

Evaluation Report



Assessing the Impact of Proposition 64 on Cannabis Use, Maladaptive Cannabis Use, and Cannabis Use Disorder Treatment Cannabis Use, Frequent Cannabis Use, Cannabis Use Disorders and Publicly Funded Cannabis Use Disorder Treatment in California, 2010-2020

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Executive Summary

On November 8, 2016, California voters approved Proposition 64, which legalized non-medicinal adult use of cannabis. Cannabis has shown promise as an effective tool in the management of some health conditions, but it also brings health risks, including the development of cannabis use disorders (CUD). This report is the first in a series of reports on Proposition 64's health impacts that researchers from UCLA's Integrated Substance Abuse Programs are preparing for the California Department of Cannabis Control (DCC). The aims of these reports are to monitor the impacts that Proposition 64 has on: (1) population rates of cannabis use, maladaptive cannabis use, and CUD; (2) the treatment of CUD; and (3) public health, including health costs associated with cannabis use and the relationship between shifts in cannabis use and the use of alcohol and other drugs. The purpose of these reports is not to "judge" Proposition 64 or determine if it has "worked." Rather, it is to educate policymakers and the general public about the health impacts of Proposition 64, and to generate data-driven, evidence-based recommendations on how the DCC, policymakers, healthcare systems, and other stakeholders can safeguard and promote the health and wellness of Californians in the age of cannabis legalization.

Given the numerous significant developments in cannabis policy and substance use disorder treatment nationally and within the state, it is difficult to ascertain to what degree the observed changes in cannabis use, frequent cannabis use, CUD, and CUD treatment in California can be attributed to Proposition 64 or to other causes. Nonetheless, these data provide several key insights regarding cannabis use, cannabis use disorder treatment, and health in California over the past decade. In particular:

- Cannabis use and frequent cannabis use are increasing in California, and some data indicate that there have been substantive increases in frequent cannabis use in recent years. Rates of CUD have remained steady over the past decade.
- Cannabis use has become more prevalent across demographic groups since 2010. There are signs that use may be levelling off or even starting to decline among youth and Black Non-Hispanics, while it has continued to increase among adults under 60 and White Non-Hispanics. However, these increases have not led to documented increases in the prevalence of CUD.
- Frequent cannabis use has continued increasing since 2016 among adults under 60.
- Though rates of CUD have remained steady since 2010, admissions to publicly funded CUD treatment have been declining since 2010. This decline has been accelerating since 2016.
- Criminal justice referrals to CUD treatment have been decreasing significantly, and at a faster rate than non-criminal justice referrals since 2016. Due to other developments related to cannabis policy and SUD treatment in California, it is unclear if the observed changes were caused by Proposition 64 or other factors.
- Proposition 64's passage in 2016 was associated with a significantly greater decline in CUD admissions for White Non-Hispanics and Hispanics than Black Non-Hispanics. Due to other developments related to cannabis policy and SUD treatment in California, it is unclear if the observed changes were caused by Proposition 64 or other factors.
- Both treatment retention and successful discharge rates declined in publicly funded CUD treatment in California over the past decade. Proposition 64's passage in 2016 was associated with a statistically significant 18.4 percent decrease in 90-day treatment retention and a statistically significant 15.7 percent decrease in successful discharges. Due to other developments related to cannabis policy and SUD treatment in California, it is unclear if the observed changes were caused by Proposition 64 or other factors.

Based on these findings, the Department of Cannabis Control, policymakers, and regulators could consider the following as they develop future policies and programs related to cannabis:

- It is encouraging that CUD rates have not been increasing dramatically in California. However, given that rates of use and frequent use are increasing, it is possible that many Californians are using cannabis in a manner that could lead to CUD in the future. California law stipulates that a significant portion of the funds generated from cannabis sales need to be deposited in a Youth Education, Prevention, Early Intervention, and Treatment Account that the California Department of Health Care Services can use to educate youth, prevent substance use disorders, and prevent harm from substance use. Given trends in cannabis use and frequent use, such programming will likely be essential to help California avoid increases in CUD like those detected in other states. Funds for education, prevention, and prevention of harm need to be preserved, and directed to the Department of Health Care Services to be utilized as intended by Proposition 64.
- There are indications that cannabis use and frequent use are becoming more prevalent, so state policymakers and local jurisdictions need to take evidence-based steps to prevent problem cannabis use. In particular, lessons from alcohol and tobacco regulation can be adapted into policies that protect public health in the age of cannabis legalization. Some of these measures may include requiring health warnings on cannabis products, informing vulnerable groups about the risks of cannabis use, limiting cannabis marketing and product diversification, and taking steps to avoid the emergence of profit-driven cannabis markets that are likely to promote use.
- While the youth education, prevention, early intervention, and treatment funding generated by Proposition 64 can help mitigate the negative impacts of legalization for youth, the more profound increases in frequent use have been among adults. Given the increases in use among adults, policymakers may want to consider developing strategies to generate dedicated funding to education, prevention, and treatment related to problematic cannabis use among adults that mirror those that have already been set aside for youth.
- Though rates of CUD have remained steady, utilization of publicly funded CUD treatment has been declining. This means that there could be a growing population that needs CUD treatment but is not receiving it. Programs designed to identify individuals with CUD and engage them in treatment services are needed to address this potential problem. In particular, screening and referral to treatment in settings where individuals with unidentified CUD may present for services (e.g. medical centers, mental health programs, criminal justice programs) can potentially identify individuals with unmet cannabis use disorder treatment needs to services. However, research is needed to develop strategies on how to best implement CUD screening and referral to treatment services in these settings. Funding to support research, technical assistance, and implementation support for screening and referral to treatment programs can help California ensure that it identifies individuals who need CUD treatment and effectively links them with care.
- Since 2016, criminal justice referrals to publicly funded CUD treatment have been declining significantly. The removal of legal sanctions for non-medicinal cannabis use, while positive in many respects, could be reducing opportunities to identify individuals who have CUD and engage them in treatment through criminal justice programs. From January 2010 through September 2016, 36.3 percent of referrals to publicly funded CUD treatment in California came from criminal justice sources. It is possible that a significant portion of these referrals are no longer happening because shifts in cannabis' legal status are preventing individuals who need treatment from interfacing with the criminal justice system. Consequently, California needs to develop strategies to identify and engage individuals who are not having their CUD treatment needs identified and addressed because of decreases in criminal justice referrals.
- Treatment retention and successful discharge rates in publicly funded CUD treatment have been decreasing for most of the past decade. To reverse this trend, California must continue taking steps to improve the accessibility and quality of CUD treatment. Providing resources and support for the Department of Health Care Services and county SUD treatment departments to enhance their treatment systems can help improve the effectiveness of publicly funded treatment for CUD.

We hope that this information will help the Department of Cannabis Control and policymakers cross the state better understand impacts that cannabis is having on health in California, and take steps to promote and protect public health in the age of cannabis legalization.

Background

On November 8, 2016, California voters approved Proposition 64, which legalized non-medicinal adult use of cannabis. Cannabis has shown promise as an effective tool in the management of some health conditions including chronic pain, chemotherapy-induced nausea and vomiting, multiple sclerosis spasticity, sleep problems, HIV/AIDS, Tourette syndrome, and anxiety and posttraumatic stress disorder symptoms.² However, cannabis can also have adverse impacts on health. According to a 2017 review by the National Academies of Sciences, Engineering, and Medicine, health problems associated with cannabis use include increased cardio-metabolic risk, respiratory problems, pregnancy complications, cognitive impairment, motor vehicle crashes, overdose-related injuries, mental health disorders, and the development of substance use disorders related to alcohol or other drugs. Heavy/frequent use and cannabis smoking can exacerbate some of these risks, including those related to respiratory and behavioral health.³

Cannabis use also can lead to cannabis use disorder (CUD), a potentially chronic health condition associated with the continued use of cannabis despite significant cannabis-related problems. CUD symptoms include a cluster of cognitive, behavioral, and physiological symptoms that can affect health and quality of life dramatically (see Table 1). Approximately 8.9% of people who use cannabis regularly develop CUD.⁴ Though difficult to treat, a combination of psychotherapeutic interventions—motivational enhancement therapy, cognitive behavioral therapy, and contingency management—can be effective in the treatment of CUD. In addition, some pharmacological agents have shown promise in CUD treatment, though there is no well-established CUD medication at this time.⁵

Research from other states that allow adult use indicates that legalization is associated with increases in past-month cannabis use, frequent past-month cannabis use, and CUD among adults while also increasing CUD prevalence among adolescents.⁶ Yet in spite of the increased need for CUD treatment in states that legalize adult use, research shows that legalization has actually been associated with *decreases* in CUD treatment.⁷ This could be because legalization leads to declines in the number of individuals coerced into treatment by the legal system, or because legalization reduces social pressure from families and friends to seek treatment.⁸ Furthermore, individuals who receive CUD treatment in

Table 1 Symptoms of Cannabis Use Disorder ¹
Cannabis is often taken in larger amounts or over a longer period than intended
Persistent desire or unsuccessful efforts to cut down or control cannabis use
A great deal of time is spent in activities necessary to obtain cannabis, use cannabis, or recover from its effects
Craving, or a strong desire or urge to use cannabis
Recurrent cannabis use resulting in a failure to fulfill major role obligations at work, school, or home
Continued cannabis use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of cannabis
Important social, occupational, or recreational activities are given up or reduced because of cannabis use
Recurrent cannabis use in situations in which it is physically hazardous
Continued cannabis use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by cannabis
Tolerance, as defined by either: (a) a need for markedly increased amounts of cannabis to achieve intoxication or desired effect; (b) markedly diminished effect with continued use of the same amount of cannabis
Withdrawal, as manifested by either: (a) three of the following signs/symptoms within approximately one week of cessation of heavy/prolonged use—irritability/anger/aggression; nervousness or anxiety; sleep difficulty; decreased appetite or weight loss; restlessness; depressed mood; significant discomfort from abdominal pain, shakiness/tremors, sweats, fever, chills, or headache; (b) taking cannabis or a closely related substance is to relieve or avoid withdrawal symptoms

¹ American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders: Fifth Edition. DSM-5*. Arlington, VA: American Psychiatric Association.

