



## Original Research

# Exploring the Impact of Adult-use Cannabis Legalization on Legal System Referrals to Treatment for Cannabis Use: Do Age and Race Have a Moderating Effect?

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### ABSTRACT

**Purpose:** Despite the progression of recreational cannabis legalization, the legal system remains the largest source of referral to treatment for cannabis use. The legal system's continued practice of requiring participation in cannabis treatment programs raises questions regarding the extent to which individuals who interact with the legal system are monitored for cannabis use post-legalization. This article presents trends in justice-system referrals to treatment for cannabis use in legal and nonlegal states for 2007–2019. The relationship between legalization and justice system treatment referrals for black, Hispanic/Latino, and white adults and juveniles was explored. Given that minority and youth populations are subject to disproportionate levels of cannabis enforcement, legalization is expected to have a weaker relationship with justice-system referral rates in white juveniles and black and Hispanic/Latino adults and juveniles compared to white adults.

**Methods:** Using 2007–2019 data from the Treatment Episode Data Set—Admissions (TEDS-A), variables were created for state-level rates of legal system-referred treatment admissions for cannabis use in black, Hispanic/Latino, and white adults and juveniles. Rate trends were compared across populations and staggered difference-in-difference and event analyses were conducted to determine whether legalization is associated with a decline in justice-system referrals to treatment for cannabis use.

**Findings:** For the study period, the mean rate of legal system-referred admissions in the total population was 2.75 per 10,000 residents. Black juveniles had the highest mean rate (20.16), followed by Hispanic/Latino

juveniles (12.35), black adults (9.18), white juveniles (7.58), Hispanic/Latino adults (3.42), and white adults (1.66). Legalization did not have a significant impact on treatment-referral rates in any population of study. Events analyses indicated significant rate increases in black juveniles in legalized states compared to controls at 2 and 6 years after policy change, and in black and Hispanic/Latino adults at 6 years after policy change (all,  $P < 0.05$ ). While racial/ethnic disparities in referral rates declined in absolute terms, the relative size of these disparities increased in legalized states.

**Implications:** TEDS-A captures only publicly funded treatment admissions and relies on the quality of individual-state reporting. Individual-level factors that may impact decisions regarding treatment referrals for cannabis use could not be controlled for. Despite limitations, the present findings suggest that for individuals who interact with the criminal legal system, cannabis use may still result in legal monitoring after reform. The upward trend in legal system referrals for black (but not white) adults and juveniles several years after states legalize cannabis warrants further examination and may reflect continued disparate treatment of these populations at multiple points along the legal-system continuum. (*Clin Ther.* 2023;45:599–615.) © 2023 Elsevier Inc.

**Key words:** cannabis, criminal justice system, legalization, marijuana, racial disparities.

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## INTRODUCTION

Despite the rapid advancement of cannabis reform in recent years, an estimated 317,792 individuals were arrested for cannabis possession in 2020.<sup>1</sup> Countless more are monitored by the criminal legal system for cannabis use through such mechanisms as probation, diversionary programs, and mandated treatment for drug use. The legal system has been the largest source of referral to treatment for cannabis use since 1995. In 2019 it referred over 100,000 individuals for treatment for cannabis use, accounting for roughly half (49.2%) of all cannabis-related treatment admissions.<sup>2</sup> And while national data indicate long-term declines in treatment admissions for cannabis use, the percentage of referrals coming from the legal system has remained stable. This raises questions regarding the extent to which individuals who interact with the legal system are monitored for cannabis use post-reform. This issue was addressed using an examination of trends in legal-system referrals to treatment for cannabis use in states that have legalized adult-use cannabis (*legalized states*) and states that have not (*nonlegalized states*) in 2007–2019. To determine whether the policy change has a different impact in different populations, the relationship between the legalization of adults using cannabis and justice-system treatment referrals of black, Hispanic/Latino, and white adults and juveniles was tested.

## Background

Legally mandated treatment for substance use is a common feature of probation and diversion programs for people who commit drug-related offenses in the United States. These programs were developed in response to unsustainable growth in drug arrests that backlogged courts and overcrowded jails.<sup>3</sup> Cannabis-related offenses have been a popular target of diversion efforts because they account for the majority of drug arrests in most jurisdictions and are often classified as less serious than other drug-related offenses and thus are perceived as better suited to alternatives to incarceration.

During the 1990s and 2000s, both cannabis-related arrests and treatment admissions rose sharply. The greatest increases occurred among minority youth and young adults, who were disproportionately targeted by drug-war policing despite using drugs at rates similar to those of their white counterparts.<sup>4–7</sup> Between 1992 and 2008, as cannabis arrests nearly doubled, cannabis-related treatment admissions among

adolescents and young adults increased by 344%.<sup>8</sup> Between 1995 and 2012, the number of black and Hispanic/Latino youth (aged 12–20 years) in treatment for cannabis use increased by 86% and 258%, respectively, compared to an 11% increase for white youth.<sup>9</sup> Rates of cannabis and other drug use among youth were stable or declined during that period, and by 2016 only a quarter of individuals admitted to treatment for cannabis use reported daily consumption.<sup>10,11</sup>

There are numerous avenues through which a court, probation department, or other legal entity may refer an individual to treatment for cannabis use. Treatment participation may be a condition for having a case dismissed or avoiding incarceration. It may be a stipulation of probation or parole following a period of incarceration. It may be required of an individual whose alleged offense did not directly involve cannabis, but whose use was identified by one of the risk assessments often used in criminal cases.<sup>12,13</sup> Each of these referral pathways typically entails monitoring of treatment progress by a probation officer, diversion program, or other legal entity. Thus, legally mandated treatment is a form of legal oversight because it is monitored by a legal entity, and failure to complete it can result in additional consequences such as extended legal monitoring, conviction, or incarceration.<sup>14,15</sup>

Mandated treatment for drug use is a punishment less severe than incarceration and may offer an opportunity to avoid a criminal record. However, the threat of incarceration and conviction remains, making it necessary to consider legally mandated treatment in the context of these potential outcomes. A criminal conviction can reduce employment opportunities and earning potential; render an individual ineligible for student loans and subsidized housing; interfere with parental rights; increase the likelihood of future legal involvement; and contribute to greater stress levels, lower quality of life, and acute and chronic adverse health outcomes.<sup>16,17</sup> Even if an individual is not convicted, they may still have a criminal record that is accessible to police and potential employers. The far-reaching impacts of legal involvement can exacerbate many of the root causes of problematic drug use and addiction—poverty, family destabilization, mental illness, poor health, and feelings of hopelessness and despair.

