HHS Public Access

Author manuscript

Drug Alcohol Depend. Author manuscript; available in PMC 2022 December 01.

Published in final edited form as:

Drug Alcohol Depend. 2021 December 01; 229(Pt A): 109154. doi:10.1016/j.drugalcdep.2021.109154.

Cannabis use disorder treatment use and perceived treatment need in the United States: Time trends and age differences between 2002-2019

Melanie S. Askari[a], **Katherine M. Keyes**[a], **Pia M. Mauro**[a]

[a]Department of Epidemiology, Columbia University Mailman School of Public Health, 722 W 168th Street, New York, NY 10032, United States

Abstract

Background: As trends in CUD treatment are understudied, we examined time trends in CUD treatment and perceived treatment need among people with CUD overall and by age group.

Methods: Data from the 2002-2019 National Survey on Drug Use and Health included 43,307 individuals who met past-year DSM-5-proxy CUD criteria. Last/current treatment for cannabis use (i.e., any or specialty CUD treatment) and perceived treatment need were regressed on survey year and age (12-17, 18-25, ≥26) using generalized linear spline models. Time-varying effect modification assessed the magnitude of age-treatment associations over time.

Results: Between 2002-2019, 6.1% of people with CUD used any CUD treatment, 2.8% used specialty treatment, and 2.2% perceived a treatment need. CUD treatment use decreased by 54.23% between 2002-2019 (9.11% to 4.17%). Compared with adolescents, adults ages 18-25 were less likely to use specialty CUD treatment [aRR: 0.70: 95% CI: 0.52, 0.93] and ages ≥26 were more likely to perceive treatment need [aRR: 1.84: 95% CI: 1.19, 2.83]. Age-specific differences in the time-varying magnitude of associations were observed (e.g., in 2010 perceived treatment need was higher in ages ≥26 versus ages 12-17 [aOR: 2.34, 95% CI: 1.47, 3.71]).

Conclusions: CUD treatment is decreasing and young adults have lower treatment use compared with adolescents. Attitudes towards cannabis use harms are shifting, potentially contributing to decreasing CUD treatment utilization and perceived treatment need. Future research should identify treatment barriers, especially among young adults with the lowest CUD treatment use.

Corresponding author: Melanie S. Askari, MPH, Columbia University, Mailman School of Public Health, 722 W 168th Street, New York, NY 10032, msa2180@cumc.columbia.edu.

Contributors: All authors have seen and approved of the final version of the manuscript being submitted. **Melanie S. Askari:** Conceptualization, Formal Analysis, Writing – Original Draft Preparation, Writing – Reviewing and Editing. **Katherine M. Keyes:** Writing – Reviewing and Editing. **Pia M. Mauro:** Conceptualization, Supervision, Writing – Reviewing and Editing.

Declaration of Competing Interest

The authors declare that they have no conflicts of interest.

Keywords

Time-Varying Effect Modification; cannabis use disorder; cannabis treatment perceptions; cannabis treatment; cannabis trends

1. INTRODUCTION

Heavy cannabis use can have substantial negative consequences, such as vehicle crashes (Asbridge et al., 2012), respiratory diseases (Karila et al., 2014), and the development of cannabis use disorder (CUD) (Connor et al., 2021). CUD is a condition involving social disruptions resulting from cannabis use, loss of control of cannabis use, and risky cannabis use (APA, 2013). CUD is associated with deficits in cognitive development (Broyd et al., 2016; Volkow et al., 2016) and psychiatric comorbidities (Hasin et al., 2016). Psychosocial therapies (e.g., cognitive-behavioral therapy) to treat CUD are effective in decreasing cannabis use frequency compared with those receiving an inactive control (Gates et al., 2016). While there are no currently available pharmaceutical treatments for CUD (Connor et al., 2021), there are pharmaceutical treatments for cannabis withdrawal symptoms pending FDA approval (Brezing and Levin, 2018; NIDA, 2021). However, lifetime cannabis treatment utilization is low, with only 13% of adults with a CUD reporting CUD treatment in 2012-2013 (Kerridge et al., 2017). Among adults who had CUD and encountered the healthcare system from 2015-2017, only 9% received any drug treatment and 6% received specialty drug treatment in the past year (Mauro et al., 2020).