² National Academies of Sciences, Engineering, & Medicine. (2017). *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*. Washington, D.C. National Academies Press.

³ National Academies of Sciences, Engineering, & Medicine, *op cit*.

⁴ Lopez-Quintero, C., Perez de los Cobos, J., Hasin, D.S., Okuda, M., Wang, S., Grant, B.F., & Blanco, C. (2011). Probability and predictors of transition from first use to dependence on nicotine, alcohol, cannabis, and cocaine: results of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Drug and Alcohol Dependence* 115:120-130.

⁵ Sherman, B. J., & McRae-Clark, A. L. (2016). Treatment of cannabis use disorder: current science and future outlook. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*, 36(5), 511-535.

⁶ Cerdá, M., Mauro, C., Hamilton, A., Levy, N. S., Santaella-Tenorio, J., Hasin, D., ... & Martins, S. S. (2020). Association between recreational marijuana legalization in the United States and changes in marijuana use and cannabis use disorder from 2008 to 2016. *JAMA Psychiatry*, 77(2), 165-171

⁷ Maxwell, J.C., Mendelson, B. (2016). What do we know about the impact of the laws related to marijuana? *Journal of Addiction Medicine* 10(1):3-12: Mennis J., Stahler, GJ. (2020). Adolescent treatment admissions for marijuana following recreational legalization in Colorado and Washington. *Drug and Alcohol Dependence*, 210: 107960.

⁸ Hall, W., Lynskey, M. (2016). Evaluating the public health impacts of legalizing recreational cannabis use in the United States. *Addiction* 111(10):1764-1773.

adult-use states are less likely than their counterparts to stay in treatment for 90 days (as is recommended by the National Institute on Drug Abuse), but their treatment outcomes are comparable to those observed elsewhere.⁹ There is also concern racial and ethnic groups who are at increased risk—particularly Blacks and Hispanics—could suffer disproportionately from the negative consequences of legalization, including increases in CUD.¹⁰ Thus while legalization of adult-use cannabis has potential benefits (e.g. correcting injustices associated with the U.S. Drug War), increases in cannabis use, frequent use, and CUD in states that allow adult use is a public health concern.¹¹

This report is the first in a series of reports on Proposition 64's health impacts that researchers from UCLA's Integrated Substance Abuse Programs are preparing for the California Department of Cannabis Control (DCC). The aims of these reports are to monitor the impacts that Proposition 64 has on: (1) population rates of cannabis use, maladaptive cannabis use, and CUD; (2) the treatment of CUD; and (3) public health, including health costs associated with cannabis use and the relationship between shifts in cannabis use and the use of alcohol and other drugs. The purpose of these reports is not to “judge” Proposition 64 or determine if it has “worked.” Rather, it is to educate policymakers and the general public about the health impacts of Proposition 64, and to generate data-driven, evidence-based recommendations on how the DCC, policymakers, healthcare systems, and other stakeholders can safeguard and promote the health and wellness of Californians in the age of cannabis legalization.

This report is divided into sections on the following topics as they relate to cannabis and its health impacts in California: (1) changes in cannabis use and frequent cannabis use; (2) changes in CUD prevalence; and (3) changes in CUD treatment utilization and outcomes. The report concludes with a section discussing the implications of its findings, and recommendations on steps California can take to mitigate negative any trends revealed by the data.

It should be noted that the population surveys analyzed below (the National Survey on Drug Use and Health - NSDUH, the Behavioral Risk Factor Surveillance System - BRFSS, the California Health Interview Survey - CHIS) use different methods, leading to some discrepancies in the estimates they produce. However, each survey covers different time frames, (NSDUH 2002-2019, BRFSS 2017-2019, CHIS 2019-2020) and allows for different types of analyses (NSDUH collects data on CUD; the BRFSS and CHIS allow for more detailed breakdowns of age groups). The sources taken together paint a general picture of trends in cannabis use, frequent cannabis use, and CUD in California over the last decade. Readers should also be aware that limitations of several public use data sources—particularly the population surveys utilized—make it impossible to meaningfully analyze or interpret data regarding all age and racial/ethnic groups. In particular, the NSDUH data source utilized for this report only allows for state-level analyses of differences by age among two groups (individuals ages 12-25, individuals age 26+) and three racial/ethnic groups (White Non-Hispanics, Black Non-Hispanics, Hispanics). Since the data do not allow for analyses of data from other racial ethnic groups (e.g. Non-Hispanic Asian Americans, Native American/Alaska Natives, Native Hawaiians, Pacific Islanders), this report does not include data concerning these racial/ethnic groups. The authors acknowledge that this is a major shortcoming of the data sources used for this report and will work to find data on demographic groups not mentioned in this report in the future.

Finally, readers should keep in mind that Proposition 64 and its passage were part of a larger trend towards cannabis law liberalization in California and nationwide. See Table 2 for an overview of key policy developments that may have affected the availability of cannabis, the utilization of CUD treatment, public perceptions of cannabis' dangerousness and social acceptability, and legal sanctions faced by individuals who produce, sell, or consume cannabis. It is likely that these policies and developments, and not just Proposition 64, contributed to the trends reported below.

⁹ Bourdon, J.L., Francis, M.W., Jia, L., Liang, C., Robinson, H.I., Grucza, R.A. (2021). The effect of cannabis policies on treatment outcomes for cannabis use among U.S. adults. *Journal of Substance Abuse Treatment* <https://doi.org/10.1016/j.jsat.2021.108535>

¹⁰ Adinoff, B., & Reiman, A. (2019). Implementing social justice in the transition from illicit to legal cannabis. *The American Journal of Drug and Alcohol Abuse*, 45(6), 673-688.

¹¹ Cerdá, M., et al., 2020.

Table 2 Key Cannabis-Related Policy Developments in California, 1996-2020		
YEAR	POLICY DEVELOPMENT	IMPLICATIONS
1996	Proposition 215 (Compassionate Use Act of 1996) ¹²	California law permitting use of cannabis for medical purposes if deemed appropriate and recommended by a physician
2003	Senate Bill 420 ¹³	State Department of Health Services establishes and maintains a voluntary program for issuance of medical cannabis identification cards to qualified patients
2008	Mental Health Parity and Addiction Equity Act ¹⁴	Required insurers and health plans to provide mental health and substance use disorder treatment benefits that are similar to all other health conditions, potentially increasing access to substance use disorder treatment.
2009	U.S. Department of Justice Memorandum concerning Investigations and Prosecutions in States Authorizing the Medical Use of Marijuana (Ogden Memo) ¹⁵	U.S. Department of Justice guidance to U.S. Attorneys not to focus federal resources on actions of individuals who are in clear and unambiguous compliance with state medical cannabis laws.
2010	Senate Bill 1449 ¹⁶	Reduces possession of less than an ounce of cannabis from a misdemeanor to an infraction, punishable only by fine
2011	U.S. Department of Justice Memorandum, Guidance Regarding the Ogden Memo in Jurisdictions Seeking to Authorize Marijuana for Medical Use (Cole Memo) ¹⁷	U.S. Department of Justice guidance reiterating illegality of large-scale cannabis cultivation and sales
2011	Assembly Bill 1300 ¹⁸	Explicitly allows governments in California to adopt ordinances regulating the location, operation, and establishment of medical cannabis dispensaries.
2011	Assembly Bill 109 ¹⁹	Allows local supervision as alternative to state prison for non-violent offenders
2013	U.S. Department of Justice Memorandum, Guidance Regarding Marijuana Enforcement (Cole Memo II) ²⁰	U.S. Department of Justice guidance specifying that federal cannabis enforcement should focus on eight priority areas (including prevention of distribution to minors, preventing diversion to states that have not legalized cannabis, and preventing violence in cannabis cultivation and distribution); describes expectations that states that legalize cannabis will implement laws with an effective and robust regulatory framework.
2014	Medicaid Expansion under Affordable Care Act ²¹	Extension of Medicaid coverage to low-income individuals, expanding potential access to cannabis use disorder treatment
2015	Medical Marijuana Regulation and Safety Act ²²	State laws governing the cultivation, processing, transportation, testing, and distribution of medical cannabis
2016	Proposition 64	Legalizes non-medical adult use of cannabis in California
2017	California Section 1115 Medicaid Waiver for Substance Use Disorder Treatment ²³	Expands access to different levels of substance use disorder treatment for California Medicaid beneficiaries
2018	Licensed sales of adult use cannabis begin in California ²⁴	Beginning of access to adult use (non-medical) cannabis
2018	U.S. Department of Justice Memorandum, Marijuana Enforcement (Sessions Memo) ²⁵	Rescinds all previous Department of Justice memoranda concerning cannabis enforcement, including 2009 Ogden Memo, 2011 Cole Memo, and 2013 Cole Memo II.
2020	COVID-19 pandemic ²⁶	Potential increase in problematic substance use, decrease in utilization of substance use disorder treatment