Black, Hispanic/Latino, male, and adolescent/young adult populations are more likely to come into

contact with the legal system and thus are more likely to experience its collateral consequences.<sup>18–20</sup> Diverting individuals from incarceration to treatment may be viewed as one way to reduce these consequences. However, research suggests that drug-diversion programs may replicate, rather than reduce, disparities in drug-related legal involvement. When the alternative to diversionary treatment for drug use is incarceration, black and Hispanic/Latino populations may be less likely to be diverted compared to their white counterparts,<sup>21–24</sup> but when the alternative to diversion is no legal intervention at all, then minority groups may be more likely to receive such interventions. For example, research has demonstrated an association between drug court implementation and an increase in misdemeanor drug arrests among black, but not white, individuals, and that black and Hispanic/Latino individuals spend a longer time in diversion programs and are less likely to complete than are white participants.<sup>25,26</sup>

To be sure, there are individuals who encounter the legal system who would benefit from treatment, and the general shortage of treatment for substance-use disorder in the United States more severely affects minorities and legal system-involved individuals.<sup>23,27</sup> Proponents of mandated treatment programs cite the prevalence of addiction among legal system-involved individuals as evidence that the legal system is a tool useful for connecting this population with treatment.<sup>28</sup> But the legal system often does not connect individuals with appropriate care and can hinder the treatment process.<sup>29–33</sup> Few studies assess the long-term impacts of mandated treatment for drug use on substance-use behaviors. Programs offering treatment as an alternative to incarceration are associated with lower recidivism rates, but this effect is due partly to substantive differences between individuals who are selected for diversionary treatment and those who are not.<sup>34,35</sup>

The legal system may also refer to treatment individuals who do not meet the diagnostic criteria for a substance-use disorder.<sup>36,37</sup> This may be more common among black individuals, who are more likely to be referred through the legal system and have fewer markers of problematic use, such as frequent use and use of multiple drugs, compared to individuals referred from other sources.<sup>38</sup> Requiring individuals who do not want or need treatment to engage in it can reduce a community's capacity to serve voluntary

treatment clients, thus exacerbating the treatment-shortage problem in some circumstances.<sup>39</sup>

### Impacts of Cannabis Reform on Legal System Outcomes

Proponents of adult-use cannabis legalization often frame reform as a solution to the collateral consequences of prohibition and the racially disparate enforcement of cannabis laws.<sup>40</sup> Research examining the impacts of cannabis legalization on legal system outcomes focuses primarily on arrests and suggests an ambiguous relationship. While legalization is associated with declines in arrests, the extent of decline varies by state and population.<sup>41–43</sup> Legalization is not associated with a decline in arrests among youth.<sup>42</sup> In several legal states, arrests have decreased but racial disparities in arrest rates persist.<sup>44–48</sup> Sheehan et al<sup>49</sup> found that declines in arrest rates and in racial disparities in legalized states started in the 2 to 3 years prior to policy change, suggesting that these downward trends could have been a response to other social and political factors.

While cannabis-related arrests measure street-level law enforcement activity surrounding cannabis use, possession, and sales, referrals to treatment capture activity of legal system entities, including courtroom actors, diversionary programs, and probation departments, that handle cases after an arrest has been made. Together these institutions make decisions that determine case outcomes, including whether to dismiss a case; to dismiss a case if specified conditions are met; to pursue a conviction; to convict; and whether to punish with fines and fees, community supervision, time served, conditional release, incarceration, or a combination of penalties. Except for case dismissal, every other possible outcome entails additional interaction with the legal system that, as discussed above, can have impacts that last long after legal involvement ends. Thus, evaluating the ways in which courts and corrections departments deal with individuals who use cannabis and interact with the legal system adds to research on arrests to provide a more complete picture of how the criminal legal system as a whole responds to cannabis use post-reform.

As discussed above, legal system referrals to treatment are considered a form of legal oversight because they involve legal monitoring of the treatment process, and failure to complete treatment can result in additional legal involvement. If a state formally permits

cannabis use and facilitates a commercial market then, theoretically, this type of legal system oversight for cannabis use may be expected to decline as a result. Whether this relationship occurs in practice is an important question because of the adverse and racially disparate consequences of legal-system involvement outlined above.<sup>20,50</sup>

Few studies have examined how legalization may impact the role of the justice system in referrals for the treatment of cannabis use. Mennis and Stahler<sup>51</sup> found that post-legalization Colorado and Washington experienced larger reductions in justice-system referrals to treatment compared to nonlegal states, but these differences were not statistically significant. The present study expands on this line of work by including more legalized states for a longer period of time and testing differential policy impacts among black, Hispanic/Latino, and white adults and juveniles. Given the disproportionate enforcement of cannabis laws against minority and youth populations, and that states restrict legal use to individuals 21 and over, it is expected that legalization will have a weaker relationship with justice system referral rates among white juveniles and black and Hispanic/Latino adults and juveniles compared to white adults.

## MATERIALS AND METHODS

To test the hypotheses, a large N quasi-experimental approach and longitudinal data were used. The analysis was conducted at the state level. States where legalization of cannabis possession for adult use went into effect prior to January 2019 were assigned to the treatment group. The primary data source was the Treatment Episode Dataset—Admissions (TEDS-A) compiled by the US Substance Abuse and Mental Health Services Administration (SAMHSA) for the period 2007–2019.<sup>52</sup> The TEDS-A includes data on several indicators, including treatment referral source, primary substance for referral, and client demographics. TEDS-A includes data only on public and private entities that receive government funding, so it does not capture all treatment providers. However, it is commonly recognized as the most complete set of data on US treatment admissions available, and is used frequently for the analysis of trends in treatment of substance use.<sup>53–55</sup>

