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Cannabis Use Across the States in the Early Legalization Era

While Adult Cannabis Use Grew from 2012-2013 to 2018-2019, Prevalence of Use by Underage Youth Held Steady

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Summary

Using data from the National Survey on Drug Use and Health (NSDUH), this brief examines data on changing trends in the prevalence of self-reported cannabis use, focusing on differences across age subgroups, states, and by the legal status of cannabis across states.

Another crucial set of questions pertains to the decision by cannabis legalization states to limit non-medical use to adults age 21 and older, influenced by evidence-based concerns that cannabis use by youth may entail particular risks.^{6,7,8,9} For example, *is the prevalence of cannabis use increasing among both adults and underage youth despite these age-based limitations for legal sales? And do the trends in cannabis use among adults and underage youth differ between legalization and non-legalization states?*

Introduction

In the years since the first states legalized cannabis for non-medical use by adults in 2012, a cascade of other states has followed suit. By the end of 2024, 24 states and the District of Columbia had legalized cannabis for non-medical use by adults age 21 and older, together representing just over half of the U.S. population.

At the same time, Americans' cannabis use has been trending upward. Surveys have found that prevalence of self-reported use has been increasing for years, including both before and since states began legalizing cannabis for non-medical use.^{1,2} For instance, one report by the U.S. Centers for Disease Control and Prevention found that prevalence of self-reported cannabis use began increasing in the late 2000s.³ By 2023, the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) reported that nearly one in four (22.5%) U.S. adults age 21 and older said they had used cannabis in the past year.⁴

These developments raise important questions about the [public health implications of state cannabis legalization policies](#). A half-century of federal prohibition of "marijuana," as cannabis is known by the U.S. government, and severe restrictions on research have left sizable gaps in our scientific knowledge about the potential risks and benefits of its use.⁵

Alongside the question of public health implications, there are also other basic questions about the factors surrounding the growing prevalence of cannabis use. For instance, are the states that have legalized cannabis for adult use solely responsible for the overall rise in use, or is the prevalence of cannabis use also increasing in states that have not legalized?

Background

Although voters in Colorado and Washington approved ballot measures to legalize cannabis for non-medical use by adults in 2012, the era of legal cannabis didn't begin in earnest until those states began to allow retail sales in 2014. Throughout this report, when we refer to the legal status of cannabis in states, we focus mainly on whether and when commercial sales for non-medical use by adults were legal.¹⁰

For this analysis, we used data from the National Survey on Drug Use and Health (NSDUH), a federal survey sponsored by the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA). The NSDUH asks a range of questions about substance use and mental health of people age 12 and older, including questions about cannabis use.

To conduct our analysis, we used the SAMHSA Data Analysis System to access restricted-use estimates of self-reported cannabis use at the state-level, as well as by age subgroups. Due to smaller state-level sample sizes in the NSDUH, we used files that combined two years of survey data into single, combined estimates (i.e., 2012-2013, 2014-2015, 2016-2017, and 2018-2019), focusing primarily on differences between 2012-2013 and 2018-2019.

Our analysis begins with data from the combined 2012-2013 time period, just before the first states began to allow legal sales of non-medical cannabis to adults, and concludes with data from the combined 2018-2019 time period. We were not able to use more-recent NSDUH estimates for this analysis due to data limitations.¹¹ Statistical significance was assessed at a 95% confidence level (i.e., $p < 0.05$).

