Initiation of Marijuana Use: Trends, Patterns, and Implications

Joseph C. Gfroerer
Li-Tzy Wu
Michael A. Penne

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Substance Abuse and Mental Health Services Administration
Office of Applied Studies

Acknowledgments

This report was prepared by the Division of Population Surveys, Office of Applied Studies (OAS), Substance Abuse and Mental Health Services Administration (SAMHSA), and by RTI of Research Triangle Park, North Carolina, under Contract Nos. 283-98-9008 and 283-99-9018. At SAMHSA, Joseph C. Gfroerer coauthored the report and reviewed its progress. At RTI, Li-Tzy Wu was the major contributor to the report and was task leader for its production. Yvonne U. Ohadike assisted in the preparation of the literature review; Michael A. Penne was statistician for the report and Weihua Shi provided statistical analyses; Ralph E. Folsom, Akhil K. Vaish, Neeraja S. Sathe, and Lea T. Drye conducted the small area estimation; and David Chrest and Shari B. Lambert developed the State maps. Mary Ellen Marsden reviewed the report, Richard S. Straw and David Belton edited it, and Pamela Couch Prevatt and Teresa F. Gurley prepared its web versions.

Obtaining Additional Copies of Publication

Copies may be obtained, free of charge, from the National Clearinghouse for Alcohol and Drug Information (NCADI), a service of SAMHSA. Write or call NCADI at:

National Clearinghouse for Alcohol and Drug Information
P.O. Box 2345, Rockville, MD 20847-2345
(301) 468-2600, 1-800-729-6686, TDD 1-800-487-4889

Electronic Access to Publication

This publication can be accessed electronically through World Wide Web connections:

http://www.samhsa.gov
http://www.DrugAbuseStatistics.SAMHSA.gov

Originating Office

SAMHSA, OAS
5600 Fishers Lane, Room 16-105
Rockville, MD 20857

July 2002

Table of Contents

Chapter **Page**

Table of Contents (continued)

List of Figures

List of Tables

List of Tables (continued)

List of Tables (continued)

List of Tables (continued)

List of Tables (continued)

Table **Page**

Highlights

Estimates of first-time drug use, referred to as incidence or initiation, provide an important measure of the Nation's drug use problem. They suggest emerging patterns of use and identify periods of heightened risk for an immediate focus on the prevention of substance use, particularly among children and youths. Incidence data also suggest the future burden on substance abuse treatment systems. This report contains an analysis of the initiation of marijuana use. Marijuana is the most widely used illicit drug in the United States and is, in most cases, the first illicit drug used by persons who have used an illicit drug. The analysis is based on data from the 1999 and 2000 National Household Surveys on Drug Abuse (NHSDAs). Selected findings are given below:

- An estimated 2.0 million Americans aged 12 or older used marijuana for the first time in 1999. This was fewer than the estimated number of new users in 1998 (approximately 2.5 million Americans), but still above the 1989 and 1990 levels (1.4 million each year).

- The rate of marijuana initiation increased during the late 1960s and early 1970s, with a peak in 1976 and 1977 (21.0 per 1,000 potential new users). After that period, the rate of new marijuana use decreased to 8.5 in 1990, followed by an increase to 16.8 in 1996, then a decrease to 13.6 in 1999.

- The trend in marijuana incidence since 1965 followed the same general pattern for males and females, although rates for females were consistently below rates for males. In 1999, the rates of new use per 1,000 potential new users were 15.5 for males and 12.1 for females.

- The rates of first marijuana use among American Indians/Alaska Natives were higher than for other racial/ethnic groups during the 1990s. Unlike the overall trend in rates, which showed a peak in 1996, the trend for American Indians/Alaska Natives indicated a continuing increase, reaching 46.5 per 1,000 potential new users in 1999.

- The mean age at first marijuana use was 19 years in the early 1970s and decreased to 17 years in the 1990s. The trends for males and females were parallel, with males initiating at an earlier age than females, on average. The average age of new marijuana users in 1999 was 16.4 years for males and 17.6 years for females.

- These average annual incidence rates varied slightly across different States and age groups. Colorado, Delaware, Massachusetts, New Hampshire, and Vermont were ranked in the top 10 for the overall age group (ages 12 or older), the youth age group (ages 12 to 17), and the young adult age group (ages 18 to 25). New Mexico had the highest rate

for the overall and youth age groups. Minnesota had the highest rate for the overall and young adult age groups. By comparison, Louisiana had the lowest rate of recent new users for the overall, youth, and young adult age groups. Texas and Utah had the lowest rates of recent initiation among youths and young adults.

- Among recent initiates of marijuana (first use in 1998 or 1999), nearly three quarters had first used between the ages of 13 and 18. More than a quarter initiated use at age 14 or younger.

- Approximately 60 percent of recent initiates had used both alcohol and cigarettes prior to their first use of marijuana. About 9 percent had never used alcohol or cigarettes at the time of first marijuana use, and the remaining recent initiates had used either alcohol only (16.6 percent) or cigarettes only (14.8 percent).

- The average number of marijuana initiates per day during 1998 and 1999 was highest in June and July. For females, the months with the highest rates of initiation were January and July. On average during 1998 and 1999, there were 3,197 male initiates and 2,989 female initiates per day. Among males, the number of daily initiates increased to approximately 4,300 in June and July. Among females, the estimated initiates per day rose to 3,625 in July and 3,519 in January.

- Prior use of alcohol or cigarettes was highly correlated with becoming a new marijuana user. Among persons aged 12 to 25 who had never used marijuana, those who had smoked cigarettes were an estimated 6 times more likely than nonsmokers to initiate marijuana use within 1 year. Alcohol users were an estimated 7 to 9 times more likely than nonusers to start using marijuana within a year. Daily cigarette smoking was associated with a twofold increase in risk for marijuana initiation.

- Initiation of marijuana use before age 15 was associated with a greater risk of other drug use behaviors at age 26 or older. These behaviors include heroin use, cocaine use, nonmedical psychotherapeutic use, daily or almost daily marijuana use, and weekly use of illicit drugs other than marijuana.

- Initiation of marijuana use before age 15 was associated with a greater risk of illicit drug dependence or abuse at age 26 or older. Relative to adults who had initiated marijuana use at age 21 or older, adults who had first used before age 15 were 6 times as likely to be dependent on an illicit drug.

1. Introduction

1.1 Purpose of the Report

Estimates of first-time drug use, referred to as incidence or initiation, provide an important measure of the Nation's drug use problem. They suggest emerging patterns of use and identify periods of heightened risk for an immediate focus on the prevention of substance use, particularly among children and youths. Incidence data also suggest the future burden on substance abuse treatment systems.

This report contains an analysis of the initiation of marijuana use. Marijuana is the most widely used illicit drug in the United States and is in most cases the first illicit drug used by persons who have used an illicit drug. The analysis is based on data from the 1999 and 2000 National Household Surveys on Drug Abuse (NHSDAs). Overall estimates of the prevalence and rate of marijuana initiation based on combined 1999 and 2000 data were released in September 2001 (Office of Applied Studies [OAS], 2001b). Those results showed that, although there was a decrease in incidence from 2.6 million new users in 1996 to 2.0 million in 1999, these levels were still significantly higher than the levels in 1990 (1.4 million). The purpose of this report is to present more in-depth analyses of incidence rates among population subgroups, demographic characteristics and predictors of recent initiates, and consequences of early marijuana initiation. Specifically, this report has four objectives:

- estimate incidence rates and trends of marijuana use,
- provide State-specific incidence estimates,
- identify characteristics and predictors of recent marijuana initiates, and
- examine the relationship between early marijuana use and later drug use patterns.

The report is organized into seven chapters and two appendices. Chapter 2 describes the data source, measures of key study variables, and statistical methods. Chapter 3 presents incidence rates and trends of marijuana use based on the combined 1999 and 2000 computer-assisted interviewing (CAI) data. Chapter 4 summarizes incidence rates by State using small area estimation (SAE) methods. Chapter 5 examines social and demographic characteristics of recent marijuana initiates and predictors of initiation. This chapter also examines the relationship of marijuana initiation with school status, employment, and marital status among those aged 18 to 25 years. Chapter 6 addresses the relationship between early marijuana use and later drug use patterns, including lifetime and past year use of heroin, cocaine,

and psychotherapeutics nonmedically; heavy marijuana use; heavy illicit drug use other than marijuana; abuse of and/or dependence on alcohol or other drugs; marijuana dependence; illicit drug dependence other than marijuana; illicit drug dependence; and alcohol dependence. Chapter 6 also reports findings on the relationship between the age at onset of marijuana use and past year drug dependence among lifetime marijuana users aged 26 or older who also used marijuana in the past year. Chapter 7 provides a summary of overall findings and conclusions and discusses some implications. Appendix A discusses the statistical methods used and the limitations of the NHSDA data, describes the statistical methods for calculating incidence rates and potential biases associated with incidence estimates, and discusses the change in NHSDA measures of substance use initiation and its impact on incidence rate calculation. Appendix B presents selected standard error tables for population estimates in the report. Appendix C provides selected questionnaire pages from the 1999 and 2000 NHSDAs on the demographic and marijuana questions.

1.2 Background on Marijuana Use and Initiation of Marijuana Use

1.2.1 Recent Trends in Use

Marijuana is the most widely used illicit drug in the United States (OAS, 2001b). According to the 2000 NHSDA, an estimated 14.0 million Americans were current (past month) marijuana users (OAS, 2001b). This represents 6.3 percent of people aged 12 or older and 76 percent of current illicit drug users. Of all current illicit drug users, approximately 59 percent used only marijuana, 17 percent used marijuana and another illicit drug, and the remaining 24 percent used only an illicit drug other than marijuana in the past month (OAS, 2001b).

The NHSDA and the Monitoring the Future (MTF) have shown generally similar long-term trends in the prevalence of substance use among youths, regardless of substantial differences in methodology between the two primary surveys of youth substance use. Between 1999 and 2000, both the NHSDA and MTF found no significant changes in lifetime, past year, and current use of marijuana (Johnston, O'Malley, & Bachman, 2001; OAS, 2001b).

The MTF found that marijuana use rose particularly sharply among 8th graders in the 1990s, with annual prevalence tripling between 1991 and 1996 (i.e., from 6 to 18 percent) (Johnston et al., 2001). Starting a year later, marijuana use also rose significantly among 10th and 12th graders. Following the recent peak in 1996-1997, annual marijuana use declined somewhat in recent years (Johnston et al., 2001).

1.2.2 Prior Studies of Marijuana Initiation

Although the prevalence of marijuana use has been studied widely, relatively few incidence (first use) data are available. In the first published analysis of national incidence trends, Gfroerer and Brodsky (1992) estimated the number of new users of marijuana and other drugs based on combined data of 1985 to 1991 NHSDAs. They found that fewer than half a million people per year began using marijuana before 1966 and that new use of marijuana began increasing after 1966, reaching a peak in 1973 and declining thereafter. Johnson, Gerstein, Ghadialy, Choi, and Gfroerer (1996) studied the incidence of alcohol, cigarettes, and illicit drugs using data from the 1991 to 1993 NHSDAs. Their investigation found declining trends of marijuana initiation at all ages since at least the late 1970s. However, the mean age of marijuana initiates declined throughout most of the measurement period, from older than 19 years in the mid-1960s to younger than 18 years in the late 1980s and early 1990s. In addition, the rates of marijuana initiation at ages 12 to 17 (youths) and 18 to 25 (young adults) in the early 1990s were still much higher than corresponding rates in the early 1960s.

In recent years, youths aged 12 to 17 have constituted about two thirds of the new marijuana users, with young adults aged 18 to 25 constituting most of the remaining third (OAS, 2001b). Additionally, recent rates of new use among youths in 1996-1998 (averaging 86.4 initiates per 1,000 potential new users) were higher than they had ever been. Nonetheless, rates of new use for both youths and young adults decreased between 1998 and 1999. The average age of marijuana initiation has generally declined since 1965 and remained around 17 years after 1992 (OAS, 2001b).

1.2.3 Research on Seasonality of Substance Use

There are no known prior studies of seasonal patterns in the initiation of substance use. A few studies, however, have looked at seasonal patterns in use. Zingraff and Belyea (1983) suggested a possibility of increased rates of marijuana use during the summer months; other researchers have suggested that variations in activities during the different seasons may influence substance use (McKee, Sanderson, Chenet, Vassin, & Skolnikov, 1998). Kovalenko et al. (2000) studied the seasonality in symptoms of mental and substance use disorders among youths aged 9 to 17 and found a weak seasonality in the counts of symptoms of marijuana use, with estimated zeniths in August and September. The investigators suggested that the possible seasonality in marijuana use may be related to the cycles in school attendance.

On the other hand, one analysis found a lower prevalence of current marijuana during July to September. Using data from 1992-1996 NHSDAs, Huang, Schildhaus, and Wright (1999) examined the seasonality of past month substance use on a quarterly basis. In their logistic regression model controlling for survey year, age, gender, race/ethnicity, and region, current use

of the following substances among youths aged 12 to 17 was observed to show seasonal differences: alcohol, an illicit drug except marijuana, marijuana only, an illicit drug, and heavy drinking. Youths were 1.3 times more likely to engage in current marijuana use only in Quarter 4 (October-December) than in Quarter 3 (July-September). Relative to Quarter 3, youths also were 1.2 times more likely to use an illicit drug in Quarter 1 (January-March). Further analyses found that, during Quarter 3, youths were significantly less likely to report being approached by drug dealers in the past month than in the other quarters.

1.2.4 Predictors of Initiation

Little research exists on the predictors of marijuana initiation. Van Etten and Anthony (1999) examined the initial opportunity to try marijuana and the transition from first opportunity to first marijuana use using data from the 1979 to 1994 NHSDAs. They found that an estimated 51 percent of U.S. residents had an opportunity to try marijuana. One striking finding is that 43 percent of those with an opportunity went on to first use marijuana within 1 year of the first opportunity (i.e., making a rapid transition). The study also found that males were more likely than females to have an opportunity to use marijuana, but were not more likely to eventually use marijuana once an opportunity was presented. Research has also shown that the risk of initiating marijuana use is associated with age and birth cohort. Chen and Kandel (1995) found that the major risk period for initiation into marijuana was mostly over by age 20. Gfroerer and Epstein (1999) also found that marijuana initiation was unlikely to occur after age 21. Rates of first marijuana use were higher among younger people and cohorts born after World War II than older people and cohorts born before World War II (Johnson et al., 1996; Johnson & Gerstein, 1998).