Each observation reported in TEDS-A represents an admission for treatment, not a specific individual, meaning that individuals who enter treatment twice in 1 year are counted as two admissions. Consistent

with other analyses using TEDS-A, all observations with prior treatment episodes were removed to ensure that each observation represents a unique admission to treatment.<sup>37,56,57</sup> All 50 states provided admissions data for the years included in the study, but some had intermittent or inconsistent reporting. After review, 7 states were excluded due to data limitations, leaving 43 states with data available for study. Indiana and Wisconsin were excluded due to incomplete reporting of individuals with prior treatment episodes. (Specifically, Indiana's reporting for the single-year datasets diverged significantly from the reporting captured in the 2000–2019 composite dataset, with the 2000–2019 dataset reporting that all individuals admitted for treatment in Indiana during those years had prior treatment episodes, a highly improbable scenario. Wisconsin did not distinguish between first-time admissions and repeated admissions for the whole range of the study period.) Delaware, Nebraska, North Dakota, Oregon, and South Carolina had 3 or more consecutive years of missing data over the study period and their data were removed. A few states, including Alabama, Arizona, and New Mexico, had data missing from a single year or 2 consecutive years at the beginning of the study period. Consistent with prior research, these states were excluded from analysis in the years their data were missing but were retained for years in which data were available.<sup>51</sup>

## Independent Variable

The independent variable was *state legalization of cannabis*, defined as the removal of all civil and criminal penalties for the possession of cannabis. Data from states that place caps on the amount of cannabis that is legal to possess were included, as were data from states that had not authorized sales or home cultivation. A variety of sources were used to identify legalized states, including state legislative databases, Legiscan, peer-reviewed literature, and nonprofit resources (Table I).

Policy change was operationalized as a dichotomous variable for each year, where “1” denoted legalization and “0” indicated no change. (The analyses were also performed using partial coding for years in which the policy change took effect mid-year, that is, policies that went into effect in June or July were coded as .5 and so on. These models did not produce statistically significant results for the policy change variable.) Coding was based on the date that possession became legal, rather than the start

Table I. State adult-use cannabis legalization policies.

State	Date in Effect	Statute	Specifics
Alaska	2/24/2015	AK Stat § 17.38.020 (2015)	No penalty for possessing 1 oz or less, restricted to people 21 and older
California	12/1/2016	Prop 64/HSC 11000, 11357, 11362.7	No penalty for possessing 1 oz or less; infraction for people under 21
Colorado	12/10/2012	CO Constitution, Art. 18 Sect. 16; CRS 18-13-122	No penalty for possessing 1 oz or less, 21 and older; under 21 is max fine of \$100 and drug education program
Maine	1/30/2017	IB 2015, c.5; Sec. 6 MRSA § 2453-A	No penalty for possessing 2.5 oz or less, 21 and older; under 21 possession is a civil violation, can be expunged whether no other violations within one year
Massachusetts	12/15/2016	Mass. Gen. Laws Title XV c.94G § 7; § 13(h)	No penalty for possessing 1 oz or less, restricted to people 21 and older. Poss 1 oz civil penalty with \$100 fine for people 18-21, under 18 same civil penalty + drug awareness program
Michigan	12/6/2018	Proposal 1 /Section 333.27951-27967	No penalty for possessing 2.5 oz or less, restricted to people 21 and older. Poss a civil penalty with \$100 fine for people 18-20; under 18 also have drug counseling for first offense
Nevada	1/1/2017	Title 56 Nevada Revised Statutes 678D.200; NRS 453.336	No penalty for possessing 1 oz or less, restricted to people 21 and older. Under 21 possession is a misdemeanor
Vermont	7/1/2018	House Bill 511; Vermont Stat 18 V.S.A. § 4230	No penalty for possessing 1 oz or less, restricted to people 21 and older. Under 21 a civil violation with \$100 fine for first offense
Washington	12/6/2012	I-502; RCW 69.50.4013; RCW 69.50.4014	No penalty for possessing 1 oz or less, restricted to people 21 and older. Misdemeanor for people under 21

of commercial sales. All states limit legal cannabis possession and sales to individuals 21 and older. Some, like Colorado and Maine, have reduced penalties for low-level possession for individuals aged <21 years to civil infractions, while in others, like Nevada and Washington, possession for this population remains a misdemeanor. All were coded as legalized states for adults and juveniles to test whether legalization overall has an impact on referral patterns in these populations.

### Dependent Variables

The dependent variables were state-level rates of legal system referrals to treatment for cannabis as the primary substance of use. Sources of legal system

referrals included courts, probation, parole, diversionary programs, prison, DUI courts, or other recognized legal entities. Separate state-level justice system referral rates were calculated for black, Hispanic/Latino, and white adults (aged 18 years and older) and for black, Hispanic/Latino, and white juveniles (aged 12–17 years). (The Hispanic/Latino identifier in TEDS-A is composed of four categories, including Cuban, Mexican, Puerto Rican, and “other.”) To calculate the state-level rates, the number of individual observations for each state by year was totaled and divided by the relevant state population, then multiplied by 10,000. (Total population rates included all demographics groups. For analyses that were limited to specific demographic categories, only rates in white, black, and



Hispanic/Latino populations were calculated due to the relatively small sizes of the other groups.) Population data were taken from the US Census. State-level age and race demographic data for 2007–2009 were not available; values from 2010 were used in these years as suggested by data analysts at the US Census Bureau.

### Control Variables

The control variables for this analysis were: (1) percentage of white population (US Census, American Community Survey); (2) rate of substance treatment facilities per 10,000 residents (TEDS-A); (3) percentage of uninsured population (Kaiser Family Foundation); (4) an index for socioeconomic disadvantage that includes measures for household poverty rate, percentage of female-led households with children, percentage of individuals with a bachelor's degree or higher, and percentage of owner-occupied housing (United States Census, American Community Survey)<sup>58</sup>; (5) state government ideology (Berry et al measure)<sup>59</sup>; (6) state incarceration rates (Department of Justice, Bureau of Justice Statistics); and (7) a dummy variable indicating whether a state has legalized cannabis for medical use (see Supplemental Table S1).

### Analysis

All analyses were conducted using the Stata 17 statistical software package (StataCorp, 2021, College Station, Texas). The dataset includes all first-time admissions in which cannabis was the primary substance of use for the period 2007–2019, for a total of 1,030,185 individual observations. The individual observations were used to create the state rates of justice system referrals to treatment for cannabis use by age and race. This produced a total of 551 state-level observations for the period 2007–2019.