Healthcare utilization models, such as the Andersen Behavioral Model of Health Service Use, propose that a combination of predisposing characteristics, enabling resources, and need (both clinically evaluated and perceived) influence service use (Andersen, 1995). Studies have documented changing trends in cannabis treatment admissions at publicly funded specialty treatment facilities, which represent approximately three-fourths of all specialty substance use treatment in the United States (Batts et al., 2012). Treatment episodes for cannabis use decreased from 2008 to 2016 in recent years among adolescents and young adults by 53.9% and 44.6%, respectively (Standeven et al., 2020). While these data are useful in understanding treatment trends in publicly funded facilities, there is a gap in the literature examining nationally representative treatment utilization prevalence trends in a non-clinical population, and comparing differences across age groups.

Perceived need for treatment is a critical predictor of treatment service use (Andersen, 1995; Mojtabai and Crum, 2013). Perceived treatment need, defined as self-reported need for any or additional treatment for a particular disorder, has been associated with subsequent treatment use (Mojtabai and Crum, 2013), yet research on perceptions for CUD treatment specifically is limited. Among adolescents from 2002-2013, perceiving a need for substance use treatment was associated with increased treatment utilization (Haughwout et al., 2016). In a longitudinal study, adults reporting a perceived need for alcohol or drug treatment at baseline were more likely to receive treatment in the follow-up period than those that did not report perceived treatment need (Mojtabai and Crum, 2013). One recent study in 2015-2017 found that only 4% of adults who had CUD and encountered the healthcare

system perceived a need for CUD treatment in the past year (Mauro et al., 2020), but did not assess time trends in perceived CUD treatment need. Documented decreases in perceptions of cannabis risk coupled with increases in perceptions of cannabis availability (Azofeifa et al., 2016; Levy et al., 2021) could influence subsequent perceptions of needing CUD treatment. However, research assessing whether perceptions of CUD treatment need have varied with time and by age is scarce, particularly recent studies of service utilization among community-based samples of those with potential need for treatment and not clinical samples that are already seeking treatment.

Understanding how CUD treatment use and perceptions of treatment need have varied with time could help inform CUD treatment efforts amidst a changing cannabis policy environment. This includes 36 states legalizing medical cannabis and 18 states legalizing recreational cannabis as of September, 2021 (NCSL, 2021). However, little is known about age differences in CUD treatment trends during this time in community samples. Among those that received CUD treatment at US specialty facilities that received public funds, majority (86.8% in 2010) of those sought treatment before, rather than during, adulthood (SAMHSA, 2013). Different age groups have specific needs for developmentally appropriate treatment. For example, adolescents who use cannabis frequently are more likely to experience cognitive changes compared with their adult counterparts (Gorey et al., 2019), so lower levels of cannabis use frequency in adolescents might indicate a need for treatment. CUD prevalence decreased among those ages 12-17 (4.3% to 2.7%) and ages 18-25 (6.0% to 4.9%) but not among those ages 26 and older (0.8% to 0.9%) from 2002 to 2014 (Azofeifa et al., 2016) and from 2014 to 2018 using an approximate definition of DSM-5 CUD increases have been observed in some age groups (e.g., ages 18 to 25) (Levy et al., 2021). This indicates that age groups have different burdens of CUD treatment need, so it is important to estimate changes in age effects over time.

There is a gap in our understanding of age group influences on CUD treatment time trends among people with CUD. Analytic techniques, such as time-varying effect modification (Li, 2017), could estimate whether there have been changes in the magnitude of age group differences over time to inform whether age-specific clinical modifications (e.g., changes in CUD treatment services offered to specific age groups) might be needed. Age differences might change over time because cannabis risk perceptions have changed at different rates by age group. For example, young adults have higher rates of increased low risk perceptions of cannabis use from 2002-2018 compared with other age groups (Levy et al., 2021). Perceived cannabis availability (Levy et al., 2021) and daily use differ by age group (Mauro et al., 2018). In combination, these factors that have changed over time at differing rates by age group could contribute to potential age-specific time-varying effects in CUD treatment. One could hypothesize that the magnitude of the age difference would change if CUD treatment is changing in one age group and not another. Examining age-specific time trends in CUD treatment is an important public health priority to help identify age groups that may need additional treatment supports or tailored treatment referral mechanisms.

The present study had two aims. First, we estimated time trends in CUD treatment use and perceived need for treatment overall and by age group. Second, in order to assess whether changes in CUD treatment over time differed by age group, we visualized time-

varying effect modification of age-treatment use and perceived treatment need associations to determine whether the relationships changed in 2002-2019. This information could be used to inform age-specific needs for CUD treatment interventions, such as expanding treatment referral mechanisms for adolescents and young adults where needed.