The onset of marijuana use also is influenced by a variety of personal, family, and community risk and protective factors, such as affiliation with drug-using peers, personality dimensions (e.g., unconventionality), and the parent-child bond (Brook et al., 1999a; Clayton, 1992).

1.2.5 Sequencing of Substance Use Initiation

Marijuana has been hypothesized to be a gateway drug for other illicit drug use. Studies by Kandel and other investigators have identified a developmental sequence of drug involvement among youths (Ellickson, Hays, & Bell, 1992; Kandel, Yamaguchi, & Chen, 1992; Yamaguchi & Kandel, 1984). Specifically, the initial use of alcohol and/or cigarettes typically precedes the use of marijuana, which then is followed by the involvement of other illicit drugs. By studying a sample of rural youths, Donnermeyer (1993) also found that early use of alcohol predicted early use of marijuana, which in turn was predictive of early use of other illicit drugs. Studies of age at initiation of drug use confirmed that initiation of alcohol or tobacco typically occurred before

marijuana initiation (Costello, Erkanli, Federman, & Angold, 1999; Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000).

1.2.6 Early Marijuana Use and Later Substance Use Problems

Not only does early marijuana use signal an increased risk for hard drug use by grade 10 (Ellickson & Morton, 1999), but it also is associated with drug use problems, dependency, and treatment need (Brook, Richter, Whiteman, & Cohen, 1999b; Clark, Kirisci, & Tarter, 1998; Gfroerer & Epstein, 1999). Among individuals with a history of marijuana dependence, the age at onset of marijuana dependence was younger in the adolescent-onset individuals compared with the adult-onset individuals, and the time from the first use to the onset of dependence also was shorter in the adolescent-onset individuals (Clark et al., 1998). Among middle school students, use of marijuana and other drugs before the age of 12 was found to be associated with engaging in greater numbers of health risk behaviors than among students whose age at onset was 12 years or older or the never users (DuRant, Smith, Kreiter, & Krowchuk, 1999). Early marijuana use is associated with later adolescent problems that limit the acquisition of skills necessary for employment and increased risk of contracting the human immunodeficiency virus (HIV) and using illicit drugs (Brook et al., 1999b). Gfroerer and Epstein (1999) used NHSDA data to examine the impact of marijuana initiation on future drug abuse treatment need and found age at first use of marijuana as the most significant predictor of treatment need in all four age groups (i.e., 12 to 17, 18 to 25, 26 to 34, and 35 or older).

The number of new marijuana users may have a significant impact on the future demand for substance abuse treatment as some new users continue into heavier marijuana use or other illicit drug taking. Consequently, delaying the onset of marijuana initiation could be important in preventing the progression into heavy drug involvement and other drug-related health risk behaviors, as well as in decreasing the social burdens of illicit drug use.

Taken together, studies of marijuana initiation provide vital information for focused prevention programs about the periods of heightened initiation risk, specify subgroups vulnerable to initial use, and generate estimates on treatment needs and future demand for substance abuse treatment.

2. Data and Methods

2.1 Data Source

The National Household Survey on Drug Abuse (NHSDA) is the primary source of statistical information on the use of licit and illicit drugs by the U.S. population aged 12 or older. Conducted by the Federal Government since 1971, the survey collects data by administering questionnaires to a representative sample of the population through face-to-face interviews at their place of residence. The survey is sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA). Data collection is carried out by RTI of Research Triangle Park, North Carolina, under a contract with SAMHSA's Office of Applied Studies (OAS).

The target population covers residents of households, noninstitutional group quarters (e.g., shelters, rooming houses, dormitories), and civilians living on military bases. Persons excluded from the survey include homeless people who do not use shelters, active military personnel, and residents of institutional group quarters, such as prisons and long-term hospitals. The survey is conducted from January through December each year.

Prior to 1999, the NHSDA was administered in about an hour and used paper-and-pencil interviewing (PAPI) methods. The NHSDA PAPI instrumentation consisted of a questionnaire booklet completed by the interviewer and a set of individual answer sheets completed by the respondent. All substance use questions and other sensitive questions appeared on the answer sheets so that the interviewer was not aware of the respondent's answers. Less sensitive questions, such as demographics, occupational status, and household size and composition, were asked aloud by the interviewer and recorded in the questionnaire booklet.

Beginning in 1999, the NHSDA underwent a major redesign. The new features of the survey design produce a significant impact on the NHSDA estimates for substance use. In addition to the following summary, see the report titled *Development of Computer-Assisted Interviewing Procedures for the 1999 National Household Survey on Drug Abuse* (OAS, 2001a).

First, the method of data collection was changed from a paper questionnaire administration to a computer-assisted administration. The 1999 NHSDA marked the first survey year in which the national sample was interviewed using a computer-assisted interviewing (CAI) methodology. The survey used a combination of computer-assisted personal interviewing (CAPI) conducted by the interviewer and audio computer-assisted self-interviewing (ACASI). For the most part, questions previously administered by the interviewer are now administered by the interviewer using CAPI, and questions previously administered using answer sheets are now

administered using ACASI. The CAI method has many advantages over PAPI, including more efficient collection and processing of the data and improved data quality.

Use of ACASI is designed to provide the respondent with a highly private and confidential means of responding to questions and should increase the level of honest reporting of illicit drug use and other sensitive behaviors. The interview averages about an hour. In brief, the interview begins in CAPI mode with the field interviewer (FI) reading the questions from the computer screen and entering the respondent's replies into the computer. The interview then transitions to the ACASI mode for the sensitive questions. In this mode, the respondent can read the questions silently on the computer screen and/or listen to the questions read through headphones and enter his or her responses directly into the computer. At the conclusion of the ACASI section, the interview returns to the CAPI mode with the interviewer completing the questionnaire. No personal identifying information is captured in the CAI record for the respondent.

Second, the sample design was changed from a strictly national design to a State-based sampling plan. Beginning in 1999, the NHSDA sample employed a 50-State design with an independent, multistage area probability sample for each of the 50 States and the District of Columbia. The eight States with the largest population (which together account for 48 percent of the total U.S. population aged 12 or older) were designated as large sample States (i.e., California, Florida, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas). For these States, the design provided a sample large enough to support direct State estimates. For the remaining 42 States and the District of Columbia, smaller, but adequate samples were selected to support State estimates using small area estimation (SAE) techniques. The design also oversampled youths and young adults so that each State's sample was approximately equally distributed among three major age groups: 12 to 17 years, 18 to 25 years, and 26 years or older.

The NHSDA also tripled its sample size in 1999, which makes it possible to produce marijuana use estimates separately for every State and the District of Columbia and for smaller population subgroups. It also allows more detailed analyses of national patterns of use, predictors of recent initiation, and consequences of early first use of marijuana. The precision of the estimates at the national level has been improved substantially. The CAI methodology has made data collection and processing more efficient and improved the quality of the data. However, because of the major differences between the CAI and PAPI methods, it is not appropriate to compare the 1999 and 2000 CAI estimates of substance use with earlier NHSDA estimates in order to assess changes over time in substance use. In addition, the sample expansion had unexpected effects on some aspects of the data collection. In-depth analyses of these methodological issues are described in another SAMHSA report (Gfroerer, Eyerman, & Chromy, in press).

Third, beginning in 1999, the NHSDA questionnaire allows for collecting year and month of first use for recent initiates (i.e., new drug users). In addition, the questionnaire call record provides the date of the interview. Exposure time to substances can be determined in terms of days and converted to an annual measure. Having data about exact dates of birth and first use allows person time of exposure to a drug during the targeted period to be determined. In prior years, before exact date data were available for computing incidence of drug use, the calculation of the person time exposure for incidence rates of drug use was based on an approximation, rather than an exact computation for each person. Thus, because of the changes in methodology since the 1999 NHSDA, the estimates from the 1999 and 2000 surveys are not completely comparable with data obtained from prior surveys. Nonetheless, because all incidence estimates in this report, including pre-1999 estimates, are based on the 1999 and 2000 NHSDAs, they are comparable. A more complete discussion of the differences between the old and new incidence estimates is presented elsewhere (Chromy, in press; Gfroerer et al., in press).

2.2 Limitations of the Data

Regardless of the survey year, the NHSDAs are all based on retrospective reports by survey respondents, and they may be subject to similar kinds of recall and reporting biases. Some sources of biases are related to the NHSDA designs and retrospective self-reports.

First, some degree of underreporting on drug use-related behaviors might have occurred because of the social acceptability of drug use behaviors and respondents' fear of disclosure. Prior studies showed that underreporting of drug use among youths in their homes may be substantial (Gfroerer, 1993; Gfroerer, Wright, & Kopstein, 1997). Self-report data also are influenced by memory and recall errors, including recall decay (tendency to forget events occurring long ago) and forward telescoping (tendency to report that an event occurred more recently than it actually did). These memory errors would both tend to result in estimates for earlier years (i.e., 1960s and 1970s) that are downwardly biased (because of recall decay) and estimates for later years that are upwardly biased (because of telescoping).

Second, the NHSDA target population focuses on civilian, noninstitutionalized household residents. Although it includes almost 98 percent of the U.S. population aged 12 or older, some population subgroups who may have different drug-using patterns are excluded, such as active military personnel, people living in institutional group quarters, and homeless persons not living in identifiable shelters. Thus, the generalizability of the findings to the excluded subgroups is limited. Further, the estimates for drug use should be considered conservative.

Third, there is a potential bias associated with differential mortality because some individuals who were exposed to the risk of first drug use in the historical periods shown in the

tables died before the 1999 NHSDA was conducted. This bias is probably very small for analyses of recent marijuana initiation.

Fourth, marijuana incidence trends based on NHSDA data may be biased. Johnson, Gerstein, and Rasinski (1998) concluded that the marijuana incidence trend from the NHSDA may be biased because the reporting of initiation declines as the length of time between initiation and the survey increases. However, their analysis did not address very recent estimates, which could be biased because they reflect recent drug use and because they are heavily based on the reports of adolescents. Appendix A presents estimates for cocaine, heroin, and marijuana use based on single years of NHSDA data in order to better understand the size of the biases and to assess the reliability of estimates for recent years. This analysis shows that marijuana initiation rates appear to have small biases.

2.3 Analysis Sample

A total of 66,706 respondents aged 12 or older completed the 1999 survey, and a total of 71,764 respondents completed the 2000 survey (Tables 2.1 and 2.2). The analysis samples for this report vary depending on the specific objective of the chapter. The full sample of 1999 and 2000 CAI data (N = 138,470) was used to estimate trends in the incidence of marijuana use (Chapter 3), as well as State-level incidence rates (Chapter 4). The characteristics of recent initiates (Section 5.2) were examined in a sample consisting of individuals who started to initiate marijuana use in 1998 and individuals who had never used marijuana prior to 1998 in the 1999 NHSDA, as well as 1998 and 1999 marijuana initiates and individuals who had never used marijuana prior to 1998 in the 2000 NHSDA (n = 99,752). The analysis of seasonality (Section 5.3) was based on all marijuana users who were asked the month of first use question and reported it (i.e., no imputed data) (n = 2,085). These users reflect persons interviewed during 1999 and 2000 who initiated marijuana either at their current age or at 1 year less than their current age. Although this captures some initiation occurring in 1997 and 2000, it primarily represents 1998 and 1999 initiation.

The sample for the analysis of predictors of recent initiation (Section 5.4) was restricted to 1998 marijuana initiates and individuals who had never used marijuana prior to 1998 in the 1999 NHSDA, as well as 1999 marijuana initiates and individuals who had never used marijuana prior to 1999 in the 2000 NHSDA (n = 97,530). Using this sample allows the analysis to reflect the population that had never used marijuana at a point in time and model the transition from nonuse to use over a 1-year time period.

For the analysis of the relationship between early use and later drug use patterns (Chapter 6), the sample included all lifetime marijuana users aged 26 or older in 1999 and 2000 CAI data

(n = 16,652). Because the 1999 questionnaire did not fully represent the criteria in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (American Psychiatric Association [APA], 1994), the analysis of substance dependence and/or abuse was conducted on data from the 2000 survey (n = 8,927). A subset of the analysis investigated whether the risk of substance dependence and/or abuse was greater for early initiates than late initiates among lifetime marijuana users who used it in the past year. The analysis sample was based on lifetime marijuana users aged 26 or older who also used marijuana in the past year (n = 1,447).

2.4 Measures and Definitions of the Terms Used in the Report

This section describes the NHSDA measures and definitions of the following study variables: first marijuana use; social and demographic variables; use of cigarettes, alcohol, and other drugs; heavy use of illicit drugs; and dependence on or abuse of alcohol and other drugs.

2.4.1 First Marijuana Use

Estimates of first use, incidence, or initiation of marijuana use were based on the following questions: age at first use, year and month of first use for recent initiates, the respondent's date of birth, and the interview date. By using this information, along with editing and imputation when necessary, an exact date of first use was determined for each marijuana user. Recent marijuana initiates were defined as persons who reported that their first use of marijuana occurred during 1998 or 1999. Age at first marijuana use was defined as self-reported age at first use of marijuana and was grouped into four categories (i.e., aged 14 or younger, 15 to 17, 18 to 20, and 21 or older).

2.4.2 Social and Demographic Variables

A range of social and demographic variables was included in the 1999 and 2000 NHSDAs. Age of the respondent was defined as "age at time of interview." In the predictor analysis (Section 5.4), age was defined as "age on January 1, 1998" in the 1999 survey and as "age on January 1, 1999" in the 2000 survey. Race/ethnicity was coded into the following categories: (a) non-Hispanic whites (referred to as "whites"); (b) non-Hispanic blacks (referred to as "blacks"); (c) Hispanics; (d) non-Hispanic American Indians/Alaska Natives; (e) non-Hispanic Asians/Pacific Islanders/Native Hawaiians; and (f) non-Hispanic persons reporting more than one race. Level of education (for 18 to 25 year olds only) was categorized into four groups: school dropouts, high school students, high school graduates, and college students or graduates. A school dropout was defined as an individual aged 18 to 25 who had completed less than the 12th grade, reported not being currently enrolled in school, and did not have a high school degree or take an equivalency exam (e.g., a general equivalency diploma [GED]).