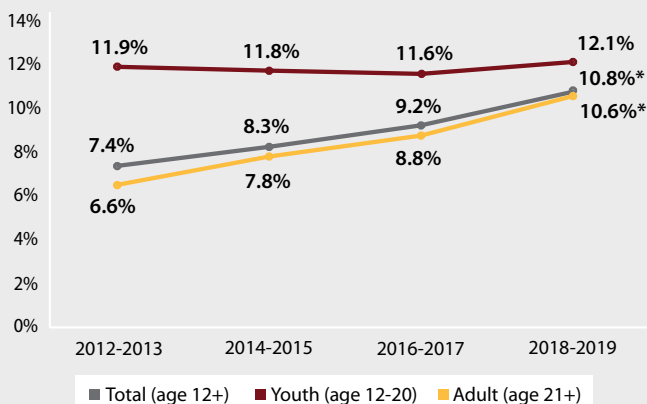
Self-reported cannabis use by age subgroups

The era of legal cannabis sales — beginning in 2014 — saw measurable growth in prevalence of self-reported cannabis use across the overall U.S. population. Between 2012-2013 and 2018-2019, the percentage of the U.S. population age 12 and older who reported having used cannabis in the past 30 days increased from 7.4% to 10.8%, a statistically significant change (Figure 1).

However, trends in cannabis use prevalence at the U.S. level differ between adults and underage youth. We define ‘adults’ as people age 21 and older and ‘underage youth’ as people younger than age 21 (or age 12 to 20 using NSDUH data). That age threshold is relevant to state-level cannabis policy, as all states that have legalized cannabis for non-medical use have instituted a minimum age requirement of 21, with people younger than 21 prohibited from purchasing, possessing, and using cannabis.

From 2012-2013 to 2018-2019, the percentage of U.S. adults who reported using cannabis in the past 30 days increased from 6.6% to 10.6%, a statistically significant increase. While the prevalence of cannabis use in the past 30 days for underage youth was significantly higher than among adults for each two-year period from 2012-2013 to 2018-2019 (significance not shown in chart), there was no statistically significant change in underage cannabis use across this time period (Figure 1). The prevalence of self-reported cannabis use in the past 30 days among underage youth was 12.1% in 2018-2019, not significantly different from the percentage in 2012-2013.

Figure 1. Self-reported Cannabis Use in the Past 30 Days, 2012-2013 to 2018-2019



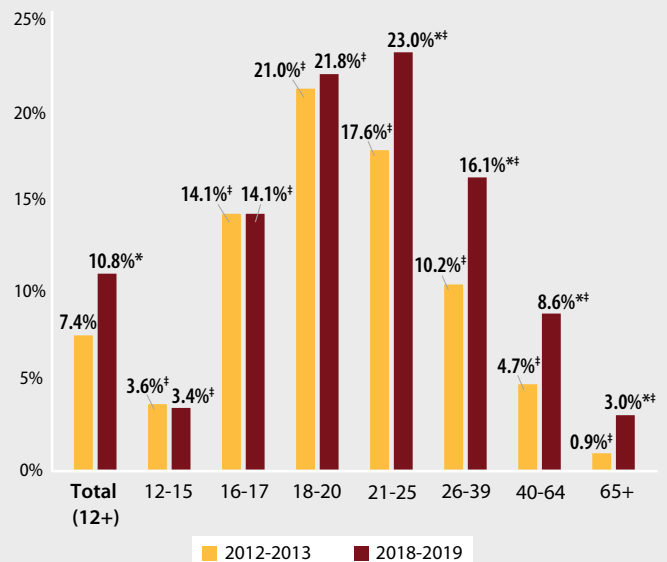
CRC/SHADAC analysis of restricted NSDUH data
 * Statistically significant increase from 2012-2013 to 2018-2019 at the 95% level.

Long description for Figure 1 can be found in first three paragraphs of the section titled, ‘Self-Reported Cannabis Use by Age Subgroups’

Those trends and patterns remain consistent when we further disaggregate cannabis use prevalence by more-detailed age subgroups. Self-reported prevalence of cannabis use in the past 30 days increased significantly from 2012-2013 to 2018-2019 among adults ages 21-25, 26-39, 40-64, and 65 and older (Figure 2). The increase was largest (5.9 percentage points) among adults age 26-39. However, there were no statistically significant changes in cannabis use in the past 30 days among underage youth ages 12-15, 16-17, and 18-20 during this time period.