The analysis was conducted in five steps. First, descriptive statistics were calculated to understand the nature of the variables. Second, mean annual admissions trends were graphically compared between legalized and nonlegalized (control) states by racial/ethnic group and age. Third, to better capture potential disparities, both the absolute differences and relative differences in admissions rates between white and black adults, white and Hispanic/Latino adults, white and black juveniles, and white and Hispanic/Latino juveniles were plotted. Fourth, the analytic strategy of Mennis and Stahler<sup>51</sup> and Mennis et al<sup>60</sup> was followed and staggered difference-in-

difference was used to determine whether legalization had a significant impact on treatment-referral trends, with separate models estimated for white, black, and Hispanic/Latino adults and juveniles. Staggered difference-in-difference is used when the treatment is introduced at different points in time across the study period. The models were carried out using fixed effects with errors clustered at the state level and the analysis was performed with and without control variables to better understand the sensitivity of the results. Lastly, a series of event panel analyses with fixed effects were conducted and errors at the state level were clustered. Like difference-in-difference, event analysis is used to determine the effects of a policy change over time. However, the event analysis better accounts for heterogeneity in policy implementation time by creating a standard baseline around which to test the impact of the treatment variable.<sup>61</sup> This allowed for a clearer examination of trends in cannabis admissions in the years preceding and following legalization in states that enacted reforms in different years. Thus, using staggered difference-in-difference and event analysis together strengthened the ability to determine whether and how legalization may impact treatment-referral trends.

## RESULTS

### Descriptive Statistics

The individual-level TEDS-A population data was 48.35% white, 34.86% black, and 18.34% Hispanic/Latino. Juveniles (aged 12–17 years) constituted 30.16% of the sample (see Supplemental Table S2). The descriptive statistics for the state-level variables are reported in [Table II](#). For the study period, the mean justice system referral rate for all states was 2.75 per 10,000 residents, with control states having a greater mean rate (2.88) than legal states (2.18). Black juveniles had the highest mean admissions rate (20.16 per 10,000), followed by Hispanic/Latino juveniles (12.35), black adults (9.18), white juveniles (7.58), Hispanic/Latino adults (3.42), and white adults (1.66).

### Annual Trends

[Figure 1](#) displays annual admissions rates in legalized states. The mean legal system-referred admissions rates in legalized states declined 57.19% from 2007 to 2019. The size of the decline ranged from 11.5% in Colorado to 99.7% in Washington. Declines started

Table II. State-level variables, descriptive statistics.

Variable	Mean	SD	Min	Max
Dependent variables (N = 551)				
White adult rate	1.66	1.22	0.00	6.32
White juvenile rate	7.58	6.65	0.00	36.00
Black adult rate	9.18	8.87	0.00	59.59
Black juvenile rate	20.16	22.88	0.00	185.19
Hispanic adult rate	3.42	3.19	0.00	15.80
Hispanic juvenile rate	12.35	12.42	0.00	75.13
Primary independent variable: state legalization (N = 551)				
Controls (N = 551)				
Socioeconomic status index	-1.89	0.24	-2.48	-1.32
Medical marijuana state	0.40	0.49	0.00	1.00
Per capita treatment centers	0.56	0.26	0.15	1.72
Government ideology	44.66	16.89	17.51	73.62
Incarceration rate	396.16	149.87	132.00	893.00
Percent white	0.79	0.13	0.24	0.96
Uninsured percentage	0.12	0.05	0.03	0.24

prior to legalization in all states. This trend continued after legalization in most states, though some, including Alaska, California, Colorado, and Nevada, experienced upticks in rates relative to reform-year levels.

Mean admissions rates in the subpopulations of interest declined in both legal and control states during the study period (Figure 2). Juvenile admissions rates in each racial/ethnic group were greater compared to their adult counterparts (Table III). The greatest relative age-related differences were between white adults and juveniles. The mean referral rate for white juveniles was 4.6-fold greater than the white adult rate in control states and 4.5-fold greater in legal states. Among Hispanics/Latinos, the mean juvenile referral rate was 3.7-fold greater compared to that in adults in control states and 3.2-fold greater in legal states. The mean referral rate in black juveniles was 2.26-fold as high as the black adult rate in control states and 1.84-fold greater in legal states.

Comparisons across racial/ethnic groups show that in all states, black and Hispanic/Latino admissions rates were greater than rates in whites. Among juveniles, mean admissions rates in white juveniles declined consistently over time and ranged from 3.64 to 11.47 in control states and from 2.43 to 9.33 in legal states. Rates in black and Hispanic/Latino juveniles

were considerably more variable. Black juveniles in control states had the highest mean annual admissions rate, which ranged from a high of 32.94 in 2007 to a low of 11.29 in 2017. Rates in black juveniles in legalized states were lower and ranged from 26.75 in 2011 to 7.55 in 2017, but the long-term decline was punctuated by periodic spikes. Rates in Hispanic/Latino juveniles were generally lower in legal states versus those in control states, though this finding was not uniform across the study period (mean rate ranged from 7.02 to 17.43 in control states vs 5.51 to 17.65 in legal states).

Among adults, black adults had the highest legal system-referred admissions rates, which ranged from 5.58 to 10.38 in legal states and from 6.36 to 14.67 in control states. Hispanic/Latino adult admissions rates were similar in legal (2.42–4.80) and control states (2.49–4.38) and slightly greater in legal states for several years in the study period. Rates in white adults were similar in legal (0.84–2.01) and control (1.28–2.33) states.