Employment status (for 18 to 25 year olds only) was categorized into employed persons (full-time or part-time) and not employed persons (unemployed individuals, students, or others). Not employed persons in this age group primarily consist of students. Marital status was categorized into two groups: never married and ever married (for 18 to 25 year olds only).

Population density was grouped into three categories: large metropolitan, small metropolitan, and nonmetropolitan. *Large metropolitan areas* had a population of 1 million or more; *small metropolitan areas* had a population of less than 1 million; and *nonmetropolitan areas* were areas outside metropolitan statistical areas (MSAs). *Residential region* was categorized into four regions: Northeast, Midwest, South, and West. The *Northeast region* has nine States: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The *Midwest region* has 12 States: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The *South region* has 16 States, as well as the District of Columbia: Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. And the *West region* has 13 States: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

2.4.3 Use of Cigarettes, Alcohol, and Other Drugs

The definitions for the use of cigarettes, alcohol, and other drugs include past year use and lifetime use. *Lifetime use* referred to a respondent reporting any use of the substance at least once in his or her lifetime. *Past year use* referred to a respondent reporting any use of the substance at least once during the 12 months preceding the interview date. Use of psychotherapeutic drugs was defined as any nonmedical use of prescription-type pain relievers, sedatives, tranquilizers, or stimulants (i.e., when it was not prescribed for the respondent, or used only for the experience or feeling it caused). Pain relievers include painkillers like Darvon, Demerol, Percodan, and Tylenol with codeine. Sedatives are sometimes referred to as "downers" and include barbiturates, sleeping pills, and Seconal. Tranquilizers include antianxiety drugs, such as Librium, Valium, Ativan, and Meprobamate. Stimulants are often called "uppers" or "speed" and include amphetamines and Preludin.

2.4.4 Heavy Use of Illicit Drugs

Heavy marijuana use was defined as using marijuana daily or almost daily in the past year (i.e., at least 300 days). Heavy use of other illicit drugs referred to using one or more of the following drugs on at least 50 days in the past year: cocaine, hallucinogens, heroin, inhalants, pain relievers, sedatives, tranquilizers, or stimulants, regardless of heavy marijuana use.

2.4.5 Dependence on or Abuse of Alcohol and Other Drugs

The 2000 NHSDA included a series of questions to assess substance dependence and abuse based on DSM-IV criteria (APA, 1994). The seven *dependence criteria* are (1) tolerance; (2) withdrawal or avoidance of withdrawal; (3) persistent desire or unsuccessful attempts to cut down or stop substance use; (4) spending a lot of time using the substance, obtaining the substance, or recovering from its effects; (5) reducing or giving up occupational, social, or recreational activities in favor of substance use; (6) impaired control over substance use; and (7) continuing to use the substance despite physical or psychological problems. A respondent was considered to be dependent on a substance when he or she reported having at least three of the dependence criteria.

The four substance *abuse criteria* are (1) having serious problems due to substance use at home, work, or school; (2) the use of that substance putting the respondent in physical danger; (3) substance use causing the respondent to be in trouble with the law; and (4) continuing to use the substance despite having substance-use-related problems with family and friends. A respondent was classified with abuse when he or she reported having at least one of the four abuse criteria.

The following types of substance dependence or abuse were studied in relation to age at first use of marijuana:

- *Illicit Drug Dependence or Abuse*: dependence on or abuse of an illicit drug in the past year (i.e., marijuana, cocaine/crack, hallucinogens, inhalants, heroin, pain relievers, sedatives, tranquilizers, or stimulants).

- *Alcohol or Illicit Drug Dependence or Abuse*: dependence on or abuse of either alcohol or an illicit drug in the past year (i.e., marijuana, cocaine/crack, hallucinogens, inhalants, heroin, pain relievers, sedatives, tranquilizers, or stimulants).

- *Illicit Drug Dependence*: dependence on an illicit drug in the past year (i.e., marijuana, cocaine/crack, hallucinogens, inhalants, heroin, pain relievers, sedatives, tranquilizers, or stimulants).

- *Alcohol Dependence*: dependence on alcohol in the past year.

- *Marijuana Dependence*: dependence on marijuana in the past year.

- *Other Illicit Drug Dependence*: dependence on cocaine/crack, hallucinogens, inhalants, heroin, pain relievers, sedatives, tranquilizers, or stimulants in the past year, regardless of marijuana dependence.

2.5 Statistical Methods

2.5.1 Incidence Estimation: National

SUrvey DAta ANalysis (SUDAAN) software (Shah, Barnwell, & Bieler, 1996) was used for the analyses to take into account the complex survey design of the NHSDA. The incidence rate of marijuana was defined as the rate of new marijuana users in a given year (i.e., the number of new marijuana users divided by the person time of exposure) (Appendix A). By applying sample weights to the incidence of first use, estimates of the number of new users for each year were made. The incidence of first use was classified by year of occurrence. For age-specific incidence rates, the period of exposure was defined for each respondent and age group for the time that the respondent was in the age group during the calendar year. For the analysis that used aggregated 1999 and 2000 data, sample weights were adjusted to obtain a simple average weight over 2 years (i.e., averaging the weights by dividing them by two).

2.5.2 Incidence Estimation: State

The average annual numbers of marijuana initiates and rates by State, as reported in Chapter 4, were obtained using small area estimation (SAE) methods applied to the pooled 1999-2000 survey data and are, therefore, different from incidence estimates reported in the other chapters. A detailed discussion of the SAE methodology can be found in *State Estimates of Substance Use from the 2000 NHSDA* (Wright, in press).

In brief, NHSDA State estimates of each substance use measure are produced by combining an estimate of the measure based on the State sample data with the estimate of the measure based on a national regression model applied to local-area county and Census block group/tract-level estimates from the State. The parameters of the regression model are estimated from the entire national sample. Because the 42 smaller (in terms of population) States and the District of Columbia have smaller samples than the eight large States, estimates for the smaller States rely more heavily on the national model. The model for each substance use measure typically utilizes from 50 to 100 independent variables in the estimation. These variables include basic demographic characteristics of respondents (e.g., age, race/ethnicity, and gender), demographic and socioeconomic characteristics of the Census tract or block group (e.g., average family income and percentage of single-mother households), and county-level substance abuse and other indicators (e.g., rate of substance abuse treatment, drug arrest rate, and drug- and alcohol-related mortality rate). Population counts by State and age group are applied to the estimated rates to obtain the estimated number of persons with the substance use characteristic.

Corresponding to each SAE estimate is a 95 percent prediction interval (PI) that indicates the precision of the estimate. The PI accounts for variation due to sampling as well as variation due to the model and is derived from the process that generates the State SAE. There is a 95 percent probability that the true value lies within the interval.

The incidence estimates discussed in this report are based on the combination of two separate measures: (1) the number of marijuana initiates during the past 24 months, and (2) the number of persons who have never used marijuana. Each of these measures is generated independently using SAE, by State and age group. The following formula was used to generate the average annual rate of first use of marijuana for each State:

Average annual incidence rate =
0.5 * {*Number of initiates in past 24 months* /
[(*Number of initiates in past 24 months* * 0.5) + *Number of persons who never used*]}.

2.5.3 Logistic Regression Analyses

Logistic regression procedures were used to (1) determine the characteristics and suspected predictors of recent initiation and (2) examine the relationship between early onset of marijuana use and later drug use patterns (e.g., heavy illicit drug use, alcohol and/or illicit drug dependence or abuse). Odds ratio (OR) estimates derived from logistic regression procedures denote the estimated magnitude of an association between a binary outcome and a covariate. In this report, the *p* value equal to or less than .05 is considered statistically significant. The OR estimate greater than 1 indicates a positive association between the outcome of interest and the covariate; a value of less than 1 reflects an inverse association.

Table 2.1 Survey Sample Sizes for All Respondents Aged 12 or Older, by Age Group and Demographic Characteristics: 1999 and 2000

	Total		Age Group (Years)					
			12-17		18-25		26 or Older	
Demographic Characteristic	**1999**	**2000**	**1999**	**2000**	**1999**	**2000**	**1999**	**2000**
Total	66,706	71,764	25,357	25,717	21,933	22,613	19,416	23,434
Gender								
Male	32,092	34,386	12,798	12,977	10,411	10,716	8,883	10,693
Female	34,614	37,378	12,559	12,740	11,522	11,897	10,533	12,741
Hispanic Origin and Race								
Not Hispanic								
White only	46,054	49,415	16,90	17,047	14,697	14,991	14,456	17,377
Black only	7,982	8,494	3,297	3,367	2,729	2,711	1,956	2,416
American Indian or Alaska Native only	739	769	273	288	278	270	188	211
Native Hawaiian or other Pacific Islander	232	261	92	92	84	108	56	61
Asian only	2,146	2,393	795	784	765	856	586	753
More than one race	1,072	1,039	483	468	380	352	209	219
Hispanic	8,481	9,393	3,516	3,671	3,000	3,325	1,965	2,397
Adult Education[1]								
< High school	7,458	8,376	N/A	N/A	4,347	4,771	3,111	3,605
High school graduate	14,845	16,026	N/A	N/A	8,218	8,234	6,627	7,792
Some college	11,692	12,577	N/A	N/A	6,990	6,954	4,702	5,623
College graduate	7,354	9,068	N/A	N/A	2,378	2,654	4,976	6,414
Current Employment[1]								
Full-time	23,723	26,826	N/A	N/A	11,433	11,984	12,290	14,842
Part-time	7,220	7,567	N/A	N/A	5,184	5,113	2,036	2,454
Unemployed	1,705	1,706	N/A	N/A	1,266	1,237	439	469
Other[2]	8,701	9,948	N/A	N/A	4,050	4,279	4,651	5,669

N/A: Not applicable.

[1] Data on adult education and current employment not shown for youths aged 12 to 17. Estimates for both adult education and current employment are for persons aged 18 or older.

[2] Retired, disabled, homemaker, student, or "other."

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 2.2 Survey Sample Sizes for All Respondents Aged 12 or Older, by Age Group and Geographic Characteristics: 1999 and 2000

	Total		Age Group (Years)					
			12-17		18-25		26 or Older	
Geographic Characteristic	**1999**	**2000**	**1999**	**2000**	**1999**	**2000**	**1999**	**2000**
Total	66,706	71,764	25,357	25,717	21,933	22,613	19,416	23,434
Geographic Division								
Northeast	11,830	14,394	4,475	5,102	3,656	4,310	3,699	4,982
Midwest	18,103	19,355	6,530	6,655	6,165	6,236	5,408	6,464
South	21,018	22,041	7,731	7,856	7,189	7,189	6,098	6,996
West	15,755	15,974	6,621	6,104	4,923	4,878	4,211	4,992
County Type								
Large metro	25,901	28,744	10,116	10,576	8,121	8,759	7,664	9,409
Small metro	22,612	24,579	8,316	8,505	7,859	8,108	6,437	7,966
Nonmetro	18,193	18,441	6,925	6,636	5,953	5,746	5,315	6,059

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

3. Trends in Marijuana Incidence

3.1 Introduction

Estimates of marijuana incidence, or the number of new marijuana users during a given year, provide an important measure of the Nation's marijuana use problem. They can suggest emerging patterns of use, give clues about the changes in the prevalence of use, identify at-risk subgroups for targeting prevention programs, and suggest substance abuse treatment needs for the Nation.

This chapter presents incidence estimates of marijuana use based on data from the 1999 and 2000 National Household Surveys on Drug Abuse (NHSDAs). These incidence estimates are based on the NHSDA questions on age at first use, year and month of first use for recent initiates, the respondent's date of birth, and the interview date. Using this information, along with editing and imputation when necessary, an exact year, month, and day of first use was determined for each substance used by each respondent. Because these data were collected on a retrospective basis, incidence estimates were always 1 year behind the data on current use. For age-specific incidence rates, the period of exposure was defined for each respondent and age group for the time that a respondent was in an age group during a calendar year.

The average age of new users in each year also was estimated. These rates are presented in this report as the number of new marijuana users per 1,000 potential new users because they indicate the rate of new use among persons who had not yet used the drug (i.e., potential new users). More precisely, the rates are actually the number of new users per 1,000 person-years of exposure. The numerator of each rate is the number of persons in the age group who first used the drug in the year. The denominator is the person time exposure measured in thousands of years. Each person's exposure time ends on the date of first use. For age-specific estimates, exposure is limited to the time during the year that the person was in that age group. Persons who first used the drug in a prior year had zero exposure to first use in the current year, and persons who still had never used the drug by the end of the current year had 1 full year of exposure to the risk.

Because these incidence estimates were based on retrospective reports, they were subject to several biases, as discussed in Chapter 2. It is possible that some of these biases, particularly telescoping and underreporting because of fear of disclosure, may affect estimates for the most recent years more significantly. However, further analysis is needed to understand the magnitude of these biases. In addition, the estimates in this report were based on the new CAI data, and the estimation methodology for these estimates was different from that used in NHSDAs prior to 1999 (i.e., based on paper-and-pencil interviewing [PAPI] methodology). The revised

methodology had an impact on age-specific rates (Gfroerer et al., in press). Thus, comparisons with prior NHSDA estimates should not be made.

Estimated trends and incidence rates of marijuana use reported in this chapter were based on the combined sample of 1999 and 2000 CAI data. These estimates are presented by the overall sample, combined age groups and gender (e.g., 12 to 14 male, 12 to 14 female, 15 to 17 male, 15 to 17 female, 18 to 20 male, 18 to 20 female, 21 or older male, and 21 or older female), and race/ethnicity (e.g., white, black, Hispanic, Asian/Pacific Islander/Native Hawaiian, American Indian/Alaska Native, and persons reporting more than one race).