Despite not increasing significantly between 2012-2013 and 2018-2019, the prevalence of cannabis use amongst underage youth age 18-20 was the second highest prevalence of cannabis use of all age groups at 21.8% in 2018-2019, with young adults age 21-25 reporting the highest prevalence at 23.0% in 2018-2019 (a statistically significant increase from 17.6% in 2012-2013). And, notably, underage youth age 18-20 and young adults age 21-25 reported the two highest prevalences of cannabis use of all age groups both before and during the cannabis legalization era.

Figure 2. Self-reported Cannabis Use in the Past 30 Days by Age Subgroups, 2012-2013 to 2018-2019



CRC/SHADAC analysis of restricted NSDUH data
 * Statistically significant increase from 2012-2013 to 2018-2019 at the 95% level.
 ‡ Statistically significant difference between subgroup and total at 95% level.

Long description for Figure 2 can be found in paragraphs 4 and 5 in the section titled, ‘Self-Reported Cannabis Use by Age Subgroups’

Cannabis use patterns across the states

Although the number has since grown rapidly, only six states allowed legal cannabis sales by the beginning of 2018: Alaska, California, Colorado, Nevada, Oregon, and Washington. As a group, those states represented roughly 61 million people, or nearly 20% of the U.S. population. The other 44 states had either not legalized cannabis or had legalized cannabis but had not begun sales by the start of 2018.

Between 2012-2013 to 2018-2019, we found that a majority of states (38) experienced statistically significant increases in prevalence of self-reported cannabis use in the past 30 days among people age 12 and older (Figure 3). Those increases were found in each of the six legal-sales states, as well as 32 of the 44 states that did not allow legal sales by the start of 2018.¹²

Additionally, it is important to note that self-reported cannabis use did not only increase on one end of the prevalence spectrum (Figure 4). There were states with relatively low prevalence of cannabis use that experienced statistically significant increases from 2012-2013 to 2018-2019 (e.g., Mississippi, Louisiana, Texas), as well as states reporting a relatively high prevalence of cannabis use that also experienced statistically significant increases (e.g., Washington, Oregon, Vermont).

Figure 3. Statistically Significant Changes in Self-reported Cannabis Use in the Past 30 Days by State, 2012-2013 to 2018-2019

