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National Survey Results on Drug Use, 1975–2024: Overview and key findings for secondary school students

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50 YEARS
1974–2024

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Overview and key findings for secondary school students

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CHAPTER 1 – Introduction

Substance use is a leading cause of preventable morbidity and mortality; it is in large part why, among 17 high-income nations, people in the United States have the highest probability of dying by age 50.[1,2,3] Substance use is also an important contributor to many social problems including domestic violence, violence more generally, criminal behavior, suicide, and more—and it is typically initiated during adolescence. It warrants our sustained attention.

Monitoring the Future (MTF) is designed to give such attention to substance use among the nation's youth and adults. It is an investigator-initiated study that originated with, and is conducted by, teams of research professors at the University of Michigan's Institute for Social Research. Since its onset in 1975, MTF has been funded continuously by the National Institute on Drug Abuse—one of the National Institutes of Health—under a series of peer reviewed, competitive research grants. The 2024 survey, reported here, is the 50th consecutive national survey of 12th grade students and the 34th national survey of 8th and 10th grade students (who were added to the study in 1991).

MTF contains ongoing national surveys of both adolescents and adults in the United States. It provides the nation with a vital window into the important but often hidden problem behaviors of use of illegal drugs, alcohol, tobacco, and psychotherapeutic drugs used without a doctor's orders. For nearly five decades, MTF has helped provide a clearer view of the changing topography of these problems among adolescents and adults, a better understanding of the dynamic factors that drive some of these problems, and a better understanding of some of their consequences. It has also given policymakers, government agencies, public health professionals, and nongovernmental organizations (NGOs) in the field some practical approaches for intervening.

A widespread epidemic of illicit drug use emerged in the 1960s among U.S. youth, and since then dramatic changes have occurred in the use of nearly all types of illicit drugs as well as alcohol and tobacco. Of particular importance, as discussed in detail below, are the many new illicit drugs that have emerged, along with new forms of alcoholic beverages and nicotine products. Among the substances and devices that have emerged over the life of the survey are new classes of drugs that include vaping devices, hookah smoking, synthetic marijuana, and drugs taken for performance enhancement. New devices and methods for taking drugs, such as vaporizers and e-cigarettes, provide novel ways to use substances and use them in new combinations. Unfortunately, the

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[1] Case, A. & Deaton, A. (2015). Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century. *Proceedings of the National Academy of Sciences, 112*(49), 15078-15083.

[2] Murphy, S. L., Xu, J., Kochanek, K. D., & Arias, E. S. (2020). Mortality in the United States, 2020. NCHS Data Brief, no 395. Hyattsville, MD: National Center for Health Statistics.

[3] Esser, M. B., Leung, G., Sherk, A., Bohm, M. K., Liu, Y. Lu, H., & Naimi, T. S. (2022). Estimated deaths attributable to excessive alcohol use among US adults aged 20 to 64 years, 2015 to 2019. *JAMA Network Open, 5*(11), e2239485.

number of new substances added to the list over the years substantially outnumbers the number removed because so many substances remain in active use. Throughout these many changes, substance use among the nation's youth has remained a major concern for parents, educators, health professionals, law enforcement, and policymakers, largely because substance misuse is one of the largest and yet most preventable causes of morbidity and mortality during and after adolescence.

The MTF annual monograph series is a key vehicle for disseminating MTF's epidemiological findings. In addition to this monograph, the series includes a separate, annual monograph that presents prevalence and trends among U.S. adults now ages 19 to 65, including both college students and their age peers who are not attending college (scheduled for publication this summer), as well as an additional, periodic monograph that presents information on risk and protective behaviors for HIV among young adults. All MTF publications, including press releases, are available on the project website at www.monitoringthefuture.org.

Content Areas Covered

Two of the major topics included in the present monograph are (a) the *prevalence and frequency* of use of a great many substances, both licit and illicit, among U.S. secondary school students in 8th, 10th, and 12th grades and (b) *historical trends* in use by students in those grades. Distinctions are made among important demographic subgroups in these populations based on gender, college plans, region of the country, population density, parent education, and race/ethnicity. MTF has demonstrated that key attitudes and beliefs about drug use are important determinants of usage trends, in particular the amount of risk to the user perceived to be associated with the various drugs and disapproval of using them. Thus, those measures also are tracked over time, as are students' perceptions of certain relevant aspects of the social environment—in particular, perceived availability of each drug, peer norms about their use, and use by friends. Data on grade of first use, noncontinuation of use, trends in use when in lower grades (based on retrospective reports), and intensity of use are also reported here.

Drug Classes

Initially, 11 separate classes of drugs were distinguished in order to heighten comparability with a parallel series of publications based on the National Survey of Drug Use and Health (NSDUH, formerly titled the National Household Survey of Drug Abuse): cannabis (including hashish), inhalants, hallucinogens, cocaine, heroin, narcotics other than heroin (both natural and synthetic), amphetamines, sedatives, tranquilizers, alcohol, and tobacco. Additional estimates have been added for a number of subclasses of drugs within these more general categories such as PCP and LSD (both hallucinogens), barbiturates and methaqualone (both sedatives), methamphetamine, crystal methamphetamine ("ice"), "crack", and cocaine.

In the years since the study was launched, many additional categories of substances have been added to the MTF questionnaires—in many but not all cases in all three grades. Relatively fewer substances have been dropped due to their reaching very low prevalence. The substances added and dropped are shown in Table 1-1 sequentially by year and within year by the grade levels affected.

The large number of substances added over the years illustrates the dynamic and multidimensional nature of the country's drug problems. As time passes and new trends develop, additional drugs will be added to the study's coverage; occasionally ones that fall to very low prevalence levels are dropped (such as bath salts, "look-alike" pseudo-amphetamines, kreteks, bidis, PCP, and Provigil). It is important, given this rapidly shifting variety of drugs, that information be gathered and reported relatively quickly to inform legislators, regulatory agencies, scientists, practitioners in the field, parents, and educators about the extent to which newer drugs are making inroads in the youth population and what subgroups are proving most vulnerable.

Much of the information reported here deals with illicit use of controlled substances. The major exceptions are alcohol, vaping nicotine, cigarettes, other tobacco products, inhalants, nonprescription stimulants, medicines taken appropriately by prescription in the treatment of ADHD, creatine, and cough and cold medicines.

In addition to reporting drug use prevalence, we also focus attention on drug use at high frequency levels. This is done to help differentiate levels of magnitude, or extent, of drug involvement. While there is no scientific or public consensus on what levels or patterns of use constitute misuse, there is a consensus that higher levels of use are more likely to have detrimental effects for the person who uses and for society. We have indirect measures of dosage per occasion by asking respondents about the duration and intensity of highs they usually experience with each type of drug. These items have shown some interesting trends over the years, detailed in Chapter 7.

Attitudes, Beliefs, and Early Experiences

Separate sections or whole chapters are devoted to the following issues related to a number of licit and illicit drugs:

- grade of first use;
- noncontinuation of use;
- respondents' own attitudes and beliefs about specific drugs;
- degree and duration of the highs attained;
- perceptions of availability of the drug; and

- perceptions of attitudes and behaviors of others in the social environment related to the use of various drugs.

Some of these variables have proven to be very important in explaining changes in use, as we discuss in detail in Chapter 8.

Over the Counter Substances

Included in this monograph are trends in the use of nonprescription stimulants, including cough medicines, and the performance-enhancing substances of anabolic steroids, androstenedione (andro), and creatine.

Cumulative Lifetime Daily Cannabis Use

Also included are trend results from a set of questions about cumulative lifetime cannabis use at a daily or near-daily level. These questions were added to enable us to develop a more complete individual history of daily use over a period of years. They reveal some important facts about frequent users of this drug.

Trends in Use of Specific Alcoholic Beverages

Twelfth grade data are reported for a wide spectrum of substances, including beer, liquor, wine, and flavored alcoholic beverages. Results on these various substances are discussed in Chapter 4 and Chapter 5. We present trends on alcohol use, as well as on most other substances among demographic subgroups and for specific classes of alcoholic beverages in a separate, accompanying publication.[4]

Prescription Drugs

MTF documents trends in prescription-type psychotherapeutic drugs used without medical supervision. Since 2008, Chapter 4 and Chapter 5 also contain estimates of the proportion of 12th grade students who use *any* psychotherapeutic drug nonmedically in each prevalence period; these estimates can be made only for 12th graders because estimates of use of sedatives and narcotics other than heroin are not reported for students in the lower grades due to concerns about the validity of their reports of these substances.

Synopses of Other MTF Publications

[4] Johnston, L. D., Miech, R. A., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Patrick, M. E. (2022). *Demographic subgroup trends among adolescents in the use of various licit and illicit drugs 1975-2021* (Monitoring the Future Occasional Paper No. 97). Ann Arbor, MI: Institute for Social Research, University of Michigan.

Chapter 10 contains short synopses of other MTF publications produced during the past year (journal articles, chapters, occasional papers, etc.). References to the full documents are provided, and many are available on the MTF website.

Appendices

Appendix A addresses the issue of whether absentees and school dropouts affect MTF results and, if so, to what extent. For illustrative purposes, the appendix provides estimates of prevalence and trends adjusted for these missing segments of the population for cannabis, cocaine, any illicit drug use, cigarettes, and alcohol.

Appendix B gives the definitions of the various demographic subgroups discussed.

Appendix C provides trends since 1991 in drug use for the *three grades combined*, as well as the absolute decline and the proportional decline in the prevalence of each drug since the most recent *peak* level. Such tables are helpful in getting a quick read on the trends. By combining the three grades, however, much of the meaningful detail available from grade-specific estimates is lost, including evidence of cohort effects.

Appendix D presents drug trends in tabular format from 1991 to 2024 with one-year, five-year, low-current, and peak-current significance tests. With these tables MTF publishes drug prevalence trends for all drugs in a single document for the historical record. This appendix provides a complementary way to view and search the MTF drug prevalence results presented in Chapter 5, which is organized around external links to drug-specific tables and graphs.

In 2017 and earlier, the Appendix C of this monograph reported information on how to take into account the complex sample design in order to calculate confidence intervals for point estimates and how to calculate statistics that test the significance of changes over time or of differences between subgroups. This appendix is no longer necessary with the opening of MTF's secure remote portal at the National Addiction and HIV Data Archive Program, which now allows researchers to compute such statistics directly using MTF weights and clustering variables (after completing an application process that includes a signed pledge to protect the confidentiality of the data). Interested readers may refer to Appendix C of earlier monographs for the information it provides about design effects and how their computational influence varies by substance. They are listed under Results > Annual Reports on the study website: www.monitoringthefuture.org.

Purposes and Rationale for This Research

Perhaps no social problem has proven more clearly appropriate for and in need of the application of systematic research and reporting than substance misuse. Substance use behaviors are often hidden from public view, can change rapidly and frequently, and are of great importance to the wellbeing of the nation. Many legislative and programmatic interventions are aimed at these

behaviors, such as the current opioid crisis and increases in adolescent smoking and illicit drug use, which we reported in the 1970s and again in the 1990s as a relapse in the drug epidemic unfolded.

Young people are often at the leading edge of social change, and this has been particularly true of drug use. MTF documented that the relapse in the drug epidemic in the early 1990s initially occurred almost exclusively among adolescents. Adolescents and adults in their 20s fall into the age groups at highest risk for illicit drug use. Moreover, use that begins in adolescence sometimes continues well into adulthood.[5] This is indicated in the cohort effects that we report for a number of substances (and even in some attitudes and beliefs about them). The original epidemic of illicit drug use in the 1960s began on the nation's college campuses and then spread downward in age. By way of contrast, MTF has shown that the relapse phase in the 1990s first manifested itself among secondary school students and then started moving upward in age as those cohorts matured.

One purpose of MTF is to develop an accurate description of these important changes as they are unfolding. An accurate picture of the basic size and contours of the substance use problem among youth in the U.S. is a prerequisite for informed public debate and policymaking. In the absence of reliable *prevalence* data, substantial misconceptions can develop and resources can be misallocated. In the absence of reliable *trend* data, early detection and localization of emerging problems are more difficult and societal responses more lagged. For example, MTF provided early evidence that cigarette smoking among U.S. adolescents was rising sharply in the early 1990s, which helped stimulate and support some extremely important policy initiatives that culminated in the tobacco settlement between the tobacco industry and the states. MTF documented and described the sharp rise and subsequent decline in ecstasy use and earlier in cocaine use, illustrating the important role that *perceived risk* played in these changes, as it has done for a number of other drugs in the past. The study also helped draw attention to the rise in steroid and androstenedione use among adolescents in the late 1990s, resulting in legislative and regulatory action. It exposed a rise in the use of narcotic drugs other than heroin (especially certain prescription-type analgesics), stimulating an initiative at the White House Office of National Drug Control Policy aimed at reducing use. More recently, MTF has become a key source of information

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[5] Patrick, M. E., Kloska, D. D., Mehus, C. J., Terry-McElrath, Y. M., O'Malley, P. M., & Schulenberg, J. E. (2021). Key subgroup differences in age-related change from 18 to 55 in alcohol and marijuana use: U.S. national data. *Journal of Studies on Alcohol and Drugs. 82*(1), 93–102.

Patrick, M. E., Pang, Y. C., Jang, B. J., Arterberry, B. J., & Terry-McElrath, Y. M. (2023). Alcohol use disorder symptoms reported during midlife: Results from the Monitoring the Future Study among US adults at modal ages 50, 55, and 60. *Substance Use and Misuse, 58*(3), 380–388.

Patrick, M. E., Peterson, S. J., Pang, Y. C., & Terry-McElrath, Y. M. (2024). Links between adolescent binge drinking and midlife alcohol use behaviors by age, sex, and race/ethnicity. *Alcohol, Clinical & Experimental Research*, *48*(11), 2060–2069.

Patrick, M. E., Schulenberg, J. E., O'Malley, P. M., Johnston, L. D., & Bachman, J. G. (2011). Adolescents' reported reasons for alcohol and marijuana use as predictors of substance use and problems in adulthood. *Journal of Studies on Alcohol and Drugs, 72*(1), 106–116.

on vaping, and MTF results are cited by the FDA in its recent regulations prohibiting all flavoring of vaping cartridges except tobacco and menthol. In addition to enabling early detection and localization of problems, valid trend data make assessments of the impact of major historical and policy-induced events much less conjectural.

The accurate empirical comparison of subgroup differences has challenged conventional wisdom in some important ways. Accurately characterizing not only differences but also differential changes among subgroups has been an important scientific contribution from MTF. For example, dramatic racial/ethnic differences in cigarette smoking emerged during the life of the study—differences that were almost nonexistent when MTF began in 1975. Further, the misinformed assumption by some that Black students use illicit drugs more than do White students has been disconfirmed since the beginning of the study, which shows lower levels of use for Black students in most years, though these differences have been narrowing in recent years as overall use of many substances declined, thus leaving less room for differences.

MTF also monitors a number of factors—peer norms regarding drugs, beliefs about the dangers of drugs, and perceived availability—that help explain the historical changes observed in drug use. Monitoring these factors has made it possible to examine a central policy issue in this nation's efforts to reduce drug use—namely, the relative importance of supply versus demand factors in bringing about some of the observed declines and increases in drug use.[6] Our group has also put forth a general theory of drug epidemics that uses many of these concepts to help explain the rises and declines that occur in use and emphasizes the importance of demand-side factors.[7]

In addition to accurately assessing prevalence and testing explanations of their causes, the integrated MTF study of adolescents and adults has a substantial number of other important research objectives that are addressed in our other publications. These include (a) assessing the long-term impact of historical events such as the COVID-19 pandemic on population levels of substance use; (b) helping to determine which young people are at greatest risk for developing various short and long term patterns of drug misuse; (c) gaining a better understanding of the lifestyles and value orientations associated with various patterns of drug use and monitoring how subgroup differences shift over time; (d) determining the immediate and more general aspects of the social environment associated with drug use and misuse; (e) determining how major transitions in the social environment (e.g., entry into military service, civilian employment, college, working, unemployment) or in social roles (e.g., engagement, marriage, pregnancy, parenthood, divorce, remarriage) affect changes in drug use; (f) determining the life course trajectories and comorbidity of the various drug-using behaviors from early adolescence to middle and later

[6] Other major studies have adopted many of these measures including the National Survey on Drug Use and Health (NSDUH) and the European school surveys of substance use in nearly forty European countries (ESPAD), which is largely modeled after MTF.

[7] See Johnston, L. D. (1991). Toward a theory of drug epidemics. In R. L. Donohew, H. Sypher, & W. Bukoski (Eds.), *Persuasive communication and drug abuse prevention* (pp. 93–132). Hillsdale, NJ: Lawrence Erlbaum.

adulthood and distinguishing such age effects from cohort and period effects; (g) determining the effects of social legislation, such as cannabis legalization, the long term effects of the Master Tobacco Settlement Agreement of 1998, and Tobacco 21 legislation on various types of substance use; (h) examining possible consequences of using various drugs; (i) examining linkages between educational success or failure and substance use; and (j) determining the changing connotations of drug use and changing patterns of multiple drug use among youth.[8] Readers interested in publications dealing with any of these topics should visit the MTF website at www.monitoringthefuture.org.