3.2 Trends in Marijuana Incidence

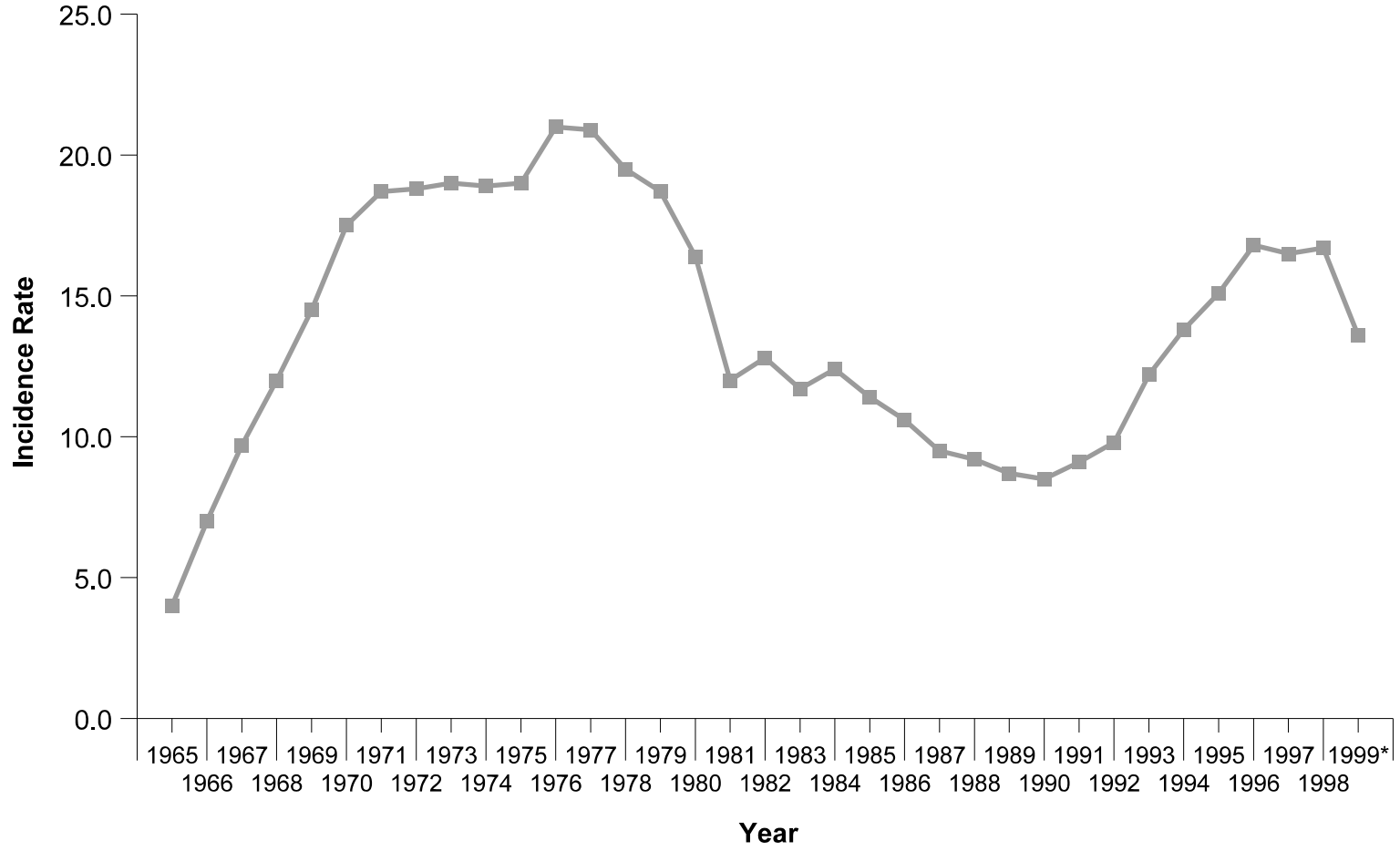
Table 3.1 summarizes the estimated number of new marijuana users, mean age of first use, and annual incidence rates from 1999 and 2000 NHSDA data. An estimated 2.0 million Americans aged 12 or older used marijuana for the first time in 1999, which was fewer than the estimated number of new users in 1998 (approximately 2.5 million Americans), but still above the 1989 and 1990 levels (1.4 million each year). Figure 3.1 shows that the rate of marijuana initiation increased during the late 1960s and early 1970s, with a peak in 1976 and 1977 (21.0 per 1,000 potential new users). After that period, the rate of new marijuana use decreased to 8.5 in 1990, followed by an increase to 16.8 in 1996, then a decrease to 13.6 in 1999. The mean age at first use was 19 years in the early 1970s and decreased to 17 years in the 1990s.

3.3 Trends, by Age and Gender

Over the years, rates of marijuana incidence were generally higher among males than among females (Tables 3.2 and 3.3, Figure 3.2). Among males, the rate increased dramatically from 4.9 in 1965 to 22.9 in 1971. The highest peak was noted in 1976-1977 (close to 24). After the late 1970s, incidence rates for males declined to around 10 in the late 1980s, followed by a period of increase during the 1990s to 19.3 in 1997. For females, the incidence rate increased steadily from 3.3 in 1965 to 18.9 in 1976. Similar to the pattern of males, the rate was lower during the 1980s, followed by an increase during the early 1990s. The most recent peak for females was in 1996 (15.5). For both genders, the rate in 1999 (15.5 and 12.1, respectively, for males and females) was lower than the rate in 1996-1998.

The estimated mean age at first marijuana use generally has been slightly younger in males than in females. For males, the mean age at first marijuana use ranged from 18-19 years during late 1960s to 16-17 years in recent years. For females, the mean age at first marijuana use decreased from 20 years during late 1960s to around 17 years in recent years. The average age of new marijuana users in 1999 was 16.4 years for males and 17.6 years for females.

Figure 3.1 Marijuana Incidence Rates, by Year

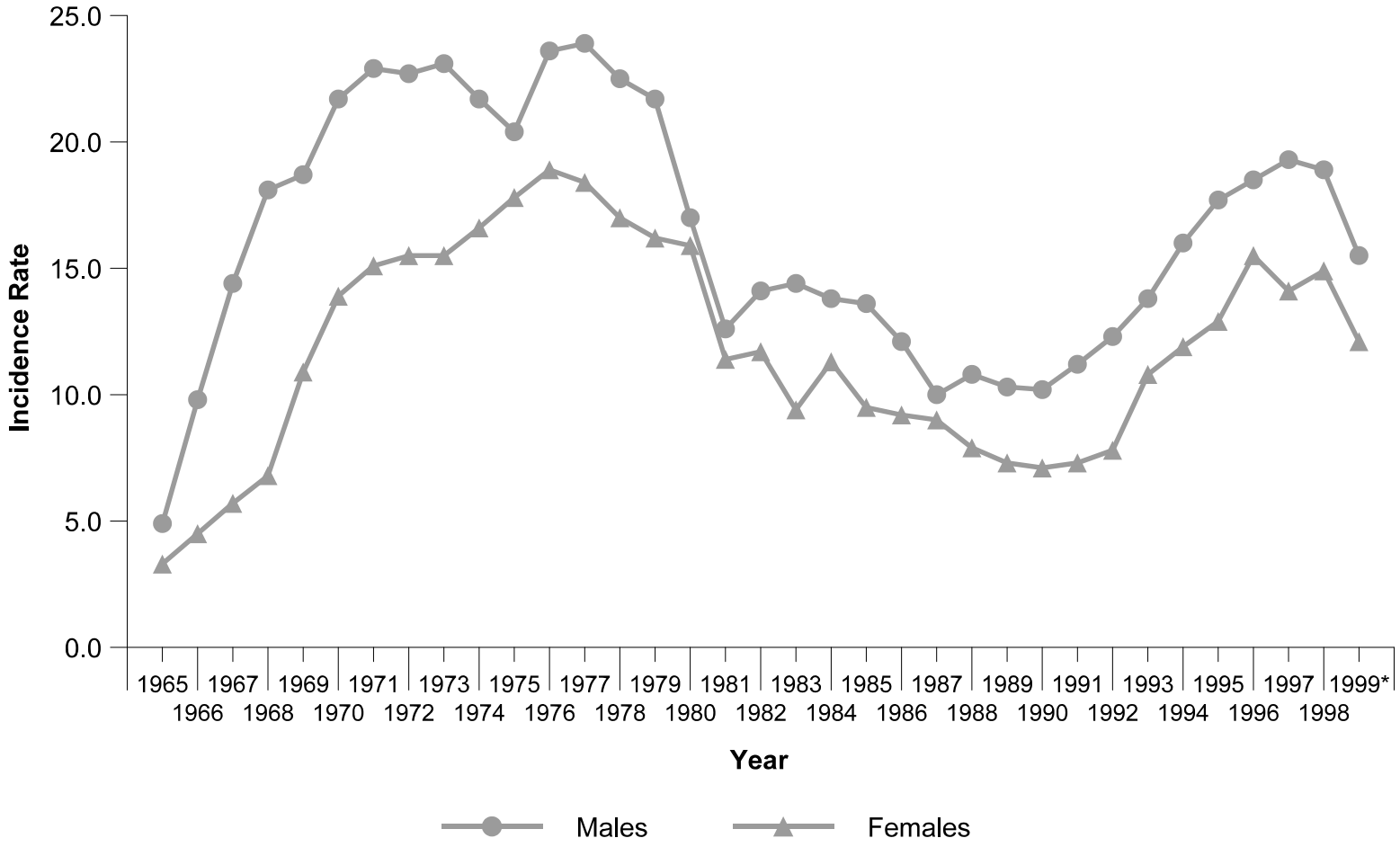


Note: The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years for persons aged 12 or older.

* Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Figure 3.2 Marijuana Incidence Rates, by Gender and Year



Note: The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years for persons aged 12 or older.

* Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Detailed data on age- and gender-specific incidence rates are summarized in Table 3.4. The data indicate that trends of incidence rates peaked at different periods for youths and adults. Among youths aged 12 to 17, annual incidence rates reached peaks during the late 1970s and late 1990s, and the pattern was similar for both genders. Among adults, particularly males, a peak rate of initiation was reached during the late 1960s, with rates remaining high throughout the 1970s, before dropping significantly in the 1980s. In addition, among adults aged 21 or older, the data did not show a peak in new use during the late 1990s, while persons aged 18 to 20 did.

3.4 Trends, by Race/Ethnicity

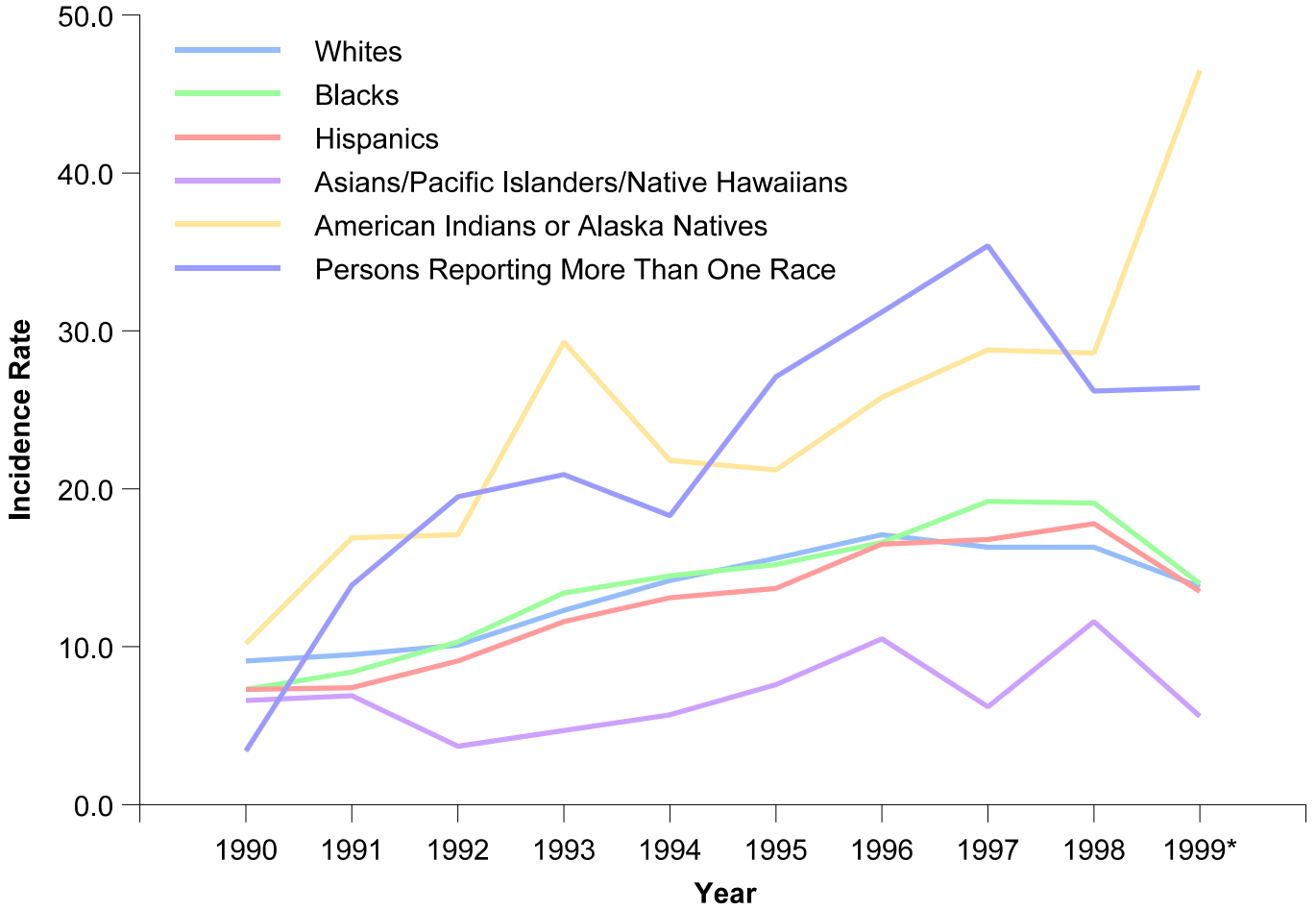
The trends of marijuana incidence also varied across racial/ethnic groups (Tables 3.5 to 3.7). In 1999, an estimated 1.4 million new marijuana users were white; there were 0.25 million black initiates, 0.25 million Hispanic initiates, 0.04 million Asian initiates (including other Pacific Islanders and Native Hawaiians), 0.03 million American Indian/Alaska Native initiates, and 0.03 million initiates who reported more than one race. Except for American Indians/Alaska Natives, the estimated numbers of new users were lower in 1999 than in 1998. In recent years, American Indians/Alaska Natives appeared to have a younger mean age of first marijuana use (14.1 years in 1999) than members of other racial/ethnic groups. In 1999, the mean age of marijuana initiation was 17.2 years for whites, about 16.4 years for blacks and Hispanics, 18.8 for Asians (including other Pacific Islanders and Native Hawaiians), and 15.8 years for persons reporting more than one race.