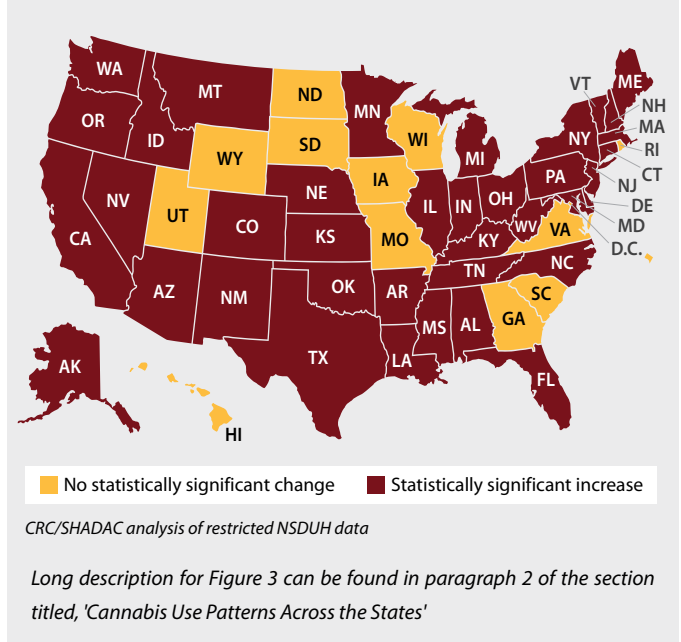
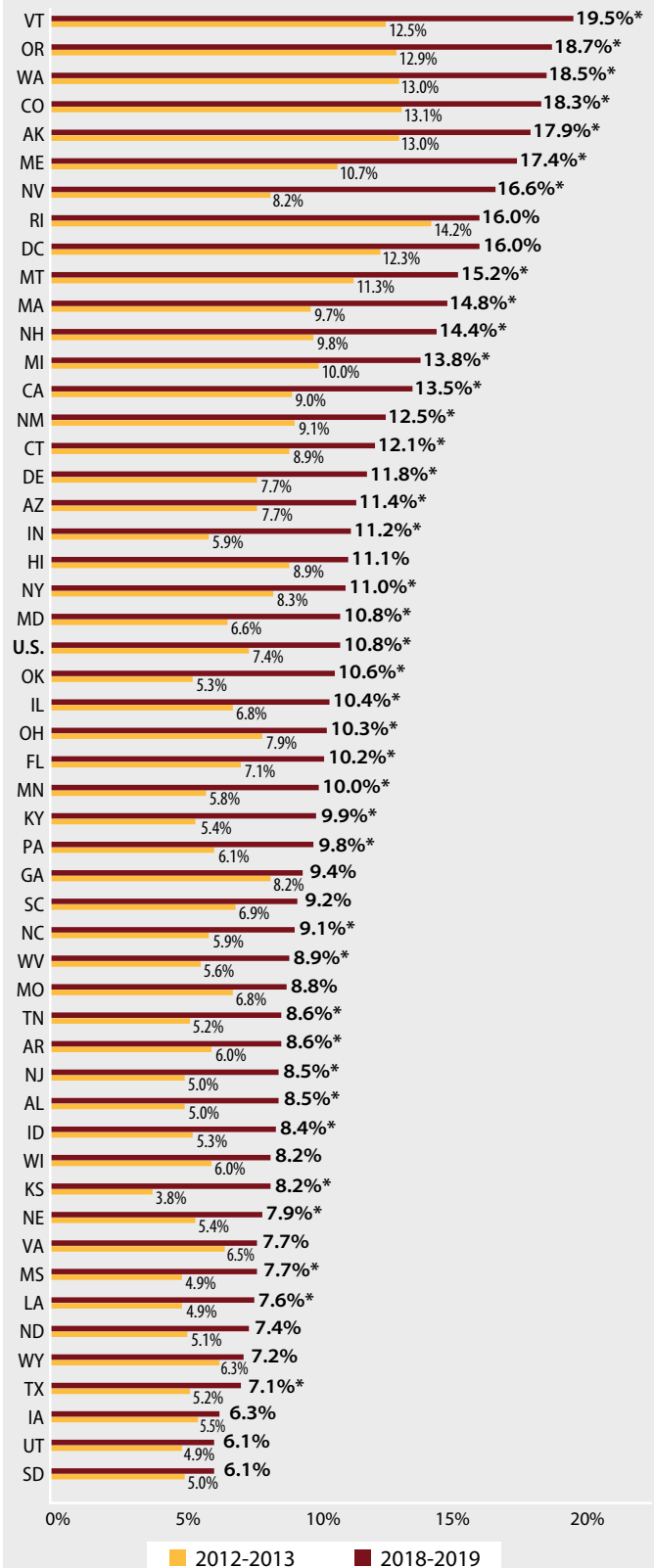


Figure 4. Self-reported Cannabis Use in the Past 30 Days by State, 2012-2013 to 2018-2019



CRC/SHADAC analysis of restricted NSDUH data

* Statistically significant increase from 2012-2013 to 2018-2019 at the 95% level.

An accessible data table for Figure 4 can be found in Appendix Table A

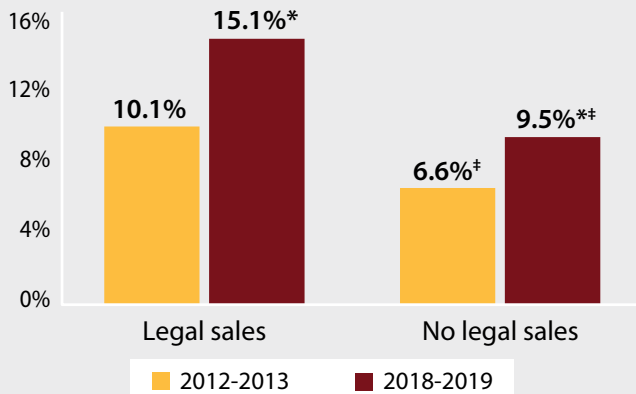
Cannabis use by legalization status

We also grouped states according to whether they allowed legal cannabis sales or did not allow legal cannabis sales as of January 2018 to understand what, if any, differences would exist in cannabis use prevalence.

