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Trends and Patterns of Addictive Substance Use among Adolescent Cannabis Users with No History of Cigarette Smoking, 1976–2020

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Abstract

Adolescents who have tried cannabis face a markedly higher likelihood of engaging in strongly habit-forming substances, including cocaine, heroin, and improper use of prescription medications. It remains unclear if this heightened likelihood extends to teenage cannabis users who have never used traditional cigarettes, a subgroup that has expanded significantly in recent times. This research tracks the recent expansion in the share of teenage cannabis users who avoid traditional cigarette smoking and assesses their likelihood of using habit-forming substances. The analysis draws from yearly, cross-sectional, representative samples in the Monitoring the Future study involving 607,932 American 12th graders surveyed between 1976 and 2020. For those with any history of cannabis use, the proportion who had no experience with traditional cigarettes rose from 11% in 2000 to 58% in 2020. This subgroup showed rates of habit-forming substance use that exceeded those of non-cannabis-using peers by 8%. By contrast, teenagers with any cannabis experience—irrespective of cigarette history—exhibited rates of habit-forming substance use that were 500% greater than non-users. Teenage cannabis users without a history of traditional cigarette smoking display considerably lower rates of habit-forming substance use compared to the broader population of cannabis users. These findings indicate that efforts and regulations designed to lower teenage involvement with habit-forming substances might be more effective if they target cigarette smoking among cannabis-using adolescents rather than cannabis use in isolation.

Keywords: Cigarette smoking, Addictive substance, Cannabis users, Habit-forming substances

Introduction

Teenagers who consume cannabis show a significantly greater chance of illicit involvement with potent addictive substances like cocaine, heroin, hallucinogens, and improper prescription medication use [1-3]. This greater chance raises serious worries among parents, educators, and authorities, and it forms a key element in theoretical frameworks, legal approaches, and intervention programs related to substance use. In theoretical terms, it underpins both the "gateway" hypothesis and the "common liability" model, where the former suggests cannabis use directly contributes to this increased chance, while the latter attributes it to underlying personal vulnerabilities that influence multiple substance behaviors [2, 4-6]. Legally, fears that teenage cannabis consumption could lead to addictive substances have historically supported arguments for maintaining cannabis prohibition to discourage youth uptake [7, 8]. In prevention efforts, this association implies that targeting cannabis might help curb the broader use of highly addictive drugs [8, 9].

It has received limited investigation whether this greater chance applies to teenage cannabis consumers who have avoided traditional cigarette smoking entirely. Leading theories offer scant insight into their substance patterns. Models of substance escalation often place cannabis as a middle step following tobacco onset and preceding addictive drugs [2]. It is uncertain if cannabis retains a similar link to addictive substances when removed from this progression and unaccompanied by tobacco.

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Moreover, cannabis use without tobacco does not align neatly with common liability models positing a broad vulnerability to various substances [6].

During the 1960s and 1970s, when many current cannabis theories and regulations emerged, separating the effects of cannabis from cigarette smoking was challenging for teenage populations. Adolescent cannabis users exhibited extremely high rates of cigarette smoking [10], complicating efforts to isolate influences. Additionally, since the two were closely linked, examining the minor subset of cannabis users who refrained from cigarettes appeared more theoretical than practically relevant for guiding policy.

Over recent decades, teenage cannabis users who refrain from cigarette smoking deserve greater scrutiny due to the substantial growth in this population. This growth stems from the widespread drop in cigarette smoking over the last twenty years [11]. In that period, lifetime cigarette experience among 12th graders declined from 63% in 2000 to 24% in 2020 [12]. Lifetime cannabis use showed no comparable drop, remaining around 44% in 2020 after stabilizing for about ten years [12]. Consequently, at least half of the 44% reporting cannabis use in 2020 likely had no cigarette history—a lower-bound figure assuming full overlap between cigarette users and cannabis users.

This research addresses unknowns by examining (a) patterns in the proportion of cannabis users who have never used cigarettes from 1976 through 2020, and (b) their rates of addictive substance involvement.