The absolute rate difference between white and black adults in control states reached a high of 12.34 in 2009 and declined to 5.08 in 2019 (Figure 3). The difference in referral rates between white and black adults was lower in legal states in most years of study

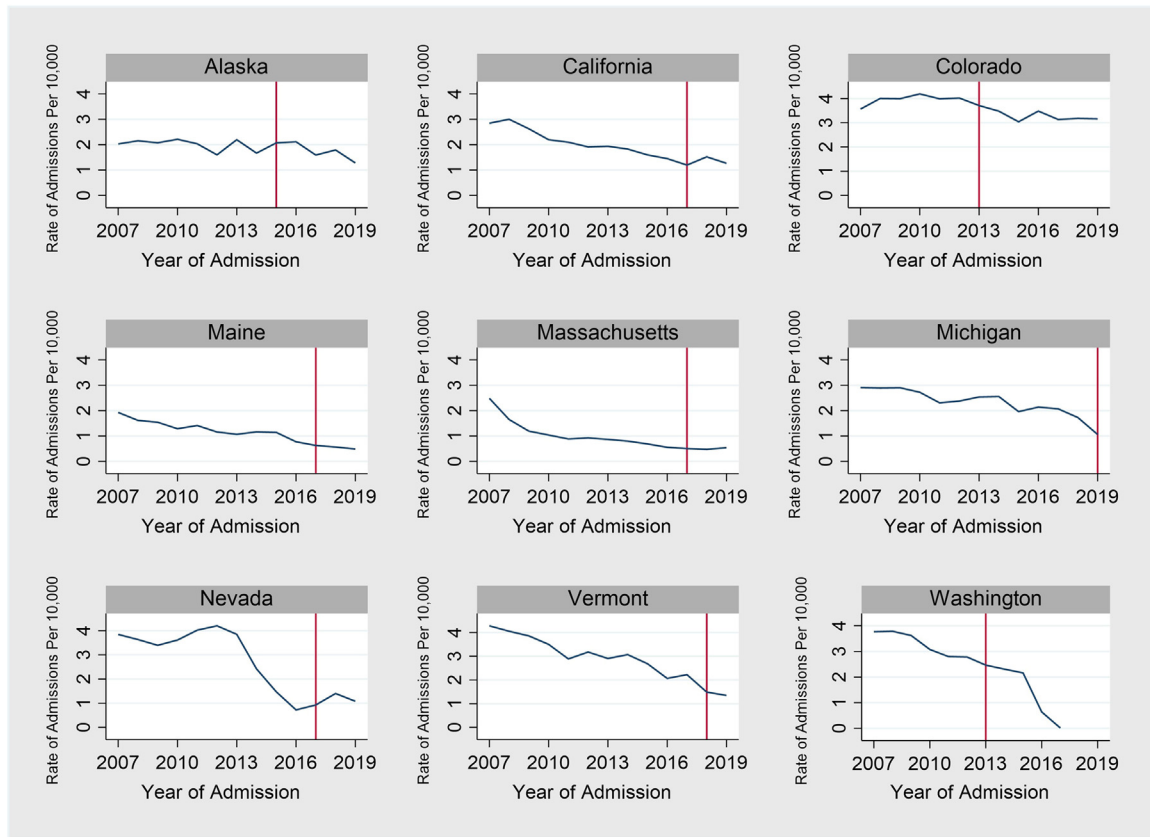


Figure 1. trends in legal system-referred admissions for the treatment of cannabis-use in legalized states (red line denotes year legalization took effect).

and declined to 4.75 in 2019. The rate difference between white and Hispanic/Latino adults was smaller and more similar at the start and end of the study period in both legal states (1.98 in 2007 vs 1.68 in 2019) and control states (0.99 in 2007 vs 1.21 in 2019).

The absolute rate differences among juveniles were more variable. The most notable and significant decline in rate differences occurred between white and black juveniles in control states. In 2007 the absolute rate differential between these populations was 22.26; this dropped to 6.85 in 2017. The rate difference between white and black juveniles in legal states was more uneven over time, peaking at 18.57 in 2011, dropping to 3.58 in 2017 and then rising again. In Hispanic/Latino and white juveniles, the rate differential in legal states rose from 2.54 to 3.08 and from 2.22 to 3.38 in control states.

Notably, though racial/ethnic disparities in referral rates declined in absolute terms (except for Hispanic/Latino juveniles), the relative size of these disparities increased in legal states (Figure 3). At the end of the study period, the disparities in referral rates between most groups were greater in legal states than in control states. In 2019, black adults were referred at a rate 6.67-fold greater than were white adults in legal states and at a rate 4.97-fold greater than white adults in control states. Hispanic/Latino adults in legal states were referred at rate 3.0-fold greater than that in white adults and at a rate 1.95-fold greater than that in white adults in control states. The rate in black juveniles was 3.31-fold as high as the rate in white juveniles in legal states and 3.75-fold as high in control states. Hispanic/Latino juveniles were referred at a 2.28-fold greater rate in legal states and at a 1.93-fold greater rate in control states.



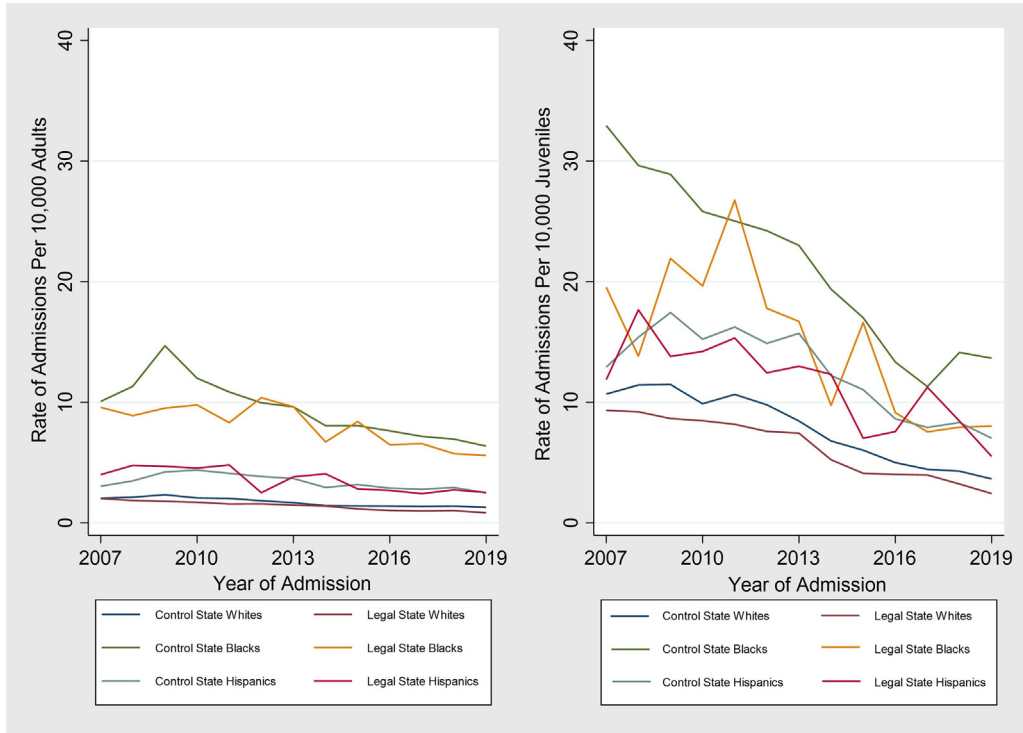


Figure 2. Trends in mean rates of legal system-referred cannabis treatment admissions, by age, race, and state legal status.