Our analysis found that states with legal sales in 2018-2019 had significantly higher prevalence of self-reported cannabis use compared to states without legal sales (15.1% versus 9.5%, respectively) (Figure 5); however, the legal sales states as a group already had a significantly higher prevalence of cannabis use prior to the legal sales era (i.e., 2012-2013).

Additionally, our analysis found that self-reported cannabis use in the past 30 days increased significantly both in states with and without legal cannabis sales from 2012-2013 to 2018-2019. In the legal sales states, cannabis use increased 5.0 percentage points, from 10.1% in 2012-2013 to 15.1% in 2018-2019. In the states without legal sales, cannabis use increased 2.9 percentage points, from 6.6% in 2012-2013 to 9.5% in 2018-2019. Both increases were statistically significant.

Figure 5. Self-reported Cannabis Use in the Past 30 Days by Status of State Legal Sales, 2012-2013 to 2018-2019

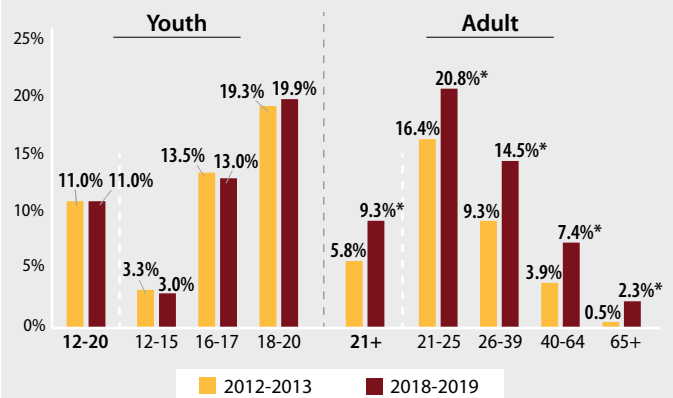


CRC/SHADAC analysis of restricted NSDUH data
 * Statistically significant increase from 2012-2013 to 2018-2019 at the 95% level.
 ‡ Statistically significant difference from legal sales comparison at 95% level.
 Long description for Figure 5 can be found in the second and third paragraphs in the section titled, 'Cannabis Use by Legalization Status'

We also examined whether the prevalence of cannabis use changed across age subgroups according to state cannabis policy, again grouping states into two groups: those with and without legal sales. Our analysis found statistically significant increases in self-reported use of cannabis in the past 30 days among adults both in states with and without legal sales (Figures 6 and 7), but not among underage youth—in either states with or without legal sales.

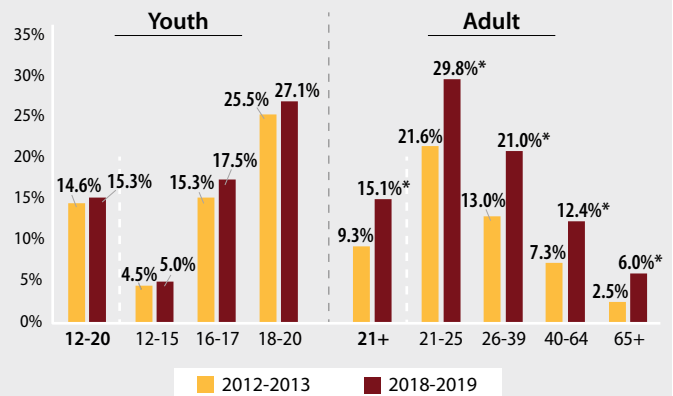
Disaggregating those age categories into more detailed subgroups, our analysis found the pattern held consistent: While all subgroups of adults (ages 21-25, 26-39, 40-64, 65 and older) reported statistically significant increases in past 30 day cannabis use in states with and without legal sales, no subgroups of underage youth (ages 12-15, 16-17, 18-20) reported statistically significant changes in cannabis use in either states with or without legal sales (Figures 6 and 7).