The differentiation of age, period, and cohort effects in the use of various substances has been a particularly important contribution of MTF and one for which the study's cohort-sequential research design is especially well suited.

Since 2004, we have also been reporting about factors related to the spread of HIV.[9] These factors include number of sexual partners, gender of sexual partners, condom use, injection drug use, injection drug use with shared needles, and getting tested for HIV. Most of the research objectives listed above for licit and illicit drug use can also be addressed in relation to these very important behaviors. Our emphasis is on measuring and reporting prevalence and trends in HIV-related behaviors in the general population of young adults ages 19–30 who are high school graduates. We have also been measuring the extent to which these various risk and protective behaviors are correlated.

Our efforts over the years and going into the future cover both the epidemiology and etiology of substance use and related risk behaviors. Including both sets of efforts within the same large-scale study—and keeping measurement consistent across historical and developmental time—allows us to provide the nation with scientifically reliable, nationally representative estimates of historical trends of substance use, as well as the developmental trends and possible causes, correlates, and consequences of substance use and other risk behaviors from adolescence through adulthood.

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[8] For an elaboration and discussion of the full range of MTF research objectives in the domain of substance use, see Johnston, L. D., O'Malley, P. M., Schulenberg, J. E., Bachman, J. G., Miech, R. A., & Patrick, M. E. (2016). The objectives and theoretical foundation of the Monitoring the Future Study (Monitoring the Future Occasional Paper No. 84). Ann Arbor, MI: Institute for Social Research, University of Michigan.

[9] Patrick, M. E., Johnston, L. D., O'Malley, P. M., & Miech, R. A. (2024). HIV-related risk and protective factors among young adults in the U.S.: Data from the Monitoring the Future Panel Study, 2004–2023. Monitoring the Future Monograph Series. Ann Arbor, MI: Institute for Social Research, University of Michigan.

TABLE 1-1

Added and Deleted Prevalence of Use Questions

for 8th, 10th, and 12th Graders

Drug Name	Year in which added	Grades in which added			Year in which dropped	Grades in which dropped		
		8th	10th	12th		8th	10th	12th
PCP	1979			X	2014 [c]			X
Nonprescription Diet Pills	1982			X				
Stay-Awake Pills	1982			X				
Smokeless Tobacco [a]	1986, 1992			X	1990			X
Crack [b]	1986–1987, 1990			X	2024 [j]	X	X	X
Steroids	1989			X				
Crystal Methamphetamine (Ice)	1990			X				
Been Drunk	1991			X				
Ecstasy (MDMA)	1996	X	X	X				
Rohypnol	1996	X	X	X	2002 [h]			X
Methamphetamine	1999	X	X	X				
GHB	2000	X	X	X	2012 [i]	X	X	
Ketamine	2000	X	X	X	2012 [i]	X	X	
Androstenedione	2001	X	X	X	2016 [i]	X	X	
Creatine	2001	X	X	X				
Ritalin	2001	X	X	X				
OxyContin	2002	X	X	X				
Vicodin	2002	X	X	X				
Flavored Alcoholic	2003			X				
Beverages (Alcopops) [d]	2004	X	X					
ADHD Stimulant-type drug—prescribed	2005	X	X	X				
ADHD Non-stimulant-type drug—prescribed	2005	X	X	X				
Any Prescription Drug—not prescribed [e]	2005			X				
10+ drinks in a row in past two weeks	2005			X				
	2016	X	X					
15+ drinks in a row in past two weeks	2005			X				
Over-the-counter Cough/Cold Medicines	2006	X	X	X				
Adderall	2009	X	X	X				
Tobacco using a Hookah	2010, 2016			X				
	2016	X	X					
Small Cigars	2010			X				
Energy Drinks	2010	X	X	X				
Energy Shots	2010	X	X	X				
Alcohol Beverages containing Caffeine [f]	2011	X	X	X				
Snus	2011			X				
	2012	X	X					
Large Cigars	2014	X	X	X				
Flavored Little Cigars	2014	X	X	X				
Regular Little Cigars	2014	X	X	X				

(Table continued on next page.)

TABLE 1-1 (cont.)
Added and Deleted Prevalence of Use Questions
for 8th, 10th, and 12th Graders

	Year in which added	Grades in which added			Year in which dropped	Grades in which dropped		
		8th	10th	12th		8th	10th	12th
Vaping Nicotine	2017	X	X	X				
Vaping Marijuana	2017	X	X	X				
Vaping Just Flavoring	2017	X	X	X				
Marijuana Under a Doctor's Orders	2017	X	X	X				
Delta-8	2023			X				
	2024	X	X					
CBD	2023	X	X	X				
Nicotine Pouches	2023	X	X	X				
Methaqualone	1975			X	1990/2013			X
Nitrites	1979			X	2010			X
Provigil	2009			X	2012			X
Bidis	2000	X	X		2006	X	X	
	2000			X	2011			X
Kreteks	2001	X	X		2006	X	X	
	2001			X	2015			X
Electronic Vaporizors	2015	X	X	X	2017	X	X	X
Look-Alikes	1982			X	2018			X
Bath Salts (synthetic stimulants)	2012	X	X	X	2019	X	X	X
Powdered Alcohol	2016	X	X	X	2020	X	X	X
Heroin With a Needle	1995	X	X	X	2022	X	X	X
Heroin Without a Needle	1995	X	X	X	2022	X	X	X
JUUL	2019	X	X	X	2022	X	X	X
Salvia	2009			X	2023	X	X	X
	2010	X	X		2023	X	X	X
Synthetic Marijuana [g]	2011			X	2023	X	X	X
Dissolvable Tobacco Products	2011			X	2023	X	X	X
	2012	X	X		2023	X	X	X
Cocaine other than Crack	1987			X	2024	X	X	X

Source. The Monitoring the Future study, the University of Michigan.

Note. All prescription-type drugs listed refer to use without a doctor's orders, unless otherwise noted.

[a]Smokeless tobacco was added to one questionnaire form in 1986, dropped in 1990, then added to a different questionnaire form in 1992.

[b]A question on annual use of crack was added to a single form in 1986. The standard triplet questions (lifetime, annual, and 30-day use) were added to two forms in 1987 and to all forms in 1990.

[c]For 12th grade only: Lifetime and 30-day prevalence of use questions were dropped in 2002. A question on annual use remains in the study.

[d]For 12th grade only: A question on annual use of Alcopops was added to a single form in 2003. In 2004 it was replaced by the standard triplet questions (lifetime, annual, and 30-day use) about use of flavored alcoholic beverages.

[e]For 12th grade only: The use of any prescription drug includes use of any of the following: amphetamines, sedatives (barbiturates), narcotics other than heroin, or tranquilizers…without a doctor telling you to use them.

[f]For all grades: In 2012 the alcoholic beverages containing caffeine question text was changed. See text for details.

[g]For all grades: Questions on the annual use of synthetic marijuana were added to the survey in the year specified in the table.

[h]For 12th grade only: Lifetime and 30-day prevalence of use questions were dropped in 2014. A question on annual use remains in the study.

[i]Only 8th and 10th grade questions were dropped from the study.

[j]Lifetime and 30-day prevalence of use questions were dropped in 2024. A question on annual use remains in the study.

CHAPTER 2 – Overview of Key Findings in 2024

Monitoring the Future (MTF), now having completed its 50th year of data collection, has become one of the nation's most relied upon scientific sources of valid information on trends in use of licit and illicit psychoactive drugs by U.S. adolescents, college students, young adults, and adults up to age 65. During the last five decades, the study has tracked and reported on the use of an ever-growing array of such substances in these populations of adolescents and adults.

The annual MTF series of monographs is one of the primary mechanisms through which the epidemiological findings are reported. Findings from the inception of the study in 1975 through 2024 are included in the monographs—the results of 50 national in-school surveys and 48 national follow-up surveys.

MTF has conducted in-school surveys of nationally representative samples of (a) 12th grade students each year since 1975 and (b) 8th and 10th grade students each year since 1991. In addition, beginning with the class of 1976, the study has conducted follow-up surveys of representative subsamples of the respondents from each previously participating 12th grade class. These follow-up surveys now continue well into adulthood, currently up to age 65. This monograph focuses on the results from the in-school surveys of 8th, 10th, and 12th grade students; a companion report on the panel study results[10] focuses on the follow-up surveys from ages 19 to 65.

MTF is designed to detect age, period, and cohort effects in substance use and related attitudes. Age effects are similar changes at similar ages seen across multiple class cohorts; they are common during adolescence. An example of an age effect is that levels of substance use generally increase as adolescents age, a finding seen in all MTF cohorts and in all historical periods. Period effects are changes that affect multiple age groups simultaneously (in this case, all three grades under study—8, 10, and 12). An example of a period effect is the marked decrease in adolescent drug use during the pandemic onset and the associated social distancing policies from 2020 to 2021, a decrease that occurred in all grades. Cohort effects are substance use behaviors or attitudes that distinguish a class cohort from others that came before or after them and are maintained as the cohort ages. An example of cohort effect is that youth cohorts in the late 1990s had increased levels of cigarette smoking compared to the cohorts that came before and after them, and their elevated levels persisted as they aged.

Below we summarize key findings for use of various substances by U.S. 8th, 10th, and 12th graders in 2024, and full details for all drug trends follow in Chapter 5. In addition, the text below also refers

[10] Patrick, M. E., Miech, R. A., Johnston, L. D., & O'Malley, P. M. (2024). Monitoring the Future Panel Study annual report: National data on substance use among adults ages 19 to 65, 1976–2023. Monitoring the Future Monograph Series. Ann Arbor, MI: Institute for Social Research, University of Michigan. Prior year versions are available on the MTF website. An updated version of this report that includes data from 2023—as well as results from respondents age 65—will be available on the MTF website in mid-August.

to analyses for all three grades combined. These grade-combined results will appear in this Volume's Appendix C when the full Volume is released in the summer of 2025.

Table 2-1 presents the demographic distribution of the 2024 sample. In response to the question "What is your sex?" in all grades about half reported "female" and about half reported "male", with 1% reporting "other" and 3% reporting "prefer not to say". Eighty percent of 8th and 10th grade students reported they planned to attend a four-year college in the future, a percentage that declined to 73% in 12th grade. In all grades, most students lived in the South, followed by the West, the Midwest, and then the Northeast. In all grades, 6% to 7% of students attended schools in rural areas. In 8th and 10th grade, 37% attended schools in the urban areas, and ~56% attended schools in the suburbs. In 12th grade, 25% attended schools in school in urban areas, and 69% attended school in the suburbs. About 60% of students in all grades reported that at least one of their parents had a college degree. About 14% of students identified as Black or African American across the three grades; the percentage Hispanic was highest in 8th grade at 40% and decreased to 31% and 35% in 10th and 12th grade, respectively, while the percentage who identified as White increased with grade level, at 34% in 8th grade, 36% in 10th grade, and 42% in 12th grade.

The survey results divide cleanly into the time periods before and after the onset of the COVID-19 pandemic. All surveys in 2020 were completed before March 15, when national social distancing policies were enacted and data collection was halted due to pandemic concerns. Consequently, results from 2020 and previous years are pre-pandemic, while results from 2021 and later took place after the onset of the pandemic and the associated national response.

Executive Summary

Drug Abstention Among Students Reaches Record Highs in 2024, Further Increasing the Substantial Gains That Took Place During the Pandemic

Abstention from drug use is defined here as no past 30-day use of alcohol, marijuana, or nicotine by vaping or by cigarettes. Abstention levels in 2024 were at the highest recorded by the survey since it first started tracking this outcome in 2017. The percentage of students who abstained from drug use in 2024 was 67% in 12th grade (compared to 53% in 2017), 80% in 10th grade (compared to 69% in 2017), and 90% in 8th grade (compared to 87% in 2017). The increases from 2023 to 2024 were statistically significant in 12th and 10th grade.

Whether the lowered levels of drug use after the pandemic would be long lasting has been a question with substantial policy and research implications. It is possible that the factors that disrupted and lowered drug use during the pandemic from 2020 to 2021 resulted in permanent change. This could occur if the pandemic disrupted both school/community peer groups that encourage drug use as well as the processes by which these groups perpetuate themselves by recruiting new members. Alternatively, substance use could have quickly rebounded to pre-

pandemic levels when students returned to school buildings in 2022 and afterwards, if pre-pandemic patterns of social interaction and drug use rapidly re-established. The 2024 results indicate that the lowered levels of student drug use after the pandemic onset are lasting and, in fact, continue to drop even further.

Use of Nicotine Pouches (e.g., "Zyn") Significantly Increases in 2024 Among High School Students

Nicotine pouches are small, white pouches that contain nicotine that users place in their mouth. They are different from other smokeless tobacco products such as snus, dip, or chew because they do not contain any ground tobacco leaf. Use is readily concealable because users do not expectorate juice.

Prevalence doubled in 12th grade from 2023 to 2024 for past 12-month use, with a significant increase from 3% to 6%. In 10th grade, it increased from 2% to 3%, and this increase was also statistically significant. In 8th grade, prevalence held steady at less than 1%.

Nicotine pouches have generated much media attention amid concerns that adolescent use may grow rapidly, often drawing comparisons to the rise of nicotine vaping from 2017 to 2019. As of 2024, prevalence remains relatively low at 6% in 12th grade for past 12-month use (which compares to 21% for nicotine vaping). Similar oral nicotine products have made substantial inroads among students in the past (e.g., smokeless tobacco reached a lifetime prevalence of 32% in the early 1990s), suggesting that prevalence of nicotine pouch use has a high ceiling.

Continuing Decreases for Three Most Common Drugs Used by Students in 2024

Alcohol use, marijuana use, and nicotine vaping all decreased in 2024 in 12th grade, in 10th grade, and in 8th grade.

For alcohol, significant decreases in 12th and 10th grade continued a long standing decline that began in the late 1990s, more than two decades ago. The percentage of students who used any alcohol in the past 12 months in 2024 was 42% in 12th grade (compared to 75% in 1997), 26% in 10th grade (compared to 65% in 1997), and 13% in 8th grade (compared to 46% in 1997). These declines are evident in specific survey questions that ask about use of beer, wine, and liquor.

For marijuana, decreases in use among students are a more recent development. In all grades, the percentage that used marijuana in the past 12 months hovered within a tight window of just a few percentage points in the twenty years from 2000 to 2020. The results in 2021, the first year measured after the pandemic onset, showed that large and substantial declines in marijuana use took place in all grades. In 12th and 10th grades, these declines have since continued, and past 12-month use levels in 2024 were the lowest in the past three decades, at 26% and 16%, respectively. In 8th grade, the percentage in 2024 was 7%, where it has stayed for the past four years after dropping from a pre-pandemic level of 11% in 2020.

For nicotine vaping, the 2024 declines continue a 180-degree turn centered around the pandemic onset. Prior to the pandemic, use levels surged from 2017 to 2019 and then held steady in 2020. Large declines took place during the pandemic and have since continued to the point where the 2024 levels for past 12-month use are close to where they started in 2017, the first year that questions on nicotine vaping were included on the survey. Specifically, past 12-month use was 21% in 12th grade (compared to 35% in 2020 and 19% in 2017), 15% in 10th grade (compared to 31% in 2020 and 16% in 2017), and 10% in 8th grade (compared to 17% in 2020 and 10% in 2017).

TABLE 2-1
Demographic Distribution of MTF Sample
8th, 10th, and 12th Graders, 2024

	Grade		
	8th	10th	12th
Gender			
Male	47.0	50.5	48.5
Female	48.8	45.0	47.5
Other	1.0	1.1	0.9
Prefer not to say	3.1	3.4	3.1
College Plans			
None or under 4 years	19.6	20.4	26.9
Complete 4-year degree [a]	80.4	79.6	73.1
Region			
Northeast	16.2	16.7	16.9
Midwest	20.5	20.5	21.6
South	39.4	30.3	37.6
West	23.9	23.6	23.9
Population Density at School Location			
Urban	37.4	37.1	25.1
Suburban/Town	55.9	56.7	68.5
Rural	6.7	6.1	6.4
Parental Education			
No parent has college degree	42.0	37.7	44.6
Any parent has college degree	58.1	62.4	55.4
Race/Ethnicity			
Hispanic [b]	40.4	31.3	34.7
Non-Hispanic			
American Indian or Alaska Native	0.6	0.8	0.4
Asian American	3.9	3.7	3.4
Black or African American	13.2	16.9	13.4
Middle Eastern	0.7	2.5	1.0
Native Hawaiian or Pacific Islander	0.3	0.4	0.2
White	33.8	36.4	41.8
Marked More than One Race [d]	7.1	8.2	5.1

[a]Respondents who indicate they “definitely will” or “probably will” graduate from a four-year college program.

[b]Hispanic indicated by students who marked the response "Mexican American or Chicano," "Cuban American," "Puerto Rican," or "Other Hispanic or Latino."

[d]Students who marked more than one non-Hispanic category.