Table III. Annual trends in admission rates by age, race, and legal status, descriptive statistics.

State Type/Variable	Mean	SD	Min	Max
<b>Control states (n = 447)</b>				
Total population mean	2.88	1.95	0.00	9.60
White adult mean	1.72	1.27	0.00	6.32
White juvenile mean	7.88	7.04	0.00	36.00
Black adult mean	9.43	9.35	0.00	59.59
Black juvenile mean	21.35	24.64	0.00	185.19
Hispanic adult mean	3.38	3.25	0.00	13.94
Hispanic juvenile mean	12.54	13.08	0.00	75.13
<b>Legal states (n = 104)</b>				
Total population mean	2.18	1.08	0.48	4.28
White adult mean	1.41	0.37	0.84	2.01
White juvenile mean	6.29	2.42	2.43	9.33
Black adult mean	8.12	1.63	5.58	10.38
Black juvenile mean	15.01	5.97	7.55	26.75
Hispanic adult mean	3.57	0.93	2.42	4.80
Hispanic juvenile mean	11.56	3.41	5.51	17.65

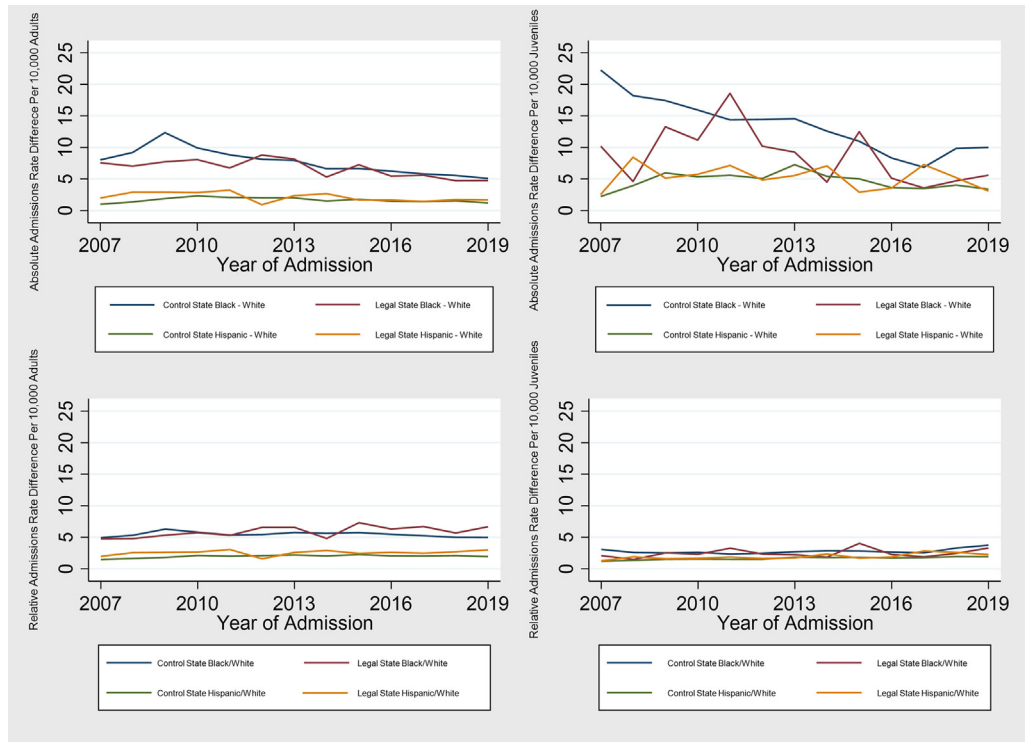


Figure 3. Trends in rate differentials in legal system-referred cannabis treatment admissions, by age, race, and state legal status.

### Difference-in-Difference and Event Study Analyses

The staggered difference-in-difference analysis indicated that legalization did not have a significant impact on treatment-referral rates in any population of study. This finding was consistent in models with and without control variables (see Supplemental Table S3). In the models that included controls, greater levels of conservatism as measured by the government ideology index were associated with greater referral rates in black juveniles, and Hispanic/Latino adults and juveniles (all,  $P < 0.05$ ). Greater incarceration rates were associated with lower referral rates in black adults ( $P < 0.05$ ).

To check for potential variability across different adult populations (ie, legalization is limited to adults aged 21 years and over and adults aged 18–25 years are more likely to be involved with the legal system than older adults), additional analyses were performed on data from three separate adult age groups (18–20, 21–24, and  $\geq 25$  years) in each racial/ethnic group. Legalization was not significant in these models. In

all models, the annual time-control variables were significant and negative, suggesting that the decline was a function of time rather than the policy change. This finding is consistent with the findings from the descriptive statistics and annual-trends analysis.

The results of the event study analyses are reported in Figure 4. Consistent with the difference-in-difference models, legalization was not significantly associated with the long-term downward trend in legal-system referral rates, with the exception of lead 10 in white adults ( $P < 0.05$ ). Several of the controls in the event panel models were significant (see Supplemental Table S4). Greater uninsured rates were significantly associated with greater referral rates in all groups. The effect size was particularly large in black juveniles. Greater levels of socioeconomic disadvantage were significantly associated with greater referral rates in Hispanic/Latino adults and juveniles (both,  $P < 0.05$ ). Larger white populations were significantly associated with greater referral rates in white and Hispanic/Latino juveniles (both,  $P < 0.05$ ).