2. METHODS

2.1 Data source and study participants

We used the 2002-2019 public use data files from National Survey on Drug Use and Health (NSDUH), a nationally representative annual cross-sectional survey including approximately 68,000 non-institutionalized civilians ages 12 and older from the 50 states and the District of Columbia. Data were collected from face-to-face household interviews using computer assisted interviewing and audio computer assisted survey instruments. Weighted interview response rates were 78.5% in 2002 and 64.9% in 2019 (SAMHSA, 2004, 2020). From 2005 to 2013, the NSDUH equally sampled participants from these age groups: ages 12-17, ages 18-25, and ages 26 and older. In 2014, the NSDUH altered the sample allocation to 25% for ages 12-17 and ages 18-25, respectively, and 50% for ages 26 and older. Adolescents (ages 12-17) and young adults (ages 18-25) were oversampled in the NSDUH in all years (2002-2019) in order to obtain reliable nationally representative estimates of the United States general population for these younger age groups (SAMHSA, 2020).

As CUD can be an indicator of clinical treatment need (Brezing and Levin, 2018), it is important to estimate trends in CUD treatment utilization over time among those with CUD. Of all 1,005,421 participants ages ≥12 in the 2002-2019 NSDUH, we restricted to those meeting criteria for the DSM-5-proxy CUD (N=43,307; 2.31%). To estimate the DSM-5-proxy for CUD in the past year, we followed procedures described elsewhere (Compton et al., 2019; Levy et al., 2021). This included DSM-IV criteria (APA, 1994) for cannabis dependence as well as abuse except legal problems; the proxy measure did not include craving, which was not collected in the NSDUH.

2.2 Measures

2.2.1 Last/current CUD treatment use in any or specialty settings: Last/current CUD treatment was measured by “The last time you entered treatment, did you receive treatment or counseling for your use of marijuana or hashish?” for respondents that were no longer in treatment or “Are you currently receiving treatment or counseling for your use of marijuana or hashish?” for respondents that reported currently being in treatment. Last/current CUD treatment use in the past year differentiated any setting from specialty treatment settings. Any CUD treatment use was assessed based on whether a) the respondent received last or current treatment for marijuana or hashish in any location (e.g., private doctor’s office, religious settings, self-help groups) and b) this last/current treatment occurred in the past year. Any CUD specialty treatment use was assessed based on whether the respondent a) received last or current treatment for marijuana or hashish, b) that last/current treatment was at a specialty facility (e.g., drug/alcohol rehabilitation facility, mental health center), and c) that last/current specialty treatment occurred in the past year.

2.2.2 Perceived CUD treatment need: Any perceived CUD treatment need was assessed based on whether the respondent reported perceiving a need for any treatment or additional treatment for their use of cannabis in the past year.

2.2.3 Time measure: We created a year indicator variable for each survey year, and used it to create a continuous time variable for 2002-2019 (i.e., 0 if 2002, 1 if 2003, 2 if 2004, etc.).

2.2.4 Age group: Age was characterized into three groups (ages 12-17, 18-25, and ≥26) to assess differences in cannabis treatment use and perceived treatment need, corresponding to the NSDUH sampling design age allocations (Substance Abuse and Mental Health Services Administration, 2020). This age category was consistent with NSDUH sampling and aligned our findings with the existing literature examining cannabis use in these specific age groups (Cerda et al., 2020; Santaella-Tenorio et al., 2019).

2.3 Analytic strategy

2.3.1 Descriptive characteristics—Survey weighted descriptive sample characteristics were estimated among people who met criteria for DSM-5 proxy for CUD in the past year.

2.3.2 Time and age trends—Weighted prevalence of any CUD treatment use, specialty treatment use, and perceived treatment need were assessed from 2002-2019. We tested time trends in any CUD treatment use, specialty treatment use, and perceived treatment need over time using generalized linear models with a log link and binomial family. We used linear combinations (i.e., adding the continuous year estimate and age group estimates) to report yearly change over time by age group.

2.3.3 Time-varying effect modification—We used time-varying effect modification (TVEM) to assess whether the magnitude of the associations between age group and CUD treatment outcomes changed meaningfully over time (i.e., whether there is a time-varying association between age group on CUD treatment outcomes). Odds ratios were estimated from a logistic regression response distribution. TVEM uses a non-parametric modeling technique to visually display the functional form of associations over a continuous time period, allowing associations to change fluidly over time (Lanza et al., 2014; Li, 2017; Tan et al., 2012). We utilized the weighted %TVEM SAS macro version 2.6 for this analysis (Dziak et al., 2017) and accounted for NSDUH complex survey design weights. Figures illustrated odds ratios with point-wise confidence intervals (CIs) and a dashed line at 1.0 to indicate a null relationship. A vertical line at 2015 indicates that NSDUH survey design changed in this year (CBHSQ, 2015). Empirical sandwich estimators were used with unpenalized b-splines that select an appropriate amount of smoothness by specifying knots for each time-varying effect variable in the model (Li, 2017).