MONITORING THE FUTURE

CHAPTER 3 – Study Design and Procedures

Monitoring the Future (MTF) incorporates several survey designs into one study, yielding analytic power beyond the sum of those component parts. The components include cross-sectional studies, repeated cross-sectional studies, and panel studies of individual cohorts and sets of cohorts. In this chapter we discuss the research design for the nationally representative, annually repeated cross-sectional studies of 8th, 10th, and 12th grade students. For details on the research design of the MTF panels, see the sister monograph reporting results for adults age 19 to 65.[11]

Sampling Procedures

Each spring, the project has surveyed separate, U.S. nationally representative samples of 8th, 10th, and 12th grade students across the contiguous U.S. These surveys have been ongoing since 1991 for 8th and 10th grade students and since 1975 for 12th grade students. All three grades are sampled independently, with no school representing more than one grade, resulting in three separate and independent, nationally representative samples each year.

MTF currently uses a two-stage stratified random sampling procedure[12] as follows:

Stage 1: Schools

In each grade schools are randomly drawn from 70 grade-specific strata. These strata group each school in the contiguous 48 U.S. states on the basis of its (1) location in one of the nine U.S. Census Divisions; (2) size, categorized as large, medium, or small (cutoffs listed below); and (3) urbanicity, defined as rural, suburban, or urban, using the National Center for Educational Statistics criteria.

In each grade, up to six schools are randomly drawn from within each of these 70 strata, with more schools allocated for selection in strata with larger numbers of total students. Each school in a stratum has an equal selection probability, which is the number of schools selected divided by the total number of schools in the stratum.

Stage 2: Students

The second stage is selection of students at the target grade within each selected school. The usual procedure is to include all of them in the data collection when feasible. In some cases, a subset of students is selected either by randomly sampling classrooms or by some other random method that is convenient for the school and judged to be unbiased. In this stage,

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[11] Patrick, M. E., Miech, R. A., Johnston, L. D., & O'Malley, P. M. (2024). Monitoring the Future Panel Study annual report: National data on substance use among adults ages 19 to 65, 1976–2023. Monitoring the Future Monograph Series. Ann Arbor, MI: Institute for Social Research, University of Michigan.

[12] Kish, L. (1965). *Survey sampling*. Wiley.

students are assigned a selection probability accordingly; e.g., students in schools where all students are selected have a selection probability of one, and students in schools where a random half is selected have a selection probability of 0.5.

A sample weight is assigned to each participant that is based on the inverse of the multiple of the two selection probabilities from these two stages. Analyses of samples using this design produce nationally representative estimates and correct standard errors when using statistical algorithms that that take into account this sampling weight as well as the clustering of students within schools and by strata.

The Three-Stage Stratified Sampling Design From 1975-2023

Prior to 2024 MTF used a three-stage stratified random sampling procedure that started with random selection of geographic areas. The contiguous U.S. was divided into about 100 geographic strata defined on the basis of wide ranging geographical coverage and urbanicity, per the University of Michigan's Survey Research Center (SRC) national sample design (78 strata in 1975–1985, 84 in 1986–1993, and 108 in 1994–2023). A subarea within each stratum was selected and assigned a selection probability proportionate to its size in the stratum. Schools were then selected within the randomly selected subarea, with school selection probability proportionate to the size of the target grade.[13] The third stage was student selection, which used the same procedure described above for the current, two-stage sampling design. The probability weight for each student in the three-stage design was defined as the inverse of the multiple of the three selection probabilities from these three stages.

The three-stage sampling design served MTF well but had become dated. The groupings of 3000+ U.S. counties that made up the 108 strata used from 1994 to 2023 were based on the 1990 census and the definition of metropolitan statistical areas (MSAs) at that time. Updating the number of strata and/or the boundaries that define them is a challenge because the criteria to qualify as a MSA changed after 1990. In addition, strata sizes were defined on the basis of household counts, and not on the more directly-relevant number of 8th, 10th, and 12th grade students. The project worked with the professional sampling statisticians at SRC for a period of three years to develop the current, two-stage sampling procedure implemented in 2024.

Number of Years in the MTF Study

Each school is initially invited to participate for two years, and starting in 2024 at the end of the second year, each school is invited to participate for one additional year. Almost all participating schools continue for a second and third year, and substitute schools are randomly selected from the sampling frame for the few that do not. Participation is staggered so that about 1/3 of the sample

[13] Kish, L. (1965). *Survey sampling* (p. 220). Wiley.

is newly recruited each year, while the rest of the sample continues into its second or third year. Prior to 2024, school participation was for a two-year, staggered period so that half of the schools were newly recruited each year.

Post-Stratification

Starting in 2020, to address the smaller sample size in that year as a result of the COVID-19 pandemic and associated greater variability, the analyses were additionally weighted by region of the country (West, Midwest, Northeast, and South) and, within each region, by metropolitan/non-metropolitan status. The purpose of this weighting is to ensure that the impact of these two factors on the analysis results is proportional to their size in the nation. Substance use levels and other demographics did not inform the sampling weights. This same weighting procedure was used for the 8th and 10th grade students. This post-stratification weighting was continued in all subsequent years for all three grades.

School Size

Schools with less than 25 students in 10th and 12th grade, and less than 20 students in 8th grade, are excluded from the sampling frame. In each grade this exclusion omits less than 3% of total students nationally. Cutoffs for small, medium, and large schools vary by grade. For public schools, the 12th grade cutoffs are 25–75, 76–200, and 201+, respectively. For 10th grade, the cutoffs are 25–75, 76–225, and 226+, respectively; and for 8th grade, they are 20–65, 66–175, and 176+. For private schools, only two school sizes are used for sampling, with cutoffs of 25–60 and 61+ in both 12th and 10th grade and 20–35 and 36+ in 8th grade.

School Recruiting Procedures and Survey Administration

Early during the fall semester, a letter inviting participation is sent by MTF to the principal of each randomly selected school. The letter and accompanying materials describe the study. The letter also explains what participation would mean for the school, and it indicates that we will be calling within a few days to answer questions and determine their intention. A staff member follows up with a telephone call, deals with any questions or problems (as is often necessary), and makes arrangements to contact and seek permission from any other school officials that are required (such as at the school district).

Securing the cooperation of selected schools is often a long and arduous process. No school is an isolated unit; each is part of a larger local school district or system. Frequently, approval for a school's participation in the survey is required from a school or district official in addition to the principal of the selected school. In some cases, this is the superintendent or, particularly in the larger systems, an official (or review committee) whose approval is required for all external research conducted in the system. Further complicating the process is the considerable variation

in local rules governing research conducted in schools. State legislatures, school boards, teacher associations, and parent associations all may have a voice in whether a school participates.

The standard procedure for recruiting a school involves an initial telephone contact with the principal after he or she has received a letter of invitation. If a school refuses, the refusal often occurs at this point. The reasons most commonly given are objections to using student time for surveys, over-participation in surveys that year, or some temporary crisis or disruption in the system that year (e.g., mandatory testing, a teacher strike, budgetary difficulties, a disruptive event). Other less commonly given reasons include disapproval due to survey content and concerns about adverse parental reaction to a survey dealing with social issues. If refusals occur at higher levels, such as the school district, the reasons given tend to be the same as those listed above.

Once the project staff member obtains the school's agreement to participate, he or she makes arrangements by phone or email for selecting a random sample of students in the grade in question (when the school is large) and for administering the questionnaires. An SRC representative is assigned to carry out the administration, and a specific date for the survey is mutually agreed upon.

Pre-Administration Arrangements

The SRC representative communicates with the participating school about two weeks before the actual administration date to meet the teachers whose classes will be affected. The representative provides a brochure describing the study, a brief set of guidelines about the questionnaire administration, and a supply of flyers to be distributed to the students a week to 10 days before the questionnaire administration. The guidelines to the teachers provide a suggested announcement to students when distributing the flyers.

The students' first acquaintance with the study usually comes via parents because two weeks prior to the administration date, a first-class letter is sent to the parents of each sampled student, along with an informational flyer about the study. These materials make clear that participation in the study is voluntary. (The project provides all necessary materials for this mailing, including postage, but the schools provide parents' names and addresses, usually on labels that are applied by and at the school.) Those parents choosing not to have their child participate in the study are asked to sign a form included at the bottom of the letter, and return it to a specified person at the school (a procedure termed "active parental *dissent*"). Some schools require that parental consent be obtained in writing before students can participate ("active parental *consent*"). In all cases, the project follows the school's requirements.

Later, when teachers announce the study in the classroom, they distribute additional copies of the informational flyer to the students. The teachers are asked to stress that the questionnaires used in the survey are not tests and that there are no right or wrong answers. The flyer tells students that they will be invited to participate in the study, points out that their participation is strictly voluntary,

and stresses confidentiality (including a reference to the fact that the Monitoring the Future project's grant of confidentiality from the Department of Justice allows us to protect their answers). The flyer also presents positive reasons for participation (e.g., the topics are interesting, the data will be important, and results will be widely distributed).

Questionnaire Administration

The local representatives of the SRC and their assistants conduct the questionnaire administration in each school, following standardized procedures detailed in a project instruction manual. The questionnaire administrations take place in classrooms during normal class periods whenever possible; however, circumstances in some schools require the use of larger group administrations. Teachers are asked only to introduce the SRC staff members, provide enrollment and attendance information, and remain present in order to help guarantee an orderly atmosphere for the survey. Teachers are urged to avoid walking around the room, lest students feel that their answers might be observed.

The actual process of completing the questionnaires is quite straightforward. Participants fill out a web-based questionnaire on their personal electronic device (in rare cases when students do not have personal electronic devices, MTF provides electronic tablets for students to complete the survey). Prior to 2019, students received sharpened pencils to mark their answers in paper surveys. Most participants can finish within a 45-minute class period; for those who cannot, an effort is made to provide a few minutes of additional time.

Questionnaire Organization and Format

Electronic Survey Mode

MTF uses an electronic questionnaire format. Students in 8th, 10th, and 12th grades complete a web-based questionnaire on their own electronic devices during class time since 2021. In both 2019 and 2020, students also completed an electronic questionnaire that was connected to the internet, although they completed the survey on electronic tablets that MTF brought to schools. It is no longer necessary for MTF to bring tablets to schools because practically all schools now have internet access and almost all students have electronic devices to complete the MTF questionnaires. In rare cases when these resources are not available at a school, MTF brings electronic devices for students, as well as a mobile server to collect their survey responses.

Multiple Questionnaire Forms

The school surveys presently use multiple questionnaire forms, with four forms in 8th and 10th grade and six forms in 12th grade; follow-up surveys of graduates age 19–30 use forms matched to the form the student completed in 12th grade. The use of multiple forms is made possible by the large number of students we survey each year and allows us to include many more questions than can

be covered in a single questionnaire requiring only one class period to complete. Keeping the survey administration within a single class period minimizes the disruption of the school's schedule and encourages a higher proportion of schools to participate. In addition, a 45- to 50-minute-long questionnaire has a better chance of maintaining participant involvement than a longer one.

The use of multiple forms adds a complexity at the analysis stage. Because not all variables in the study are measured on the same set of participants, not all can be included in the same multivariable analyses. However, we believe this problem is limited. We made extensive efforts during the initial questionnaire design to minimize this problem by: (a) including questions on the most common drugs in all questionnaires, (b) including the most obvious control or moderating variables in all questionnaire forms (these include measures of demographic and family background characteristics, plus certain measures of school and work status), and (c) including in the same questionnaire factors that we believed *a priori* should be examined together.

We will not review here the differences in questionnaire content from one form to another; the complete content of the school surveys for 8th and 10th grade students is presented here, for 12th grade students here, and for the panel data here.

Number of Questionnaire Forms by Grade

The 12th grade questionnaires consisted of five forms from 1975 to 1988, and then six forms in 1989 and the years thereafter. The sixth form was added to extend the number of variables that appeared together on the same form, and thereby facilitated analysis of their association. Prior to 1989, some questions such as perceived risk of harm and availability of drugs appeared on only one form. The sixth form was specifically designed to include questions such as these with other form-limited questions, as well as the core drug questions.

The 8th and 10th grade questionnaires have fewer forms (four) than the 12th grade questionnaires (six). The primary consideration leading to fewer forms was the large amount of material judged essential for inclusion in all forms, leaving rather little space for form-specific items. Our decision for fewer questionnaire items, coupled with the need to cover all of our basic measures of drug use and demographic material, left us with less space available for other material. It was also the case that some question sets were deemed most appropriate for the older students, given that their greater maturity may result in more reasoned and informed answers.

Two forms comprised the 8th and 10th grade questionnaire well from 1991 to 1996. In 1997, we decided that it was important to increase coverage of tobacco-related behaviors, in light of the major changes occurring in the nation regarding youth and tobacco. Accordingly, because the two existing forms were already too long for added material, we created two new forms. The strategy was to add the new tobacco-related material (questions about ease of access to cigarettes, brand smoked, etc.) to each of the new forms, retaining most but not all of the original material from each

of the original forms. Each of the two original (unchanged) forms was administered to a random one-third of participants from 1997 on, while each of the two new forms was administered to one-sixth. Thus, the new material related to tobacco was available from one-third (one-sixth times two) of the sample, while original material was available from the entire sample (in the case of material that was retained in all forms), or from one-third (in the case of material that was retained in one of the original forms but not included in the new forms).

Questionnaire Length and Difficulty by Grade

Nearly all of the items used in the original 8th and 10th grade questionnaire forms were selected (usually unchanged) from among the much larger set of items in the senior year forms. Table 3-1 and Table 3-2 note the variables that appear in the forms by grade. In general, most of the monitored variables having to do with drugs (own use, friends' use, perceived risks, disapproval, perceived availability, etc.) are included (representing a bit more than half of the total questionnaire space), along with most of the background variables and measures of educational and employment experiences. Coverage of the other monitored variables, for reasons discussed above, is considerably more limited in the 8th and 10th grade forms.

We recognized that some students in 8th grade (and, to a lesser extent, 10th grade) would be more limited than 12th grade students in their reading skills, and thus would require questionnaires a bit shorter and with lower difficulty levels. We aimed for 10–20% less questionnaire material (i.e., 10–20% fewer items) in the 8th and 10th grade questionnaires than in the 12th grade questionnaires. We also decided that some items in the senior surveys that asked relatively complex questions would be above the difficulty level of some 8th and 10th grade readers, and thus did not consider those questions for inclusion.

Procedures for Assuring Voluntary Participation and Protection of Confidentiality

Any study that relies on voluntary reporting of drug use must have procedures to guarantee the confidentiality of such reports. Participants should adequately understand these procedures so that they are comfortable providing honest answers and so that the voluntary nature of their participation is clear.

The flyers about the project distributed in the weeks before its administration emphasize confidentiality and voluntary participation. These themes are also noted in the oral instructions at the start of the actual questionnaire administration. Each participating student is instructed to read the preamble to the questionnaire, which stresses the importance and value of the study, notes that answers will be kept strictly confidential, and makes this further statement about voluntary participation: "This study is completely voluntary. If there is any question you or your parents would find objectionable for any reason, just leave it blank." The instructions to 12th grade students then

point out that in a few months all participants will receive a mailed summary of nationwide results and that after a year some students will get a follow-up questionnaire.

The cover message explains that these are the reasons for asking that name and address be written on a special form that 12th grade students receive in class and hand in separately. The information on this form and student answers are linked by encrypted numbers that can only be matched by use of a special computer file at the University of Michigan.

All of the above procedures are designed to fully protect the rights of the research subjects. These procedures are carefully reviewed each year and approved by the relevant University of Michigan Institutional Review Board.

Transition From Paper-and-Pencil to Electronic Questionnaires

2019 Estimates

The project conducted a randomized controlled experiment in 2019, in which a randomly selected half of schools administered the student surveys with electronic tablets connected to the internet and the other half with traditional paper-and-pencil questionnaires. The use of two different modes in 2019 raised the possibility that differences in 2019 estimates in comparison to other years may have stemmed in part from survey mode effects. We examined this possibility in detail, and for drug prevalence estimates, we found no evidence of mode effects.[14] Consequently, for all 2019 drug prevalence estimates, we report results from the pooled sample of paper-and-pencil and electronic tablet responses.

2020 Estimates

In-school data collection in 2020 was halted on March 15, 2020 as a result of the COVID-19 pandemic. This halt resulted in a sample size about one-quarter the size of a typical data collection. The 2020 in-school data collection was also unique because it was the first year all students recorded their answers on electronic tablets, which MTF brought to the schools. (The previous year a randomly selected half of schools used electronic tablets.)

Detailed analyses of the 2020 results indicated that the curtailed MTF 2020 sample did not differ significantly from the nationally representative results from previous years in terms of sociodemographics and prevalence of use of substances that had stable prevalence in recent years.[15]

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[14] Miech, R. A., Couper, M. P., Heeringa, S. G., & Patrick, M. E. (2020). The impact of survey mode on US national estimates of adolescent drug prevalence: Results from a randomized controlled study. *Addiction, 116*(5), 1144–1151.

[15] Miech, R. A., Leventhal, A., Johnston, L., O'Malley, P. M., Patrick, M. E., & Barrington-Trimis, J. (2021). Trends in Use and Perceptions of Nicotine Vaping Among US Youth From 2017 to 2020. JAMA pediatrics, 175(2), 185–190.