¹² Compassionate Use Act of 1996 Accessed from https://leginfo.ca.gov/faces/codes_displaySection.xhtml?sectionNum=11362.5&lawCode=HSC

¹³ Senate Bill 420. Accessed from https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=200320040SB420

¹⁴ Paul Wellstone and Pete Domenici Mental Health Parity and Addiction Equity Act of 2008. Accessed from <https://www.cms.gov/regulations-and-guidance/health-insurance-reform/healthinsreformforconsume/downloads/mhpaea.pdf>

¹⁵ U.S. Department of Justice, Memorandum for Selected United States Attorneys, Investigations and Prosecutions in States Authorizing the Medical Use of Marijuana. October 19, 2009. Accessed from <https://www.justice.gov/sites/default/files/opa/legacy/2009/10/19/medical-marijuana.pdf>

¹⁶ Senate Bill 1449. Accessed from https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=200920100SB1449

¹⁷ U.S. Department of Justice, Memorandum for United States Attorneys, Guidance Regarding the Ogden Memo in Jurisdictions Seeking to Authorize Marijuana for Medical Use. June 29, 2011. Accessed from <https://www.justice.gov/sites/default/files/opa/legacy/2014/07/23/dag-guidance-2011-for-medical-marijuana-use.pdf>

¹⁸ Assembly Bill 1300. Accessed from https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201120120AB1300

¹⁹ Assembly Bill 109. Accessed from https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB109

²⁰ U.S. Department of Justice. Memorandum for All United States Attorneys, Guidance Regarding Marijuana Enforcement. August 29, 2013. Accessed from <https://www.justice.gov/iso/opa/resources/3052013829132756857467.pdf>

²¹ Buck, J. A. (2011). The looming expansion and transformation of public substance abuse treatment under the Affordable Care Act. *Health Affairs*, 30(8), 1402-1410.

²² Senate Bill No. 643. Accessed from https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB643

²³ Urada, D., et al., (2018). *California Drug Medi-Cal Organized Delivery System, 2018 Evaluation Report*. Los Angeles, CA: UCLA Integrated Substance Abuse Programs.

²⁴ Assembly Bill 64. Accessed from https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB64

²⁵ U.S. Department of Justice. Memorandum for All United States Attorneys, Marijuana Enforcement. January 4, 2018. Accessed from <https://www.justice.gov/opa/press-release/file/1022196/download>

²⁶ Czeisler, M. E., Lane, R. I., Petrosky, E., Wiley, J. F., Christensen, A., Njai, R., ... & Rajaratnam, S. M. (2020). Mental health, substance use, and suicidal ideation during the COVID-19 pandemic—United States, June 24–30, 2020. *Morbidity and Mortality Weekly Report*, 69(32), 1049: Rogers, A. H., Shepherd, J. M., Garey, L., & Zvolensky, M. J.

Data Sources and Definitions

Data for this report were drawn from the following sources:

- *Substance Abuse and Mental Health Services Administration, National Survey on Drug Use and Health (NSDUH)*: The NSDUH is an annual nationwide survey that provides up-to-date information on tobacco, alcohol, and drug use, as well as mental health and other health-related issues in the United States. Each year the NSDUH is conducted in all 50 states and the District of Columbia, with respondents sampled from households through scientific methods. The Substance Abuse and Mental Health Services Administration's Center for Behavioral Health Statistics and Quality oversees all aspects of the NSDUH, including data collection, analysis, and reporting. To improve statistical power for data analytics, public use files merging data from two years are reported at a regional basis. Though there are other statewide surveys that provide detailed information on substance use in California, the NSDUH is being used in this report since it provides annual estimates of CUD in all states from 2002/2003 through 2018/2019. More information on the NSDUH can be found at https://nsduhweb.rti.org/respweb/about_nsduh.html NSDUH data presented in this report was collected from the Substance Abuse and Mental Health Data Archive's Restricted-use Data Analysis System, which is available at <https://rdas.samhsa.gov/#/> and its Interactive NSDUH Substate Estimates page, which is available at <https://pdas.samhsa.gov/saes/substate>. It should be noted that a limitation of the NSDUH is that it only collects information from the housed, non-institutionalized population, and the estimates it generates concerning substance use sometimes differ from those observed in other national surveys.²⁷
- *U.S. Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System (BRFSS)*: BRFSS collects annual data about health-related risk behaviors, chronic health conditions, and the use of preventive services from all 50 states as well as the District of Columbia and three U.S. territories. Since 2016, the California BRFSS has included information about cannabis use. In this report, BRFSS data is used mainly to examine trends in cannabis use (but not CUD) since the passage of Proposition 64.
- *The UCLA Fielding School of Public Health, Center for Health Policy Research California Health Interview Survey (CHIS)*: CHIS is the largest state health survey in the United States, and is conducted continuously to allow for timely one-year estimates. CHIS interviews over 20,000 Californians from all 58 counties and provides a detailed picture of the state's health and health care needs. In 2019 and 2020, CHIS included questions about cannabis, but not CUD. In this report, CHIS data is used mainly to examine trends in cannabis use since the passage of Proposition 64.
- *California Department of Health Care Services (DHCS) Outcomes Measurement System, Treatment (CalOMS-Tx) Database*. CalOMS-Tx includes information on all treatment episodes for people who receive DHCS-funded outpatient, residential, and withdrawal management substance use disorder (SUD) services in California dating back to 2007. There are data on over 100,000 treatment episodes per year in CalOMS-Tx. For each of these episodes, CalOMS-Tx has information concerning client demographics, substance use, referral sources, treatment retention, and treatment outcomes. This report only includes information concerning treatment in outpatient (both methadone and non-methadone) and residential levels of care. Though California's publicly funded SUD system also offers other types of treatment such as withdrawal management ("detox"), these services are generally of short duration, and intended to be first steps towards treatment in a residential or outpatient program rather than treatments in and of themselves.²⁸ Consequently, this analysis excluded treatment in withdrawal management programs. Programs that report to CalOMS-Tx account for approximately 53 percent of the state's SUD treatment providers, and provide services to nearly 82 percent of all

(2020): Mark, T. L., Gibbons, B., Barnosky, A., Padwa, H., & Joshi, V. (2021). Changes in Admissions to Specialty Addiction Treatment Facilities in California During the COVID-19 Pandemic. *JAMA Network Open*, 4(7), e2117029-e2117029.

²⁷ Grigsby, T. J., Howard, K., & Howard, J. T. (2021). Comparison of Past Year Substance Use Estimates by Age, Sex, and Race/Ethnicity Between Two Representative Samples of the US Adult Population. *Population research and policy review*, 1-16: Grucza, R. A., Abbacchi, A. M., Przybeck, T. R., & Gfroerer, J. C. (2007). Discrepancies in estimates of prevalence and correlates of substance use and disorders between two national surveys. *Addiction*, 102(4), 623-629.

²⁸ Center for Substance Abuse Treatment (2015). *Detoxification and Substance Abuse Treatment. Treatment Improvement Protocol (TIP) Series, No. 45*. Rockville, MD: Center for Substance Abuse Treatment.

individuals who receive SUD treatment in California.²⁹ These programs serve a diverse, predominantly low-income population that is at high risk for CUD.³⁰ More information on CalOMS-Tx can be found at <http://www.dhcs.ca.gov/provgovpart/Pages/CalOMS-Treatment.aspx>