2.3.4 Sensitivity analyses—We tested differences in treatment prevalence before/after 2015, to statistically test whether the 2015 NSDUH redesign (CBHSQ, 2015) was associated with a change in the intercept of CUD treatment use beyond what would otherwise be

expected given the trends over time. If changes in trends were due to a methodological artifact, we would expect an abrupt change in the intercept in 2015 across treatment-related outcomes and ages. We created a binary indicator for years 2015 onwards (1 if 2015 or later, 0 if 2014 or earlier) due to changes in NSDUH survey design introduced in 2015 (SAMHSA, 2016). We created a continuous measure of time since the 2015 redesign. We regressed CUD treatment outcomes on age and time, testing age by time interactions (i.e., continuous year*age, 2015 redesign indicator*age, time since 2015 redesign*age). We used linear combinations (i.e., adding the continuous year estimate and the time since 2015 redesign estimate) to report yearly change over time before and after 2015. Linear combinations were used to combine age-specific trends over time before and after 2015.

To reflect age groups used in cannabis policies, such as legal use of recreational cannabis, sensitivity analyses explored trends in CUD treatment outcomes over time by age group (ages <21, ages 21+). To explore whether changes in CUD treatment use might be influenced by changes in CUD severity (mild: 2-3 symptoms; moderate: 4-5 symptoms; severe: 6+ symptoms), we assessed differences in CUD treatment use by severity and age group. Additional generalized linear models controlled for severity assessing yearly age-specific trends with linear combinations.

3. RESULTS

3.1 Descriptive characteristics

Among people met criteria for DSM-5-proxy CUD, 46.92% were ages 18 to 25, 65.98% were men, 44.25% had a high school or less educational attainment, 83.29% had no comorbid substance use disorders other than CUD, and 43.30% were involved in the criminal justice system (Table 1). Figure S1 displays prevalence of the DSM-5-proxy CUD (i.e., proportion that met our inclusion criteria) over time by age group. Among those that met the criteria for DSM-5-proxy CUD between 2002-2019, 6.06% reported any last/current CUD treatment, 2.76% specialty last/current CUD treatment, and 2.19% perceived a need for CUD treatment in the past year.

3.2 Time trends overall

Any last/current CUD treatment use among people 12 and older with DSM-5-proxy CUD decreased by 54.23% over the study period from 9.11% in 2002 to 4.17% in 2019 (Figure 1). Specialty CUD treatment (3.45% in 2002 and 1.66% in 2019) and perceived CUD treatment need (3.10% in 2002 and 0.97% in 2019) also decreased over time. CUD treatment use decreased by 3% each year in the overall sample (Table 2; aRR: 0.97, 95% confidence interval [CI]: 0.96, 0.99). CUD specialty treatment use decreased by 3% per year (aRR: 0.97, 95% CI: 0.95, 0.99) and perceived CUD treatment need by 5% per year (aRR: 0.95, 95% CI: 0.92, 0.98).

3.3 Age group differences

Figures S2-S4 show changes in prevalence of cannabis treatment over time by age group. Compared to ages 12-17, likelihood of CUD treatment use was lower among ages 18 to 25 (Table 2; aRR= 0.63; 95% CI: 0.52, 0.75). Likelihood of CUD specialty treatment use was

also lower among those ages 18 to 25 (aRR: 0.70: 95% CI: 0.52, 0.93) compared with those ages 12 to 17. Likelihood of perceived CUD treatment need was higher in those ages ≥26 (aRR: 1.84: 95% CI: 1.19, 2.83) compared with those ages 12 to 17. Age-specific yearly decreases in CUD treatment outcomes were observed across all age groups. For example, CUD treatment use decreased by 5% per year among ages 18-25 (aRR: 0.95, 95% CI: 0.94, 0.97).