2021 Estimates and Beyond

The year 2021 was the first full school year affected by the COVID-19 pandemic and its associated social distancing policies. Anticipating that many students would be schooling remotely, MTF switched to an online questionnaire that students completed on their own electronic devices, either at school or at home (if schooling remotely).

Because the pandemic came on suddenly and unexpectedly, it was not possible for MTF to conduct a randomized-controlled test of the web-survey mode in comparison to electronic tablets. For two reasons we expect that such a test would have shown little to no differences in drug prevalence across the two modes, given that they are similar and both involve electronic devices connected to the internet. First, a 2019 MTF experiment that tested a much more substantial mode difference found no significant effect on drug prevalence estimates. In the 2019 administration, MTF surveyed a randomly selected half of the schools using electronic tablets and the other half using paper-and-pencil questionnaires and found no mode differences in drug use prevalence.[6] Second, 2021 trends were similar in analyses that used all participants and in analyses that restricted the analysis pool to the 46% of students who had all their classes in their school building, which suggests that at-home and in-school administrations produced similar results (analyses not shown here). Consequently, in this report we directly compare drug prevalence estimates in 2022 and 2021 with previous years.

However, we cannot rule out possible mode effects for some of the attitude and belief estimates after 2020. Consequently, we do not directly compare these results from 2022 and later years with results from 2020 and beforehand. We note that our cautiousness in comparing to previous years does necessarily mean that the results are not comparable, but only that comparability is not known at this point.

Representativeness and Sample Accuracy

School Participation

Schools can participate in the MTF study for up to three consecutive years. With very few exceptions, each school that participates for a first year agrees to participate in the subsequent years as well. When an original, randomly drawn school in a geographic area declines to participate in the survey, a substitute school is selected in the same geographic area. In these cases the substitute selected is in the same Census division, has the same public or private status, is of similar size, and is an area of similar population density (i.e., rural, suburban/town, or urban). This should almost entirely remove problems of bias in region, urbanicity, and the like that might result from schools that decline to participate. Table 3-2 presents yearly information on the percentage of originally selected and substitute schools.

Two questions are sometimes raised about the substitute schools: (a) How do substitutions affect the representativeness of the sample? (b) How does variation over time in the percentage of schools that are substitutes contribute to changes in estimates of drug use?

Among participating schools, there is very little difference in substance use levels between the sample of participating schools that were original selections taken as a set and the substitute schools taken as a set. Averaged over the years 2003 through 2015 for grades 8, 10, and 12 combined, the difference between original schools and substitute schools averaged 0.26 percentage points in the observed prevalence averaged across a number of drug use measures: two indices of annual illicit drug use, the annual prevalence of each of the major illicit drug classes, and several measures of alcohol and cigarette use. For half of the measures, prevalence was higher in the substitute selections, and in the other half, it was higher in the original selections; specifically, out of 39 comparisons (13 drugs and drug indexes for each grade), prevalence was higher in 20 of the original selections and in 19 of the substitute selections.

Potential biases could be subtle, however. If, for example, it turned out that principals of schools with "drug problems" refused to participate, the sample could be biased. And if any other single factor were dominant in school refusals, that reason for refusal might also suggest a source of potential bias. However, the reasons principals give for declining to participate tend to be varied and are often a function of happenstance events specific to that particular year, such as a weather-related event that reduced the number of school days or the fact that the school already committed to participate in a number of other surveys that year; only very few schools, if any, object specifically to the drug-related survey content.

If it were the case that substitute schools differed substantially in drug use, then which particular schools participated could have a greater effect on estimates of drug use. However, the great majority of variance in drug use lies within schools, not between schools.[16] For example, from 2003 to 2015 for schools with 8th, 10th, or 12th grade students, about 2% to 8% of the variance in smoking cigarettes or drinking alcohol in the past 30 days was between schools. Among the illicit drugs, marijuana showed the largest amount of between-school variation, averaging between slightly less than 4% up to 5% for annual use and 3% to 4% for 30-day use. Annual prevalence of cocaine use averaged between less than 1% and 1.5%, while prevalence of annual heroin use averaged less than 0.5%. Further, some, if not most, of the between-school variance is due to differences related to factors such as region and urbanicity, which remain well controlled in the present sampling design.

[16] O'Malley, P. M., Johnston, L. D., Bachman, J. G., Schulenberg, J. E., & Kumar, R. (2006). How substance use differs among American secondary schools. *Prevention Science, 7*, 409–420.

It is unlikely that the substitute schools affect drug trends. If they did, then we would expect noticeable bumps up or down across all substance use estimates as the percentage of substitute schools varied over time. But MTF produces results that are very smooth and generally change in an orderly fashion from one year to the next. Moreover, different substances trend in distinctly different ways. We have observed, for example, marijuana use decreasing while cocaine use was stable (in the early 1980s), alcohol use declining while cigarette use held steady (in the mid to late 1980s), ecstasy use rising sharply while cocaine use showed some decline (late 1990s, early 2000s), and marijuana use remaining steady while alcohol use hit historic lows (since 2011). Moreover, attitudes and perceptions about drugs have changed variously but generally in ways quite consistent with the changes in actual use. All of these patterns are explainable in terms of psychological, social, and cultural factors; they cannot be explained by a common factor of changes in percentage of substitute schools.

Of course, there could be some sort of constant bias across the years, but even in the unlikely event that there is, it seems highly improbable that it would be of much consequence for policy purposes, given that it would not affect trends and likely would have a very modest effect on levels of prevalence. Thus, we have a high degree of confidence that school refusals have not seriously biased the survey results.

Nevertheless, securing the cooperation of schools has become increasingly difficult. This is a problem common to the field, not specific to MTF. Therefore, beginning with the 2003 survey, we have provided payment to schools as a means of increasing their incentive to participate. (By that time, several other ongoing school-based survey studies already were using payments to schools.)

At each grade level, about two-thirds of each year's sample comprises schools that started their participation before the current year, and one-third comprises schools that began participating in the current year. Importantly, both the one-third and two-thirds samples are national replicates, meaning that each is nationally representative by itself. This staggered sample design is used to check on possible fluctuations in the year-to-year trend estimates due to school turnover.

Student Participation

In 2024, completed questionnaires were obtained from 89% of all sampled students in 8th grade, 85% in 10th grade, and 76% in 12th grade (see Table 3-1 for response rates in all years). Because students with fairly high rates of absenteeism also report above average rates of drug use, some degree of bias is introduced into the prevalence estimates by missing the absentees. Much of that bias could be corrected through the use of special weighting based on the self-reported absentee rates of the students who did respond; however, we decided not to use such a weighting procedure because the bias in overall drug use estimates is quite small, whereas the necessary weighting procedures would have introduced greater sampling variance in the estimates. Appendix A in this

report illustrates the changes in trend and prevalence estimates that would result if corrections for absentees had been included.

Sampling Accuracy of the Estimates

Confidence intervals (95%) are provided in Chapter 4 for lifetime, annual, 30-day, and daily prevalence of use for 8th, 10th, and 12th grade students. For example, lifetime prevalence of marijuana use for 12th graders could theoretically vary by up to ± 2.8 percentage points. The interpretation of this 95% confidence interval is that if we took a large number of samples of this size from the universe of all schools containing 12th graders in the contiguous U.S., 95 times out of 100 the sample would yield a result that would be less than 2.8 percentage points divergent from the result we would get from a comparable massive survey of *all* ~4.4 million 12th graders in *all* schools. Confidence intervals for the other prevalence periods (last 12 months, last 30 days, and current daily use) are generally smaller than those for lifetime use. In general, confidence intervals for 8th and 10th graders are very similar to those observed for 12th graders. Some drugs that are measured on only one or two questionnaire forms will have larger confidence intervals because they are based on smaller sample sizes.

In 2020, as a result of the smaller sample size, these confidence intervals were wider than they have been in previous years, when confidence intervals averaged ± 1.4% for lifetime prevalence across a wide variety of drug classes. Because of these larger confidence intervals in 2020, the minimum change in prevalence from 2019 to 2020 that was detectable as statistically significant was larger in 2020 than it was in earlier years.

In 2021 and subsequent years sample sizes, and consequently confidence intervals, were relatively closer to their typical size.

The Appendix C of Volume I published in 2017 and earlier years reported information on how to calculate confidence intervals for point estimates and how to calculate statistics that test the significance of changes over time or of differences between subgroups. This appendix is no longer necessary with the opening of MTF's remote portal at the National Addiction and HIV Data Archive Program, which now allows researchers to compute such statistics directly using MTF weights and clustering variables. Interested readers may refer to earlier publications of this monograph for the information it provides about design effects and how their computational influence varies by substance (e.g., see Appendix C here).

Validity of Measures of Self-Reported Drug Use

Are sensitive behaviors such as drug use honestly reported? Like most studies dealing with sensitive behaviors, we have no direct, totally objective validation of the present measures;

however, the considerable amount of existing inferential evidence strongly suggests that the MTF self-report questions produce largely valid data. Here we briefly summarize this evidence.[17]

First, using a three-wave panel design, we established that the various measures of self-reported drug use have a high degree of reliability—a necessary condition for validity.[18] In essence, respondents were highly consistent in their self-reported behaviors from model ages 18 to 22. Second, we found a high degree of consistency among logically related measures of use within the same questionnaire administration. Third, the proportion of 12th graders reporting some illicit drug use has reached two-thirds of all respondents in peak years and over 80% in some follow-up years, constituting *prima facie* evidence that the degree of underreporting must be very limited. Fourth, 12th graders' reports of use by their unnamed friends—about whom they would presumably have considerably less reason to conceal information about use—have been highly consistent with self-reported use in the aggregate, both in terms of prevalence and trends in prevalence, as discussed in Chapter 9. Fifth, we have found self-reported drug use to relate in consistent and expected ways based on theory to a number of other attitudes, behaviors, beliefs, and social situations—strong evidence of "construct validity". Sixth, the missing data levels for the self-reported use questions are only very slightly higher than for the preceding nonsensitive questions, in spite of explicit instructions to respondents immediately preceding the drug section to leave blank those questions they feel they cannot answer honestly. Seventh, an examination of consistency in reporting of lifetime use conducted on the long term panels of graduating seniors found quite low levels of recanting of earlier reported use of the illegal drugs.[19] There was a higher level of recanting for the psychotherapeutic drugs, suggesting that adolescents may actually overestimate their use of some drugs because of misinformation about definitions but that this knowledge improves as they get older. Finally, the great majority of respondents, when asked, say they would answer such questions honestly if they are or were users.[20]

As an additional step to assure the validity of the data, we check for logical inconsistencies in the answers to the triplet of questions about use of each drug (i.e., lifetime, annual, and 30-day use), and if a respondent exceeds a maximum number of inconsistencies across the set of drug use

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[17] A more complete discussion may be found in: Johnston, L. D. & O'Malley, P. M. (1985). Issues of validity and population coverage in student surveys of drug use. In B. A. Rouse, N. J. Kozel, & L. G. Richards (Eds.), *Self-report methods of estimating drug use: Meeting current challenges to validity* (NIDA Research Monograph No. 57 (ADM) 85 1402). Washington, DC: U.S. Government Printing Office; Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1984). *Drugs and American high school students: 1975–1983* (DHHS (ADM) 85 1374). Washington, DC: U.S. Government Printing Office; Wallace, J. M., Jr., & Bachman, J. G. (1993). Validity of self-reports in student-based studies on minority populations: Issues and concerns. In M. de LaRosa (Ed.), *Drug abuse among minority youth: Advances in research and methodology* (NIDA Research Monograph No. 130). Rockville, MD: National Institute on Drug Abuse.

[18] O'Malley, P. M., Bachman, J. G., & Johnston, L. D. (1983). Reliability and consistency in self-reports of drug use. *International Journal of the Addictions, 18*, 805–824.

[19] Johnston, L. D. & O'Malley, P. M. (1997). The recanting of earlier reported drug use by young adults. In L. Harrison (Ed.), *The validity of self-reported drug use: Improving the accuracy of survey estimates* (NIDA Research Monograph No. 167, pp. 59–80). Rockville, MD: National Institute on Drug Abuse.

[20] For a discussion of reliability and validity of student self-report measures of drug use like those used in MTF across varied cultural settings, see Johnston, L. D., Driessen, F. M. H. M., & Kokkevi, A. (1994). Surveying student drug misuse: A six-country pilot study. Strasbourg, France: Council of Europe.

questions, his or her record is deleted from the data set. Similarly, we check for improbably high rates of use of multiple drugs and delete such cases, assuming that the respondents are not taking the task seriously. Fortunately, very few cases (< 3%) have to be eliminated for these reasons.

This is not to argue that self-reported measures of drug use are necessarily valid in all studies. In MTF, we have gone to great lengths to create a situation and set of procedures in which respondents recognize that their confidentiality will be protected. We have also tried to present a convincing case as to why such research is needed. The evidence suggests that a high level of validity has been obtained. Nevertheless, insofar as any remaining reporting bias exists, we believe it to be in the direction of underreporting. Thus, with the possible exception of the psychotherapeutic drugs, we believe our estimates to be lower than their true values, even for the obtained samples, but not substantially so.

Consistence and Measurement of Trends

MTF is designed to be sensitive to changes from one time period to another. A great strength of this study is that the measures and procedures have been standardized and applied consistently across many years. To the extent that any biases remain because of limits in school and/or student participation, and to the extent that there are systematic distortions (lack of validity) in the responses of some students, it seems very likely that such problems will exist in much the same proportions from one year to the next. In other words, biases in the survey estimates will tend to be consistent from one year to another, meaning that they should have very little effect on our measurement of trends. The smooth and consistent nature of most trend curves reported for the various drugs provides rather compelling empirical support for this assertion.

TABLE 3-1

Sample Sizes and Response Rates

	Number of Public Schools			Number of Private Schools			Total Number of Schools				Total Number of Students				*Student Response Rate (%)*		
Grade:	8th	10th	12th	8th	10th	12th	8th	10th	12th	Total	8th	10th	12th	Total	*8th*	*10th*	*12th*
1975	—	—	111	—	—	14	—	—	125	—	—	—	15,791	—	—	—	*78*
1976	—	—	108	—	—	15	—	—	123	—	—	—	16,678	—	—	—	*77*
1977	—	—	108	—	—	16	—	—	124	—	—	—	18,436	—	—	—	*79*
1978	—	—	111	—	—	20	—	—	131	—	—	—	18,924	—	—	—	*83*
1979	—	—	111	—	—	20	—	—	131	—	—	—	16,662	—	—	—	*82*
1980	—	—	107	—	—	20	—	—	127	—	—	—	16,524	—	—	—	*82*
1981	—	—	109	—	—	19	—	—	128	—	—	—	18,267	—	—	—	*81*
1982	—	—	116	—	—	21	—	—	137	—	—	—	18,348	—	—	—	*83*
1983	—	—	112	—	—	22	—	—	134	—	—	—	16,947	—	—	—	*84*
1984	—	—	117	—	—	17	—	—	134	—	—	—	16,499	—	—	—	*83*
1985	—	—	115	—	—	17	—	—	132	—	—	—	16,502	—	—	—	*84*
1986	—	—	113	—	—	16	—	—	129	—	—	—	15,713	—	—	—	*83*
1987	—	—	117	—	—	18	—	—	135	—	—	—	16,843	—	—	—	*84*
1988	—	—	113	—	—	19	—	—	132	—	—	—	16,795	—	—	—	*83*
1989	—	—	111	—	—	22	—	—	133	—	—	—	17,142	—	—	—	*86*
1990	—	—	114	—	—	23	—	—	137	—	—	—	15,676	—	—	—	*86*
1991	131	107	117	31	14	19	162	121	136	419	17,844	14,996	15,483	48,323	*90*	*87*	*83*
1992	133	106	120	26	19	18	159	125	138	422	19,015	14,997	16,251	50,263	*90*	*88*	*84*
1993	126	111	121	30	17	18	156	128	139	423	18,820	15,516	16,763	51,099	*90*	*86*	*84*
1994	116	116	119	34	14	20	150	130	139	419	17,708	16,080	15,929	49,717	*89*	*88*	*84*
1995	118	117	120	34	22	24	152	139	144	435	17,929	17,285	15,876	51,090	*89*	*87*	*84*
1996	122	113	118	30	20	21	152	133	139	424	18,368	15,873	14,824	49,065	*91*	*87*	*83*
1997	125	113	125	27	18	21	152	131	146	429	19,066	15,778	15,963	50,807	*89*	*86*	*83*
1998	122	110	124	27	19	20	149	129	144	422	18,667	15,419	15,780	49,866	*88*	*87*	*82*
1999	120	117	124	30	23	19	150	140	143	433	17,287	13,885	14,056	45,228	*87*	*85*	*83*
2000	125	121	116	31	24	18	156	145	134	435	17,311	14,576	13,286	45,173	*89*	*86*	*83*
2001	125	117	117	28	20	17	153	137	134	424	16,756	14,286	13,304	44,346	*90*	*88*	*82*
2002	115	113	102	26	20	18	141	133	120	394	15,489	14,683	13,544	43,716	*91*	*85*	*83*
2003	117	109	103	24	20	19	141	129	122	392	17,023	16,244	15,200	48,467	*89*	*88*	*83*
2004	120	111	109	27	20	19	147	131	128	406	17,413	16,839	15,222	49,474	*89*	*88*	*82*
2005	119	107	108	27	20	21	146	127	129	402	17,258	16,711	15,378	49,347	*90*	*88*	*82*
2006	122	105	116	29	18	20	151	123	136	410	17,026	16,620	14,814	48,460	*91*	*88*	*83*
2007	119	103	111	32	17	21	151	120	132	403	16,495	16,398	15,132	48,025	*91*	*88*	*81*
2008	116	103	103	28	19	17	144	122	120	386	16,253	15,518	14,577	46,348	*90*	*88*	*79*
2009	119	102	106	26	17	19	145	119	125	389	15,509	16,320	14,268	46,097	*88*	*89*	*82*
2010	120	105	104	27	18	22	147	123	126	396	15,769	15,586	15,127	46,482	*88*	*87*	*85*
2011	117	105	110	28	21	19	145	126	129	400	16,496	15,382	14,855	46,733	*91*	*86*	*83*
2012	115	107	107	27	19	20	142	126	127	395	15,678	15,428	14,343	45,449	*91*	*87*	*83*
2013	116	103	106	27	17	20	143	120	126	389	15,233	13,262	13,180	41,675	*90*	*88*	*82*
2014	111	98	105	30	16	17	141	114	122	377	15,195	13,341	13,015	41,551	*90*	*88*	*82*

(Table continued on next page.)