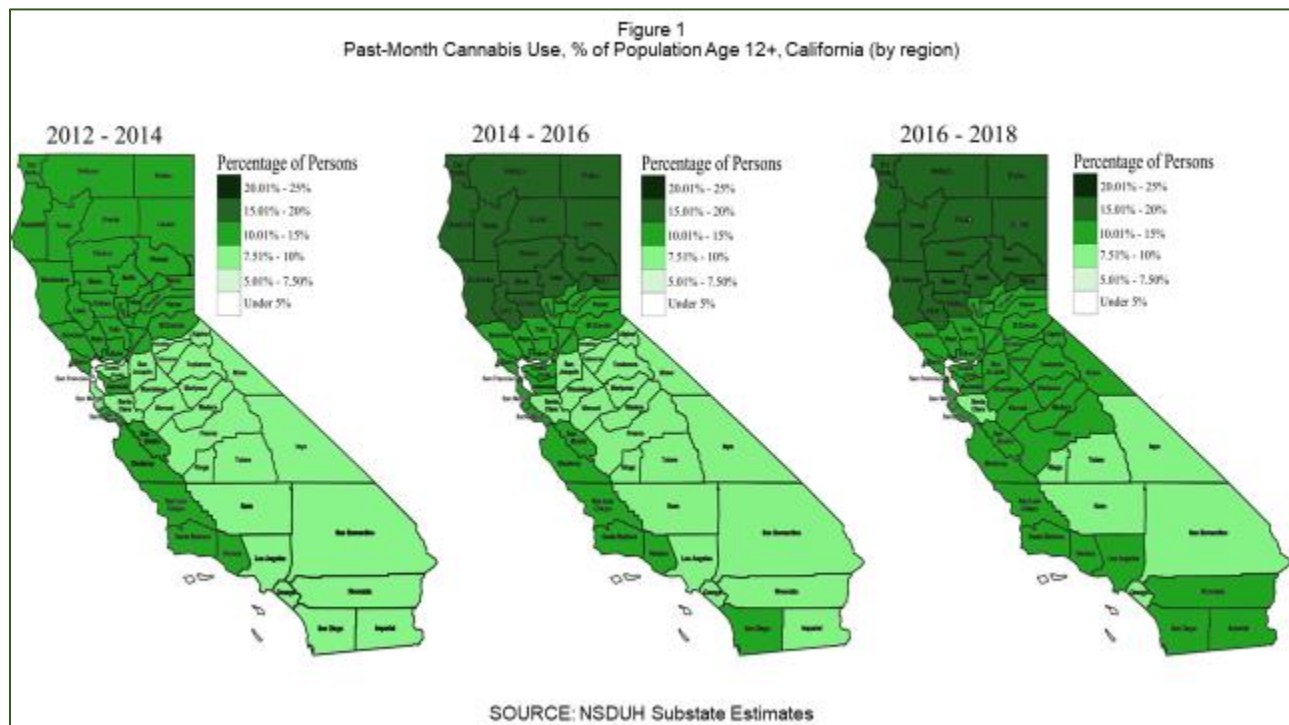
See the Appendix for the definitions used for key outcomes and measures in this report.

Findings

Changes in Cannabis Use and Frequent Cannabis Use

Rates of past-month cannabis use and frequent (20 of 30 days) past-month cannabis use have been growing since 2010. This trend has not changed dramatically since Proposition 64. However, past-month prevalence indicators show notable increases in use from 2014/2015-2018/2019.

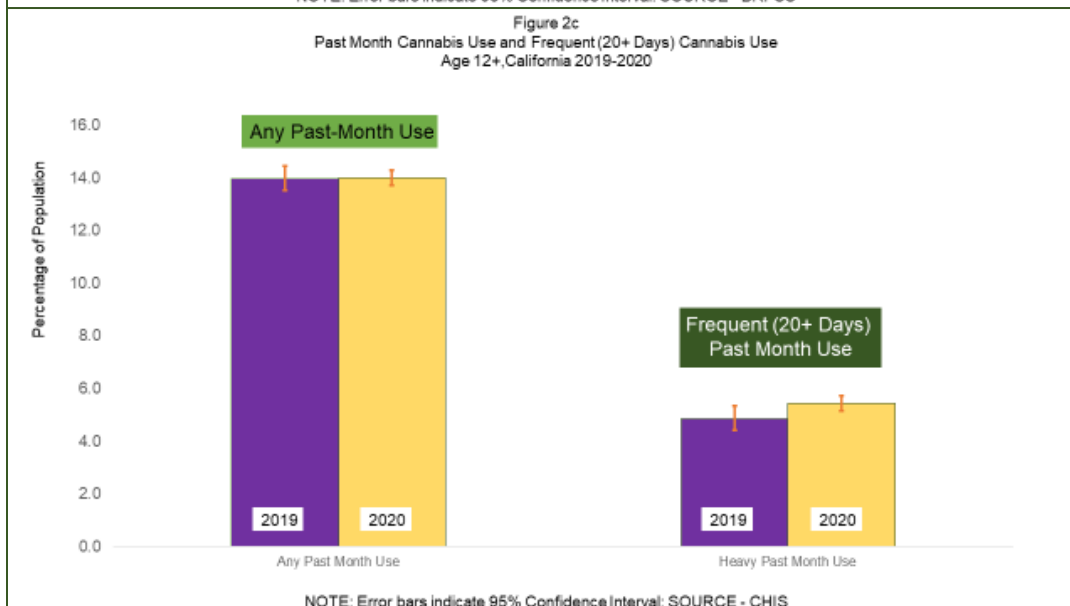
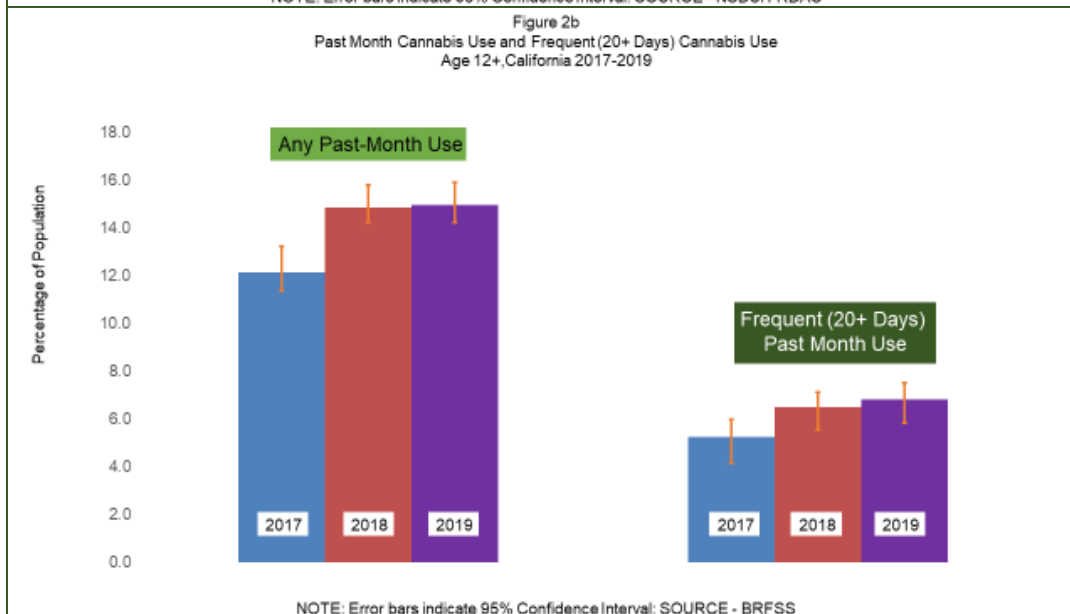
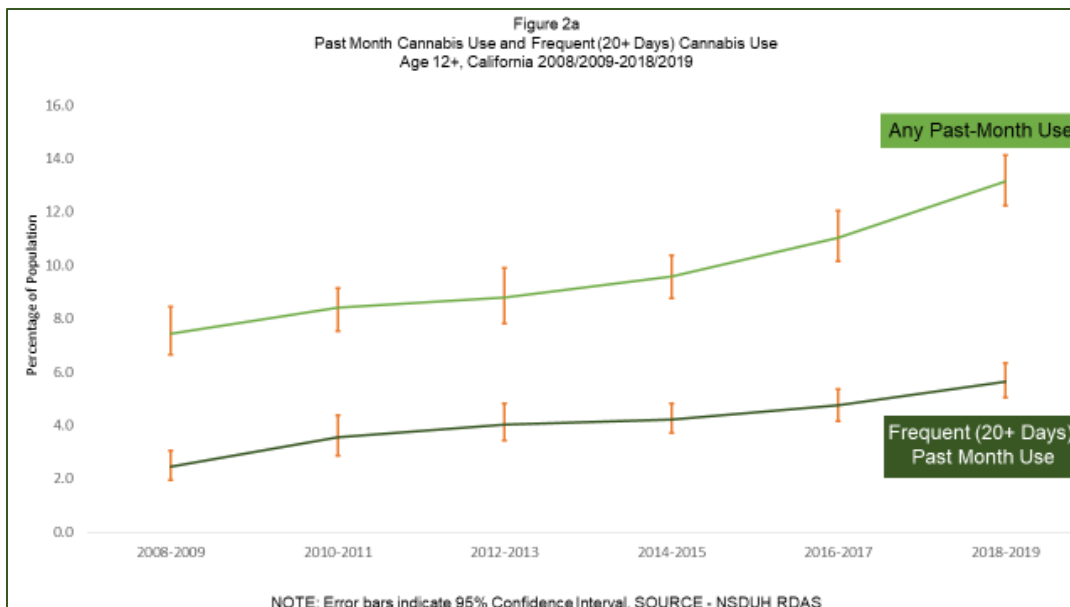
Figure 1 shows the estimated prevalence of past-month cannabis use across California, broken down by region,³¹ based on NSDUH data from 2012-2014, 2014-2016, and 2016-2018. Rates of past-month use have been highest in Northern California, increasing over time in Northern and Central regions of the state, and growing in Los Angeles, San Diego, Riverside, and Imperial Counties.



²⁹ Bass B, Urada D, Joshi, V. (manuscript in preparation). The effect of the Drug Medi-Cal Organized Delivery System 1115 Demonstration Waiver on substance use disorder treatment access: evidence from California.