3.4 Time-varying effect modification results

Figure 2 displays time-varying associations between CUD treatment use, specialty treatment use, and perceived treatment need and age group from 2002 to 2019. Likelihood of CUD treatment use was lower in ages 18-25 and higher in ages ≥26 compared with ages 12-17 (panel A) at some time points, particularly in 2010 (ages 18-25: aOR=0.57, 95% CI=0.46, 0.71; ages ≥26: aOR=1.26, 95% CI= 0.97, 1.63). Similarly, likelihood of specialty CUD treatment was lower in ages 18-25 and higher in ages ≥26 compared with ages 12-17 (panel B), particularly in 2010 (aOR=0.57, 95% CI=0.41, 0.79 in ages 18-25 versus aOR=1.27, 95% CI=0.88, 1.84 in ages ≥26). Similar age group trends were observed for perceived CUD treatment need (panel C). There appears to be an inflection point in perceived CUD treatment need around 2010 among ages ≥26 compared to ages 12-17 (aOR: 2.34, 95% CI: 1.47, 3.71) and following 2010 age differences become less pronounced. Likelihood of perceived CUD treatment need was lower in ages 18-25 versus ages 12-17 in 2010 (aOR: 0.48, 95% CI: 0.31, 0.74).

3.5 Sensitivity analyses

There was no change in the 2015 intercept for CUD treatment use (any or specialty) or perceived need for CUD treatment (Table S1; e.g., CUD specialty treatment intercept in 2015 (aRR: 0.93, 95% CI: 0.66, 1.32) and minimal differences in age-specific changes in CUD outcomes before and after 2015 (Table S2). Differences by CUD severity were observed (Table S3; e.g., severe CUD was associated with higher likelihood of CUD treatment use aRR: 4.16, 95% CI: 3.68, 4.72). Figures S2-S4 compare CUD outcomes with ages 12-20 and 21 and older with CUD treatment outcome trends similar to the age groups used in our main analysis. Figures S5-S7 show that CUD outcomes differed by DSM-5-proxy CUD severity and age group, especially perceived CUD treatment need that declined at a faster rate for adults ages 26+ with moderate symptoms after 2014 compared with other age and CUD severity groups.

4. DISCUSSION

Our study assessed trends in CUD treatment use and perceived need for treatment in 2002-2019, overall and by age group in a nationally representative sample. CUD treatment use and perceived need for treatment decreased from 2002 to 2019 across age groups. Time-varying effect modification indicated that there the strength of the relationships between age group and CUD treatment and perceived need over time were relatively stable. Our study fills a gap in the literature presenting evidence of age group differences over time in CUD treatment use and perceived CUD treatment need with important implications for enhancing age-specific cannabis treatment referral mechanisms. Findings were observed in the context

of age group differences in CUD over time (Azofeifa et al., 2016) and increases in frequent cannabis use prevalence among adults after 2007 (Mauro et al., 2018).

CUD treatment decreased over time for all age groups. CUD treatment use and perceived treatment need could be decreasing over time for multiple reasons. Perceived cannabis availability is increasing (Schuermeyer et al., 2014), while perceived harms from cannabis use are decreasing (Azofeifa et al., 2016; Carliner et al., 2017). These attitude changes could be contributing to decreases in CUD treatment seeking and perceived treatment need. Despite the fact that drug use discussions with providers are associated with increased perceived need and receipt of treatment, over a third of adults that self-reported drug use on surveys also reported not discussing use with their providers (Mauro et al., 2020). Barriers to discussing cannabis use with healthcare providers (e.g., providers unable to bill insurance for these services) could be contributing to decreases in CUD treatment use and perceived treatment need over time. Decreasing trends in CUD treatment use observed in our study using a repeated nationally representative community-based sample were consistent with state-level decreases in CUD specialty treatment episodes among young adults (Mennis et al., 2021).

Our study found that age-related associations of CUD treatment need perceptions, but not CUD treatment use, are changing over time, particularly when comparing ages 26 and older to ages 12-17. That is, while reductions in treatment use over time are of different magnitude, the relative age differences remain stable over time. When assessing absolute overall differences by age, there are many potential reasons why young adults could have lower CUD treatment use and perceived treatment need than adolescents. First, differential perceptions in regular cannabis use risk between adolescents and young adults could contribute to differences in treatment utilization, as adolescents have a higher prevalence of perceived risk from regular cannabis use compared with young adults (44.1% versus 23.8% in 2012) (Pacek et al., 2015). Second, unlike adolescents (Curtis et al., 2014; Maslowsky et al., 2017), young adults may not have exposure to school screening for substance use disorders including CUD. Third, adolescents are often mandated to receive CUD treatment through the juvenile legal system (Ledgerwood and Cunningham, 2019). Thus, age differences in coerced treatment could be contributing to higher CUD treatment utilization in adolescents versus adults. Alternatives to criminal legal system referrals to treatment, which are less likely to include evidence-based services than other referrals, are needed to minimize barriers to drug treatment engagement (Drug Policy Alliance, 2011). As cannabis policies can affect arrests differently by age (Plunk et al., 2019), future studies should test how policies impact criminal legal system treatment referrals.