Materials and Methods

Study sample

The data are drawn from the Monitoring the Future study [13], an ongoing annual survey that is nationally representative of U.S. students. It employs self-administered questionnaires completed by students in classroom settings. The study has received approval from the University of Michigan Institutional Review Board (approval #HUM00131235). Consent was secured either actively or passively (depending on individual school requirements) from parents of participants under 18 years of age, and directly from students who were 18 or older. Each year from 1976 through 2020, separate, nationally-representative samples of 12th-grade students were surveyed. Full details of the survey design and sampling methods are available elsewhere [14]. Average student participation rates reached 82%, with most non-participation attributable to absenteeism.

Table 1 presents the wording and coding of all measures used in the study. Missing data at the item level were minimal: 97% of participants reported on lifetime cigarette use, 96% on lifetime cannabis use, and 94% on lifetime use of other addictive drugs. Following listwise deletion for missing values, 89% of the original respondents supplied complete data on these three substance variables as well as the covariates, yielding a final analytic sample of 607,932 12th-grade students.

Table 1. Measures from the survey and their prevalence rates (with 95% confidence intervals shown in parentheses)

Measure	Item wording and variable construction	Prevalence (%)
Lifetime cannabis use	Assigned a value of 1 for participants who selected any option indicating one or more occasions in response to the item: "On how many occasions (if any) have you used marijuana (weed, pot) or hashish (hash, hash oil) in your lifetime?"; assigned 0 in all other cases	47.4 (46.9–47.9)
Lifetime cigarette smoking	Assigned a value of 1 for participants who selected any option except "never" in response to the item: "Have you ever smoked cigarettes?"; assigned 0 otherwise	56.8 (56–57.5)
Lifetime cannabis use without any cigarette smoking	Assigned a value of 1 for participants who indicated any lifetime cannabis use and reported no lifetime cigarette smoking; assigned 0 otherwise	8.7 (8.4–9.0)
Lifetime use of addictive substances other than cannabis [a]	Assigned a value of 1 for participants who reported any lifetime use of at least one of the following: heroin, LSD, other hallucinogens (examples listed on the questionnaire: mescaline, peyote, "shrooms", psilocybin, PCP), cocaine, nonmedical amphetamines, nonmedical tranquilizers (examples listed: Librium, Valium, Xanax), nonmedical quaaludes (examples listed: Soapers, Quads, Ludes), nonmedical barbiturates (examples listed: phenobarbital, Ambien, Seconal, Lunesta, Dalmane, Sonata, Restoril, Intermezzo, Halcion, Zolpimist), or nonmedical opioids (examples listed: methadone, opium, morphine, codeine, Demerol, Vicodin, OxyContin, Percocet); assigned 0 otherwise	29.2 (28.8–29.7)
Parental college education (at least one parent)	Assigned a value of 1 for participants who indicated "completed college" or "graduate or professional school after college" for the highest education level of either their mother or father; assigned 0 otherwise	44.4 (43.6–45.2)