Figure 6. Self-reported Cannabis Use in the Past 30 Days by Age Subgroups in States Without Legal Sales, 2012-2013 to 2018-2019



CRC/SHADAC analysis of restricted NSDUH data
 * Statistically significant increase from 2012-2013 to 2018-2019 at the 95% level.
 An accessible data table for Figure 6 can be found in Appendix Table B

Figure 7. Self-reported Cannabis Use in the Past 30 Days by Age Subgroups in States With Legal Sales, 2012-2013 to 2018-2019



CRC/SHADAC analysis of restricted NSDUH data
 * Statistically significant increase from 2012-2013 to 2018-2019 at the 95% level.
 An accessible data table for Figure 7 can be found in Appendix Table C

Conclusions and discussion

The era of state legalization of cannabis for non-medical use by adults has been marked by growth in the prevalence of its use. Our analysis found that self-reported use of cannabis in the past 30 days increased in 38 states between 2012-2013 and 2018-2019. While that includes the six states where cannabis sales were legal, cannabis had not been legalized in most of the states that experienced increased use. If legalization is influencing the trend of increasing prevalence of cannabis use, it does not appear to be the only factor, particularly in light of evidence that prevalence of cannabis use began to increase before states started legalizing it.

A closer examination by age categories illustrates more nuance: Our analysis found that statistically significant increases in self-reported use of cannabis in the past 30 days were limited to adults age 21 and older, which is the minimum age adopted by all legalization states thus far. That pattern remained consistent even when disaggregating adults into smaller age subgroups, with prevalence of cannabis use significantly increasing among young adults age 21 to 25, adults age 65 and older, and those in between. Furthermore, the increases in adult cannabis use prevalence also occurred in both legalization and non-legalization states.

While adult age subgroups showed consistent increases in cannabis use prevalence, the situation was starkly different among underage youth. We found no statistically significant changes in cannabis use among people age 12-20, either in total or among any age subgroups. Again, that pattern remained consistent when examining data by state-level cannabis policy: We found no change in cannabis use prevalence among underage youth either in states with or without legal cannabis sales (though underage youth 18-20 years old still report among the highest cannabis use prevalence). This finding that cannabis use is not increasing among underage youth is consistent with other studies indicating that various forms of substance use by youth have either declined or held steady in recent years.¹³

Together, these data and other evidence, such as the pre-legalization trend of growing cannabis use prevalence, suggest that state-level legalization may not be the only factor in the trend of increasing cannabis use. They also provide some reason for optimism that carefully crafted and implemented approaches to cannabis policy, such as limiting access to underage youth, may succeed in mitigating some potential public health risks. Our finding that cannabis use prevalence has held steady among underage youth even in legalization states is particularly encouraging. However, it will be important to continue to conduct ongoing research as the cannabis policy landscape evolves, the cannabis marketplace matures, and the culture around cannabis use develops in new ways.

About the Cannabis Research Center

The University of Minnesota School of Public Health Cannabis Research Center was established in 2023, shortly after Minnesota legalized the use of cannabis for individuals age 21 and older.

The University of Minnesota School of Public Health Cannabis Research Center (CRC) strives to understand the public health implications of cannabis legalization and be a trusted source of information to guide policy and practice related to cannabis use in Minnesota. To accomplish this, the CRC:

- Conducts timely and Minnesota-specific research on both the positive and negative public health effects of cannabis legalization.
- Studies issues pertaining to equity in cannabis production, sales, marketing, and use.
- Provides interpretation and contextualization of research findings.
- Collaborates with state and local agencies, policymakers, and community members to ensure information is responsive to needs and accessible to all Minnesotans.
- Trains and supports future practitioners and scholars to engage in research related to cannabis policy and its effects on health and health equity.