Age differences may be time-varying and narrowing in recent years after 2010 because of changes in cannabis attitudes and policy over time impacting all age groups. For example, perceiving great risk of regular cannabis use decreased from 2002 to 2012 across all age groups (ages 12-17, 18-25, 26-49, and 50+) (Pacek et al., 2015) and not in one age group alone, which could contribute to a narrowing of age group differences. It could also be that CUD severity is changing at different rates by age group driving the changes in CUD treatment use; however, our sensitivity analyses did not find major differences in time trends of CUD treatment use by age and severity. Some differences in the time trends of perceived

CUD treatment need by age and severity were observed with larger decreases in recent years for adults ages 26+ with moderate CUD. Identifying young adult CUD treatment barriers and acceptable treatment modalities is important to enhance treatment uptake in this age group.

Our study has policy implications to motivate expanded access to and availability of CUD treatment, as medical cannabis laws have changed substantially throughout this time period (NCSL, 2021). The changing policy environment over this time period led to both overall and age-specific policies relating to cannabis (e.g., minimum legal purchase age). Age-specific interventions to minimize harms from cannabis use and enhance CUD treatment are needed. Our study assessed national-level trends and did not examine state or regional differences; however, it is possible that age-specific CUD treatment use trends could vary by state or region. Future research should use data with state indicators to assess whether cannabis legalization contributed to the age-specific CUD treatment trends observed in our study. There did not appear to be an artifactual abrupt change in 2015 after the NSDUH treatment module survey redesign. Future research using the NSDUH CUD treatment variables may be able to assess outcomes across all NSDUH survey years rather than stratifying based on pre- and post-2015 survey redesign.

4.1 Limitations

The main limitation is that the CUD treatment outcome was last/current treatment episode, not any treatment in the past year. People with multiple treatment episodes in the last year would only be captured if the most recent episode included CUD treatment. We incorporated a variable related to time since last/current CUD treatment to create an indicator assessing any last/current CUD treatment use in the past-year, but this operationalization could underestimate CUD treatment use. However, as most people do not get any treatment for drug-related problems (Mauro et al., 2020), we expect to have captured most past-year episodes. The DSM-5-proxy CUD measure excluded craving since this was not collected in the NSDUH, which could have led us to exclude people who met the CUD diagnostic threshold. Additionally, TVEM cannot output risk ratios, so a binomial distribution and odds ratios were used for the figures even though multivariable models used a binomial distribution with a log link to output risk ratios. Since the outcomes were relatively rare (<15%), we expect the reported odds in the TVEM models to approximate risk. This study did not distinguish age effects from birth cohort effects. Observed changes in CUD treatment and perceived treatment need over time could be due to changing attitudes with age, or that particular attitudes are associated with specific birth cohorts moving through time together. For example, in Australia birth cohort effects have been observed in cannabis attitudes towards legalization (Kaur et al., 2021). Changes in barriers/facilitators to CUD treatment over time could influence utilization but were not addressed in this study. Future studies applying the Andersen model should explore potential structural barriers to treatment.

5. CONCLUSIONS

Self-reported CUD treatment use and perceived CUD treatment need decreased from 2002-2019 across age groups in the US. Young adults had the lowest prevalence of

perceived CUD treatment need. As cannabis is becoming more widely available with changing attitudes about cannabis use harms during a time when more states are enacting recreational cannabis laws (NCSL, 2021), it is important for future research to identify young adult treatment barriers and acceptable treatment modalities. Future research should assess whether there have been changes in CUD treatment utilization by marginalized sub-populations, and assess whether changing cannabis policies are associated with cannabis treatment disparities.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Role of Funding Source:

This work was supported by the National Institutes of Health/National Institute on Drug Abuse (K01DA045224 to PM) and the National Institutes of Health (R01-DA048853/ R49 CE002096 to KK).