Female gender	Assigned a value of 1 for participants who selected "Female" in response to the item "What is your sex"; assigned 0 otherwise	50.6 (50.2–50.9)
Sex not disclosed	Assigned a value of 1 for participants who provided no response to the item "What is your sex"; assigned 0 otherwise	2.1 (2.1–2.2)
Race/Ethnicity		
Hispanic	Assigned a value of 1 for participants who selected "Mexican American or Chicano," "Cuban American," "Puerto Rican," or "Other Hispanic or Latino" in response to "How do you describe yourself?"; assigned 0 otherwise	11.0 (10.2–11.8)
Non-Hispanic Black	Assigned a value of 1 for participants who selected "Black or African-American" in response to "How do you describe yourself?" and who were not coded as Hispanic; assigned 0 otherwise	11.2 (10.5–12)
Non-Hispanic Other Race	Assigned a value of 1 for participants who selected "Asian American," "American Indian or Alaska Native," or "Native Hawaiian or Other Pacific Islander" in response to "How do you describe yourself?" and who were not coded as Hispanic; assigned 0 otherwise	6.5 (6.2–6.8)
Non-Hispanic White	Assigned a value of 1 for participants who selected "White" in response to "How do you describe yourself?" and who were not coded as Hispanic; assigned 0 otherwise	61.3 (59.1–63.4)
Multiple Races	Assigned a value of 1 for participants who selected more than one of the categories for Black, Other Race, or White (as defined above); assigned 0 otherwise	1.1 (1.0–1.2)
Survey Year		
1975–1979	Assigned a value of 1 for data collected in 1975–1979; assigned 0 otherwise	9.4 (8.3–10.6)
1980–1984	Assigned a value of 1 for data collected in 1980–1984; assigned 0 otherwise	12.9 (11.6–14.3)
1985–1989	Assigned a value of 1 for data collected in 1985–1989; assigned 0 otherwise	12.5 (11.3–13.9)
1990–1994	Assigned a value of 1 for data collected in 1990–1994; assigned 0 otherwise	12.1 (10.8–13.4)
1995–1999	Assigned a value of 1 for data collected in 1995–1999; assigned 0 otherwise	11.3 (10.2–12.6)
2000–2004	Assigned a value of 1 for data collected in 2000–2004; assigned 0 otherwise	10.3 (9.2–11.6)
2005–2009	Assigned a value of 1 for data collected in 2005–2009; assigned 0 otherwise	11.0 (9.9–12.3)
2010–2014	Assigned a value of 1 for data collected in 2010–2014; assigned 0 otherwise	10.4 (9.3–11.6)
2015–2020	Assigned a value of 1 for data collected in 2015–2020; assigned 0 otherwise	10.1 (9.0–11.3)

[a] Over the study period, modifications to this measure involved adding examples of emerging drugs and removing examples of drugs that were no longer relevant. These adjustments had negligible or no impact on overall prevalence estimates for lifetime use of addictive drugs other than cannabis in the years they occurred [13].
n = 607,932

Statistical analysis

All statistical procedures were conducted using Stata MP 17, employing the "svy:" command suite to incorporate survey probability weights and to adjust for clustering of participants within primary sampling units and strata [14].

Prevalence estimates were derived from proportion calculations. The reported findings are based on multivariable regression models that adjust for temporal trends and demographic characteristics. To accommodate possible non-linear patterns over time, survey years from 1976 to 2020 were categorized into 5-year blocks, with dummy variables included for each block (omitting one reference category). Multivariable results are expressed as relative risk ratios, obtained through generalized linear models specifying a binomial distribution for the error terms and a log link function.

Results and Discussion

Figure 1 illustrates trends in lifetime cannabis use and lifetime combustible cigarette smoking among 12th-grade students. Over the most recent decade, the prevalence of lifetime cannabis use has remained relatively stable, fluctuating within a tight band between 43% and 45% from 2010 through 2020.

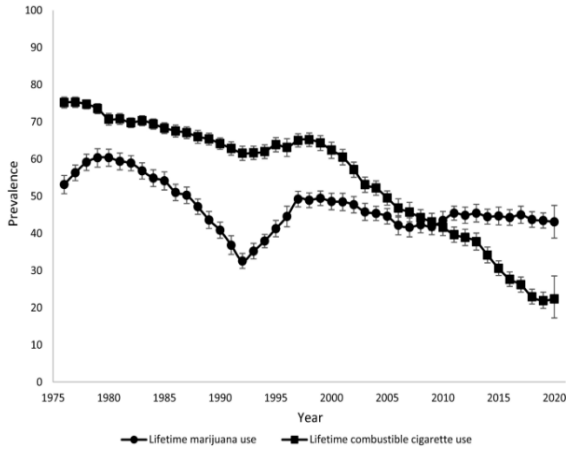

Figure 1. Trends in lifetime prevalence of cannabis and combustible cigarette use across survey years.