Among whites, the trend pattern was generally consistent with the overall trend seen in Table 3.1. Probably because of small samples, more variation was noted for non-Hispanic minority groups (American Indians/Alaska Natives, Asians/Pacific Islanders/Native Hawaiians, and persons reporting more than one race) and for years before 1990. Incidence rates between 1990 and 1999 for the racial/ethnic groupings are displayed in Figure 3.3.

Among blacks, the annual incidence rate (per 1,000 potential new users) increased from 8.0 in 1966 to 16.7 in 1968, reached a peak at about the same time as whites (19.4 in 1976), then remained high throughout the late 1970s. Following the low rates in the 1980s, rates among blacks rose again in the early 1990s, reached a peak in 1997 and 1998 (19.2 and 19.1, respectively), then dropped to 14.0 in 1999. Similar to the general pattern for whites and blacks, Hispanics' annual incidence rate rose during late 1970s and 1990s, with a peak in 1998 (17.8).

Asians (including other Pacific Islanders and Native Hawaiians) typically had lower annual incidence rates than the other racial/ethnic groups. However, the sample size did not allow for the generation of reliable estimates for trend data prior to 1985. Among recent initiates, rates of first marijuana use by racial/ethnic groups were generally lower in 1999 than in 1998,

Figure 3.3 Marijuana Incidence Rates, by Race/Ethnicity and Year



Note: The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years for persons aged 12 or older.

* Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

with the exception of American Indians/Alaska Natives. Estimates from Table 3.7 suggest a higher rate of new marijuana use in recent years among American Indians/Alaska Natives and among persons reporting more than one race. The annual incidence rate among American Indians/Alaska Natives was 21.2 (per 1,000) in 1995 and had risen over these years to a rate of 46.5 in 1999. Similar to the rates for American Indians/Alaska Natives, incidence rates among persons reporting more than one race were higher than among other racial/ethnic groups during the 1990s. Their incidence rate ranged from 26.2 to 35.4 between 1995 and 1999 compared with a rate below 20.0 among whites, blacks, Hispanics, and Asians/Pacific Islanders/Native Hawaiians.

Table 3.1 Estimated Numbers (in Thousands) of Persons Who First Used Marijuana During the Years 1965 to 1999, Their Mean Age at First Use, and the Annual Incidence Rates of First Use (Per 1,000 Person-Years of Exposure), for All Ages

Year	Number of Initiates (1,000s)	Mean Age at First Use	Incidence Rates[1]
1965	553	20.4	4.0
1966	975	19.2	7.0
1967	1,385	19.5	9.7
1968	1,738	19.4	12.0
1969	2,123	19.0	14.5
1970	2,592	18.7	17.5
1971	2,789	18.7	18.7
1972	2,819	18.8	18.8
1973	2,854	18.6	19.0
1974	2,853	17.9	18.9
1975	2,874	18.3	19.0
1976	3,184	18.5	21.0
1977	3,163	18.3	20.9
1978	2,967	18.1	19.5
1979	2,859	18.1	18.7
1980	2,522	19.2	16.4
1981	1,867	17.9	12.0
1982	2,021	18.8	12.8
1983	1,865	18.2	11.7
1984	2,012	18.3	12.4
1985	1,865	18.1	11.4
1986	1,753	17.6	10.6
1987	1,588	17.6	9.5
1988	1,550	17.4	9.2
1989	1,447	17.7	8.7
1990	1,407	18.3	8.5
1991	1,485	18.0	9.1
1992	1,599	16.7	9.8
1993	1,954	17.2	12.2
1994	2,187	16.7	13.8
1995	2,357	16.5	15.1
1996	2,590	17.1	16.8
1997	2,494	17.0	16.5
1998	2,488	17.4	16.7
1999[2]	2,028	17.0	13.6

[1] The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years for persons aged 12 or older.

[2] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.2 Estimated Age-Gender Numbers (in Thousands) of Persons Who First Used Marijuana During the Years 1965 to 1999

	Number of Initiates (1,000s)							
Year	Males 12-14	Females 12-14	Males 15-17	Females 15-17	Males 18-20	Females 18-20	Males 21+	Females 21+
1965	41	*	114	36	72	84	70	98
1966	64	*	159	86	271	129	142	102
1967	113	54	200	98	312	149	314	132
1968	98	38	248	109	552	195	293	184
1969	115	78	372	216	488	261	266	291
1970	197	187	435	328	496	279	333	303
1971	266	210	405	283	486	320	358	395
1972	264	148	496	453	414	308	385	326
1973	261	225	565	385	365	320	353	306
1974	245	271	584	468	329	301	253	307
1975	309	275	469	493	339	270	235	404
1976	213	208	665	603	414	317	303	420
1977	292	272	633	559	396	309	291	354
1978	263	221	691	542	317	341	230	296
1979	287	237	627	522	362	300	176	274
1980	184	165	486	531	215	297	249	312
1981	156	144	357	383	212	203	120	221
1982	189	132	385	391	254	215	154	258
1983	182	152	394	329	197	172	241	128
1984	237	176	382	385	209	207	160	215
1985	184	155	370	371	232	194	204	118
1986	155	134	361	382	212	183	159	118
1987	85	109	340	386	250	189	75	124
1988	132	80	348	327	210	164	112	136
1989	122	96	326	280	175	175	116	99
1990	130	94	309	240	197	135	103	148
1991	154	96	302	265	180	171	160	101
1992	185	159	347	258	222	173	104	82
1993	244	222	364	355	229	210	124	136
1994	276	261	450	394	242	234	123	121
1995	336	274	510	401	226	256	137	141
1996	350	294	523	523	235	268	138	202
1997	329	313	547	478	266	227	145	139
1998	334	313	519	467	236	250	154	175
1999[1]	291	255	446	399	151	175	124	159

* Low precision; no estimate reported.

[1] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.3 Estimated Numbers (in Thousands) of Persons Who First Used Marijuana During the Years 1965 to 1999, Their Mean Age at First Use, and the Annual Incidence Rates of First Use (Per 1,000 Person-Years of Exposure), by Gender

	Number of Initiates (1,000s)		Mean Age at First Use		Incidence Rates[1]	
Year	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
1965	315	239	18.1	23.4	4.9	3.3
1966	642	333	18.8	19.9	9.8	4.5
1967	952	433	19.1	20.4	14.4	5.7
1968	1,212	527	19.0	20.1	18.1	6.8
1969	1,264	859	18.6	19.5	18.7	10.9
1970	1,479	1,112	18.6	19.0	21.7	13.9
1971	1,570	1,218	18.4	19.0	22.9	15.1
1972	1,560	1,258	19.2	18.3	22.7	15.5
1973	1,587	1,267	18.6	18.6	23.1	15.5
1974	1,493	1,360	17.7	18.1	21.7	16.6
1975	1,405	1,469	17.7	18.9	20.4	17.8
1976	1,625	1,559	18.2	18.8	23.6	18.9
1977	1,647	1,517	18.0	18.5	23.9	18.4
1978	1,556	1,411	17.6	18.7	22.5	17.0
1979	1,507	1,352	17.5	18.7	21.7	16.2
1980	1,187	1,335	19.0	19.4	17.0	15.9
1981	896	971	17.2	18.6	12.6	11.4
1982	1,014	1,007	17.9	19.7	14.1	11.7
1983	1,049	815	18.9	17.4	14.4	9.4
1984	1,020	992	18.3	18.2	13.8	11.3
1985	1,021	844	18.2	17.9	13.6	9.5
1986	925	828	17.8	17.4	12.1	9.2
1987	773	815	17.3	17.9	10.0	9.0
1988	834	716	17.1	17.9	10.8	7.9
1989	787	660	17.5	17.8	10.3	7.3
1990	774	633	17.5	19.4	10.2	7.1
1991	837	648	18.1	17.8	11.2	7.3
1992	909	690	16.6	16.8	12.3	7.8
1993	1,009	945	16.8	17.6	13.8	10.8
1994	1,152	1,035	16.7	16.8	16.0	11.9
1995	1,254	1,103	16.4	16.7	17.7	12.9
1996	1,284	1,306	16.4	17.7	18.5	15.5
1997	1,318	1,176	17.0	16.9	19.3	14.1
1998	1,268	1,220	17.6	17.2	18.9	14.9
1999[2]	1,034	993	16.4	17.6	15.5	12.1

[1] The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years.

[2] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.4 Estimated Annual Age-Gender Specific Incidence Rates of First Use (Per 1,000 Person-Years of Exposure) of Persons Who First Used Marijuana During the Years 1965 to 1999

Year	Age-Gender Specific Incidence Rates[1]							
	Males 12-14	Females 12-14	Males 15-17	Females 15-17	Males 18-20	Females 18-20	Males 21+	Females 21+
1965	7.2	*	21.5	5.9	18.2	16.0	3.0	3.4
1966	11.1	*	30.5	14.7	60.9	22.3	5.8	3.3
1967	19.7	8.8	37.7	17.2	68.0	24.0	12.4	4.1
1968	17.1	6.1	46.9	18.8	125.6	34.0	11.0	5.4
1969	19.1	11.9	71.2	37.4	121.7	49.1	9.6	8.2
1970	30.9	28.6	86.4	57.5	124.6	54.8	11.6	8.2
1971	41.3	32.3	83.0	48.9	125.5	64.1	12.2	10.3
1972	43.6	22.5	99.5	77.0	108.3	64.5	12.8	8.2
1973	43.9	33.5	110.6	68.0	98.2	68.3	11.4	7.5
1974	40.0	42.0	118.6	84.6	89.7	64.1	8.0	7.3
1975	48.3	44.4	99.4	88.5	93.2	58.2	7.2	9.4
1976	34.1	34.0	142.5	109.6	114.5	71.3	9.1	9.5
1977	49.9	44.5	131.6	108.3	117.5	72.6	8.5	7.8
1978	48.4	37.6	141.2	110.5	100.0	81.3	6.6	6.4
1979	57.0	41.6	133.2	106.3	114.3	73.7	4.9	5.8
1980	37.2	29.9	110.3	109.1	66.0	78.0	6.8	6.5
1981	30.9	26.2	82.9	79.7	60.3	54.4	3.2	4.5
1982	36.3	23.7	93.4	83.0	72.3	57.6	4.0	5.2
1983	34.5	26.9	96.2	69.6	58.4	44.9	6.2	2.5
1984	46.5	31.4	90.7	82.2	63.5	53.3	4.0	4.1
1985	38.1	28.8	85.8	79.2	73.7	50.5	5.0	2.2
1986	33.4	26.5	83.6	80.6	67.2	47.5	3.8	2.2
1987	18.5	22.0	80.8	81.6	76.0	50.0	1.8	2.2
1988	29.0	16.7	85.9	71.4	62.2	43.0	2.6	2.4
1989	26.3	19.6	82.9	64.3	51.7	45.3	2.6	1.7
1990	27.2	19.1	79.7	55.3	58.6	34.5	2.3	2.5
1991	31.5	18.6	77.3	62.2	56.5	44.3	3.5	1.7
1992	36.1	29.3	88.3	59.6	70.9	46.6	2.2	1.4
1993	45.6	39.6	90.5	82.5	75.2	57.4	2.6	2.2
1994	49.6	46.8	112.7	89.1	80.5	67.3	2.5	1.9
1995	61.2	49.9	126.8	90.3	76.9	74.6	2.8	2.2
1996	65.1	55.0	127.0	117.8	80.5	80.4	2.8	3.1
1997	60.2	59.2	130.5	110.3	94.0	67.7	2.8	2.1
1998	59.9	58.8	127.4	111.5	83.9	75.2	3.0	2.6
1999[2]	51.8	48.1	112.2	97.9	53.0	52.1	2.3	2.4

* Low precision; no estimate reported.

[1] The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years.

[2] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.5 Estimated Numbers (in Thousands) of Persons Who First Used Marijuana During the Years 1965 to 1999, by Racial/Ethnic Subgroups

	Number of Initiates (1,000s)					
Year	White	Black	Hispanic	Asian / Pacific Islander / Native Hawaiian	American Indian / Alaska Native	More Than One Race
1965	427	*	*	*	*	*
1966	804	113	*	*	*	*
1967	1,180	128	49	*	*	*
1968	1,417	246	62	*	*	*
1969	1,834	175	63	*	*	*
1970	2,264	180	73	38	*	21
1971	2,313	228	177	*	14	*
1972	2,413	244	111	12	22	17
1973	2,442	260	91	*	*	*
1974	2,343	256	213	12	*	19
1975	2,377	296	171	12	*	*
1976	2,615	317	172	*	31	*
1977	2,608	277	163	74	*	28
1978	2,370	297	206	77	*	12
1979	2,388	275	127	*	8	23
1980	2,067	235	168	*	*	*
1981	1,518	195	120	*	6	*
1982	1,640	164	165	*	16	7
1983	1,459	149	187	39	11	*
1984	1,633	232	98	*	8	7
1985	1,437	179	165	65	7	12
1986	1,375	186	130	25	24	13
1987	1,242	140	134	52	10	12
1988	1,222	137	132	20	24	15
1989	1,074	137	183	21	*	16
1990	1,057	144	144	49	8	5
1991	1,092	164	146	50	14	20
1992	1,154	199	178	27	13	27
1993	1,388	256	225	34	23	28
1994	1,582	273	250	41	16	24
1995	1,711	282	259	54	16	35
1996	1,848	303	307	75	19	39
1997	1,733	345	308	44	20	43
1998	1,702	336	320	80	19	31
1999[1]	1,436	248	246	39	30	28

* Low precision; no estimate reported.