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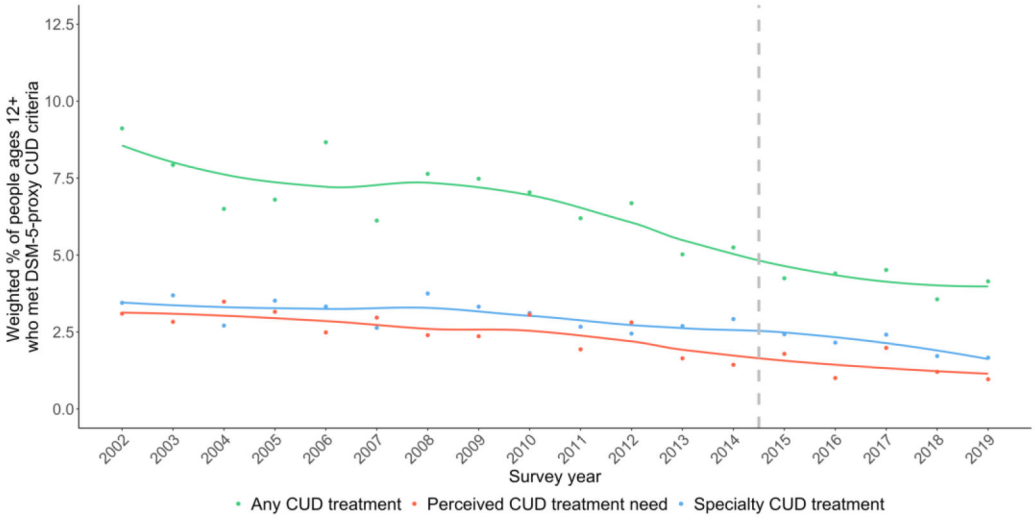

Figure 1:

Prevalence of CUD any treatment use, specialty treatment use, and perceived treatment need in the past year among those who met criteria for past-year DSM-5-proxy CUD, NSDUH 2002-2019 (N= 43,307)

Notes: CUD= Cannabis Use Disorder. Vertical line at 2015 represents NSDUH survey redesign.

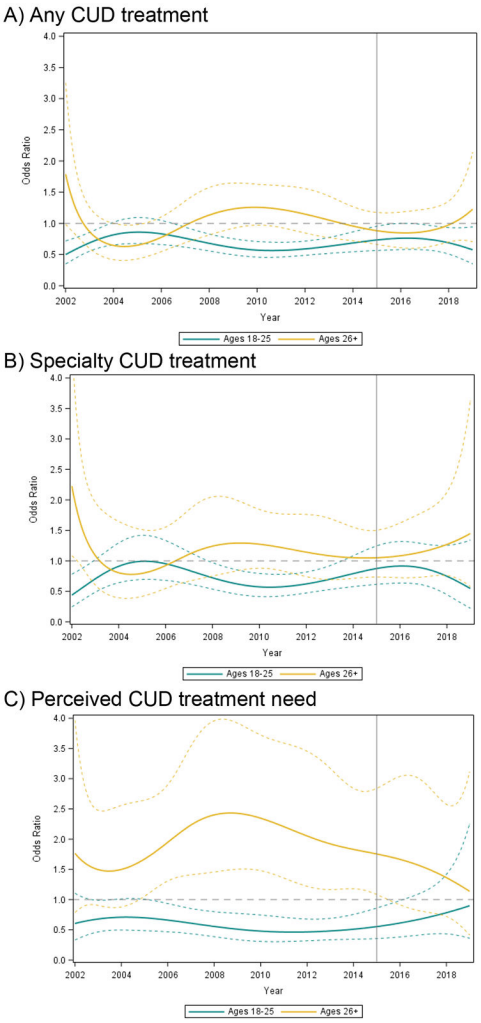

Figure 2:

Time-varying association between age (Ages 18-25 and Ages ≥26 vs Ages 12-17) and A) any past-year CUD treatment use, B) any past-year CUD specialty treatment use, and C) any past-year perceived CUD treatment need, among those who met criteria for past-year DSM-5-proxy CUD, 2002-2019 NSDUH (N=43,307)

Notes: CUD= Cannabis Use Disorder. Vertical line at 2015 represents NSDUH survey redesign.