TABLE 3-1 (cont.)

Sample Sizes and Response Rates

	Number of Public Schools			Number of Private Schools			Total Number of Schools				Total Number of Students				*Student Response Rate (%)*		
Grade:	**8th**	**10th**	**12th**	**8th**	**10th**	**12th**	**8th**	**10th**	**12th**	**Total**	**8th**	**10th**	**12th**	**Total**	***8th***	***10th***	***12th***
2015	111	102	101	30	18	20	141	120	121	382	15,015	16,147	13,730	44,892	*89*	*87*	*83*
2016	117	92	100	25	18	20	142	110	120	372	17,643	15,230	12,600	45,473	*90*	*88*	*80*
2017	109	89	105	22	17	18	131	106	123	360	16,010	14,171	13,522	43,703	*87*	*85*	*79*
2018	110	106	106	28	21	23	138	127	129	394	14,836	15,144	14,502	44,482	*89*	*86*	*81*
2019	114	104	108	29	22	20	143	126	128	397	14,223	14,595	13,713	42,531	*89*	*86*	*80*
2020	30	36	29	8	2	7	38	38	36	112	3,161	4,890	3,770	11,821	*88*	*89*	*79*
2021	91	84	82	30	16	16	121	100	98	319	11,446	11,792	9,022	32,260	*82*	*78*	*69*
2022	81	82	80	23	20	22	104	102	102	308	9,889	11,950	9,599	31,438	*86*	*84*	*75*
2023	59	61	65	17	15	18	76	76	83	235	6,240	8,494	7,584	22,318	*80*	*85*	*72*
2024	76	78	64	21	15	18	97	93	82	272	7,460	9,891	6,906	24,257	*89*	*85*	*76*

MONITORING THE FUTURE

TABLE 3-2

Percentage Original and Replacement School Selections, by Year [a]

Percent of slots filled by...	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'96	'97
Original	59	63	62	63	71	71	66	72	67	66	72	71	68	70	59	55	60	53	52	53	51
Replacements	39	36	35	32	25	26	32	26	29	33	26	26	30	29	39	43	39	44	44	43	47
Total	98	99	97	95	96	97	99	98	96	99	99	98	99	99	98	98	99	97	96	96	98

Percent of slots filled by...	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'08	'09	'10	'11	'12	'13	'14
Original	51	57	62	56	49	53	62	63	59	58	53	54	58	56	53	54	58	56	53	54	51
Replacements	48	42	35	42	48	45	37	34	40	39	43	44	39	40	43	44	39	40	43	41	41
Total	99	99	97	98	97	98	99	97	99	97	96	98	97	96	96	98	97	96	96	95	92

Percent of slots filled by...	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24
Original	44	44	41	40	41	13	27	22	16	51
Replacements	49	47	49	50	50	13	52	50	34	13
Total	93	91	90	90	91	26	79	72	50	64

[a]In 2020 data collection was halted prematurely as a result of the COVID-19 pandemic.

CHAPTER 4 – Forthcoming May 2025

CHAPTER 5 – Trends in Drug Use

The measurement of historical and developmental change over the past five decades has been among the most important contributions of Monitoring the Future (MTF) to the fields of substance use research, policy, and prevention. This includes measurements of change in the levels of drug use, in the types of drugs being used, in the methods of using them, in the ages and characteristics of people using them, in related attitudes and beliefs about drug use, and in conditions surrounding use. Such information has significant implications for public policy—for needs assessment, agenda setting, policy formulation, and policy evaluation. More generally, it has implications for the current and future health of the nation. In this chapter, we review the many changes that have taken place over the past 50 years in the use of drugs, both licit and illicit.

Historical trend data are presented and discussed in this chapter for students in 8th, 10th, and 12th grades. Data for 12th graders come from 50 nationally representative surveys conducted between 1975 and 2024, while data for the 8th and 10th graders come from 34 nationally representative surveys conducted between 1991 and 2024. For a variety of substances, the use measures discussed include lifetime use, use during the past 12 months, use during the past 30 days, use on 20 or more occasions during the past 30 days (which we refer to as daily to near-daily use), and daily use.

Trends in Adolescent Drug Use Since the Covid-19 Pandemic

Many of the largest one-year declines ever recorded by the study took place across a wide variety of drugs during the COVID-19 pandemic between 2020 and 2021. The survey results divide neatly into the time periods before and after the onset of the pandemic. All surveys in 2020 were completed before March 15, when national social distancing policies were enacted and data collection was halted due to pandemic concerns. Consequently, results from 2020 and previous years are pre-pandemic, while results from 2021 and afterwards took place after the onset of the pandemic and the associated national response.

Tables 5-1, 5-2, and 5-3 provide detailed information on the extent of the one-year declines during the pandemic onset. Marijuana use experienced its largest recorded decline in each of the three grades, with tracking since 1975 for 12th grade and tracking since 1991 for 8th and 10th grades. Nicotine vaping also saw its largest recorded decline in all three grades, with tracking beginning in 2017. Similarly, alcohol use experienced its largest recorded decline in 12th grade (tracked since 1975) and in 10th grade (tracked since 1991). Among the ten drug outcomes with the highest current prevalence levels for past 12-month use, record declines occurred at the onset of the pandemic for seven of them in 12th grade and in 8th grade, and for nine of them in 10th grade. Drug outcomes outside of the ten highest were less likely to have record declines during the pandemic onset, in part because they had low prevalence and therefore less room to fall.

We now have four waves of data since the pandemic onset, providing an opportunity to assess whether these declines have persisted or rebounded—a question of considerable importance for both policy and research. On the one hand, persistence of the declines would suggest that a delay in drug use initiation during adolescence can potentially lower substance use trajectories over a lifetime. Delays in drug use initiation could work to prevent youth from joining drug-using peer groups and/or disrupt biological processes that foster addiction. Additionally, the pandemic may have disrupted peer groups that encourage drug use, as well as the processes by which these groups recruit new members and perpetuate themselves. On the other hand, drug use may have rebounded, either partially or in full, as the pandemic receded and social distancing restrictions were lifted.

Tables 5-1, 5-2, and 5-3 also present information on levels of drug use in both 2021 and 2024 and show that the declines have persisted for almost all drugs; in fact, most have continued to decline further. In 12th and 10th grade, nine out of ten of the most prevalent drugs in 2024 have declined since 2021, further extending the declines that took place during the pandemic onset between 2020 and 2021. Similarly, in 8th grade, seven out of ten of the most prevalent drugs in 2024 have shown declines since 2021. These findings underscore the importance of future research to identify the intervening mechanisms that account both for these declines as well as for their persistence, with the ultimate goal to inform future policies or interventions that can substantially reduce or even eliminate youth drug use.

Three Major Themes in Drug Trends From 1975–2024

Below we present and discuss trends for each of the dozens of drugs surveilled by MTF. Throughout these discussions, we occasionally refer to and elaborate on three general, recurring themes that are apparent across numerous drugs. The first theme is the COVID-19 pandemic onset and the subsequent decline in adolescent drug use, as discussed immediately above.

The second theme is what we term the "1990s drug relapse", which was a rapid increase in prevalence for many drugs that started in the early 1990s. Previous to this period, prevalence levels of many drugs had reached a historical low after years of decline. The prevalence levels for many drugs today lie between the nadirs observed at the start of the 1990s and the peak of 1990s drug relapse. Drugs that do not follow this overall pattern, such as some forms of alcohol use and tobacco use, are important exceptions that we note and discuss below.

The third theme is cohort effects. We use the term cohort here to refer to youth born at roughly the same time who are grouped by grade level and experience history together as they age. A cohort effect is a drug trend that follows a cohort as it grows older. For example, if an upsurge in cigarette smoking occurs in a cohort that is in 8th grade, it is likely to be observed two years later when that cohort is in 10th grade and then again two years later when that cohort is in 12th grade.

A cohort-specific pattern of drug use can stem from factors such as cohort-specific attitudes towards perceived risk of drug use, changing peer norms about the acceptability of drug use, changes in legal status of a drug, and the addictiveness of the drugs that youth use. We have found that cohort effects are often present, and trends among the lower grades can foretell future changes in the higher grades. This has been the case especially during the onset of the drug relapse in the early 1990s.

Trends in Prevalence of Use, 1975–2023

Below, a bolded and underlined hyperlink appears for each drug and drug-use category assessed by the study, followed by a brief narrative outlining major trends in the drug's prevalence. Clicking on the hyperlink brings the reader to a drug-specific webpage that presents an array of drug-specific information. This includes the drug's prevalence levels for all years in both graphical and tabular formats, across all assessed reporting periods (e.g., lifetime use, past 12-month use, past 30-day use, and daily use when assessed), as well as an option to download all of the drug-specific prevalence data. Appendix D also presents tables with all drug prevalence information for each drug for readers who prefer such a format and/or readers without a working internet connection.

Abstainers

Abstainers are defined as students with no use of alcohol, marijuana, or nicotine by cigarettes or by vaping. In 2024, levels of lifetime abstention significantly increased in 8th grade and continued a multi-year upward trend in 10th and 12th grade. In all grades, the 2024 levels are at the highest recorded since the survey first started reporting this measure, at 72%, 58%, and 42% in 8th, 10th, and 12th grade respectively.

Past 30-day abstention also trended upwards in all three grades, with significant increases in 8th and 10th grade. In all three grades, 2024 levels are at record highs.

Adderall

Nonmedical use of the amphetamine Adderall in the past 12 months did not significantly change in 2024.

In 10th and 12th grade, use levels are near record lows. In 8th grade, prevalence levels have been unevenly declining since 2020, when they had peaked after a five-year climb.

In all grades, past 12-month use levels are at 3% or below. In 12th grade, levels have declined considerably since the 8% level in 2015.

ADHD Either Type

MTF asks adolescents if they use prescription ADHD drugs per the prescription of a medical professional. These drugs come in two types: stimulant and non-stimulant.

Medical use of either stimulant or non-stimulant drugs to treat ADHD did not significantly change from 2023 to 2024 in any grade for either current or lifetime use.

In all three grades, prevalence levels dipped to record or near-record lows in 2020. This decrease did not persist and since then prevalence levels have rebounded.

ADHD Non-Stimulant

MTF asks adolescents if they use prescription ADHD drugs per the prescription of a medical professional. These drugs come in two types: stimulant and non-stimulant. Medical use of non-stimulant type drugs for the treatment of ADHD are sometimes prescribed when stimulants have proven ineffective or not well tolerated.

In 2024, lifetime medical use of these drugs was at a record low in both 8th grade and 12th grade and near a record low in 10th grade (for which the lowest level was the previous year).

Past 30-day (current) use was also at a record low in 8th grade. In 10th and 12th grade, prevalence levels were little changed from the previous year.

ADHD Stimulant

MTF asks adolescents if they use prescription ADHD drugs per the prescription of a medical professional. These drugs come in two types: stimulant and non-stimulant.

Medical use of stimulant drugs to treat ADHD was one of the few substances that increased in prevalence after the pandemic onset, in 2021 and 2022. In 2024, lifetime use levels declined (although not significantly) and returned near their pre-pandemic levels. Prevalence was 7% in 8th and 10th grade and 10% in 12th grade.

Past 30-day use did not significantly change in any of the three grades in 2024 and has shown little long term trending. Levels were 4% or less in all three grades.

Alcohol

In 2024, alcohol use significantly declined in both 12th and 10th grade for lifetime and past 12-month use. In 10th grade, it also significantly declined for past 30-day use.

The decreases in alcohol use in 2024 continue a long term, overall decline that has taken place since the year 2000 in all three grades. From 2000 to 2024, past 12-month prevalence has decreased from 73% to 42% in 12th grade, from 65% to 26% in 10th grade, and from 43% to 13% in 8th grade.

Unlike most other drugs, alcohol use showed only a modest increase during the 1990s relapse, exhibiting more of a pause in its long term decline.

Binge drinking was lower in 2024 than in 2023 for all three grades, but these one-year decreases were not statistically significant. These decreases continue a slow but steady long term decline in which prevalence levels from 2000 to 2024 have fallen from 30% to 9% in 12th grade, from 24% to 5% in 10th grade, and from 12% to 2% in 8th grade. Binge drinking is defined as consuming five or more drinks in a row at least once during the past two weeks.

Alcohol With Caffeine

In all three grades, prevalence levels of past 12-month use of alcoholic beverages containing caffeine were little changed in 2024.

Since first tracked in 2011, annual use levels in these grades have declined substantially by more than 50%, resulting in levels of 10% in 12th grade, 7% in 10th grade, and 6% in 8th grade.

Amphetamines

The percentage of students who used amphetamines without a doctor's orders changed little in 2024. Overall, use has declined gradually and substantially over the course of the survey. Across the three grades, lifetime use ranged from 11% to 15% in 1991 and declined to a range of 4% to 5% in 2024. In all three grades, past 12-month use was 2% in 2024, and past 30-day use was 1%.

Androstenedione

Androstenedione, a precursor to testosterone, is a performance enhancing substance that was scheduled by the Drug Enforcement Administration early in 2005, making its sale and possession no longer legal.

In 12th grade, past 12-month prevalence declined to 1% in 2024 and lost most of the increase that took place earlier, when it surged to 1.9% in 2022 from 0.6% in 2021. The use level is now similar to pre-pandemic levels.

The sudden increase in use of androstenedione after the pandemic onset in 2021 was accompanied by an increase in use of creatine, which is another performance enhancing substance (albeit a legal one). These increases suggested that many 12th graders turned to fitness and weightlifting as a response to the social distancing policies of the time. The return of androstenedione to pre-pandemic levels in 2024 could potentially signal that the interest in fitness was temporary. But the increased level of creatine use has persisted, suggesting that the interest in fitness may have continued while the illegal use of androstenedione has fallen out of favor.

The survey stopped tracking this drug among 8th and 10th graders after 2014, when prevalence levels were less than 1% in these grades.

Any Illicit Drug

Any illicit drug use is a measure of the percentage of students who have engaged in use of at least one type of illicit drug. In 2024, the percentages of students who had ever used any illicit drugs declined in all three grades for lifetime, past 12-month, and past 30-day use. In 12th grade, these declines were statistically significant for past 12-month and past 30-day use and in 10th grade for past 12-month and lifetime use. These declines build on and continue the substantial declines that took place during the pandemic onset, from 2020 to 2021.

In 2024, levels of any illicit drug use were at record lows for lifetime and past 12-month use and near record lows for past 30-day use.

The 2024 declines in any illicit drug use are consistent with a cohort pattern. Twelfth grade students in 2024 were in 8th grade in 2020, when substance use levels decreased markedly during the pandemic-related social distance policies of the time. When this cohort was in 10th grade in 2022, its level of past 12-month use was far below the pre-pandemic levels for 10th grade students. In 2024, its level of past 12-month use was far below pre-pandemic levels, consistent with them carrying their lowered levels of substance use in 2020 for the past four years.

Patterns from the late 1990s through 2011 also suggested cohort effects were at play. Declines in past 12-month use started in a staggered fashion beginning in 1996 for 8th graders, 1997 for 10th graders, and 1999 for 12th graders. These declines also ended in a staggered fashion in 2007, 2008, and 2009, respectively. The declines were then followed by a series of staggered increases, between 2007 and 2010 among 8th graders, between 2008 and 2011 among 10th graders, and between 2009 and 2011 for 12th graders.

This pattern suggests that drug behavior and attitudes established in 8th grade can have long lasting consequences years later.

Prior to the 1990s, a period when Monitoring the Future surveys were limited to 12th grade students, their prevalence of lifetime use of any illicit drug peaked at 66% in 1981, the highest level ever recorded by the survey. In other words, fully two-thirds of these 12th grade students had used one or more illicit drugs. From that year on, lifetime use declined steadily to a prevalence of 41% by 1992, which until this year was the lowest level recorded by the survey (in 2023 lifetime prevalence was 37%).