³⁰ Hasin, D. S., Shmulewitz, D., & Sarvet, A. L. (2019). Time trends in US cannabis use and cannabis use disorders overall and by sociodemographic subgroups: a narrative review and new findings. *The American Journal of Drug and Alcohol Abuse*, 45(6), 623-643.

³¹ The regions in this map are: Region 1R (Butte, Colusa, Del Norte, Glenn, Humboldt, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity Counties), Region 2R (El Dorado, Nevada, Placer, Sutter, Yolo, Yuba Counties), Region 3R (Sacramento County), Region 4R (Marin, Napa, Solano, Sonoma Counties), Region 5R (San Francisco County), Region 6R (Santa Clara County), Region 7R (Contra Costa County), Region 8R (Alameda County), Region 9R (San Mateo County), Region 10R (Santa Barbara and Ventura Counties), Region 11R (Los Angeles County), Region 12R (Alpine, Amador, Calaveras, Mono, San Joaquin, and Tuolumne Counties), Region 13R/19R (Imperial and Riverside Counties), Region 14R (Orange County), Region 15R (Fresno County), Region 16R (San Diego County), Region 17R (Inyo, Kern, Kings, and Tulare Counties), Region 18R (San Bernardino County), Region 20R (Madera, Mariposa, Merced, and Stanislaus Counties), Region 21R (Monterey, San Benito, San Luis Obispo, and Santa Cruz Counties)



Figures 2a-2c illustrate trends in the prevalence of past-month cannabis use and frequent (20+ days) past-month cannabis use in California from 2019-2020 according to the NSDUH, BRFSS and CHIS. NSDUH (Figure 2a) shows that California's share of the population age 12+ reporting any past-month cannabis use increased steadily from 2008/2009 to 2014/2015, and then grew dramatically (increasing by 37.2 percent) from 2014/2015 through 2018/2019. BRFSS (Figure 2b) shows rates of past-month use increasing from 2017-2018 (by 22.6 percent) and remaining steady in 2019, while CHIS (Figure 2c) shows past-month use did not change appreciably from 2019-2020.

As with past-month use, the share of California's population reporting frequent (20+ days) past-month use increased steadily from 2008/2009 to 2014/2015, and it continued to increase at a similar rate after Proposition 64 (NSDUH – Figure 2a). BRFSS data (Figure 2b) show frequent past-month use increasing from 2017-2018 (by 23.8 percent) and remaining steady from 2018-2019, while CHIS data (Figure 2c) indicate that from 2019-2020, rates of frequent past-month use remained unchanged.

Across age and racial/ethnic groups, past-month cannabis use became more prevalent from 2010-2017, particularly for adults under 60. Tables 3a-3c show rates of past-month cannabis use in California from 2008-2020 by age group and race/ethnicity analyzed. NSDUH (Table 3a) shows past-month cannabis use rates trending upward for youth under 26, adults over 26, and Hispanics almost every year from 2008/2009 to 2018/2019. For White Non-Hispanics, past-month use increased each year, with a particularly dramatic increase (34.6 percent) from 2014/2015-2018/2019. BRFSS (Table 3b) shows a rising trend in past-month use rates all demographic groups analyzed from 2017-2018, although only results for Hispanics show a statistically significant (39.4 percent) increase. From 2018-2019, past-month use rates levelled off for all demographics. White Non-Hispanics and adults over 60 saw statistically significant increases in their rates of past-month use from 2017-2019. CHIS (Table 3c) shows that past-month use rates dropped for 18-25 year olds (by 22.0 percent) from 2019-2020, though it increased among adults age 26-59 over the same period.

Table 3a Percentage of California Population Reporting Past-Month Cannabis Use (95% Confidence Intervals in Parentheses) SOURCE - NSDUH						
Year	Age 12-25	Age 26+	White Non- Hispanic	Black Non- Hispanic	Hispanic	
2008/2009	13.4 (12.0-14.8)	5.5 (4.1-6.9)	9.6 (8.1-11.4)	10.8 (7.0-15.1)	5.1 (4.2-6.2)	
2010/2011	15.8 (14.4-17.2)	6.1 (4.7-7.5)	11.0 (9.3-13.0)	12.9 (8.7-18.7)	6.5 (5.5-7.7)	
2012/2013	15.7 (14.3-17.3)	6.6 (5.5-8.0)	12.1 (10.3-14.1)	12.3 (8.9-16.9)	5.9 (4.9-7.1)	
2014/2015	15.3 (13.9-16.7)	7.8 (7.0-9.6)	12.7 (11.2-14.4)	16.8 (13.4-20.8)	7.4 (6.5-8.4)	
2016/2017	16.2 (14.9-17.7)	9.6 (8.5-10.7)	14.0 (12.3-15.9)	18.3 (14.2-23.2)	8.6 (7.6-9.7)	
2018/2019	18.5 (16.9-20.2)	11.7 (10.5-12.9)	17.1 (15.3-18.9)	16.9 (13.3-21.2)	10.6 (9.4-11.9)	

Table 3b Percentage of California Population Reporting Past-Month Cannabis Use (95% Confidence Intervals in Parentheses) SOURCE - BRFSS						
Year	Age 18-24	Age 25-59	Age 60+	White Non- Hispanic	Black Non- Hispanic	Hispanic
2017	21.7 (17.2-25.6)	13.1 (11.6-14.6)	6.4 (5.2-7.6)	15.6 (13.8-17.4)	15.4 (10.1-20.7)	9.4 (7.7-11.1)
2018	26.7 (23.0-30.4)	15.4 (14.2-16.6)	8.8 (7.5-10.2)	17.5 (16.0-18.9)	20.9 (16.0-25.9)	13.1 (11.6-14.6)
2019	26.3 (22.5-30.2)	15.3 (14.0-16.6)	9.7 (8.4-11.0)	19.1 (17.5-20.7)	21.8 (16.7-26.9)	12.1 (10.6-13.6)

Table 3c Percentage of California Population Reporting Past-Month Cannabis Use (95% Confidence Intervals in Parentheses) SOURCE - CHIS						
Year	Age 18-25	Age 26-59	Age 60+	White Non- Hispanic	Black Non- Hispanic	Hispanic
2019	23.6 (20.9-26.3)	14.3 (13.6-15.0)	8.6 (8.1-9.2)	17.9 (17.2-18.5)	18.9 (16.2-21.6)	12.2 (11.2-13.2)
2020	18.4 (16.2-20.6)	15.8 (15.1-16.5)	8.4 (7.9-9.0)	18.6 (17.9-19.2)	16.2 (13.6-18.9)	11.8 (10.8-12.8)

Frequent past-month cannabis use trended upward for nearly all demographic groups analyzed from 2008-2015, prior to Proposition 64. This upward trend continued for adults under 60 after Proposition 64. Hispanics remain significantly less likely to report frequent use than other racial/ethnic groups analyzed.

Tables 4a-4c show trends in frequent past-month cannabis use (20+ days) by age group and race/ethnicity. NSDUH (Table 4a) shows frequent use rates have fluctuated but grown among 12-25 year olds over the entire period while they increased steadily for adults age 26+, more than tripling from 2008/2009 to 2018/2019. Frequent use rates have fluctuated among Black Non-Hispanics, and they have grown relatively steadily among Hispanics. However, Hispanics remain significantly less likely other racial/ethnic groups to report frequent use. The most pronounced growth in frequent use rates since Proposition 64 have been among adults age 26+ (increasing by 48.6 percent from 2014/2015-2018/2019) and White Non-Hispanics (increasing by 39.3 percent from 2014/2015-2018/2019).

Table 4a						
Percentage of California Population Reporting Frequent (20+ Days) Past-Month Cannabis Use (95% Confidence Intervals in Parentheses)						
SOURCE – NSDUH						
Year	Age 12-25	Age 26+	White Non- Hispanic	Black Non- Hispanic	Hispanic	
2008/2009	4.5 (4.1-5.0)	1.8 (1.4-2.3)	3.4 (2.6-4.5)	5.2 (2.3-11.2)	1.2 (0.9-1.6)	
2010/2011	6.2 (5.6-6.9)	2.7 (2.2-3.4)	4.7 (3.5-6.2)	7.6 (4.7-12.0)	2.7 (1.9-3.7)	
2012/2013	6.6 (6.0-7.3)	3.2 (2.6-4.0)	6.0 (4.8-7.4)	4.2 (2.7-6.4)	2.4 (1.7-3.3)	
2014/2015	5.8 (5.4-6.5)	3.7 (3.3-4.4)	5.6 (4.7-6.8)	11.1 (8.0-15.2)	2.8 (2.2-3.5)	
2016/2017	6.5 (6.0-7.2)	4.2 (3.7-5.0)	6.1 (5.1-7.3)	9.7 (6.8-13.6)	3.5 (2.8-4.3)	
2018/2019	6.3 (5.7-7.0)	5.5 (5.0-6.1)	7.8 (6.8-9.0)	9.3 (6.9-12.4)	4.1 (3.4-4.9)	