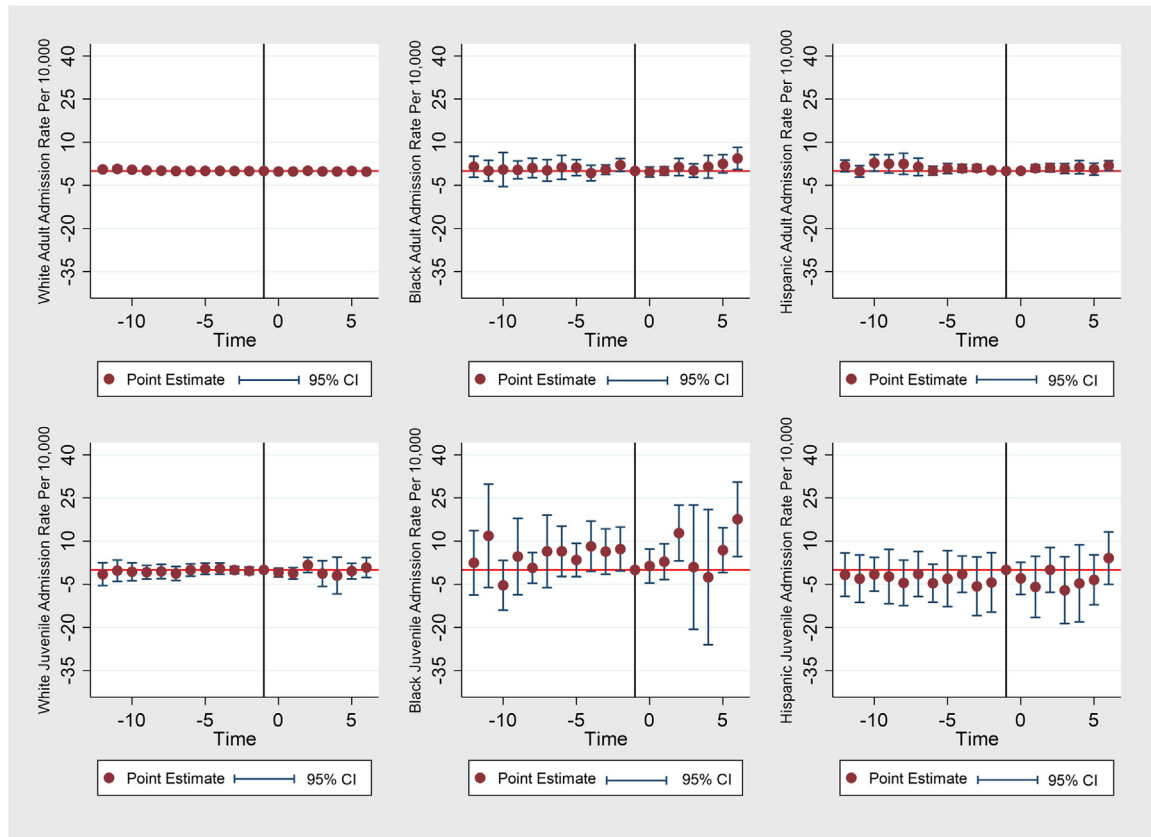


Figure 4. Rate trends of legal system-referred cannabis treatment admissions by age and race, before and after policy change (results of event analysis).

Overall, referral rates declined during the study period in both legal and nonlegal states. However, the event analyses indicate some increase in referrals associated with legalization. Specifically, rates in black juveniles in legal states increased versus those in control states after the policy change, with lag 2 and lag 6 showing significant increases ( $P < 0.05$  and  $P < 0.01$ , respectively) (Figure 4 and see Supplemental Table S4). Graphically, there was an increase in admissions in black adults in legal versus control states starting in lag 4; this difference reached significance in lag 6 ( $P < 0.05$ ). There was also a significant increase in rates in Hispanic/Latino adults in legal states in lag 6 ( $P < 0.05$ ), though the late-lag significance could have been a function of the limited number of states that had a period of 6 years past legalization. There were no apparent increases in admissions rates in Hispanic/Latino or white juveniles.

## DISCUSSION

This study examined whether the legalization of recreational cannabis had a significant impact on legal-system referrals to treatment for cannabis use in black, Hispanic/Latino, and white adults and juveniles. Though there was a long-term decline in treatment referrals in all populations studied, there was no significant association between this decrease and legalization. While the lack of a relationship between legalization and referral rates in white adults was unexpected, other observed differences were consistent with the expectation of disparate trends based on age and race.

Broadly speaking, these findings suggest that legalizing cannabis for personal use and commercial sale has not impacted how the legal system responds to cannabis use among individuals who interact with it. Instead, the declines in treatment referrals for

all populations appear to be a function of time and its attendant social and cultural changes rather than intentional policy modification. On one hand, the comparable declines in justice-system treatment referrals in legal and nonlegal states suggest that legal involvement for cannabis use can be reduced with more moderate state-level reforms, such as decriminalizing cannabis possession, as well as with local-level reforms in states that maintain prohibition. Indeed, local-level variations in enforcement may have contributed to the observed declines in treatment referrals in control states in the present study, a phenomenon that warrants further investigation. (Large jurisdictions in nonlegal states are increasingly ceasing enforcement of cannabis-possession laws. For example, four of the five largest counties in Texas have ceased or greatly reduced arrests and charges filed for cannabis possession; the number of misdemeanor cannabis cases filed between fiscal years 2017 and 2021 declined 64%).<sup>62</sup>

On the other hand, that legalization did not have a significant impact on referral trends suggests that in individuals who interact with the criminal legal system, cannabis use may still result in legal monitoring after reform. The rate-comparison analyses show that disparities persist in black and Hispanic/Latino adults and juveniles, even though use rates remain similar across these groups following legalization.

Though referral rates in black, Hispanic/Latino, and white juveniles declined over time, this decline was not associated with legalization, and all juvenile referral rates remained greater than their adult counterparts post-reform. This finding may have been partly attributable to the continued prohibition of cannabis possession in juveniles in legal states. Still, the consistently greater referral rates in juveniles are notable. The rate of use of cannabis in adolescents is lower than in adults, suggesting that greater referral rates are likely explained by other factors. These may include greater levels of concern regarding youth cannabis use<sup>63,64</sup>; greater rates of legal-system contact among juveniles compared to older adults, especially among black and Hispanic/Latino adolescents; and additional pathways, such as schools, through which juveniles may be subjected to legal interventions.