Use of any illicit drug in 12th grade is defined as any use of cannabis (use remains illegal for people under age 21), LSD, other hallucinogens, cocaine, or heroin; or any use of narcotics other than heroin, amphetamines, sedatives (barbiturates), or tranquilizers not under a doctor's orders. In 8th

and 10th grade, the use of narcotics other than heroin and sedatives (barbiturates) has been excluded because these younger respondents appear to overreport use (perhaps because they include the use of nonprescription drugs in their answers).

Any Illicit Drug Including Inhalants

When inhalants are included in the index of illicit drug use, the percentages categorized as having ever used an illicit drug rise, especially for 8th graders.

These results follow a similar pattern seen for the index of any illicit drug use. Both show a marked 2024 decline in past 12-month use for 12th grade students, which may be a continuation of this cohort's 2020 lowered level of drug use in 8th grade during the social distancing policies put in place during the pandemic.

Use of any illicit drug including inhalants in 12th grade is defined as any use of inhalants, cannabis (which remains illegal at the federal level), LSD, other hallucinogens, cocaine, or heroin; or any use of narcotics other than heroin, amphetamines, sedatives (barbiturates), or tranquilizers not under a doctor's orders. In 8th and 10th grade, the use of narcotics other than heroin and sedatives (barbiturates) has been excluded because these younger respondents appear to overreport use (perhaps because they include the use of nonprescription drugs in their answers).

Any Illicit Drug Other Than Marijuana

In 2024, the percentage of youth who had used any illicit drug other than marijuana in their lifetime trended downward in all three grades for all three reporting intervals of lifetime, past 12-month, and past 30-day use. Lifetime prevalence levels in 2024 were 8% for 8th and 10th graders and 12% for 12th graders.

The proportion of students using illicit drugs other than marijuana has declined by more than half since 1981, when past 12-month levels stood at 10%, 18%, and 21% in 8th, 10th, and 12th grade, respectively.

In all grades, use declined markedly during the pandemic from 2020 to 2021, rebounded very slightly in 2022, and then gradually declined in the following years. Lifetime and past 12-month use were at record lows in 2024 and past 30-day use was near a record low.

In the 1970s, most of the sudden rise in 12th graders' reported use resulted from the increasing popularity of cocaine between 1976 and 1979 and, then, to the increasing use of amphetamines between 1979 and 1981. Then from 1982 through 1992, there was a substantial decline in the use of any illicit drug other than marijuana among 12th graders.

Use of any illicit drug other than marijuana in 12th grade is defined as any use of LSD, other hallucinogens, cocaine, or heroin; or any use of narcotics other than heroin, amphetamines,

sedatives (barbiturates), or tranquilizers not under a doctor's orders. In 8th and 10th grade, the use of narcotics other than heroin and sedatives (barbiturates) has been excluded because these younger respondents appear to overreport use (perhaps because they include the use of nonprescription drugs in their answers).

Any Nicotine Use

In 2024, any nicotine use in the past 30 days declined in all three grades, a decrease that was statistically significant in 8th grade. Today most students use nicotine by vaping it, and the 2024 decline in any nicotine use is driven in large part by a decline in nicotine vaping.

Any nicotine use was indicated by any use of any of the following: vaping nicotine, cigarettes, large cigars, flavored small cigars, regular small cigars, tobacco using a hookah, or smokeless tobacco.

Any Nicotine Use Other Than Vaping

Past 30-day prevalence levels of any nicotine use other than vaping declined in all three grades in 2024, a decline that was statistically significant in 8th grade.

Overall this outcome has declined markedly since first tracked by the survey. Prevalence fell about threefold since tracking began in 2017 for 12th grade students and in 2019 for 8th and 10th grade students. In 12th grade it fell from 21% to 5%, in 10th grade from 8% to 3%, and in 8th grade from 6% to 1%.

Any nicotine use other than vaping is indicated by any use of any of the following: cigarettes, large cigars, flavored small cigars, regular small cigars, tobacco using a hookah, or smokeless tobacco.

Any Prescription Drug

Use of any prescription drugs is asked only of 12th graders. The percentage of 12th grade students who used any prescription drug without a doctor's orders was at the lowest level recorded by the survey in 2024 for lifetime, past 12-month, and past 30-day use. These levels were, respectively, 7%, 3%, and 2%.

Use dropped precipitously across all reporting intervals from 2020 (before the pandemic) to 2021 (during the pandemic). They then rebounded slightly in 2022 but in the following years continued a long term decline to record lows. Prevalence in 2024 is three to five times lower as compared to the levels when first tracked in 2005.

The use of any prescription drug nonmedically is defined as any use of amphetamines, sedatives (barbiturates), narcotics other than heroin, or tranquilizers "without a doctor telling you to use them".

Been Drunk

Prevalence of being drunk in the past 12 months in 2024 significantly declined in 10th grade and was little changed in 8th and 12th grade.

Being drunk has been in a long term decline in all three grades for lifetime, past 12-month, and past 30-day use. The declines began first among 8th graders after 1996, then among 10th graders after 2000, and in 12th grade after 2004, suggesting a cohort effect.

The survey text for this item reads "On how many occasions (if any) have you been drunk or very high from drinking alcoholic beverages?"

Beer

In 2024, prevalence of beer drinking declined in all grades for the three reporting intervals of lifetime, past 12-month, and past 30-day use. These declines were all statistically significant, with the one exception of past 30-day use in 8th grade, which at a 2024 prevalence of 2% had little room to fall further. In all grades and in all reporting intervals, levels are at the lowest recorded by the survey.

These one-year declines were substantial, with lifetime use decreasing by an absolute 9% in 12th grade (from 32% to 23%), 7% in 10th grade (from 19% to 12%), and by 4% in 8th grade (from 9% to 5%). The corresponding declines in overall alcohol use were not as large, suggesting that some youth eschewed beer but not alcohol use in general.

In the long term, beer use has declined substantially in all grades. From 1991 to 2024, lifetime use decreased in 12th grade from 82% to 32%, in 10th grade from 74% to 18%, and in 8th grade from 59% to 10%. Similarly large, long term declines have also taken place for past 12-month and past 30-day use.

Cigarettes

The percentage of adolescents who had smoked a cigarette in the past 30 days declined in all grades in 2024, a decline that was statistically significant in 8th and 10th grades. Prevalence in 2024 is at the lowest ever recorded by the survey.

Lifetime use also continued a long term decline to the lowest levels recorded by the survey, although the declines in 2024 were not statistically significant.

The intense public debate in the late 1990s over cigarette policies likely played an important role in bringing about the very substantial downturn in adolescent smoking that followed. MTF helped to give rise to that debate, as it publicly reported in the first half of the 1990s that the level of smoking among U.S. adolescents was rising sharply—results that were widely covered in the national media. Other subsequent developments likely have contributed, including (a) increases in cigarette prices, brought about in part by the tobacco industry settlement with the states and by

state-level taxing decisions; (b) substantially increased prevention activities, including antismoking ad campaigns in a number of states; (c) the removal of certain types of advertising (including billboards) as well as the Joe Camel campaign nationwide; (d) the initiation of a national antismoking ad campaign by the American Legacy Foundation, which was created as a condition of the tobacco Master Settlement Agreement of 1998; and (e) efforts by the Food and Drug Administration (FDA) and states to reduce youth access to cigarettes.

An important milestone occurred in 2009 with passage of the Family Smoking Prevention and Tobacco Control Act, which gave the U.S. Food and Drug Administration the authority to regulate the manufacturing, marketing, and sale of tobacco products. New efforts by the FDA have undoubtedly contributed to the continuing decline in use of cigarettes and their reported availability by 8th, 10th, and 12th graders.

In earlier years, efforts to reduce adolescent smoking did not meet with as much success. Between 1984 and 1992, smoking prevalence was little changed among 12th grade students despite increasingly restrictive legislation with regard to smoking debated and enacted at state and local levels, as well as prevention efforts made in many school systems. These results suggest that the successful reduction of adolescent smoking, as we have seen in recent decades, requires a concerted, national, multi-pronged effort.

During the 1990s, trends in cigarette smoking generally moved in concert across 8th, 10th, and 12th grades—and not in the usual, staggered pattern indicative of a cohort effect. The prevalence of current smoking began to rise among 8th and 10th graders after 1991 and among 12th graders after 1992, and until 1996 moved steadily upward in all three grades. In 1996, current smoking peaked in grades 8 and 10 and then peaked a year later among 12th graders. It is interesting that cigarettes, which normally reflect cohort differences, began to exhibit a secular trend in the same historical period that illicit drugs, which normally exhibit secular trends, began to show cohort effects.

Of particular importance is the fact that in all three grades in 2024 the prevalence of smoking half-a-pack or more per day is down from peak levels by more than 90%, and is currently less than half a percentage point in all three grades. Over time, this dramatic decline in regular smoking should produce substantial improvements in the health and longevity of the population.

Cigarillos (Small Cigars)

Use of cigarillos is asked only of 12th graders. The percentage of 12th grade students who used a cigarillo (also known as a small cigar) in the past 12 months declined to 3% in 2024. It is at a record low and compares to the 23% in 2010, when the tracking of this product first began.

Cocaine

Levels of cocaine use changed little in 2024 across all grades and all reporting intervals. Prevalence was less than 1% in all grades for past 12-month and past 30-day use.

Cocaine grew in popularity among 12th graders in the late 1970s, then plateaued at a high level of around 12% annual prevalence in the first half of the 1980s, when most drugs were falling, before plunging by about three-quarters by 1991. This drug then followed the common pattern of an increase in use during the 1990s relapse before showing a period of decline since 2006. The increase had leveled out about three years earlier for 8th graders (in 1996) than for 12th graders (in 1999), evidence of a cohort effect.

The reduction of adolescent cocaine use to today's low levels is a success story given its considerable popularity in the 1980s, when past 12-month prevalence among 12th graders reached 13% (in 1985). Reasons for this steep decline in cocaine use—in particular the role of perceived risk—are discussed in Chapter 8 in this MTF report.

Crack

In 2024, the prevalence of past 12-month use of crack cocaine significantly increased in 10th grade but in all three grades stood at 1% or less.

Questions on crack cocaine were first introduced into the survey in 1986, when information gathered routinely in MTF showed some indirect evidence of the rapid spread of crack cocaine. For example, we found that the proportion of all 12th graders reporting that they had ever smoked cocaine (as well as used it in the past year) more than doubled between 1983 and 1986, from 2.4% to 5.7%. In the same period, the proportion of those who said that they had both used cocaine during the prior year and at some time had been unable to stop using it when they tried doubled (from 0.4% to 0.8%). In addition, between 1984 and 1986, the proportion of 12th graders reporting daily use of cocaine also doubled (from 0.2% to 0.4%). We think it likely that the rapid advent of crack use during this period was reflected in all of these changes, though we did not yet have a direct measure of its use.

Because prevalence for this drug has fallen so low in recent years, in 2024 MTF asked only about past 12-month prevalence and discontinued asking about lifetime and past 30-day use. Information for trends in these reporting intervals is presented in Appendix D of the MTF 2024 annual report, which reports trends up to 2023. These questions will be reintroduced into the survey if past-12 month prevalence increases in future years.

Creatine

Creatine is not a hormone or a drug but a nutrient found in the skeletal muscle of most animals. It is used to reduce the recovery time of muscles, to increase muscle mass, and to thereby enhance

performance for high-intensity, short duration exercises. It is readily available over the counter, which undoubtedly helps to explain the substantial levels of use we have found among teens.

In 2024, past 12-month use maintained the large increases that took place during the pandemic from 2020 to 2021. In 12th and 10th grade, prevalence trended upward, and in 8th grade it held steady. In all grades, levels are at or near the highest recorded since the project first began tracking use of this substance in 2001. Prevalence in 2024 was 13% in 12th grade, 12% in 10th grade, and 5% in 8th grade.

These results are consistent with the possibility of an increase in the proportion of adolescents involved in fitness and weightlifting that began during the social distancing policies during the pandemic and has since persisted.

Crystal Methamphetamine

Use of crystal methamphetamine is asked only of 12th graders. Lifetime prevalence of crystal methamphetamine use in 12th grade has been less than 1% since 2020, leaving little room to fluctuate in response to environmental influences.

Annual prevalence among 12th graders fell from 3.0% in 2002 to 0.2% in 2024. Its similarity to crack cocaine (both are in chunks and are burned) may have played a role in this decline because crack came to be seen as very dangerous to use, and the concern may have generalized to crystal methamphetamine.

Delta-8

Questions on delta-8 were added to the survey in 2023. Delta-8 is a substance derived from hemp. It contains THC-8, which is an isomer of the active ingredient THC-9 found in cannabis. Delta-8 reportedly produces a high that some have called “marijuana light”. Regulation of delta-8 is currently under development; because it is derived from hemp, its use and sale is not covered by state, local, and federal laws that regulate cannabis.

In 2024, past 12-month prevalence increased from 11% to 12% in 12th grade, although this increase was not statistically significant. Questions on delta-8 were first asked for 10th and 8th graders in 2024, and past-12-month prevalence was 8% and 3%, respectively. These prevalence levels are considerable for a substance that has only recently come to market.

Ecstasy (MDMA)

Prevalence of MDMA (street names “Molly” and “ecstasy”) changed little in 2024 and were at or near the lowest levels recorded by the survey since this drug was first tracked in 1996. Prevalence levels in all three grades were less than 2% for lifetime use, less than 1% for past 12-month use, and less than 0.5% for past 30-day use.

The historical trend for MDMA follows a pattern somewhat different from most of the other drugs in that an increase did not occur until the late 1990s, and it peaked later than many drugs—in 2001. Obviously there were some special forces at work on the use of this drug, including its popularity at raves followed by public concern about the dangers of its use. Since that time, its prevalence has gradually declined, although a short lived upsurge took place in all three grades around 2009–2010.

In 2014, some questionnaire forms in the survey included "Molly" as an example of MDMA, along with ecstasy, and the inclusion of this example appeared to make relatively little difference in the overall reporting of prevalence of MDMA. In 2015, the remaining forms were changed to also include "Molly" as an example in the questions about MDMA.

Trends in MDMA use are unique because the upswing in use in 1999 occurred first in the older grades. The 8th graders did not show this resurgence until a year later, in 2000. A different dynamic seemed to be at work for MDMA than for most other drugs during this historical period because it appears that the increase in use rippled down the age scale rather than the reverse; this may be because raves (which older teens would be more likely to attend) played an important role in its dispersion.

Energy Drinks or Shots

Energy drinks and energy shots contain high levels of caffeine. Across all three grades, trends in daily use of these products follow a U-shaped curve, with higher levels when the project first began tracking them in 2010, a steady decline until about the year 2015, and then a reversal as prevalence subsequently increased. This trend is driven mainly by use of energy drinks and not by use of energy shots, which have not systematically trended in the past decade.

Energy Drinks

Energy drinks are non-alcoholic beverages that usually contain high amounts of caffeine and include brands such as Red Bull and Monster. MTF asks about daily use of these drinks.

Prevalence has followed a U-shaped curve, with higher levels when first tracked in 2010, a steady decline until about 2015, and then a subsequent reversal as prevalence increased thereafter. In 2024, levels of daily use were at or near the highest levels recorded by the survey, at 18%, 16%, and 14% in 12th, 10th, and 8th grade, respectively.

The wording for this question is "'Energy drinks' are non-alcoholic beverages that usually contain high amounts of caffeine, including such drinks as Red Bull®, Full Throttle®, Monster®, and Rockstar®. They are usually sold in 8- or 16-ounce cans or bottles. About how many (if any) energy drinks do you drink PER DAY, on average?"

Energy Shots

Energy "shots" usually come in 2 or 3 ounce containers and include brands such as 5-Hour Energy and Redline. MTF asks about daily use of energy shots.

Daily use of these substances has not systematically trended over the past decade. In all three grades, prevalence has hovered at around 3% to 4%. When first tracked, 8th grade students had the highest levels of use—at 7% in 2011—but by 2014, these levels had declined to 4% and have fluctuated around this level since. This lack of change in consumption of energy shots in recent years contrasts with the substantial increase of use in energy drinks.

The text for this question is: "Energy drinks are also sold as small "shots", that usually contain just 2 or 3 ounces (5-hour ENERGY®, Redline®, etc.). How many (if any) energy drink shots do you drink PER DAY, on average?"

Flavored Alcoholic Beverages

In 2024, use of flavored alcoholic beverages (also known as "alcopops" or "malternatives") declined in all grades for lifetime, past 12-month, and past 30-day use. These declines were statistically significant in all three grades for lifetime and past 12-month use and in 10th grade for past 30-day use. Levels are at the lowest recorded since this substance was first tracked in 2004 in all grades and for all reporting intervals.

Use of these products has declined substantially over the past two decades. For example, from 2004 to 2024, past 30-day use declined in 8th grade from 15% to 2%, in 10th grade from 25% to 6% in 2024, and in 12th grade from 31% to 15% in 2024.