Table 4b						
Percentage of California Population Reporting Frequent (20+ Days) Past-Month Cannabis Use (95% Confidence Intervals in Parentheses)						
SOURCE – BRFSS						
Year	Age 18-24	Age 25-59	Age 60+	White Non- Hispanic	Black Non- Hispanic	Hispanic
2017	7.7 (4.7-10.6)	6.2 (5.1-7.2)	2.4 (1.7-3.2)	7.3 (6.1-8.5)	8.2 (3.8-12.5)	3.5 (2.4-4.7)
2018	9.5 (7.2-11.8)	7.2 (6.3-8.1)	3.9 (3.0-4.8)	8.1 (7.0-9.1)	9.4 (5.9-13.0)	5.6 (4.6-6.6)
2019	11.0 (8.2-13.7)	7.2 (6.3-8.2)	4.4 (3.5-5.3)	8.7 (7.5-9.8)	12.4 (8.1-16.7)	5.3 (4.3-6.2)

Table 4c						
Percentage of California Population Reporting Frequent (20+ Days) Past-Month Cannabis Use (95% Confidence Intervals in Parentheses)						
SOURCE – CHIS						
Year	Age 18-25	Age 26-59	Age 60+	White Non- Hispanic	Black Non- Hispanic	Hispanic
2019	7.6 (5.9-9.3)	5.0 (4.6-5.4)	3.3 (3.0-3.6)	6.6 (6.2-7.0)	6.8 (5.1-8.5)	4.1 (3.5-4.7)
2020	7.0 (5.6-8.5)	5.9 (5.5-6.4)	3.7 (3.4-4.1)	7.0 (6.6-7.5)	8.0 (6.1-10.0)	4.7 (4.0-5.3)

BRFSS (Table 4b) shows that frequent use had an upward trend for almost all demographic groups analyzed from 2017-2019, though there is such large sampling variability in this measure that only increases among adults over 60 are statistically meaningful. CHIS (Table 4c) shows statistically significant increases in frequent use in just a single year, from 2019-2020, among adults age 25-59 and adults over 60. While each racial/ethnic group also continues to show upward trends in use in CHIS, these changes are not statistically significant. Hispanics show lower rates of frequent use than other groups in both BRFSS and CHIS.

Changes in Cannabis Use Disorder Prevalence

The prevalence of CUD in California has remained steady in California since 2008/2009. There have not been any notable shifts in CUD prevalence among age or racial/ethnic groups analyzed.

Figure 3 shows the prevalence of CUD in California from 2008/2009 through 2018/2019. In spite of the aforementioned changes in use and frequent use, the prevalence of CUD in California has remained relatively steady over the 10-year period.

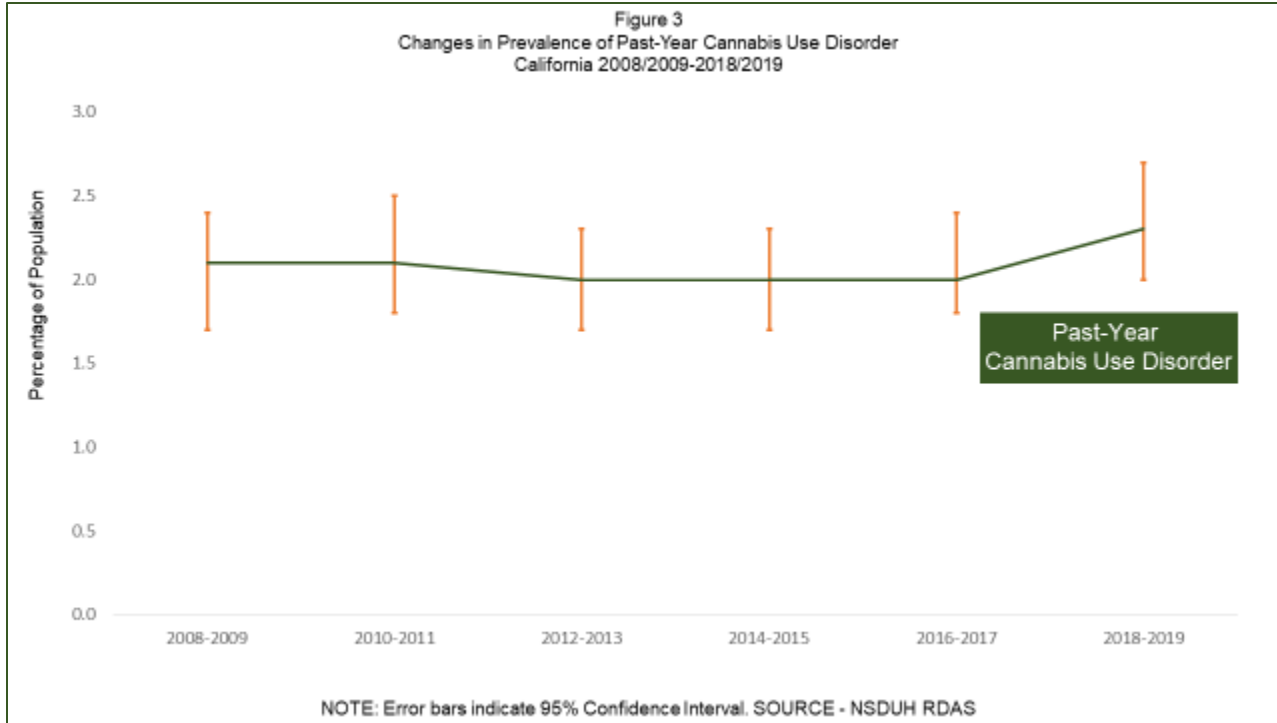


Table 5 shows the prevalence of CUD among different age and racial/ethnic groups from 2008/2009-2018/2019. CUD rates have been higher for youth age 12-25 than for adults over age 26 and for Black/Non-Hispanics than other racial/ethnic groups analyzed in most years.

Year	Age 12-25	Age 26+	White Non- Hispanic	Black Non- Hispanic	Hispanic
2008/2009	5.1 (4.4-6.0)	1.1 (0.7-1.5)	2.2 (1.7-2.8)	2.4 (1.3-2.8)	2.2 (1.7-2.9)
2010/2011	6.3 (5.5-7.2)	0.8 (0.5-1.3)	1.6 (1.2-2.2)	2.8 (1.7-4.7)	2.8 (2.2-3.6)
2012/2013	5.5 (4.7-6.4)	0.9 (0.6-1.3)	2.2 (1.7-2.9)	5.2 (3.1-8.7)	1.7 (1.4-2.2)
2014/2015	4.6 (4.0-5.2)	1.1 (0.8-1.5)	2.2 (1.8-2.9)	3.4 (2.2-5.2)	1.7 (1.3-2.3)
2016/2017	5.1 (4.3-5.9)	1.2 (0.9-1.5)	2.3 (1.8-2.8)	3.9 (2.4-6.3)	1.8 (1.4-2.3)
2018/2019	5.3 (4.5-6.2)	1.5 (1.1-1.9)	2.5 (2.0-3.1)	2.9 (1.8-4.6)	2.3 (1.7-2.9)

Changes in Cannabis Use Disorder Treatment, Referrals, and Outcomes

CUD treatment admissions, treatment retention, and successful discharge rates trended downward from 2010-2020.

Figure 4 provides an overview of CUD admissions and other SUD admissions in California from 2010-2020. CUD admissions declined steadily over the course of the decade, whereas admissions for disorders related to other substances remained relatively steady for most of the 10-year period.