[1] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.6 Estimated Mean Ages at First Use of Persons Who First Used Marijuana During the Years 1965 to 1999, by Racial/Ethnic Subgroups

	Mean Age at First Use					
Year	White	Black	Hispanic	Asian / Pacific Islander / Native Hawaiian	American Indian / Alaska Native	More Than One Race
1965	21.3	*	*	*	*	*
1966	19.3	19.2	*	*	*	*
1967	19.7	18.5	22.0	*	*	*
1968	19.3	19.6	20.2	*	*	*
1969	19.0	19.0	18.6	*	*	*
1970	18.9	17.1	17.1	18.0	*	*
1971	18.8	18.4	17.9	*	*	*
1972	18.8	18.0	21.2	*	19.5	*
1973	18.7	18.4	18.0	*	*	*
1974	17.9	18.4	17.1	*	*	16.6
1975	18.5	17.3	18.1	*	*	*
1976	18.4	19.8	17.7	*	16.8	16.4
1977	18.4	18.0	18.1	17.7	16.6	*
1978	17.9	18.5	20.1	17.9	*	*
1979	18.2	17.7	16.7	*	14.5	15.2
1980	19.4	18.8	17.9	17.1	*	*
1981	18.0	18.6	15.9	*	*	*
1982	18.8	20.8	17.0	*	18.1	*
1983	18.2	18.2	18.8	18.5	16.2	14.0
1984	18.0	20.3	14.7	29.5	10.8	13.5
1985	18.2	17.6	17.4	17.1	14.8	19.1
1986	17.8	17.4	16.9	16.1	14.5	14.9
1987	17.7	16.6	17.3	19.2	19.6	18.3
1988	17.4	16.5	18.0	17.9	21.8	15.1
1989	17.9	17.2	17.0	17.3	16.5	15.5
1990	18.6	17.8	17.7	17.5	19.3	14.9
1991	18.3	17.5	16.0	17.7	22.2	16.5
1992	16.8	17.0	15.7	17.5	15.4	16.0
1993	17.1	17.9	16.7	18.1	22.7	14.4
1994	16.8	16.9	16.2	16.5	15.8	15.2
1995	16.5	16.8	16.0	18.3	15.1	14.9
1996	17.1	17.6	16.7	17.3	14.5	16.0
1997	17.0	17.7	16.0	16.6	15.8	15.9
1998	17.8	17.2	16.0	17.6	14.6	17.0
1999[1]	17.2	16.5	16.4	18.8	14.1	15.8

* Low precision; no estimate reported.

[1] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.7 Estimated Annual Incidence Rates of First Use (Per 1,000 Person-Years of Exposure) of Persons Who First Used Marijuana During the Years 1965 to 1999, by Racial/Ethnic Subgroups

	Racial/Ethnic Specific Incidence Rates[1]					
Year	White	Black	Hispanic	Asian / Pacific Islander / Native Hawaiian	American Indian / Alaska Native	More Than One Race
1965	4.0	*	*	*	*	*
1966	7.5	8.0	*	*	*	*
1967	10.8	8.9	4.1	*	*	*
1968	12.8	16.7	4.9	*	*	*
1969	16.4	11.7	4.9	*	*	*
1970	20.2	11.8	5.4	7.3	*	21.3
1971	20.6	14.7	12.7	*	20.0	*
1972	21.5	15.5	7.7	2.2	31.6	17.7
1973	21.8	16.3	6.2	*	*	*
1974	21.0	15.9	14.1	2.0	*	18.8
1975	21.3	18.2	11.1	2.0	*	*
1976	23.5	19.4	10.9	*	41.5	34.0
1977	23.5	16.8	10.1	11.7	*	27.0
1978	21.4	17.8	12.5	12.2	*	11.6
1979	21.6	16.3	7.5	*	10.3	21.3
1980	18.6	13.7	9.7	*	*	*
1981	13.5	11.1	6.8	*	*	*
1982	14.5	9.1	9.2	*	19.7	5.8
1983	12.8	8.1	10.1	5.7	14.1	*
1984	14.2	12.4	5.2	*	9.3	5.5
1985	12.4	9.4	8.6	9.1	8.0	9.2
1986	11.7	9.6	6.6	3.4	28.5	9.2
1987	10.5	7.1	6.7	7.0	11.4	8.2
1988	10.3	6.9	6.5	2.7	28.8	10.3
1989	9.2	6.9	9.1	2.9	*	10.9
1990	9.1	7.3	7.3	6.6	10.2	3.4
1991	9.5	8.4	7.4	6.9	16.9	13.9
1992	10.1	10.3	9.1	3.7	17.1	19.5
1993	12.3	13.4	11.6	4.7	29.3	20.9
1994	14.2	14.5	13.1	5.7	21.8	18.3
1995	15.6	15.2	13.7	7.6	21.2	27.1
1996	17.1	16.6	16.5	10.5	25.8	31.2
1997	16.3	19.2	16.8	6.2	28.8	35.4
1998	16.3	19.1	17.8	11.6	28.6	26.2
1999[2]	13.8	14.0	13.5	5.6	46.5	26.4

* Low precision; no estimate reported.

[1] The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years.

[2] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

4. State Incidence Estimates

4.1 Introduction

This chapter summarizes estimates of recent marijuana initiation (new use in the past 24 months) for the 50 States and the District of Columbia based on the combined data from the 1999 and 2000 National Household Surveys on Drug Abuse (NHSDAs). These estimates were derived from a model that used a large number of variables and data collected from each State and the District of Columbia. Note that State-level incidence estimates reported in this chapter are different from those of the other chapters. That is, the State-level estimates in this chapter are referred to as the average annual marijuana initiates over the past 24 months prior to the NHSDA interview. They are presented by the following age groupings: 12 to 17 years, 18 to 25 years, 26 years or older, and a combined total for all ages 12 or older. For more information about the methodology used to generate State-level estimates of substance use, refer to *State Estimates of Substance Use from the 2000 NHSDA* (Wright, in press).

4.2 State-Level Estimates of Recent New Marijuana Users

Table 4.1 displays estimated numbers of the average annual marijuana initiates over the past 24 months by age group and State. Also included in the table are their corresponding 95 percent prediction intervals that indicate the precision of the estimates. The prediction interval reflects the uncertainty associated with sampling variability and model bias. There is a 95 percent probability that the true value lies within the interval.

Overall, the combined 1999 and 2000 NHSDAs estimated that there were approximately 2.3 million recent new marijuana users annually. On average, there were an estimated 1.2 million recent marijuana initiates aged 12 to 17 annually, 0.9 million recent initiates aged 18 to 25 , and 0.1 million recent initiates aged 26 or older. These averaged annual numbers of recent new marijuana users varied by States.

Estimated average annual rates of first use of marijuana over the past 24 months and associated 95 percent prediction intervals, by age group and State, are summarized in Table 4.2. Among all persons aged 12 or older, there were an estimated 1.5 marijuana initiates per 1,000 potential new users annually. The average annual incidence rate was about the same for youths aged 12 to 17 (6.1) and young adults aged 18 to 25 (5.5), while it was very low (0.1) among adults aged 26 or older.

The average annual incidence rates varied slightly across different individual States, and the pattern of distributions also differed by age group. This chapter's figures (maps) display the

ranking of these incidence rates by State for all respondents aged 12 or older and for two young age groups (ages 12 to 17 and ages 18 to 25). The color of each State on the maps indicates how the State ranks relative to other States. States can fall into one of five groups according to their ranking. Those States with the highest incidence rate are colored red; those with the lowest estimates are white. Approximately 10 States are included in each group. In some cases, a group may contain more or fewer than 10 States because the estimate is the same for 2 or more States in that group. It should be noted that some prediction intervals around State-level estimates are fairly sizable, which means that some estimates that appear to be different from each other may not be statistically significant. In particular, States with lower rates of recent first use tend to have wider confidence intervals than those with higher rates.

The 10 States with the *highest overall rates of recent new marijuana users* were as follows (Figure 4.1):

Alaska,
Colorado,
Delaware,
Massachusetts,
Minnesota,
New Hampshire,
New Mexico,
North Dakota,
Vermont, and
Wisconsin.

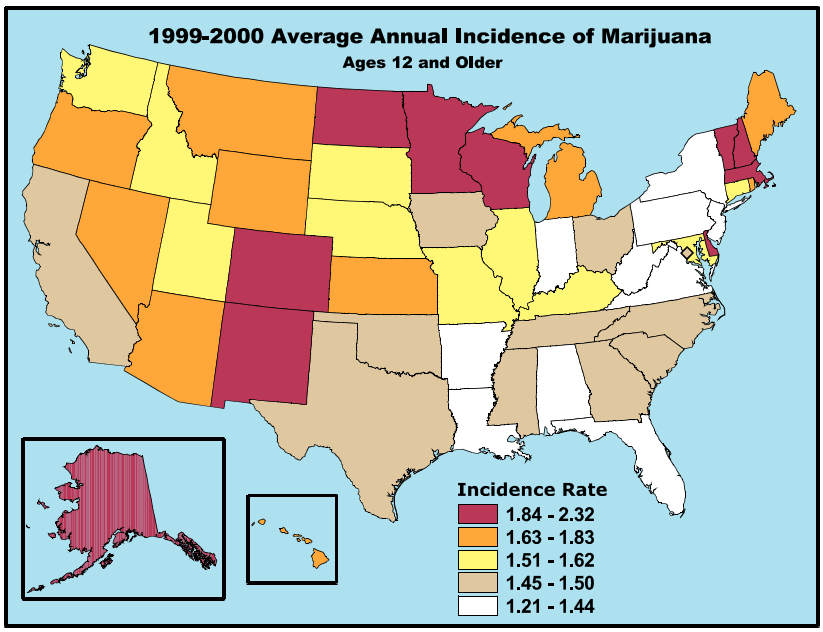
The 10 States with the *lowest overall rates of recent new marijuana users* were Alabama, Arkansas, Florida, Indiana, Louisiana, New Jersey, New York, Pennsylvania, Virginia, and West Virginia.

The nine States with the *highest rates of recent new marijuana users aged 12 to 17* were as follows (Figure 4.2):

Arizona,
Colorado,
Delaware,
Hawaii,
Massachusetts,
Nevada,
New Hampshire,
New Mexico, and
Vermont.

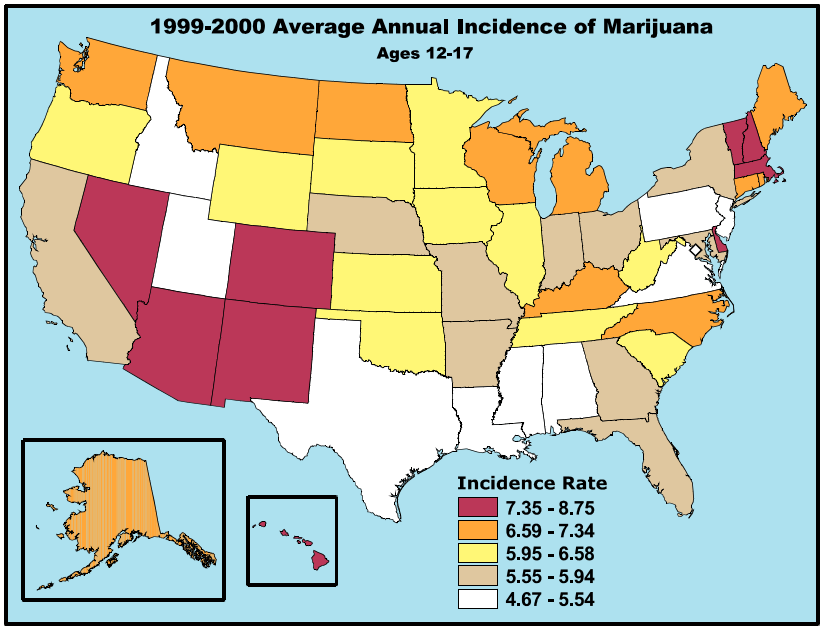
The 10 States with the *lowest rates of recent marijuana initiates aged 12 to 17* were Alabama, District of Columbia, Idaho, Louisiana, Mississippi, New Jersey, Pennsylvania, Texas, Utah, and Virginia.

Figure 4.1 Average Annual Incidence of Marijuana Use among Persons Aged 12 or Older: 1999 and 2000



Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Figure 4.2 Average Annual Incidence of Marijuana Use among Youths Aged 12 to 17: 1999 and 2000



Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

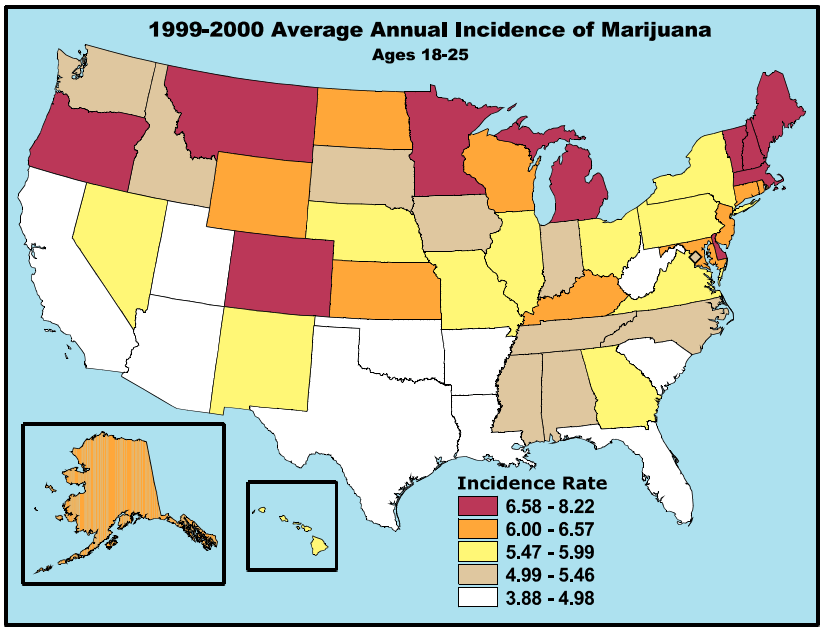
The 10 States with the *highest incidence rates among adults aged 18 to 25* were as follows (Figure 4.3):

Colorado,
Delaware,
Maine,
Massachusetts,
Michigan,
Minnesota,
Montana,
New Hampshire,
Oregon, and
Vermont.