By comparison, **Figure 1** demonstrates a sharp and sustained drop in lifetime combustible cigarette use throughout the study period, with the steepest reductions occurring after 2000. Over a single decade, this prevalence fell by nearly half, decreasing from 42 percent in 2010 to 24 percent in 2020. When combined with the relatively stable lifetime cannabis prevalence, these opposing trends necessarily indicate a growing proportion of cannabis users who have no history of combustible cigarette smoking.

Figure 2 displays patterns over time in the rate of cigarette abstention among 12th-grade students who have ever used cannabis. During the most recent decade, the share of cannabis users who had never smoked cigarettes more than doubled, rising from 27 percent in 2010 to 58 percent in 2020. This upward trajectory began around 2000, when only 11% of cannabis users reported no cigarette experience; prior to 2000, abstention from cigarette smoking among those who had used cannabis remained rare, consistently ranging between 8% and 12%

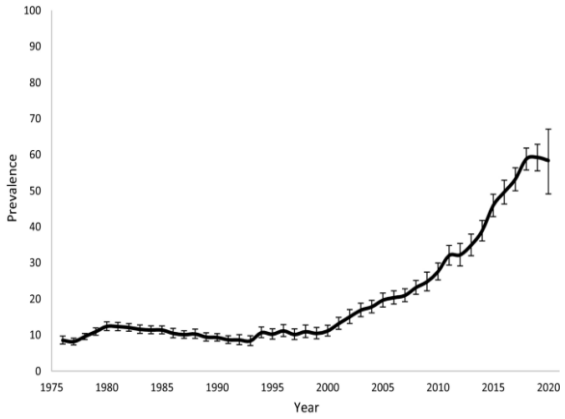

Figure 2. Proportion of lifetime cannabis users reporting no history of combustible cigarette smoking, by survey year.

Table 2 examines lifetime cannabis use without any combustible cigarette smoking as a predictor of addictive drug involvement, where the outcome is an indicator capturing any lifetime use of heroin, hallucinogens, cocaine, or nonmedical prescription drugs. In Model 1 of **Table 2,** students who reported cannabis use but no lifetime cigarette smoking exhibited addictive drug use rates that were 8% higher than those of other students (RR = 1.08; 95 percent CI 1.06–1.11). This figure represents the aggregate elevated risk across all study years combined.

Table 2. Likelihood of using addictive drugs other than cannabis based on lifetime cannabis use without lifetime cigarette use, stratified by year and sociodemographic factors (95% confidence intervals in parentheses)

Predictor	Model 1	Model 2	Model 3
Lifetime cannabis use without ever smoking combustible cigarettes[a]	1.08** (1.06–1.11)	1.17** (1.11–1.24)	1.21** (1.14–1.28)
Survey Year			
1976–1979	1.94** (1.84–2.04)	1.99** (1.88–2.10)	1.91** (1.81–2.01)
1980–1984	2.21** (2.11–2.32)	2.25** (2.13–2.37)	2.19** (2.08–2.30)
1985–1989	1.89** (1.80–1.99)	1.92** (1.82–2.03)	1.88** (1.79–1.99)
1990–1994	1.46** (1.38–1.53)	1.48** (1.40–1.56)	1.46** (1.39–1.54)
1995–1999	1.55** (1.47–1.63)	1.59** (1.50–1.68)	1.58** (1.49–1.67)
2000–2004	1.53** (1.44–1.62)	1.57** (1.48–1.67)	1.57** (1.49–1.66)
2005–2009	1.36** (1.29–1.44)	1.41** (1.33–1.49)	1.40** (1.33–1.48)
2010–2014	1.28** (1.21–1.35)	1.32** (1.25–1.40)	1.31** (1.24–1.39)
2015–2020	Referent	Referent	Referent