The wording for this question is: "On how many occasions (if any) have you had flavored alcoholic beverages (like hard seltzers, Mike's Hard Lemonade, Smirnoff Ice, wine coolers, or read-to-drink-cocktails) to drink – more than just a few sips?"

Flavored Little Cigars

Use of flavored little cigars in the past 30 days declined in all three grades in 2024, significantly so in 10th grade. These declines extended the substantial decreases in prevalence that took place in 2021 during the pandemic.

Overall prevalence has declined markedly since this measure was added to the survey in 2014. Specifically, from 2014 to 2024 prevalence in 12th grade fell from 12% to 2%, in 10th grade from 7% to 1%, and in 8th grade from 4% to 1%.

GHB

GHB is an acronym for gamma-hydroxybutyric acid, a drug that became popular at raves in the 1990s. It can produce an euphoric effect and gained notoriety as a date rape drug because of its ability to cause amnesia.

Prevalence of past-12 month GHB use among 12th grade students has been below 1.5% for the past decade and in 2024 stood at 0.4%. Since 2017, prevalence has hovered around 0.4%.

Hallucinogens

The percentage of 12th grade students using hallucinogens in the past 12 months has varied little between a narrow window of 4% and 5% over the past decade and in 2024 was 4%. In 10th grade, a drop in use during the pandemic in 2021 has persisted, and the prevalence of past 12-month use in 2024 was 2%. In 8th grade, declines in use have plateaued since around 2014, in part because prevalence has hovered at 1% since that time and has little room to fall further.

In 2024, the question text was modified to add "or psychedelic drugs" to the survey text, with the new question reading "On how many occasions (if any) have you used hallucinogens or psychedelic drugs (like PCP, mescaline, peyote, 'shrooms' or psilocybin)." This change appears to have had little effect on prevalence estimates, which changed little in 2024 compared to 2023.

Hallucinogen use followed the typical pattern of an increase during the 1990s relapse, followed by a gradual but inconsistent decline in the following years. Annual hallucinogen use peaked in 1996, which is a few years earlier than the peak for most other drugs. Current levels of annual hallucinogen use are less than half their peak in the 1990s.

The two components of the hallucinogens class, LSD and hallucinogens other than LSD (i.e., mescaline, peyote, psilocybin, and PCP), generally followed the same pattern until a sharp decline in LSD use emerged after 1999.

Hallucinogens Other Than LSD

Hallucinogens other than LSD include mescaline, peyote, and PCP as well as psilocybin, or "shrooms", which comprise a major component of this category. Use levels in 2024 did not significantly change in any of the three grades for lifetime, past 12-month, or past 30-day use.

In all grades, 2024 levels of past 12-month use are about half of what they were in 2001, the peak level they had reached after the 1990s drug relapse.

Prior to the 1990s relapse, use of hallucinogens other than LSD had declined precipitously in 12th grade from a record high of 9.4% in 1975 to a record low of 1.7% in 1992. During this time hallucinogens received substantial, negative media attention about the potential dangers of use such as "bad trips" and flashbacks. The increase that began in the 1990s may in part stem from

"generational forgetting", in which new youth cohorts have less exposure to people who have used the drug and media coverage subsides.

Heroin

Past 12-month use of heroin has always been relatively low, with annual prevalence never higher than 2% at any time in the survey for any grade. In 2024, the level of annual use was 0.2% or less in each of the three grades. Prevalence levels of heroin are now at or near all-time lows, after a long decline from a peak established at the end of the 1990s drug relapse period. One unusual pattern specific to heroin is that the late 1990s mark the highest levels of use ever recorded in the study, whereas for most other drugs the all-time highs were set near the beginning of the 1980s. This trend was due in part to the advent of heroin use without a needle.

The increase in heroin use that occurred around 1995 was recognized fairly quickly and gave rise to some ameliorative actions, including an anti-heroin campaign by the Partnership for a Drug-Free America. An increasing number of deaths due to heroin use, including in the entertainment and fashion communities, also received widespread publicity. These factors may well explain the subsequent leveling in use after the near doubling of heroin prevalence that took place from 1991 to 1995.

Inhalants

Prevalence of inhalant use in the last 12 months changed little in each of the three grades in 2024. Levels were 2% in 12th and 10th grade and 4% in 8th grade.

Inhalants are unusual because their prevalence is consistently higher in the lower grades, a pattern not observed for any other drug. The use of inhalants at an early age may reflect the fact that many inhalants are cheap, readily available (often in the home), and legal to buy and possess. The decline in use with age likely reflects their coming to be seen as "kids' drugs" in addition to the fact that a number of other, more desirable drugs become more accessible to older adolescents, who also are more able to afford them.

The increase in prevalence of inhalants in all three grades at the start of the 1990s was a continuation of a trend that was observable far earlier among 12th grade students, when only they were being surveyed. The same was likely true among 8th and 10th graders, although our data on them cover only 1991 forward. The anti-inhalant campaign launched by the Partnership for a Drug-Free America in 1995 (partly in response to MTF results showing increasing use) may have played an important role in reversing this long term trend. Increases in use that began around 2018 proved fleeting, and decreases in prevalence in 2020 and 2021 have returned levels to near record lows.

Prior to 2000, trends in inhalants were confounded by the use of amyl and butyl nitrites, and past MTF reports presented an additional 12th grade inhalant trend for measures without nitrites (e.g.,

see the 2014 MTF report for a detailed description). Since that time youth's use of nitrites has fallen to very low levels and is no longer tracked by MTF.

Ketamine

Prevalence of past 12-month ketamine use among 12th grade students has been below 2% for the past decade and in 2024 stood at 1%. This "club drug" was added to the survey in 2000. It showed little change in its usage levels through 2002. Since then, use has declined in all three grades. Because of the very low levels of use of this drug by 2011, questions about its use were dropped from the questionnaires administered to 8th and 10th graders.

Large Cigars

Smoking large cigars, which has not been particularly common among secondary school students, has declined overall since 2014 in all three grades. Since 2019, a steep decline in prevalence of 30-day use has taken place among 12th grade students, falling by more than half from 4.5% in 2019 to 1.6% in 2024. An overall downward trend in 8th and 10th grades has resulted in prevalence levels less than 1% in 2024, despite a significant increase in 10th grade from 2023 to 2024.

Liquor

Use of hard liquor is asked only of 12th grade students. In 2024, prevalence decreased for all reporting intervals, and the decline was statistically significant for lifetime and past 12-month use. With these small decreases prevalence was at the lowest recorded by the survey for lifetime, past 12-month, and past 30-day use. Nevertheless, prevalence remains substantial, with one out of every six 12th graders reporting use of liquor in the past 30 days.

A decline in liquor consumption among 12th graders actually began after about 1980 but was interrupted in the late 1990s by the relapse phase in the use of most drugs, including alcohol. After about 2002, the long term decline in alcohol use resumed.

LSD

In 2024, LSD prevalence trended down in all three grades for lifetime and past 12-month use. In 10th grade, the 2024 declines were statistically significant. In all three grades, past 30-day use held steady at less than 0.5%. Use levels are currently low, with past 12-month prevalence less than 1% in all grades.

LSD was one of the first drugs to decline at the start of the 1980s, almost surely due to increased information about its potential dangers. The subsequent increase in its use during the mid-1990s may reflect the effects of "generational forgetting"—that is, replacement cohorts knowing less than their predecessors about the potential dangers of LSD because they have had less exposure to the negative consequences of people using the drug.

We believe that the decline in use prior to 2002 might have resulted in part from a displacement of LSD by sharply rising use of MDMA (ecstasy and more recently Molly). After 2001, when MDMA use itself began to decline, the sharp further decline in LSD use likely resulted from a sudden drop in the availability of LSD (discussed in Chapter 9) because attitudes generally have not moved in a way that could explain the fall in use, while perceived availability has.

Marijuana (Cannabis)

In 2024, marijuana use declined in all three grades for lifetime, past 12-month, and past 30-day use. The 12th grade decline in past 12-month use was statistically significant. Despite these declines, the 2024 levels remain substantial, with the percentage of students using marijuana in the last 12 months at 26% in 12th grade, 16% in 10th grade, and 7% in 8th grade.

The substantial declines from 2020 to 2021 during the onset of the pandemic mark the first substantial change in marijuana prevalence in more than a decade; previous to 2021, marijuana levels had hovered without any systematic trending for about a decade. These lower levels have persisted in the following years and did not rebound.

Levels of annual marijuana use today are considerably lower than the historic highs observed in the late 1970s, when more than half of 12th graders had used marijuana in the past 12 months. This high point marked the pinnacle of a rise in marijuana use from negligible levels before the 1960s.

Daily marijuana use, defined as use on 20 or more occasions in the past 30 days, decreased slightly in 12th and 8th grades and held steady in 10th grade. The 2024 levels remained below the 2021 levels, which reflect a sharp drop during the pandemic-era social distancing policies. In 8th grade, prevalence has hovered between 0.2% and 2% since first tracked in 1991.

The prevalence of using marijuana daily for a month or more during one's lifetime is reported for 12th graders only. That prevalence was at 21% when first measured in 1982, declined sharply to just 8% by 1992, and rose back to 19% by 1997. This was then followed by a long gradual decline to 12% by 2018 before leveling. It stood at 13% in 2024.

Medical Marijuana (Cannabis)

Since 2017, the survey has included the question "Have you ever used 'medical marijuana;' that is, marijuana you used because a doctor told you to use it?" Prevalence has hovered between 1% and 4% in all years in all three grades and has not systematically trended.

Methamphetamine

Use of methamphetamine has declined to near-zero prevalence over the past two decades, with lifetime use below 1% in 2024. This marks a steep decline from 1999 lifetime prevalence levels

(when they were first tracked), which were at 4.5%, 7.3%, and 8.2% in 8th, 10th, and 12th grades, respectively.

Narcotics Other Than Heroin

Use of narcotics other than heroin without a doctor's orders is reported only for 12th grade students. In 2024, lifetime use declined significantly, bringing prevalence to 1.6%, which is the lowest recorded by the project. The 1.6% level is more than eight times lower than the high of 14% in 2002. Past 12-month use also significantly declined in 2024 to 0.6%, which also is the lowest level recorded by the survey. Past 30-day use declined, although not significantly, to a level of 0.3%, which again is the lowest recorded by the survey.

Two patterns make trends in use of these drugs unique. First, peak use came during the 1990s relapse—and not during the 1980s as it did for so many other drugs—suggesting that its rise during the 1990s was more than just a return to drug use patterns of the past and instead represented the emergence of new, unique patterns of use for adolescents. Second, the peak established after the 1990s drug relapse stayed at a stubbornly high level for much longer than most illicit drugs. High levels of use during the 2000s raised concern that use of these types of prescription drugs had become endemic. However, the sharp decline in use from 9.2% in 2009 to less than 1.0% in 2024 proved otherwise.

Because the question text on half of the questionnaire forms was updated in 2002 with the inclusion of additional examples of narcotics other than heroin (i.e., OxyContin, Vicodin, and Percocet), we obtained a higher reported level of use with the new version of the question that year (9.4%) than with the previous version of the question (7.0%). (When we make a significant change in the wording of a question, we often use this type of spliced design in which a random half of the respondents to the questionnaire forms containing the drug get the new version and others get the old version in the same year so that we can assess the impact of the wording change.) All questionnaire forms contained the new version of the question in 2003 and thereafter.

In 2024, the list of example narcotics in the survey question included Methadone, Codeine, OxyContin, Percodan, Opium, Demerol, Percocet, Ultram, Morphine, Oxycodone, Tylox, Tramadol, Vicodin, Hydrocodone (Lortab, Lorcet, Norco), MS Contin, and Suboxone.

Nicotine Pouches

Nicotine pouches are small, white pouches that contain nicotine that users place in their mouth. Nicotine pouches are different from other smokeless tobacco products such as snus, dip, or chew because they do not contain any ground tobacco leaf. Use of nicotine pouches is readily concealable by adolescents because they do not require the user to expectorate juice.

Lifetime and past 12-month use both significantly increased from 2023 to 2024 in 10th and 12th grade. In 12th grade, past 12-month prevalence doubled on the national scale in just one year from 3% to 6%, and in 10th grade it increased from 2% to 3%. In 8th grade, prevalence was below 1% and stayed steady.

Past 30-day use in 12th grade also significantly increased from 2023 to 2024, from 1.4% to 3.5%.

Nicotine pouches have generated much media attention amid concerns that adolescent use may grow rapidly, often drawing comparisons to the rise of nicotine vaping from 2017 to 2019. As of 2024, past 12-month prevalence of nicotine pouches remains relatively low at less than 6% (which compares to 21% for nicotine vaping). Similar oral nicotine products have made substantial inroads among adolescents in the past (e.g., smokeless tobacco reached a lifetime prevalence of 32% in the early 1990s), suggesting that prevalence of nicotine pouch use has a high ceiling.

Over the Counter Cough/Cold Medicine

There are a number of over the counter drugs that can be used to relieve symptoms from coughing or having a cold. Several of them, like Robitussin and Tylenol, contain dextromethorphan (DXM). When taken in large doses, its side effects can mimic those of some illegal drugs, like hallucinations and sensory changes. Teens can buy them to use for these purposes and risk a number of dangerous side effects.

Not all cough and cold medications contain DXM, of course, but because a number of them do, we track the more general class to get an indication of changes in DXM abuse. The survey questions asks students if they have taken nonprescription cough or cold medicines "to get high".

In 2024, past 12-month prevalence changed one percentage point or less in each of the three grades. In 8th grade, the current level of 4.4% is toward the higher end of the range that varies from the low of 2% recorded in 2015 and the high of 4.6% recorded in 2020.

In 10th grade, a 2024 increase (which was not statistically significant) brought prevalence to 4%, which is two-thirds of the 6% high recorded in 2009.

In 12th grade, prevalence edged upward to 2.8%, which is less than half of the 6.9% high recorded when the survey first started tracking this outcome in 2006.

Note that in recent years the grades have tended to reverse the order of their prevalence levels, with the 8th graders tending to have the highest prevalence and the 12th graders the lowest. The only other class of drugs that currently shows such a pattern is inhalants.

OxyContin

In 2024, the percentage of youth who used the specific narcotic drug OxyContin without a doctor's orders in the past 12 months significantly increased in 10th and 12th grade. Despite these increases, use remained low at 1.1% or lower in all grades.

Use of OxyContin has declined overall since first tracked by the survey in 2002. Its prevalence began a long term decline in 2009/2010 for 10th and 12th grade students and in 2013 for 8th grade students, resulting in record or near-record lows in recent years.

PCP

The prevalence of past-year PCP use is reported only for 12th grade students, and in 2024 it was 0.7%. Prevalence has not risen above 2% for the past 20 years.

PCP was first included in the survey in 1979, and its prevalence dropped rapidly thereafter, suggesting that it achieved a deserved reputation as a dangerous drug very quickly. Its use increased during the 1990s drug relapse, but its annual prevalence increased to a high of only 2.6% (in 1996). Since 2002, its use has remained low.

To free up space for questions on other drugs, the survey stopped tracking lifetime and past 30-day use of this low-prevalence drug in 2014 (for information on these outcomes see the 2013 annual report). These measures will be re-introduced into the survey if past 12-month use increases in the future.

Regular Small Cigars

Use of regular (unflavored) small cigars during the past 30 days did not significantly change in 2024 in any of the three grades. Prevalence has declined markedly overall since first tracked in 2014, and 2024 levels are at or near record lows, all below 2%.

Ritalin

The stimulant Ritalin is used to treat attention deficit hyperactivity disorder (ADHD). Prevalence of use without a doctor's orders in the last 12 months was 1.1% or less in all grades in 2024.

Prevalence has declined substantially since first tracked by the survey in 2001. From 2001 to 2024, it declined from 2.9% to 0.7% in 8th grade, from 4.8% to 0.9% in 10th grade, and from 5.1% to 1.1% in 12th grade.

Rohypnol

Rohypnol, a "club drug", was added to MTF in 1996.

In 2024, prevalence is less than 1% in all grades for past 12-month use. Lifetime and past 30-day use, which are measured in 8th and 10th grade, were also below 1% in 2024.

As a questionnaire space economy measure, in 2002 the standard triplet question (asking about lifetime, past 12-month, and past 30-day use of Rohypnol) was replaced with a tripwire question asking only about use in the past 12 months. (This change was made at 12th grade only.) As a result of this change in the structure and location of the question, trend data since 2002 may not be directly comparable to data prior to 2002, as indicated by the discontinuity in the graph.

Sedatives

Use of sedatives (barbiturates) without a doctor's orders in 2024 edged down slightly for lifetime and past 12-month use and significantly declined for past 30-day use. Use was at the lowest level recorded by the survey for all three reporting intervals (this measure reported for 12th grade students only).

Prevalence declined after the highs of the 1990s drug relapse but for some years remained substantially higher than they were before the relapse began. By 2024, annual prevalence was at a historic low at 1%. As with many other substances, prevalence increased during the 1990s drug relapse, but a long term decline did not start until 2005, which is nearly a decade later than the decline seen for most other drugs. This pattern of sustained high levels past the 1990s is found for misuse of many of the prescription drugs and was seen for the class "narcotics other than heroin". However, trends over the past fifteen years indicate that a long term decline has been taking place.