The 10 States with the *lowest incidence rates among adults aged 18 to 25* were Arizona, Arkansas, California, Florida, Louisiana, Oklahoma, South Carolina, Texas, Utah, and West Virginia.

Because of a very low rate of recent marijuana initiation among adults aged 26 or older, the distribution of State-level estimates is not shown in a figure.

Figure 4.3 Average Annual Incidence of Marijuana Use among Young Adults Aged 18 to 25: 1999 and 2000



Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

These average annual incidence rates varied slightly across different States and age groups. Across different age groups, only a few States were consistently found to be in the highest or lowest category of recent initiation. Colorado, Delaware, Massachusetts, New Hampshire, and Vermont were ranked in the top 10 for the overall age group, the youth age group, and the young adult age group. New Mexico had the highest rate for the overall and youth age groups. Minnesota had the highest rate for the overall and young adult age groups. By comparison, Louisiana had the lowest rate of recent new users for the overall, youth, and young adult age groups. In addition, Texas and Utah had the lowest rates of recent initiation among youths and young adults.

Table 4.1 Estimated Numbers (in Thousands) of Average Annual Marijuana Initiates, by Age Group and State: 1999 and 2000

	Total		Age Group (Years)					
			12-17		18-25		26 or Older	
State	Estimate	Prediction Interval	Estimate	Prediction Interval	Estimate	Prediction Interval	Estimate	Prediction Interval
Total	2,268		1,230		898		139	
Alabama	34	(29 - 39)	17	(13 - 21)	15	(12 - 19)	2	(1 - 4)
Alaska	6	(5 - 7)	4	(3 - 4)	2	(2 - 3)	0	(0 - 1)
Arizona	45	(39 - 52)	29	(24 - 35)	13	(10 - 17)	2	(1 - 4)
Arkansas	21	(18 - 24)	11	(9 - 14)	8	(6 - 10)	1	(1 - 2)
California	246	(226 - 267)	135	(123 - 148)	93	(79 - 109)	17	(11 - 26)
Colorado	38	(32 - 44)	22	(18 - 27)	14	(10 - 18)	2	(1 - 4)
Connecticut	26	(22 - 30)	15	(12 - 18)	10	(7 - 12)	2	(1 - 3)
Delaware	7	(6 - 8)	4	(4 - 5)	3	(2 - 3)	0	(0 - 1)
District of Columbia	4	(4 - 5)	2	(2 - 3)	2	(1 - 2)	0	(0 - 1)
Florida	105	(95 - 115)	59	(53 - 67)	38	(32 - 44)	7	(4 - 12)
Georgia	65	(56 - 74)	33	(28 - 39)	28	(22 - 35)	4	(2 - 7)
Hawaii	10	(8 - 11)	6	(5 - 7)	3	(2 - 4)	0	(0 - 1)
Idaho	11	(10 - 13)	6	(5 - 7)	5	(4 - 7)	1	(0 - 1)
Illinois	99	(90 - 108)	53	(47 - 60)	40	(34 - 46)	6	(4 - 9)
Indiana	49	(42 - 56)	26	(22 - 32)	19	(15 - 24)	3	(2 - 5)
Iowa	26	(22 - 29)	14	(11 - 17)	10	(8 - 13)	1	(1 - 3)
Kansas	25	(22 - 29)	13	(11 - 16)	11	(9 - 14)	1	(1 - 2)
Kentucky	37	(32 - 42)	19	(16 - 23)	16	(13 - 19)	2	(1 - 4)
Louisiana	36	(31 - 42)	20	(17 - 25)	13	(10 - 17)	2	(1 - 4)
Maine	11	(10 - 13)	6	(5 - 7)	4	(3 - 6)	1	(0 - 1)
Maryland	42	(36 - 48)	21	(17 - 26)	18	(14 - 22)	3	(1 - 4)
Massachusetts	60	(51 - 68)	36	(30 - 43)	20	(15 - 26)	3	(2 - 6)
Michigan	92	(84 - 101)	51	(46 - 57)	36	(31 - 42)	5	(3 - 8)
Minnesota	48	(42 - 55)	24	(20 - 28)	22	(18 - 27)	2	(1 - 4)
Mississippi	25	(21 - 29)	12	(10 - 15)	11	(9 - 14)	1	(1 - 3)
Missouri	46	(40 - 53)	25	(20 - 30)	19	(15 - 24)	3	(1 - 4)
Montana	9	(8 - 10)	5	(4 - 6)	3	(3 - 4)	0	(0 - 1)

Table 4.1 (continued)

State	Total		Age Group (Years)					
			12-17		18-25		26 or Older	
	Estimate	Prediction Interval	Estimate	Prediction Interval	Estimate	Prediction Interval	Estimate	Prediction Interval
Nebraska	15	(13 - 17)	8	(6 - 10)	6	(5 - 8)	1	(0 - 1)
Nevada	15	(13 - 17)	9	(7 - 11)	5	(4 - 6)	1	(0 - 2)
New Hampshire	11	(10 - 13)	7	(5 - 8)	4	(3 - 5)	1	(0 - 1)
New Jersey	64	(55 - 74)	31	(25 - 37)	29	(22 - 37)	5	(2 - 8)
New Mexico	18	(15 - 21)	11	(9 - 13)	6	(5 - 8)	1	(0 - 2)
New York	144	(130 - 159)	73	(65 - 83)	62	(52 - 72)	9	(6 - 14)
North Carolina	65	(56 - 74)	38	(32 - 44)	23	(18 - 29)	4	(2 - 7)
North Dakota	7	(6 - 8)	4	(3 - 5)	3	(2 - 4)	0	(0 - 1)
Ohio	94	(85 - 102)	50	(44 - 56)	39	(33 - 45)	5	(3 - 8)
Oklahoma	28	(24 - 33)	17	(14 - 21)	9	(7 - 12)	2	(1 - 3)
Oregon	28	(24 - 33)	15	(12 - 18)	12	(9 - 15)	2	(1 - 3)
Pennsylvania	92	(83 - 101)	46	(41 - 52)	40	(34 - 46)	6	(3 - 9)
Rhode Island	9	(8 - 10)	5	(4 - 6)	3	(2 - 4)	1	(0 - 1)
South Carolina	32	(27 - 37)	18	(15 - 22)	12	(9 - 15)	2	(1 - 4)
South Dakota	7	(6 - 8)	4	(3 - 5)	3	(2 - 4)	0	(0 - 1)
Tennessee	47	(40 - 54)	26	(21 - 31)	19	(14 - 24)	3	(2 - 5)
Texas	168	(153 - 184)	90	(81 - 101)	67	(58 - 78)	10	(6 - 16)
Utah	20	(17 - 24)	10	(8 - 13)	9	(7 - 11)	1	(1 - 2)
Vermont	6	(5 - 7)	4	(3 - 4)	2	(2 - 3)	0	(0 - 1)
Virginia	53	(45 - 61)	26	(21 - 31)	23	(18 - 30)	4	(2 - 7)
Washington	49	(43 - 57)	28	(23 - 33)	18	(14 - 23)	3	(2 - 5)
West Virginia	14	(12 - 17)	8	(6 - 9)	6	(5 - 7)	1	(0 - 2)
Wisconsin	53	(46 - 60)	30	(26 - 35)	20	(16 - 25)	3	(1 - 6)
Wyoming	5	(4 - 6)	3	(2 - 3)	2	(2 - 2)	0	(0 - 0)

Note: Estimates are based on a survey-weighted hierarchical Bayes estimation approach, and the 95 percent prediction (credible) intervals are generated by Markov Chain Monte Carlo techniques.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 4.2 Average Annual Rates of First Use of Marijuana, by Age Group and State: 1999 and 2000

State	Total		Age Group (Years)					
			12-17		18-25		26 or Older	
	Estimate	Prediction Interval	Estimate	Prediction Interval	Estimate	Prediction Interval	Estimate	Prediction Interval
Total	1.52		6.08		5.47		0.12	
Alabama	1.28	(1.08 - 1.51)	5.19	(4.09 - 6.56)	5.35	(4.18 - 6.81)	0.10	(0.06 - 0.20)
Alaska	2.32	(1.96 - 2.74)	7.29	(5.96 - 8.89)	6.48	(4.95 - 8.46)	0.17	(0.09 - 0.32)
Arizona	1.82	(1.54 - 2.15)	8.16	(6.69 - 9.92)	4.69	(3.53 - 6.19)	0.13	(0.07 - 0.25)
Arkansas	1.32	(1.12 - 1.55)	5.75	(4.65 - 7.09)	4.58	(3.58 - 5.84)	0.10	(0.06 - 0.19)
California	1.46	(1.33 - 1.61)	5.57	(5.05 - 6.15)	4.50	(3.83 - 5.29)	0.14	(0.09 - 0.22)
Colorado	2.01	(1.69 - 2.40)	7.68	(6.19 - 9.47)	7.03	(5.34 - 9.20)	0.15	(0.08 - 0.29)
Connecticut	1.59	(1.32 - 1.92)	6.83	(5.45 - 8.53)	6.47	(4.84 - 8.60)	0.13	(0.07 - 0.25)
Delaware	1.90	(1.61 - 2.24)	8.32	(6.83 - 10.10)	7.01	(5.33 - 9.17)	0.13	(0.07 - 0.25)
District of Columbia	1.48	(1.24 - 1.77)	5.54	(4.34 - 7.05)	5.28	(4.06 - 6.83)	0.13	(0.07 - 0.26)
Florida	1.21	(1.09 - 1.34)	5.76	(5.06 - 6.55)	4.67	(3.96 - 5.50)	0.11	(0.06 - 0.18)
Georgia	1.50	(1.28 - 1.76)	5.61	(4.67 - 6.71)	5.47	(4.25 - 7.00)	0.13	(0.07 - 0.23)
Hawaii	1.65	(1.38 - 1.97)	7.63	(6.16 - 9.41)	5.50	(4.01 - 7.50)	0.11	(0.04 - 0.26)
Idaho	1.58	(1.33 - 1.87)	4.91	(3.93 - 6.11)	5.39	(4.20 - 6.88)	0.13	(0.07 - 0.24)
Illinois	1.56	(1.41 - 1.73)	6.17	(5.45 - 6.97)	5.61	(4.80 - 6.55)	0.12	(0.08 - 0.20)
Indiana	1.44	(1.23 - 1.69)	5.88	(4.82 - 7.15)	5.27	(4.11 - 6.74)	0.12	(0.07 - 0.23)
Iowa	1.47	(1.26 - 1.73)	6.17	(5.03 - 7.56)	5.24	(4.11 - 6.66)	0.11	(0.06 - 0.22)
Kansas	1.68	(1.42 - 1.98)	6.17	(4.96 - 7.64)	6.54	(5.12 - 8.32)	0.12	(0.06 - 0.22)
Kentucky	1.62	(1.39 - 1.89)	6.74	(5.52 - 8.21)	6.46	(5.15 - 8.06)	0.12	(0.06 - 0.23)
Louisiana	1.39	(1.18 - 1.65)	5.51	(4.49 - 6.75)	4.26	(3.25 - 5.55)	0.12	(0.07 - 0.22)
Maine	1.74	(1.47 - 2.05)	7.12	(5.81 - 8.70)	8.07	(6.17 - 10.48)	0.11	(0.06 - 0.22)
Maryland	1.52	(1.28 - 1.81)	5.92	(4.77 - 7.32)	6.14	(4.80 - 7.84)	0.12	(0.07 - 0.23)
Massachusetts	2.03	(1.71 - 2.41)	8.75	(7.17 - 10.65)	7.55	(5.73 - 9.88)	0.15	(0.08 - 0.29)
Michigan	1.83	(1.66 - 2.03)	7.10	(6.31 - 7.98)	6.90	(5.88 - 8.07)	0.13	(0.08 - 0.21)
Minnesota	1.91	(1.63 - 2.24)	6.42	(5.24 - 7.84)	7.63	(6.05 - 9.59)	0.13	(0.07 - 0.25)
Mississippi	1.49	(1.27 - 1.76)	5.26	(4.22 - 6.54)	5.32	(4.22 - 6.69)	0.12	(0.06 - 0.22)
Missouri	1.51	(1.28 - 1.79)	5.85	(4.76 - 7.17)	5.91	(4.60 - 7.56)	0.11	(0.06 - 0.21)
Montana	1.73	(1.48 - 2.03)	7.33	(5.98 - 8.96)	6.58	(5.17 - 8.34)	0.12	(0.06 - 0.24)

Table 4.2 (continued)