To learn more about the Cannabis Research Center, visit <https://www.sph.umn.edu/research/centers/cannabis>.



**Cannabis
Research Center**

UNIVERSITY OF MINNESOTA

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- ² National Institutes of Health (NIH). (2015, October 21). Prevalence of Marijuana Use Among U.S. Adults Doubles Over Past Decade. <https://www.nih.gov/news-events/news-releases/prevalence-marijuana-use-among-us-adults-doubles-over-past-decade>
- ³ Azofeifa A, Mattson ME, Schauer G, McAfee T, Grant A, Lyster R. (2016, September 2). National Estimates of Marijuana Use and Related Indicators — National Survey on Drug Use and Health, United States, 2002–2014. Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report (MMWR). https://www.cdc.gov/mmwr/volumes/65/ss/ss6511a1.htm?s_cid=ss6511a1_w
- ⁴ CRC/SHADAC analysis of 2023 National Survey of Drug Use and Health data from its online Data Analysis System tool: <https://datatools.samhsa.gov/>
- ⁵ The federal government currently splits cannabis into two distinct categories: hemp and marijuana. The 2018 Farm Bill defined “hemp” as cannabis with especially low concentrations of delta-9 THC (0.3% or less), which is the primary psychoactive compound in cannabis. Marijuana, prohibited by the federal government as a Schedule I controlled substance, is defined as cannabis that exceeds that delta-9 THC limit.
- ⁶ National Academies of Sciences, Engineering, and Medicine. (2017). The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research. The National Academies Press. <https://doi.org/10.17226/24625>
- ⁷ Volkow, ND, Swanson, JM, Evins, AE, et al. (2016). Effects of Cannabis Use on Human Behavior, Including Cognition, Motivation, and Psychosis: A Review. JAMA Psychiatry. 73(3), 292-297. <https://jamanetwork.com/journals/jamapsychiatry/article-abstract/2488041>
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- ⁹ Tervo-Clemmens, B, Gilman, J, Evins, E. (2024). Substance Use, Suicidal Thoughts, and Psychiatric Comorbidities Among High School Students. JAMA Pediatrics. 178(3), 310-313. <https://doi.org/10.1001/jamapediatrics.2023.6263>
- ¹⁰ While most states that have legalized cannabis allow people to grow plants at home for personal use, evidence suggests that home-grow is relatively uncommon. So, people typically use cannabis that originates from legal retailers or the illicit market.
- ¹¹ We were unable to use the 2020 NSDUH due to data quality issues caused by interruptions imposed by the pandemic. Additionally, the NSDUH underwent a major redesign in 2021, which rendered those and later years of data incomparable to prior years.
- ¹² Maine legalized cannabis in 2016, but legal sales did not begin until 2020. The District of Columbia legalized cannabis in 2014, but the U.S. Congress has exercised its authority to block legal sales. These are included in this portion of our analysis as states without legal sales. Massachusetts legalized cannabis in 2016 but didn't allow legal sales until November 2018, and Michigan legalized cannabis in 2018 but didn't allow legal sales until December 2019. Because these states were both non-legal sales and legal sales states during the 2018-2019 period, we excluded them from the portion of the analysis in which we classify states by legal status of sales.
- ¹³ Miech, RA, Johnston, LD, Patrick, ME, O'Malley, PM, Bachman, JG. (2023, December). National Survey Results on Drug Use, 1975-2023: Secondary School Students. Monitoring the Future, Institute for Social Research, University of Michigan. <https://monitoringthefuture.org/wp-content/uploads/2023/12/mtf2023.pdf>

Appendix Tables

Table A. Self-reported Cannabis Use in the Past 30 Days by State, 2012-2013 to 2018-2019