Interaction: Year × Lifetime cannabis use w/o cigarettes			
1976–1979 × cannabis w/o cig use	—	0.88** (0.81–0.95)	0.86** (0.79–0.93)
1980–1984 × cannabis w/o cig use	—	0.97 (0.91–1.04)	0.96 (0.89–1.02)
1985–1989 × cannabis w/o cig use	—	1.02 (0.95–1.10)	1.03 (0.95–1.11)
1990–1994 × cannabis w/o cig use	—	1.11* (1.01–1.21)	1.16** (1.06–1.26)
1995–1999 × cannabis w/o cig use	—	0.85** (0.77–0.93)	0.92 (0.84–1.01)
2000–2004 × cannabis w/o cig use	—	0.83** (0.76–0.91)	0.87** (0.80–0.95)
2005–2009 × cannabis w/o cig use	—	0.83** (0.76–0.91)	0.85** (0.78–0.93)
2010–2014 × cannabis w/o cig use	—	0.84** (0.78–0.91)	0.85** (0.79–0.92)
2015–2020 × cannabis w/o cig use	—	Referent	Referent
Parent Education	—	—	0.94** (0.92–0.95)
Sex	—	—	
Female	—	—	0.99 (0.98–1.00)
Did not disclose	—	—	1.12** (1.08–1.15)
Male	—	—	Referent
Race/Ethnicity	—	—	
Black, Non-Hispanic	—	—	0.44** (0.43–0.46)
Hispanic	—	—	0.89** (0.86–0.91)
Other Race	—	—	0.84** (0.82–0.87)
Multiple Races	—	—	1.06* (1.01–1.12)
White, Non-Hispanic	—	—	Referent
Constant	0.18** (0.17–0.19)	0.18** (0.17–0.19)	0.20** (0.19–0.21)

* p < .05; ** p < .01
n = 607,932
[a] Coefficients reflect comparison to the 2015–2020 reference period.
Note: Values represent relative risk ratios.

Table 2's Model 2 incorporates adjustments for potential shifts over different eras in the increased likelihood of other illicit drug involvement among students who have used cannabis at least once but never tried cigarettes, relative to the rest of the sample. In the baseline era of 2015–2020, the estimate for cannabis use without any cigarette history translates to a relative risk of 1.17 (95% CI 1.11–1.24), suggesting a 17% greater chance of having ever used an illegal drug compared to peers during that timeframe.

Building further, Model 3 extends Model 2 by including controls for demographics such as parental educational attainment, gender, and racial/ethnic background. These additions caused only minor shifts in the key estimate for cannabis-only use. For the 2015–2020 baseline, the relative risk edged up from 1.17 to 1.21. Across the various five-year blocks, values fell between 1.02 and 1.40, with four eras showing non-significant associations.

Over in **Table 3**, the first three models assess any lifetime cannabis exposure—without regard to cigarette smoking—as a factor linked to addictive substance involvement. The initial model, combining data from all years, indicates that cannabis-experienced students displayed roughly five times greater involvement with addictive drugs than those without such experience (RR = 5.03; 95% CI 4.95–5.11). Model 2 introduces adjustments for era-specific differences in this relationship, producing a relative risk of 5.72 (95% CI 5.43–6.02) in the 2015–2020 baseline.

Table 3. Probability of using addictive drugs other than cannabis according to lifetime cannabis use, by year and sociodemographic characteristics (95% confidence intervals in parentheses)

Predictor	Model 1	Model 2	Model 3
Lifetime cannabis use[a]	5.03** (4.95–5.11)	5.72** (5.43–6.02)	5.70** (5.41–6.01)
Survey Year			
1976–1979	1.59** (1.52–1.65)	1.83** (1.71–1.97)	1.76** (1.64–1.89)
1980–1984	1.79** (1.72–1.86)	2.19** (2.04–2.35)	2.14** (2.00–2.29)
1985–1989	1.72** (1.65–1.79)	2.04** (1.91–2.19)	2.00** (1.87–2.14)
1990–1994	1.58** (1.52–1.65)	1.90** (1.78–2.03)	1.87** (1.76–2.00)