Prior to the increase in use in the 1990s, past 12-month use had declined very appreciably from its highest reading of 16% in 1976 to 3% in 1992.

Smokeless Tobacco

The percentage of youth who used smokeless tobacco during the past 30 days was at or near record lows in 2024. In 12th grade prevalence was 3.3% (the record low was in 2021 at 2.2%), in 10th grade it was 2.1% (the record low was in 2021 at 1.7%), and in 8th grade it was 1.5% (the record low was in 2022 at 1.2%).

Lifetime use was at record lows in 2024, at 8% in 12th grade, 5% in 10th grade, and 4% in 8th grade.

Daily use of smokeless tobacco is at near-negligible levels, with a prevalence less than 1% in all grades.

Trends in smokeless tobacco stand out as very different from trends for adolescent use of other drugs. Unlike almost all other substances, use of smokeless tobacco did not increase during the 1990s relapse but actually declined for nearly 10 years, beginning around 1994. Further, smokeless tobacco is one of few substances for which prevalence increased after 2007, although this increase among 10th and 12th grade students was not lasting. Finally, the trends show little in the way of cohort effects, given that trends have moved in parallel and not in staggered fashion for

all three grades. These results suggest that the factors leading to use of smokeless tobacco are much different from the drivers of use of other drugs.

Questions about the use of smokeless tobacco were first introduced in 1986, omitted in 1990 and 1991, and then reintroduced in 1992. Through 2010, the examples of smokeless tobacco provided in the question were snuff, plug, dipping tobacco, and chewing tobacco; because of new forms of smokeless tobacco entering the market, snus and dissolvable tobacco were added to the examples in 2011. The introduction and promotion of new smokeless products, including snus, may well have contributed to the increase in use seen in all grades that peaked around that time.

Snus

In 2024, prevalence of snus use during the past 12 months increased in all grades, an increase that was statistically significant in 8th grade. In 2024, prevalence stood at 1.2%, 2.1%, and 1.9% for 8th, 10th, and 12th graders.

Snus is a variation on smokeless tobacco, as are some other dissolvable tobacco products, that literally dissolve in the mouth. Questions on snus were added to the 12th grade survey in 2011 and to the 8th and 10th grade surveys in 2012. Past year prevalence had been falling quite sharply in the upper grades since the introduction of those questions. The upper grades have tended to have considerably higher levels of use—at least until 2018.

Clearly snus has lost most of its appeal to teenagers, possibly in part due to the introduction of other nicotine products such as nicotine pouches and nicotine vaping.

Stay Awake Pills

Use of stay awake pills, which are over the counter stimulants, were at or near the lowest level ever recorded by the survey in 2024 for lifetime, past 12-month, and past 30-day use among 12th graders (this measure reported for 12th grade students only).

The 2024, prevalence of 1.2% for past 12-month use is more than twenty times lower than the peak level of 26% in 1988. Since then prevalence of stay-awake pills has gradually declined somewhat irregularly with no periods of sustained increases.

Steroids

In 2024, lifetime prevalence of anabolic steroid use was 1.4% or lower in all grades. In general, lifetime, past 12-month, and past 30-day use have decreased, sometimes unevenly, since highs in the early 2000s.

Anabolic steroids, sometimes used for muscle development including in body building, were rendered illegal to purchase or sell without a prescription in the Anabolic Steroids Control Act of

1990. Prevalence of use fell among 12th graders for a couple of years thereafter, but then increased some. Use for all grades peaked around 2002 and have since declined substantially.

Tobacco With Hookah

Use of tobacco with hookah is asked only of 12th graders. A hookah is a device to inhale combustible tobacco and consists of a long, flexible tube through which users inhale tobacco smoke that has passed through water and is thereby cooled. In 2024, the percentage of 12th grade students who used a hookah in the past 12 months declined slightly to 2%, which is the lowest level recorded by the survey since first tracked in 2010. Use increased from 2010 to 2014 but has been steadily declining since, with 2024 prevalence about ten times lower than the high of 23% recorded in 2014.

Tranquilizers

In 2024, the percentage of youth who used tranquilizers without a doctor's orders declined or stayed steady in all grades for lifetime, past 12-month, and past 30-day use. In 12th grade, these declines were statistically significant for past 12-month use. The substantial decreases in prevalence that took place during the pandemic in 2021 persisted and continued further in 2024.

In 2001, the survey question on tranquilizers was modified to include Xanax as an example of a tranquilizer, and the discontinuity in the graph for that year marks the slightly higher prevalence estimate that resulted from this question change.

Among 12th and 10th grade students, tranquilizer use increased during the 1990s; the increase was sustained well into the 2000s, which is a trend typical for the general category of prescription medication misuse.

Vaping Flavoring

The percentage of youth who report that they vaped "just flavoring" declined in 2024 in all three grades for lifetime, past 12-month, and past 30-day use. In 12th grade, the declines were statistically significant for both lifetime and past 12-month use, and in 10th grade for all three reporting intervals.

Practically all youth who report vaping "just flavoring" also report vaping nicotine (as indicated by very low prevalence in the "Vape flavoring without nicotine" tables and graphs). Most adolescents who vape "just flavoring" are doing so as a supplement to their nicotine vaping and not as a substitute for it.

Vaping Flavoring Without Nicotine

In 2017, MTF started asking students if they vaped "just flavoring". A substantial prevalence of this outcome could raise at least two potential scenarios. First, it could be possible that a portion of youth believed they were not vaping nicotine when in fact they were. Second, if students truly were vaping only flavoring, then the recent large increases in adolescent vaping may be less alarming than it at first appeared—to the extent that adolescents are not being exposed to the addictive chemical nicotine.

These two potential scenarios are not supported by the results. The finding that in 2024 1% of students or less in all grades report vaping flavoring exclusively without nicotine in the past 30 days indicates that practically all students who report vaping "just flavoring" are also vaping nicotine.

Vaping Marijuana (Cannabis)

Vaping is a relatively new mode for marijuana use. It differs from combustible use because vaping solutions come in a variety of flavors, vaping delivers a higher concentration of THC (the active psychoactive ingredient in marijuana), and vaping is more readily concealable because it does not produce the distinctive odor associated with combustible use.

In 2024, the percentage of students who vaped marijuana in the past 12 months trended slightly downward for all three grades, although none of the declines were statistically significant.

Large increases in marijuana vaping in previous years were not accompanied by increases in overall marijuana use. These results suggest that marijuana vaping is not increasing the number of adolescent marijuana users. It could substitute for combustible marijuana use, it could serve as a way for marijuana users to avoid detection by adults because it is easier to conceal, and/or it could be a way for users to supplement their combustible marijuana use.

Vaping Nicotine (E-cigarettes)

The percentage of students who vaped nicotine in 2024 decreased in all grades for lifetime, past 12-month, and past 30-day use. In 10th grade, the declines were statistically significant for past 12-month and past 30-day use.

Despite the recent declines in use, the prevalence of nicotine vaping by adolescents remains one of the highest among all substances. In 2024, its past 12-month prevalence level of 10% in 8th grade is second only to alcohol. Its prevalence of 21% in 12th grade and 15% in 10th grade ranks third behind alcohol and marijuana use. These high rankings are largely due to the very sharp increases in the prevalence of nicotine vaping between 2017 and 2019.

Vicodin

Use of the specific narcotic drug Vicodin without a doctor's orders in the past 12 months significantly increased in 10th grade in 2024. Despite this increase, annual prevalence was 1% or

less across the three grades in 2024. The low levels in 2024 are the result of a marked decline from peaks before 2010 of 3% in 8th grade, 8% in 10th grade, and 11% in 12th grade.

While there was a large age difference in prevalence in earlier years, there remained practically none in 2024 as prevalence approached zero.

Wine

Wine consumption is asked only of 12th grade students. In 2024, prevalence declined for lifetime, past 12-month, and past 30-day use. The declines in lifetime and past 12-month use were statistically significant.

Prevalence in 2024 was at record lows for all reporting intervals, following a substantial overall decline since 2000. Specifically, from 2000 to 2024 lifetime prevalence declined from 64% to 28%, past 12-month from 45% to 16%, and past 30-day from 16% to 6%.

In 1988, MTF added a question on wine coolers, which had the effect of sharply reducing self-reported wine use. (Up to that point many users of wine coolers likely reported such use under wine.) Prevalence of wine use rose somewhat during the 1990s drug relapse but continued a long standing decline beginning in 2001.

As with liquor, the longer term decline in wine consumption that began in the late 1980s was interrupted in the 1990s during the relapse phase in drug and alcohol use.

Binge drinking with wine has been higher than with liquor. It declined substantially in the late 1980s, suggesting that wine coolers accounted for reported binge drinking until wine coolers were separated into their own category.

TABLE 5-1
Summary of Drug Trends Pre- and Post-Pandemic
Grade 12, Past 12-Month Use

Drug	2020 prevalence (pre-pandemic)[a]	2021 prevalence	2024 prevalence
Alcohol	55.3	*46.5*	**41.7**[b]
Any illicit drug + inhalants	38.7	*33.2*	**26.5**[b]
Flavored alcohol[a]	37.5	32.0	**26.2**
Any illicit drug	36.8	*32.0*	**26.2**[b]
Marijuana/hashish	35.2	*30.5*	**25.8**[b]
Been drunk	36.9	*28.8*	**25.5**
Nicotine vaping	34.5	*26.6*	**21.0**[b]
Marijuana vaping	22.1	*18.3*	**17.6**
Creatine	7.2	7.4	13.0[c]
Alcohol with caffeine	12.3	9.9	**9.9**
Flavor vaping	16.6	*11.7*	**9.5**
Any illicit drug other than marijuana	11.4	*7.2*	**6.5**
Hallucinogens	5.3	4.1	**3.7**
Hallucinogens other than LSD	2.8	2.9	3.6
Small cigars[a]	7.8	*3.4*	**3.1**
Cough medicines	3.2	*1.7*	2.8
Adderall	4.4	*1.8*	2.5
Amphetamines	4.3	2.3	2.3
Hookah	5.6	2.1	**2.0**
Inhalants	1.1	1.8	1.9
Snus[a]	2.7	2.6	**1.9**
Oxycontin	2.4	*0.9*	1.1
Ritalin	1.7	0.5	1.1
Sedatives/barbiturates	2.4	1.8	**1.0**[b]
Steroids	1.2	0.5	1.0
Cocaine	2.9	1.2	**0.9**
Ketamine	1.3	0.9	0.9
Androstenedione[a]	0.5	0.6	0.9
LSD	3.9	2.5	**0.8**[b]
Ecstasy (MDMA)	1.8	1.1	**0.8**
PCP[a]	1.1	0.7	**0.7**
Vicodin	1.2	0.9	**0.7**
Narcotics other than heroin	2.1	*1.0*	**0.6**
Rohypnol[a]	0.5	0.4	0.6
Methamphetamine	1.4	*0.2*	0.5
Tranquilizers	3.2	*1.2*	**0.4**[b]
GHB[a]	0.4	0.4	0.4
Heroin	0.3	0.1	0.2
Crystal methamphetamine	0.0	0.4	**0.2**

Notes: *Red and italicized text indicates that the decline from 2020 to 2021 is largest one-year decline on record for this drug.*
Bold text indicates 2024 levels lower than the 2021 levels measured during pandemic. Drugs sorted in descending order by 2024 prevalence levels.

[a]This value is the 2020 prevalence for drugs other than flavored alcohol, small cigars, hookah, PCP, rohypnol, GHB, androstenedione, and snus; for these drugs the 2019 value is substituted for the 2020 value, which MTF does not report because of small cell size.

[b]Linear decrease from 2021 to 2024 statistically significant (p<.05)

[c]Linear increase from 2021 to 2024 statistically significant (p<.05)

MONITORING THE FUTURE

TABLE 5-2

Summary of Drug Trends Pre- and Post-Pandemic

Grade 10, Past 12-Month Use

Drug	2020 prevalence (pre-pandemic)[a]	2021 prevalence	2024 prevalence
Alcohol	40.7	*28.5*	**26.1**
Any illicit drug + inhalants	31.3	*19.6*	**18.2**
Any illicit drug	30.4	*18.7*	**16.9**
Marijuana/hashish	28.0	*17.3*	**15.9**
Nicotine vaping	30.7	*19.5*	**15.4**[b]
Flavored alcohol	29.6	*18.8*	**13.7**[b]
Creatine	4.5	6.0	11.7[c]
Marijuana vaping	19.1	*12.4*	**11.6**
Been drunk	23.1	*13.4*	**11.1**
Flavor vaping	18.4	*10.6*	**8.1**
Alcohol with caffeine	8.3	7.5	**7.3**
Any illicit drug other than marijuana	8.6	*5.1*	**4.4**
Cough medicines	3.3	2.7	4.0
Amphetamines	4.3	2.7	**2.2**
Hallucinogens	3.4	*2.2*	**2.1**
Snus	2.2	1.0	2.1[c]
Inhalants	2.9	2.0	**1.9**
Hallucinogens other than LSD	2.2	*1.5*	1.9
Adderall	2.9	*1.6*	1.9
Oxycontin	1.0	0.9	1.0
Vicodin	0.9	0.5	1.0
Ritalin	1.0	0.3	0.9
LSD	2.5	1.5	**0.8**[b]
Tranquilizers	2.6	*1.3*	**0.8**
Steroids	0.9	*0.3*	0.7[c]
Ecstasy (MDMA)	1.2	0.7	**0.5**
Cocaine	1.1	0.6	**0.5**
Methamphetamine	0.3	0.2	0.2
Heroin	0.2	0.1	0.1
Rohypnol[a]	0.6	*0.2*	**0.1**

Notes: *Red and italicized text indicates that the decline from 2020 to 2021 is largest one-year decline on record for this drug.* **Bold text indicates 2024 levels lower than the 2021 levels measured during pandemic**. Drugs sorted in descending order by 2024 prevalence levels.

[a]This value is the 2020 prevalence for drugs other than rohypnol; for this drug the 2019 value is substituted for the 2020 value, which MTF does not report because of small cell size.

[b]Linear decrease from 2021 to 2024 statistically significant (p<.05)

[c]Linear increase from 2021 to 2024 statistically significant (p<.05)

TABLE 5-3
Summary of Drug Trends Pre- and Post-Pandemic
Grade 8, Past 12-Month Use

Drug	2020 prevalence (pre-pandemic)[a]	2021 prevalence	2024 prevalence
Alcohol	20.5	17.2	**12.9**[b]
Any illicit drug + inhalants	18.5	*12.6*	**11.8**
Nicotine vaping	16.6	*12.1*	**9.6**[b]
Any illicit drug	15.6	*10.2*	**9.0**
Marijuana/hashish	11.4	*7.1*	7.2
Flavor vaping	12.3	*7.7*	**6.4**
Alcohol with caffeine	5.7	6.2	**5.8**
Marijuana vaping	8.1	*4.7*	5.6
Flavored alcohol	14.7	*10.2*	**5.3**[b]
Creatine	2.5	3.2	4.6
Inhalants	6.1	4.8	**4.4**
Cough medicines	4.6	*3.5*	4.4
Been drunk	7.5	5.7	**3.6**[b]
Any illicit drug other than marijuana	7.7	*4.6*	**3.4**
Amphetamines	5.3	*3.0*	**2.1**
Adderall	2.7	*1.8*	**1.6**
Snus	1.6	1.2	**1.2**
Hallucinogens	1.7	*1.0*	1.1
Vicodin	0.5	0.6	0.9
Hallucinogens other than LSD	1.1	0.8	0.8
Oxycontin	0.9	0.8	**0.7**
Ritalin	0.5	0.6	0.7
Tranquilizers	2.2	*1.1*	**0.7**[b]
Steroids	1.1	*0.5*	0.6
LSD	1.1	0.7	**0.5**
Ecstasy (MDMA)	0.8	0.6	**0.3**[b]
Rohypnol[a]	0.4	0.2	0.3
Cocaine	0.5	0.2	0.2
Heroin	0.2	0.2	0.2
Methamphetamine	0.5	0.2	**0.1**

Notes: *Red and italicized text indicates that the decline from 2020 to 2021 is largest one-year decline on record for this drug.* **Bold text indicates 2024 levels lower than the 2021 levels measured during pandemic**. Drugs sorted in descending order by 2024 prevalence levels.

[a]This value is the 2020 prevalence for drugs other than rohypnol; for this drug the 2019 value is substituted for the 2020 value, which MTF does not report because of small cell size.

[b]Linear decrease from 2021 to 2024 statistically significant (p<.05)

[c]Linear increase from 2021 to 2024 statistically significant (p<.05)

MONITORING THE FUTURE

CHAPTER 6 – Forthcoming May 2025

CHAPTER 7 – Forthcoming May 2025

CHAPTER 8 – Forthcoming May 2025

CHAPTER 9 – Forthcoming May 2025

CHAPTER 10 – Forthcoming May 2025

APPENDIX A – Forthcoming May 2025

APPENDIX B – Forthcoming May 2025

APPENDIX C – Forthcoming May 2025

APPENDIX D – Forthcoming May 2025