State	2012-2013	2018-2019	Statistically significant increase from 2012-2013 to 2018-2019 at the 95% level?
Alabama	5.0%	8.5%	Yes
Alaska	13.0%	17.9%	Yes
Arizona	7.7%	11.4%	Yes
Arkansas	6.0%	8.6%	Yes
California	9.0%	13.5%	Yes
Colorado	13.1%	18.3%	Yes
Connecticut	8.9%	12.1%	Yes
Delaware	7.7%	11.8%	Yes
District of Columbia	12.3%	16.0%	No
Florida	7.1%	10.2%	Yes
Georgia	8.2%	9.4%	No
Hawaii	8.9%	11.1%	No
Idaho	5.3%	8.4%	Yes
Illinois	6.8%	10.4%	Yes
Indiana	5.9%	11.2%	Yes
Iowa	5.5%	6.3%	No
Kansas	3.8%	8.2%	Yes
Kentucky	5.4%	9.9%	Yes
Louisiana	4.9%	7.6%	Yes
Maine	10.7%	17.4%	Yes
Maryland	6.6%	10.8%	Yes
Massachusetts	9.7%	14.8%	Yes
Michigan	10.0%	13.8%	Yes
Minnesota	5.8%	10.0%	Yes
Mississippi	4.9%	7.7%	Yes
Missouri	6.8%	8.8%	No
Montana	11.3%	15.2%	Yes
Nebraska	5.4%	7.9%	Yes
Nevada	8.2%	16.6%	Yes
New Hampshire	9.8%	14.4%	Yes
New Jersey	5.0%	8.5%	Yes
New Mexico	9.1%	12.5%	Yes
New York	8.3%	11.0%	Yes
North Carolina	5.9%	9.1%	Yes
North Dakota	5.1%	7.4%	No
Ohio	7.9%	10.3%	Yes
Oklahoma	5.3%	10.6%	Yes
Oregon	12.9%	18.7%	Yes
Pennsylvania	6.1%	9.8%	Yes
Rhode Island	14.2%	16.0%	No
South Carolina	6.9%	9.2%	No
South Dakota	5.0%	6.1%	No
Tennessee	5.2%	8.6%	Yes
Texas	5.2%	7.1%	Yes
United States	7.4%	10.8%	Yes
Utah	4.9%	6.1%	No
Vermont	12.5%	19.5%	Yes
Virginia	6.5%	7.7%	No
Washington	13.0%	18.5%	Yes
West Virginia	5.6%	8.9%	Yes
Wisconsin	6.0%	8.2%	No
Wyoming	6.3%	7.2%	No

CRC/SHADAC analysis of restricted NSDUH data

Table B. Self-reported Cannabis Use in the Past 30 Days by Age Subgroups in States Without Legal Sales, 2012-2013 to 2018-2019

Age	2012-2013	2018-2019	Statistically significant increase from 2012-2013 to 2018-2019 at the 95% level?
Youth (12-20)	11.0%	11.0%	No
12-15	3.3%	3.0%	No
16-17	13.5%	13.0%	No
18-20	19.3%	19.9%	No
Adult (21+)	5.8%	9.3%	Yes
21-25	16.4%	20.8%	Yes
26-39	9.3%	14.5%	Yes
40-64	3.9%	7.4%	Yes
65+	0.5%	2.3%	Yes

CRC/SHADAC analysis of restricted NSDUH data

Table C. Self-reported Cannabis Use in the Past 30 Days by Age Subgroups in States With Legal Sales, 2012-2013 to 2018-2019

Age	2012-2013	2018-2019	Statistically significant increase from 2012-2013 to 2018-2019 at the 95% level?
Youth (12-20)	14.6%	15.3%	No
12-15	4.5%	5.0%	No
16-17	15.3%	17.5%	No
18-20	25.5%	27.1%	No
Adult (21+)	9.3%	15.1%	Yes
21-25	21.6%	29.8%	Yes
26-39	13.0%	21.0%	Yes
40-64	7.3%	12.4%	Yes
65+	2.5%	6.0%	Yes

CRC/SHADAC analysis of restricted NSDUH data