 (0.3)	27 (0.2)
Authorizing clinician specialty			
Anesthesia or pain	184 (9.6)	193 (9.1)	177 (7.9)
Psychiatry or addiction	101 (5.3)	114 (5.4)	103 (4.6)
Surgery and allied specialties	83 (4.3)	93 (4.4)	94 (4.2)
Emergency medicine	36 (1.9)	46 (2.2)	96 (4.3)
Internal, family, and allied specialties	1270 (66.1)	1328 (62.8)	1424 (63.4)
Physical medicine and rehabilitation	124 (6.5)	183 (8.6)	205 (9.1)
Palliative care	28 (1.5)	27 (1.3)	33 (1.5)
Pediatrics and allied specialties	39 (2)	55 (2.6)	45 (2)
Obstetrics/gynecology	40 (2.1)	50 (2.4)	52 (2.3)
Other/unspecified	17 (0.9)	27 (1.3)	18 (0.8)

APRN = Advanced Practice Registered Nurse; DO = Doctor of Osteopathic Medicine; MD = Doctor of Medicine; NP = Nurse Practitioner.

[*]
Authorizing clinicians from states that classified clinicians by their degree type and/or specialty are included in this table. Only states that classified clinicians by either degree type or specialty are included. The states that list clinicians by degree type are as follows. 2020: Maryland, Massachusetts (MA), Minnesota (MN), New Hampshire (NH), North Dakota (ND), Utah (UT), and Washington, DC (DC). 2021: Maryland, MN, NH, ND, Ohio (OH), Oklahoma (OK), UT, Virginia (VA), and DC. 2022: Maryland, MN, Mississippi (MS), NH, New York (NY), ND, OH, OK, UT, and VA. The states that list clinician specialties are as follows. 2020: Florida (FL), NH, and PA. 2021: FL, NH, and PA. 2022: FL, NH, PA, and West Virginia (WV). Classification schemes for authorizing clinician degrees and specialties can be found in the Supplement (available at Annals.org).