1995–1999	1.46** (1.40–1.53)	1.61** (1.50–1.73)	1.59** (1.48–1.70)
2000–2004	1.44** (1.38–1.51)	1.50** (1.39–1.62)	1.48** (1.38–1.60)
2005–2009	1.38** (1.32–1.45)	1.42** (1.32–1.53)	1.40** (1.30–1.51)
2010–2014	1.26** (1.20–1.32)	1.24** (1.15–1.34)	1.23** (1.14–1.33)
2015–2020	Referent	Referent	Referent
Interaction: Year × Lifetime cannabis use w/o cigarettes			
1976–1979 × cannabis w/o cig use	—	0.85** (0.79–0.91)	0.84** (0.78–0.90)
1980–1984 × cannabis w/o cig use	—	0.80** (0.75–0.85)	0.79** (0.74–0.84)
1985–1989 × cannabis w/o cig use	—	0.82** (0.77–0.88)	0.80** (0.75–0.86)
1990–1994 × cannabis w/o cig use	—	0.81** (0.76–0.86)	0.79** (0.74–0.84)
1995–1999 × cannabis w/o cig use	—	0.89** (0.83–0.96)	0.89** (0.83–0.95)
2000–2004 × cannabis w/o cig use	—	0.96 (0.89–1.03)	0.95 (0.88–1.02)
2005–2009 × cannabis w/o cig use	—	0.97 (0.90–1.04)	0.97 (0.90–1.04)
2010–2014 × cannabis w/o cig use	—	1.02 (0.94–1.09)	1.02 (0.95–1.09)
2015–2020 × cannabis w/o cig use	—	Referent	Referent
Parental Education	—	—	0.96** (0.95–0.97)
Sex	—	—	
Female	—	—	1.05** (1.04–1.06)
Did not disclose	—	—	1.08** (1.06–1.11)
Male	—	—	Referent
Race/Ethnicity	—	—	
Black, Non-Hispanic	—	—	0.49** (0.47–0.51)
Hispanic	—	—	0.88** (0.87–0.90)
Other Race	—	—	0.96** (0.94–0.98)
Multiple Races	—	—	0.95* (0.91–1.00)
White, Non-Hispanic	—	—	Referent
Constant	0.07** (0.06–0.07)	0.06** (0.06–0.06)	0.07** (0.06–0.07)

* p < .05; ** p < .01
n = 607,932
[a] Coefficients are relative to the 2015–2020 reference period.
Note: Values represent relative risk ratios.

In Model 3 of **Table 3**, the addition of covariates for parental educational attainment, gender, and racial/ethnic background to Model 2 produced minimal alterations in the association between lifetime cannabis consumption and lifetime use of illicit substances. The relative risk experienced a minor reduction, shifting from 5.72 to 5.70, within the reference period of 2015–2020. Over the various five-year intervals examined, these relative risks varied between 4.51 and 5.80.

The present investigation offers two key new insights into the literature. Firstly, it reveals that adolescents who use cannabis but have no history of combustible cigarette smoking exhibit risks for consuming highly dependence-inducing substances that are quite similar to those of non-users in their age group. Typically, this group's likelihood of using such drugs was only about 20% higher—or often considerably lower and lacking statistical significance—compared to peers who abstained from cannabis, and this pattern held steady across the entire 45-year span of the data collection. This stands in marked contrast to the broader population of teenage cannabis consumers, including those with any cigarette smoking experience, who demonstrated roughly five times greater odds of engaging in highly addictive drug use relative to non-users.

A further important insight from this work is the documentation of a marked rise in the share of teenage cannabis consumers who have entirely avoided combustible cigarettes. By 2020, 58% of youth reporting cannabis use had no lifetime history of smoking a combustible cigarette—just one percentage point below the peak of 59% reached in the prior year. This figure has increased progressively since 2000, when it stood at 11%; prior to that time, the rate remained largely stable at approximately 10% dating back to at least 1976.