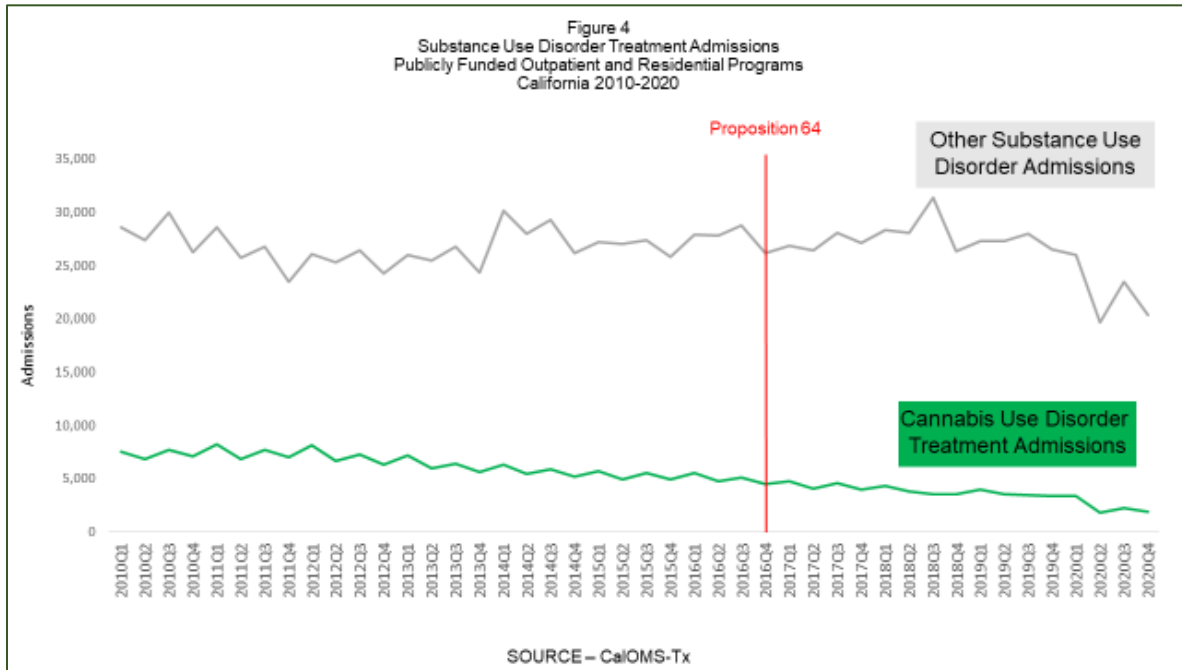
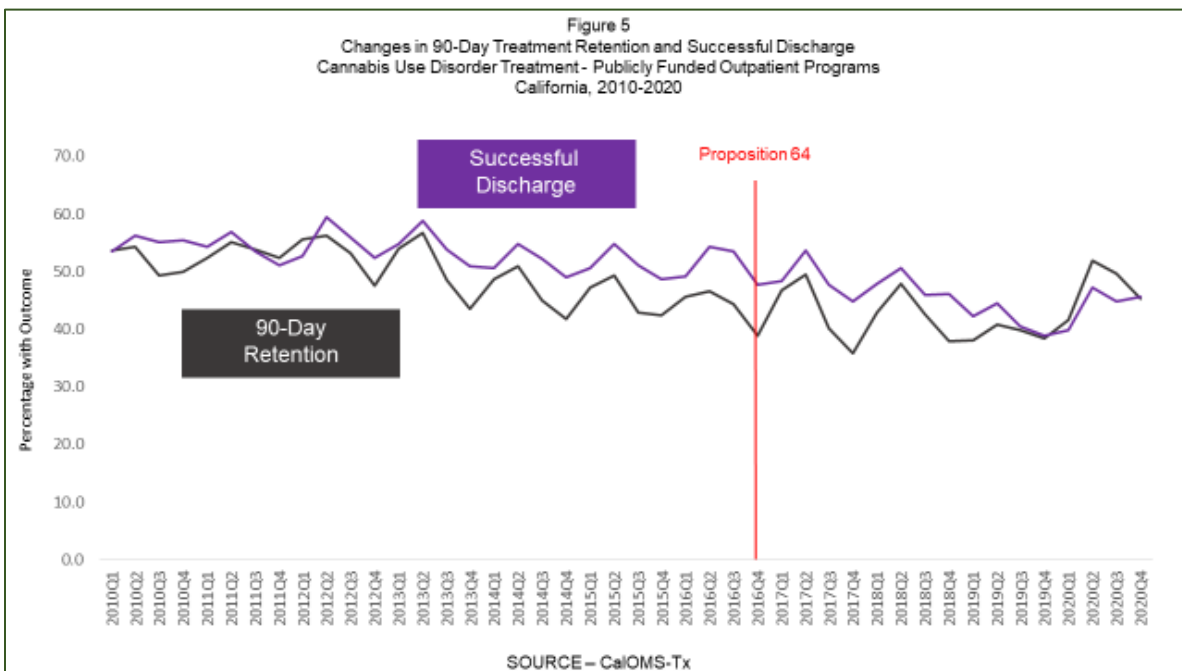


Figure 5 shows trends in 90-day treatment retention and successful discharge among clients treated for CUD. Both treatment retention and successful discharge rates declined significantly over the period from 2010-2019 ($p < 0.001$ for both retention and successful discharge).



Proposition 64's implementation was associated with statistically significant decreases in CUD treatment admissions, particularly for White Non-Hispanics and adults over 26. It was also associated with statistically significant decreases in criminal justice referrals to CUD treatment, but not with statistically significant decreases in non-criminal justice referrals. However, due to other developments related to cannabis policy and SUD treatment in California, it is unclear if the observed changes were caused by Proposition 64 or other factors.

Figures 4-5 illustrate that CUD admissions, CUD treatment retention rates, and successful discharge rates generally decreased in California's publicly funded SUD system from 2010-2020. Below, we use a more rigorous approach to determine the degree to which Proposition 64 impacted these outcomes. We estimate a linear regression model via ordinary least squares (OLS):

$$Y_{ct} = \alpha + \beta \text{Prop64}_t + \delta' X_{ct} + \lambda_c + \gamma_z + \varepsilon_{ct}$$

In this equation, "c" indexes each county, and "t" indexes each month/year. Y_{ct} is the logged outcome of interest (given the discrete nature of admissions and discharges), including admissions, treatment retention, or successful discharge. α is the intercept term, which gives us the average value of the outcome when all other explanatory variables are equal to zero. Prop64_t is an indicator set equal to 1 after Proposition 64 passed (November 8, 2016), and 0 otherwise. X_{ct} is a vector of county-specific time-varying controls, including DMC-ODS Waiver status (e.g. an indicator set equal to 1 when the county implements the DMC-ODS Waiver and 0 otherwise) and the COVID-19 death rate per 100,000. λ_c is a county fixed effect to control for time-invariant county effects, γ_z is a year fixed effect to control for county-invariant year effects (e.g. controls for factors changing each year that are common to all counties within a given year), and ε_{ct} is the error term. Observations are aggregated to the county-month-year level, and standard errors are clustered at the county level. The same model above is also used to estimate the impact of Proposition 64 on admissions by subgroups, including age, race/ethnicity, and criminal justice status. The regressions are estimated using admission and discharge data from CalOMS-Tx from January 2010 to December 2020. The main coefficient of interest in this analysis is β , which measures the impact of Proposition 64 on the outcomes of interest. We can interpret β as the expected change in the outcomes of interest after the passage of Proposition 64, compared to before the passage of Proposition 64. Analyses were conducted using Stata version 16.1.

Table 6 presents the OLS regression results estimating the associations between Proposition 64, admissions for CUD treatment among patients overall, by age group, racial/ethnic group, and referral sources.

Table 6 Association Between Proposition 64 and CUD Admissions								
	All	Age 12-25	Age 26+	White, Non-Hisp.	Black, Non-Hisp.	Hispanic	Criminal Justice	Non-Criminal Justice
Proposition 64	-0.1769** (0.0553)	-0.1279* (0.0504)	-0.1560** (0.0492)	-0.1786** (0.0442)	-0.0011 (0.0388)	-0.1267** (0.0483)	-0.1845** (0.0495)	-0.1076 (0.0560)
N	7355	7355	7355	7355	7355	7355	7355	7355
NOTES: OLS estimates from equation in the text are presented. Data on outcomes presented come from CalOMS-Tx for the years 201-02020. Observations are at the county-month-year level. Each column is a separate regression, and the natural log of each outcome is taken. Regressions include controls for DMC-ODS Waiver status and COVI-19 death rate as described in the methods section and Appendix. Standard errors clustered at the county level are reported in parentheses. * p<0.05; ** p<0.01								

Table 6 shows that when controlling for county-level time-varying and time-persistent factors, Proposition 64 had the following statistically significant effects (unless otherwise noted):

- Proposition 64 was associated with a 17.7% decrease in CUD admissions.
- Proposition 64 was associated with a 12.8% decrease in CUD admissions for 12-25 year olds, and a 15.6% decrease in admissions for adults age 26+. We conducted a chi-square test to determine if

Proposition 64's impact on admissions for youth was statistically significantly different from the effect for adults. We found that Proposition 64's impacts on youth admissions was not statistically significantly different from its impacts on adults ($p=0.6497$).

- Proposition 64 was associated with a 17.9% decrease in admissions for White Non-Hispanics, a 0.1% decrease (not statistically significant) for Black non-Hispanics, and a 12.7% decrease for Hispanics. We conducted chi-square tests to evaluate if Proposition 64's impact on admissions was statistically significantly different by racial/ethnic group. We found that Proposition 64's impact on Black Non-Hispanic admissions was significantly different from its impact on White Non-Hispanic admissions ($p<0.01$) and Hispanic admissions ($p<0.05$). Its impact on White Non-Hispanic admissions was not significantly different from its impact on Hispanic ($p=0.3253$) admissions.
- Proposition 64 was associated with an 18.5% decrease in Criminal Justice CUD referrals and a 10.8% decrease in non-Criminal Justice CUD referrals (not statistically significant). We conducted a chi-square test to determine if Proposition 64's impact on Criminal Justice and non-Criminal Justice admissions was statistically significantly different. We found that Proposition 64's impact on Criminal Justice referrals was not statistically significantly different from its impact on non-Criminal Justice referrals ($p=0.2592$).

Proposition 64's implementation was associated with statistically significant decreases in 90-day treatment retention and successful discharge rates in CUD treatment. However, due to other developments related to cannabis policy and SUD treatment in California, it is unclear if the observed changes were caused by Proposition 64 or other factors.

Table 7 presents the OLS regression results estimating the association between Proposition 64, 90-day treatment retention, and successful discharge status (all results statistically significant).

Table 7 Association Between Proposition 64, 90-Day Retention, and Successful Discharge		
	90-Day Retention	Successful Discharge
Proposition 64	-0.1843** (0.0572)	-0.1568** (0.0587)
N	7329	7329
NOTES: OLS estimates from equation in the text are presented. Data on outcomes presented come from CalOMS-Tx for the years 201-02020. Observations are at the county-month-year level. Each column is a separate regression, and the natural log of each outcome is taken. Regressions include controls for DMC-PDS Waiver status and COVI-19 death rate as described in the methods section and Appendix. Standard errors clustered at the county level are reported in parentheses. * $p<0.05$; ** $p<0.01$		

Table 7 shows that when controlling for county-level time-varying and time-persistent factors:

- Proposition 64 was associated with an 18.4% decrease in 90-day retention rates among patients receiving CUD treatment.
- Proposition 64 was associated with a 15.7% decrease in successful discharges among patients receiving CUD treatment.