Table 1:

Select characteristics overall among those with past-year DSM-5-proxy CUD, National Survey on Drug Use and Health 2002-2019

Characteristic	Among those with past-year cannabis use disorder (DSM-5-proxy CUD) N (wt. col %)
Overall	43,307 (100.00%)
Age	
12-17	12,237 (15.99%)
18-25	24,674 (46.92%)
≥26	6,396 (37.09%)
Gender	
Male	26,804 (65.98%)
Female	16,503 (34.02%)
Race/ethnicity	
NH white	26,159 (62.19%)
NH Asian/PI	946 (2.39%)
NH Black	6,088 (16.37%)
Hispanic	6,716 (15.28%)
Other	3,398 (3.77%)
Health Insurance	
Private only	21,275 (49.09%)
Public only	10,239 (21.72%)
Both private and public	1,250 (2.57%)
Other	1,477 (3.09%)
Uninsured	9,066 (23.53%)
Educational Attainment	
High school or less	17,995 (44.25%)
Some college, college or graduate school	13,075 (39.76%)
Ages 12-17	12,237 (15.99%)
Employment Status	
Employed full time	13,206 (39.24%)
Employed part time	7,835 (18.38%)
Unemployed	5,022 (11.96%)
Other	6,957 (17.55%)
Ages 12-17	10,287 (12.87%)
Household Income	
$0-19,999	13,206 (28.44%)
$20,000-49,999	14,924 (34.14%)
$50,000-74,999	6,011 (13.94%)
≥$75,000	9,166 (23.48%)
Urbanicity	

Characteristic	Among those with past-year cannabis use disorder (DSM-5-proxy CUD) N (wt. col %)
1-Large metro	19,761 (56.59%)
2-Small metro	15,405 (30.79%)
3-Nonmetro	8,141 (12.62%)
Self-rated Health	
Excellent/very good	24,983 (55.22%)
Good/fair/poor	18,324 (44.78%)
Criminal Justice Involvement, Any	17,399 (43.30%)
Cannabis Use, Past Year	43,307 (100.00%)
Daily Cannabis Use, Past Year	15,177 (37.17%)
Daily Cannabis Use, Past Month	16,354 (40.64%)
Substance Use Disorder (Excluding DSM-IV Cannabis), Past Year	19,667 (43.60%)
DSM-IV Cannabis Use Disorder, Past Year	28,327 (63.92%)
Number of Other Drug Use Disorders (Excluding DSM-5-proxy CUD)	
0	36,118 (83.29%)
1	4,671 (10.93%)
2	1,446 (3.28%)
3	621 (1.49%)
4+	451 (1.02%)

Notes: NH= Non-Hispanic; PI= Pacific Islander. Past-year cannabis use; past-year daily cannabis use (i.e., at least ≥300 days in the past year); past-month daily cannabis use (i.e., at least 25 days in the past month); any SUD except cannabis use disorder (CUD) (i.e., meeting criteria for any past-year substance use disorder excluding tobacco); and CUD (i.e., meeting criteria for any past-year CUD). Criminal justice involvement included any of the following ever arrested and booked for breaking the law, on parole or supervised released in the past year, or on probation in the past year.

Table 2:

Time trends in CUD treatment use, specialty treatment use, and perceived treatment need *among those who met DSM-5-proxy CUD criteria* in the past year by age group, National Survey on Drug Use and Health 2002-2019 (N= 43,307)

	CUD Treatment Use aRR (95% CI)	CUD Specialty Treatment Use aRR (95% CI)	Perceived CUD Treatment Need aRR (95% CI)
Age fixed effect			
12-17	Ref	Ref	Ref
18-25	**0.63 (0.52, 0.75)**	**0.70 (0.52, 0.93)**	0.92 (0.65, 1.30)
≥26	0.77 (0.56, 1.07)	0.94 (0.59, 1.48)	**1.84 (1.19, 2.83)**
Continuous Year	**0.97 (0.96, 0.99)**	**0.97 (0.95, 0.99)**	**0.95 (0.92, 0.98)**
Age*Continuous Year Interaction			
12-17	Ref	Ref	Ref
18-25	**0.98 (0.96, 1.00)**	0.99 (0.96, 1.03)	0.99 (0.95, 1.03)
≥26	0.98 (0.95, 1.01)	0.99 (0.95, 1.03)	0.98 (0.94, 1.03)
Age-specific yearly change[a]			
Ages 12-17	**0.97 (0.96, 0.99)**	**0.97 (0.95, 0.99)**	**0.95 (0.92, 0.98)**
Ages 18-25	**0.95 (0.94, 0.97)**	**0.97 (0.95, 0.99)**	**0.94 (0.92, 0.96)**
Aaes ≥26	**0.96 (0.93. 0.98)**	**0.96 (0.93. 1.00)**	**0.93 (0.91. 0.96)**

Notes: CUD= cannabis use disorder; aRR= adjusted risk ratio; CI= confidence interval; Bold values indicate p<0.05.

[a]Values derived from linear combinations of continuous year + age groups. CUD inclusion criteria= meeting criteria for DSM-5-proxy CUD.