From the perspectives of policy and intervention, these findings indicate that efforts focused on preventing cigarette smoking could effectively lower rates of highly

addictive drug involvement among youth who use cannabis. Numerous evidence-based strategies and regulations that contributed to the substantial "great decline" [11] in teenage cigarette smoking after 2000 were implemented following the Master Tobacco Settlement Agreement of 1998 [15]. These encompassed limits on youth-oriented cigarette marketing, sponsorships, and promotional activities; elevations in cigarette costs via taxation and related measures; funding for a National Public Education Foundation dedicated to broad-scale anti-smoking media campaigns and associated studies (later known as the “Truth Initiative”); and significant allocations to states for developing and executing localized tobacco prevention initiatives. The dramatic reduction in youth cigarette smoking since 1998 underscores the effectiveness of such approaches. In an optimal scenario, eliminating combustible cigarette use among adolescents entirely could, based on the current evidence, result in cannabis-using youth having risks for addictive drug involvement that are comparable to—or not meaningfully different from—those of their non-cannabis-using counterparts.

Regarding legislative frameworks, the evidence suggests that public health-oriented strategies might achieve certain objectives originally pursued through cannabis prohibition. A primary justification for criminalizing cannabis has been to discourage adolescent initiation, thereby interrupting pathways toward more dependence-prone substances. The present results imply that similar reductions in addictive drug use could be realized by applying tobacco control public health methods to curb cigarette smoking specifically among cannabis-using youth.

Theoretically, these patterns highlight the emergence of a distinct profile of teenage cannabis consumer that does not align closely with predominant explanatory models in substance use research. Gateway hypotheses typically describe sequences beginning with cigarette use and advancing to cannabis and then to highly addictive agents—sequences that do not characterize youth who avoid cigarettes altogether. Similarly, common liability models emphasize broad polysubstance involvement, which again poorly fits adolescents who use cannabis without cigarette exposure. As this cigarette-abstaining subgroup now constitutes the majority of teenage cannabis users, further in-depth investigation is needed to characterize their reasons for cannabis initiation, usage patterns and intensity, longitudinal substance trajectories, and viable points for targeted prevention or intervention.

For advancing research, the sharp escalation in youth adoption of non-combustible nicotine delivery systems, particularly e-cigarettes, since 2017 [16, 17]—representing some of the most rapid rises observed for any substance over 46 years [18]—presents a valuable natural experiment for elucidating pathways connecting cannabis, cigarette smoking, and addictive substances. In 2021, past-30-day e-cigarette prevalence reached 20% among 12th graders, 13% in 10th grade, and 8% in 8th grade [19]. Notably, this period saw no parallel population-wide escalation in adolescent use of highly addictive drugs [12]. Directly contrasting cannabis users who smoke combustible cigarettes with those who use e-cigarettes could help disentangle biological versus sociocultural factors in addictive drug progression, especially since both products provide comparable nicotine doses, allowing nicotine effects to be controlled in such analyses [20].

Two primary limitations should be acknowledged. First, the cross-sectional nature of the data precludes definitive causal inferences. Accordingly, interpretations here focus on observed associations between cannabis involvement and highly addictive drug use, framed against leading theoretical perspectives like gateway models (which incorporate causal mechanisms from cannabis) and common liability models (which do not posit causality).

Second, the dataset excludes 12th graders who have left school prematurely. However, for the study's core aims, incorporating dropouts is unlikely to substantially alter key patterns or interpretations. High school dropout rates shifted only modestly—from 8.7% to 5.7%—between 2010 and 2020 [15], a change insufficient to explain the pronounced decline in combustible cigarette use among cannabis consumers over that decade.

Conclusion

The findings demonstrate modestly heightened rates of highly addictive drug involvement among the subset of teenage cannabis users with no combustible cigarette history—a subset that has recently expanded to represent most adolescent cannabis consumers. These patterns imply that regulatory and preventive efforts seeking to minimize youth prevalence of addictive substances might achieve greater impact by prioritizing reduction of cigarette smoking among cannabis users rather than cannabis consumption itself.

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