The observed differences in referral rates by race and ethnicity is not attributable to differences in legal status or cannabis-use rates and likely reflect systemic racism at multiple stages of the legal process. While referral rates in black and Hispanic/Latino

adults declined more in absolute terms in legal states, the relative disparity in rates between these groups and white adults increased. Rate differentials between Hispanic/Latino and white juveniles increased in both absolute and relative terms. These findings are consistent with prior research that has found declines in cannabis-related arrests post-reform but no change or an increase in the relative size of racial disparities in arrest rates.<sup>44,49</sup> The event analysis further revealed an unexpected rate increase in black juveniles and black and Hispanic/Latino adults in legalized states  $\approx 2$  to 6 years following policy change. The seeming consistency with which racial disparities manifest before and after significant policy reform and at multiple points along the legal system continuum highlights the systemic nature of these disparities.

Given the prior research outlined above regarding the detrimental long-term effects of legal-system involvement, the continuation of legal oversight of individuals who use cannabis and interact with the legal system post-reform is concerning. Rather than using the legal system to identify individuals in need of treatment, policymakers may instead invest in school- and community-based prevention, treatment, and social assistance programs that do not entail life-altering consequences for nonengagement. The present findings also suggest that policymakers who want to legalize cannabis to reduce the collateral and disparate consequences of prohibition must include provisions that explicitly target legal-system features beyond arrest and prosecution. For instance, several states that have legalized recently have adopted provisions to implement an automatic, or at least more streamlined, expungement process. Some have specified that prior cannabis convictions are not grounds for housing or employment discrimination. One way to reduce excessive monitoring of individuals who use cannabis and come into contact with the legal system post-reform would be through statutory provisions requiring clear documentation of a relationship between an individual's cannabis use and the offense in question for probation departments and courtroom actors to mandate participation in a treatment program. For adolescents, cannabis use-intervention efforts should take place wholly outside of the legal system, as the consequences of legal involvement may outweigh the benefits of intervention and undermine treatment effectiveness.

In the event analysis, greater uninsured rates were associated with greater referral rates in all groups,

and greater socioeconomic disadvantage was associated with greater referral rates in Hispanic/Latino adults and juveniles. Greater levels of government conservatism were associated with greater referral rates in black juveniles and Hispanic/Latino adults and juveniles in the difference-in-difference models. The differences in model results may have been attributable to the distinct analytical methods of each approach. The primary findings surrounding legalization are not inconsistent with each other, however, and taken as a whole, the significance of the control variables points to the potential for political, economic, and health factors to shape legal-system end points. Future research should consider how the various effects of cannabis legalization on legal-system outcomes may be attenuated by the input coming from these other systems.

A limitation of the present state-level analysis was the inability to match individual referrals for treatment with other characteristics of interest, such as the offense with which one is charged. Some offenses, such as driving while impaired, may have an obvious connection to cannabis use and may carry statutory requirements to participate in a treatment program if convicted (or in lieu of a conviction). In other cases, however, legal system actors often have considerable discretion over requirements for charged or convicted individuals, particularly for probation and diversion programs. The extent to which justice system actors in legal states may use this discretion to require a person to participate in treatment absent a clear link between cannabis use and the circumstances that triggered legal involvement, is unknown. Further research on the relationship between offense and legal-system referral practices surrounding cannabis use in legal states is encouraged, to improve the understanding of the ways in which cannabis use does or does not remain associated with perceptions of individual criminality. Similarly, the frequency of cannabis use or prevalences of cannabis use disorder could not be controlled for. Cannabis use and cannabis-use disorder have increased among some populations following legalization,<sup>65</sup> and so it is possible that the number of individuals with cannabis-use disorder interacting with the legal system also increased.

Future research should also examine more closely the interplay of race and ethnicity in predicting legal system outcomes. In the present study, variables for Hispanic/Latino adults and juveniles included all

racial groups. This finding may obscure potential race-related differences, as prior research has found that black Latinos are subjected to worse criminal justice outcomes compared to white Latinos.<sup>66</sup> The state-level nature of the present analysis also precluded examination of trends in American Indian/Alaskan Native populations, a problem that is endemic to multistate studies. Research can address this issue by examining local-level data within states that have larger American Indian/Alaskan Native populations and through qualitative analysis.

The nature of the present inquiry into the impact of a policy change implemented at different points of time is inherently affected by time-variant factors. Nonetheless, we are confident in the present results given the combination of methods used for analysis, which are commonly applied to study heterogeneous policy change, and the consistency of findings across the various analyses. Finally, the findings from this study were limited by the nature of the TEDS-A data, which are subject to variable reporting quality across states and do not include non-publicly funded treatment facilities. Still, TEDS-A is one of the most robust sources of data on treatment for substance use in the United States.

## CONCLUSIONS

The findings from the present inquiry into the relationship between adult-use cannabis legalization and legal-system referrals to treatment for cannabis use suggests that the policy reform has not impacted the referral practices of the legal system, though there has been a general decline in such referrals over time. This study adds to a growing body of literature examining the potential ways in which prohibition endures through various avenues, from continued arrests to discrimination in employment for off-duty cannabis use to disparate opportunities in nascent cannabis markets.<sup>67,68</sup> Identifying areas of policy and practice still affected by prohibition after reform is crucial for informing policymakers about the additional steps necessary for effectively dismantling prohibition and its related harms. The rapidly changing landscape of cannabis reform also presents an opportunity for research to inform practice in real time, providing lessons to late-adopting states about best practices and helping already-reformed states to improve current policy.



## DECLARATION OF INTEREST

The authors have indicated that they have no conflicts of interest with regard to the content of this article.

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## AUTHOR CONTRIBUTIONS

Both of the authors conceptualized the article, gathered the data, interpreted the results, and wrote the manuscript, critically reviewed the final version, and approved prior to submission. C.K. performed statistical analyses.

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## SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.clinthera.2023.03.006](https://doi.org/10.1016/j.clinthera.2023.03.006).

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