Key Findings and Recommendations

Given the numerous significant developments in cannabis policy and substance use disorder treatment nationally and within the state, it is difficult to ascertain to what degree the observed changes in cannabis use, frequent cannabis use, CUD, and CUD treatment in California can be attributed to Proposition 64 or to other causes. Nonetheless, these data provide several key insights regarding cannabis use, cannabis use disorder treatment, and health in California over the past decade. In particular:

- Cannabis use and frequent cannabis use are increasing in California, and some data indicate that there have been substantive increases in frequent cannabis use in recent years. Rates of CUD have remained steady over the past decade.
- Cannabis use has become more prevalent across demographic groups since 2010. There are signs that use may be levelling off or even starting to decline among youth and Black Non-Hispanics, while it

has continued to increase among adults under 60 and White Non-Hispanics. However, these increases have not led to documented increases in the prevalence of CUD.

- Frequent cannabis use has continued increasing since 2016 among adults under 60.
- Though rates of CUD have remained steady since 2010, admissions to publicly funded CUD treatment have been declining since 2010. This decline has been accelerating since 2016.
- Criminal justice referrals to CUD treatment have been decreasing significantly, and at a faster rate than non-criminal justice referrals since 2016. Due to other developments related to cannabis policy and SUD treatment in California, it is unclear if the observed changes were caused by Proposition 64 or other factors.
- Proposition 64's passage in 2016 was associated with a significantly greater decline in CUD admissions for White Non-Hispanics and Hispanics than Black Non-Hispanics. Due to other developments related to cannabis policy and SUD treatment in California, it is unclear if the observed changes were caused by Proposition 64 or other factors.
- Both treatment retention and successful discharge rates declined in publicly funded CUD treatment in California over the past decade. Proposition 64's passage in 2016 was associated with a statistically significant 18.4 percent decrease in 90-day treatment retention and a statistically significant 15.7 percent decrease in successful discharges. Due to other developments related to cannabis policy and SUD treatment in California, it is unclear if the observed changes were caused by Proposition 64 or other factors.

Based on these findings, the Department of Cannabis Control, policymakers, and regulators could consider the following as they develop future policies and programs related to cannabis:

- It is encouraging that CUD rates have not been increasing dramatically in California. However, given that rates of use and frequent use are increasing, it is possible that many Californians are using cannabis in a manner that could lead to CUD in the future. California law stipulates that a significant portion of the funds generated from cannabis sales be deposited in a Youth Education, Prevention, Early Intervention, and Treatment Account that the California Department of Health Care Services can use to educate youth, prevent SUD, and prevent harm from substance use.³² Given trends in cannabis use and frequent use, such programming will likely be essential to help California avoid increases in CUD like those detected in other states.³³ Funds for education, prevention, and prevention of harm need to be preserved, and directed to the Department of Health Care Services to be utilized as intended by Proposition 64.
- There are indications that cannabis use and frequent use are becoming more prevalent, so state policymakers and local jurisdictions need to take evidence-based steps to prevent problem cannabis use. In particular, lessons from alcohol and tobacco regulation can be adapted into policies that protect public health in the age of cannabis legalization. Some of these measures may include requiring health warnings on cannabis products, informing vulnerable groups about the risks of cannabis use, limiting cannabis marketing and product diversification, and taking steps to avoid the emergence of profit-driven cannabis markets that are likely to promote use.³⁴
- While the youth education, prevention, early intervention, and treatment funding generated by Proposition 64 can help mitigate the negative impacts of legalization for youth, the more profound increases in frequent use have been among adults. Given the increases in use among adults, policymakers may want to consider developing strategies to generate dedicated funding to education, prevention, and treatment related to problematic cannabis use among adults that mirror those that have already been set aside for youth.

³² Assembly Bill 64, accessed from https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB64

³³ Cerda et al., 2020.

³⁴ Getting It Right from the Start. *Principles for Protecting Youth, Public Health, & Equity in Cannabis Regulation*. https://gettingitrightfromthestart.org/wp-content/uploads/2021/03/Principles-for-Protecting-Youth-Public-Health-and-Equity-in-Cannabis-Regulation_2021.pdf

- We hope that this information will help the Department of Cannabis Control and policymakers cross the state better understand impacts that cannabis is having on health in California, and take steps to promote and protect public health in the age of cannabis legalization.

For further information about UCLA Integrated Substance Abuse Programs' evaluation of Proposition 64's impacts on health, please contact Dr. Howard Padwa at hpadwa@mednet.ucla.edu

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Appendix

- Cannabis Use Disorder (CUD) is defined as marijuana abuse or marijuana dependence, as defined by the NSDUH, based on the criteria in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV) (1994). Though more recent definitions of cannabis use disorder were included in the DSM-V (2013), the NSDUH uses DSM-IV definitions since those are consistent across time (both before and since 2013). The DSM-IV classified an individual as being dependence on marijuana if they meet three or more of the following six dependence criteria: (1) spent a great deal of time over a period of a month getting, using, or getting over the effects of the substance; (2) used the substance more often than intended or was unable to keep set limits on the substance use; (3) needed to use the substances more than before to get desired effects or noticed that the same amount of substance use had less effect than before; (4) inability to cut down or stop using the substance every time the individual tried or wanted to; (5) continued to use the substance even though it was causing problems with emotions, nerves, mental health, or physical problems; (6) the substance reduced or eliminated involvement or participation in important activities. It defines marijuana abuse as meeting one or more of the following criteria but not having met the above criteria for dependence: (1) serious problems at home, work, or school caused by the substance, such as neglecting children, missing work or school, doing a poor job at work or school, or losing a job or dropping out of school; (2) used the substance regularly and then did something that might have put one in physical danger; (3) use of the substance caused one to do things that repeatedly get one in trouble with the law; (4) had problems with family or friends that were probably caused by using the substance and continued to use the substance even though one thought the substance use caused the problem.³⁶
- CUD treatment is defined in CalOMS-Tx as individuals who indicate that marijuana/hashish is their primary alcohol or drug problem at admission to a publicly funded SUD treatment program.³⁷
- Client age is derived from CalOMS-Tx using the date that each treatment episode begins and each client's date of birth.³⁸
- Client race/ethnicity is defined from the CalOMS-Tx race and ethnicity variables. Clients are defined as White/Non-Hispanic if they are classified as "White/Caucasian" in the CalOMS-Tx race variable and "Not Hispanic" in the ethnicity variable. They are classified as Black/Non-Hispanic if they are classified as "Black/African American" in the CalOMS-Tx race variable and "Not Hispanic" in the ethnicity variable. Clients are classified as "Hispanic" if they indicate that they are Mexican/Mexican American, Cuban, Puerto Rican, or Other Hispanic/Latino in the CalOMS-Tx ethnicity variable. Clients are classified as "Other Race/Ethnicity" if they do not meet any of the three criteria listed above. These clients are classified together in one category because their numbers are very small compared to the other groups if listed individually.³⁹
- Criminal justice referrals are defined as referrals in CalOMS-Tx that come from Probation/Parole, Post-Release Community Supervision (AB 109), DUI/DWI, Adult Felon Drug Court, Dependency Drug Court, and Court/Criminal Justice.⁴⁰
- Treatment retention is defined in CalOMS-Tx as SUD treatment episodes that occur in outpatient or intensive outpatient treatment (non-residential outpatient treatment/recovery/outpatient drug free or non-residential outpatient day program intensive/day care rehabilitative use for intensive outpatient/ day care rehabilitative) levels of care and have at least 90 days between their admission and discharge date.⁴¹ Treatment retention is only measured for non-methadone outpatient levels of care, since

³⁶ Center for Behavioral Health Statistics and Quality. (2020). *2019 National Survey on Drug Use and Health: Methodological summary and definitions*. Rockville, MD: Substance Abuse and Mental Health Services Administration.

³⁷ California Department of Health Care Services. (2014). *The California Outcomes Measurement System Treatment (CalOMS Tx) CalOMS Tx Data Dictionary, File Version 2.0, File Version 2.1 (LGBT)*. Sacramento, CA: California Department of Health Care Services.

³⁸ California Department of Health Care Services. 2014.

³⁹ California Department of Health Care Services. 2014..

⁴⁰ California Department of Health Care Services. 2014.

⁴¹ California Department of Health Care Services. 2014..

residential treatment episodes are often longer because treatment participation provides housing, and methadone treatment is often an ongoing service rather than a short-term treatment episode.

- Treatment success is defined in CalOMS-Tx as treatment episodes with a discharge status of “completed treatment/recovery plan, goals/referred/standard”, “completed treatment/recovery plan, goals/not referred/standard”, “left before completion with satisfactory progress/standard” or “left before completion with satisfactory progress/administrative.” ⁴²

⁴² California Department of Health Care Services. 2014.