State	Total		Age Group (Years)					
			12-17		18-25		26 or Older	
	Estimate	Prediction Interval	Estimate	Prediction Interval	Estimate	Prediction Interval	Estimate	Prediction Interval
Nebraska	1.51	(1.29 - 1.77)	5.71	(4.63 - 7.03)	5.48	(4.29 - 6.98)	0.11	(0.06 - 0.20)
Nevada	1.66	(1.39 - 1.98)	7.63	(6.18 - 9.37)	5.47	(4.07 - 7.32)	0.13	(0.07 - 0.26)
New Hampshire	1.92	(1.62 - 2.27)	7.52	(6.16 - 9.15)	7.49	(5.65 - 9.88)	0.13	(0.07 - 0.24)
New Jersey	1.39	(1.18 - 1.64)	5.50	(4.53 - 6.67)	6.45	(4.96 - 8.33)	0.13	(0.07 - 0.24)
New Mexico	1.99	(1.68 - 2.35)	7.66	(6.24 - 9.37)	5.99	(4.54 - 7.86)	0.14	(0.07 - 0.27)
New York	1.43	(1.28 - 1.59)	5.64	(4.94 - 6.44)	5.93	(5.01 - 7.00)	0.12	(0.07 - 0.19)
North Carolina	1.50	(1.28 - 1.75)	6.67	(5.59 - 7.94)	5.35	(4.16 - 6.86)	0.12	(0.07 - 0.22)
North Dakota	1.89	(1.64 - 2.19)	7.31	(6.04 - 8.81)	6.53	(5.21 - 8.17)	0.10	(0.05 - 0.20)
Ohio	1.49	(1.35 - 1.65)	5.94	(5.25 - 6.72)	5.91	(5.09 - 6.86)	0.10	(0.06 - 0.17)
Oklahoma	1.47	(1.24 - 1.76)	6.58	(5.26 - 8.20)	4.14	(3.16 - 5.41)	0.12	(0.06 - 0.23)
Oregon	1.70	(1.42 - 2.03)	6.50	(5.27 - 7.99)	7.10	(5.48 - 9.14)	0.15	(0.07 - 0.29)
Pennsylvania	1.32	(1.19 - 1.46)	5.32	(4.71 - 5.99)	5.85	(5.03 - 6.79)	0.10	(0.06 - 0.18)
Rhode Island	1.69	(1.43 - 1.99)	7.34	(5.95 - 9.03)	6.57	(5.01 - 8.56)	0.13	(0.07 - 0.26)
South Carolina	1.47	(1.25 - 1.74)	6.43	(5.24 - 7.87)	4.95	(3.82 - 6.39)	0.12	(0.06 - 0.24)
South Dakota	1.60	(1.37 - 1.88)	6.16	(5.02 - 7.53)	5.43	(4.22 - 6.96)	0.10	(0.05 - 0.19)
Tennessee	1.49	(1.26 - 1.76)	6.34	(5.17 - 7.76)	5.46	(4.22 - 7.03)	0.12	(0.06 - 0.24)
Texas	1.47	(1.33 - 1.63)	5.49	(4.88 - 6.18)	4.55	(3.89 - 5.30)	0.13	(0.08 - 0.20)
Utah	1.60	(1.34 - 1.91)	4.67	(3.71 - 5.87)	3.88	(3.00 - 5.02)	0.14	(0.07 - 0.27)
Vermont	2.25	(1.91 - 2.66)	8.30	(6.89 - 9.98)	8.22	(6.33 - 10.61)	0.15	(0.07 - 0.29)
Virginia	1.40	(1.17 - 1.66)	5.09	(4.15 - 6.23)	5.68	(4.35 - 7.39)	0.13	(0.07 - 0.25)
Washington	1.61	(1.37 - 1.90)	6.78	(5.58 - 8.21)	5.17	(3.99 - 6.66)	0.13	(0.07 - 0.24)
West Virginia	1.28	(1.09 - 1.50)	6.27	(5.10 - 7.70)	4.98	(3.86 - 6.41)	0.10	(0.05 - 0.19)
Wisconsin	1.88	(1.61 - 2.19)	7.34	(6.15 - 8.74)	6.46	(5.03 - 8.28)	0.15	(0.06 - 0.37)
Wyoming	1.83	(1.56 - 2.14)	6.51	(5.33 - 7.94)	6.18	(4.84 - 7.86)	0.12	(0.07 - 0.23)

Note: Estimates are based on a survey-weighted hierarchical Bayes estimation approach, and the 95 percent prediction (credible) intervals are generated by Markov Chain Monte Carlo techniques.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

5. Characteristics of Recent Marijuana Initiates

5.1 Prior Research

This chapter presents findings on (a) the demographic and prior substance use characteristics of recent marijuana initiates (i.e., 1998 and 1999 marijuana initiates), (b) the seasonality of incidence, and (c) potential predictors of marijuana initiation. These data provide descriptive information about young people who have recently initiated use of marijuana. This information can suggest potential approaches to prevention efforts and may also indicate issues that deserve further research to more fully understand the underlying factors involved in marijuana initiation.

Little prior research has been conducted on the characteristics and predictors of marijuana initiation. Most research on correlates has focused on use, not initiation. Factors associated with marijuana initiation include individuals' personality characteristics, adverse family factors, lower level of parental attachment, low parental monitoring, parental substance use, and peers' influences (Bailey & Hubbard, 1990; Brook et al., 1998a; Chilcoat & Anthony, 1996; Kandel, Griesler, Davies, & Schaffsan, 2001; Van Etten & Anthony, 1999).

Rates of first marijuana use also are influenced by demographic characteristics and by prior use of licit substances. Male youths tended to initiate marijuana use earlier than female youths (Kandel & Logan, 1984; Warren et al., 1997). However, younger cohorts of females appeared to initiate marijuana at earlier ages than older cohorts (Warren et al., 1997). Onset of marijuana use was also strongly correlated with age. The rate of marijuana initiation remained relatively flat up to about 13 years of age and increased over the succeeding 5 years (Kosterman et al., 2000). First use of marijuana rarely occurred after age 21, with the period of highest risk peaking at around age 17 and declining sharply thereafter (Kandel & Logan, 1984; Kandel & Yamaguchi, 1985).

In addition, the use of licit substances, such as cigarettes and alcohol, has been suggested to play a role in marijuana initiation. Studies have found that alcohol and/or tobacco tended to precede the use of marijuana, which in turn was followed by the use of other illicit or hard drugs (Duncan, Duncan, & Hops, 1998; Ellickson et al., 1992; Fleming, Leventhal, Glynn, & Ershler, 1989; Kandel et al., 1992; Kandel & Yamaguchi, 1985; Yamaguchi & Kandel, 1984). Both current and prior use of marijuana was found to influence the initiation of other illicit drugs among men and women (Kandel & Yamaguchi, 1985).

Research on the developmental sequence of substance use has suggested that gateway drug use may not be generalized to all substance users. An increasing number of studies have

reported racial/ethnic differences in rates of substance initiation, including marijuana. These observed differences have been suggested to be associated with different family and/or cultural factors (Catalano et al., 1992) or with differential availability of substances and parental attitudes toward substance use (Gillmore et al., 1990). Neumark-Sztainer et al. (1996) found that African-American students had a relatively lower prevalence of tobacco use, but a higher prevalence of marijuana use, than students of other racial/ethnic groups. Gillmore et al. (1990) reported that initiation rates of gateway drugs differed by race/ethnicity and gender. They found that, among 5th graders, white students reported higher rates of initiation of alcohol and tobacco than black or Asian students. White and Asian-American females were less likely than their male counterparts to have engaged in substance use; however, black females were more likely than black males to have used tobacco, alcohol, and marijuana (Gillmore et al., 1990). Recent NHSDA analyses of youth respondents have identified some significant racial/ethnic differences in factors that might be associated with substance use (e.g., access to illicit drugs, parental supervision, and religious beliefs) (Lane et al., 2001).

Similarly, descriptive 1999 NHSDA estimates of persons aged 20 to 25 have suggested that neither cigarettes nor alcohol appeared to be a compelling trigger for subsequent marijuana use because there was no fixed pattern of progression from cigarettes or alcohol to marijuana at the national level (Wright & Davis, 2001). In fact, a large proportion of persons aged 20 to 25 reported never using marijuana, and only one third reported either starting with cigarettes and going on to marijuana or starting with alcohol then going on to marijuana. Depending on prior use of a specific substance, the lag between first use of alcohol and first use of marijuana, or between first use of cigarettes and first use of marijuana, also varied widely (Wright & Davis, 2001).

Prior to this report, there were no data on the seasonality of marijuana initiation. Few available data suggest a potential seasonality in marijuana use. The analysis of data from reports of arrests found a seasonal fluctuation, with the highest marijuana arrest rates during the summer months (peaking in June or July) and the lowest arrest rates in the winter months (Zingraff & Belyea, 1983). Kovalenko et al. (2000) conducted a cross-sectional study to determine when the symptoms of marijuana use and other psychiatric disorders were highest over a 12-month period. They found significant seasonal variations in symptom counts of marijuana use. Symptom counts of marijuana use reached their nadir in February and March and their zenith in August and September.

5.2 Characteristics of Recent Marijuana Initiates

The characteristics of 1998 and 1999 marijuana initiates were examined using data from the 1999 and 2000 surveys. Estimated proportions of recent new marijuana users by gender and

race/ethnicity are summarized in Table 5.1. In 1998 and 1999, there were 2.3 million male initiates and 2.2 million female initiates. For both genders, approximately 70 percent of these recent new marijuana users were white, 3 percent were Asian or Pacific Islander or Native Hawaiian, and 1 percent each were American Indian/Alaska Native or persons reporting more than one race. Of all new male users, 11.7 percent were black, while 14.2 percent of all new female users were black. In comparison, 14.1 percent of all new male users were Hispanic and 10.8 percent of all new female users were Hispanic.

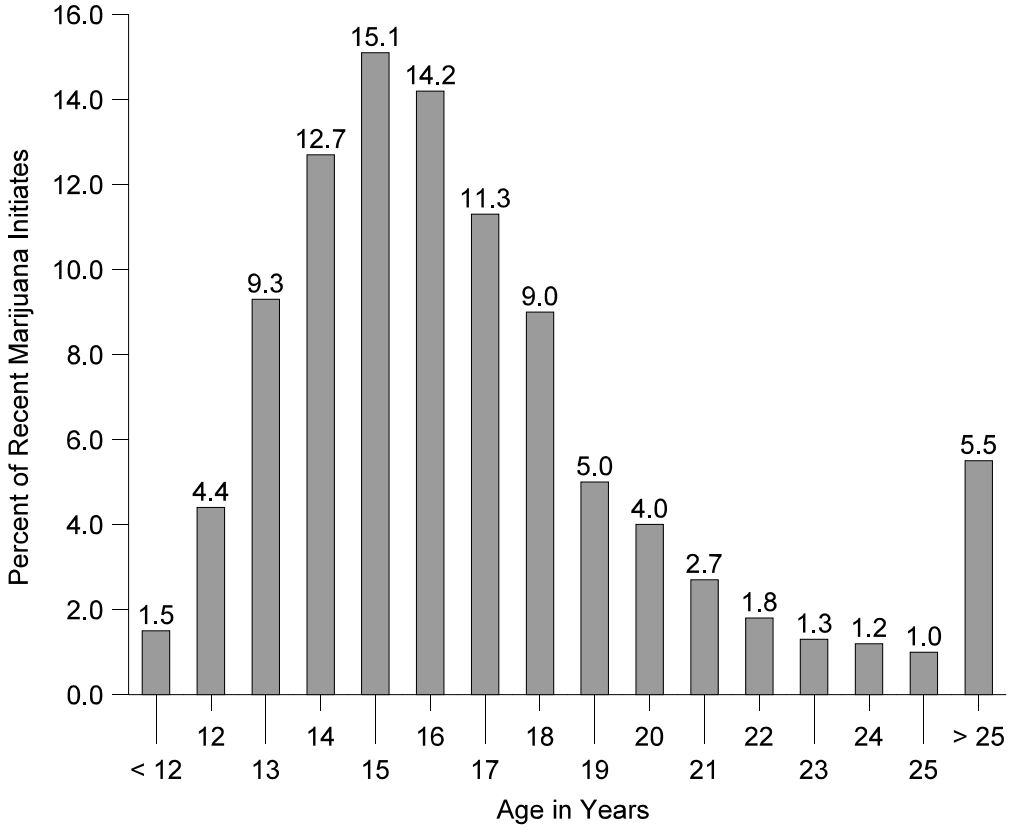
Overall, only 1.5 percent of all recent new users initiated marijuana use before age 12 and 5.5 percent initiated at age 26 or older (Table 5.1). An increased proportion of recent initiates was noted between the ages of 13 and 18, ranging from 9 to 15 percent for each age, then it declined sharply thereafter with increasing age (Figure 5.1). Specifically, 4.4 percent of new users had started to use marijuana at age 12. The proportion of first-time users jumped to 9.3 percent at age 13 and peaked at age 15 (15.1 percent). It was 14.2 percent at age 16, decreasing to 11.3 percent at age 17, 9.0 percent at age 18, and 5.0 percent at age 19. A similar age of initiation pattern was observed for both genders. For males, the highest proportion of all recent initiates was at ages 15 and 16 (both at 14.8 percent); for females, it was at age 15 (15.4 percent). A slightly higher proportion of male than female initiates started to use marijuana before age 12 (2.0 vs. 0.9 percent).

Data on the prior use of alcohol and/or cigarettes in relation to gender and age of first marijuana use among recent marijuana initiates are displayed in Table 5.2. Approximately 60 percent of recent initiates reported prior use of both alcohol and cigarettes. About 9 percent had never used alcohol or cigarettes in their lifetime, and the remaining recent initiates had used either alcohol only (16.6 percent) or cigarettes only (14.8 percent) in their lifetime (Figure 5.2). For both genders, early-onset marijuana users (before age 15) reported a higher proportion of prior use of cigarettes only than those starting their use at age 15 or older. By comparison, adult-onset marijuana users reported a higher proportion of prior use of alcohol only than those starting their use at a younger age. Early-onset marijuana users were also much more likely than other initiates to have begun using marijuana prior to any use of cigarettes or alcohol.

5.3 Seasonality of Incidence

The distribution of month of first marijuana use is presented by gender and age of first marijuana use (Table 5.3). Overall and for males, the highest peak of recent marijuana initiation was noted in June and July (Figure 5.3). Approximately 21 percent of all recent initiates or 22 percent of male initiates reported initiating their marijuana use in these 2 months. For females, the month with the highest proportion of recent initiates was in January (10.0 percent) and July (10.3 percent), while there was a much lower proportion of initiates in February (5.8 percent).

Figure 5.1 Recent Marijuana Initiates, by Age at First Use



Note: Recent initiates are persons who used marijuana for the first time in 1998 or 1999.

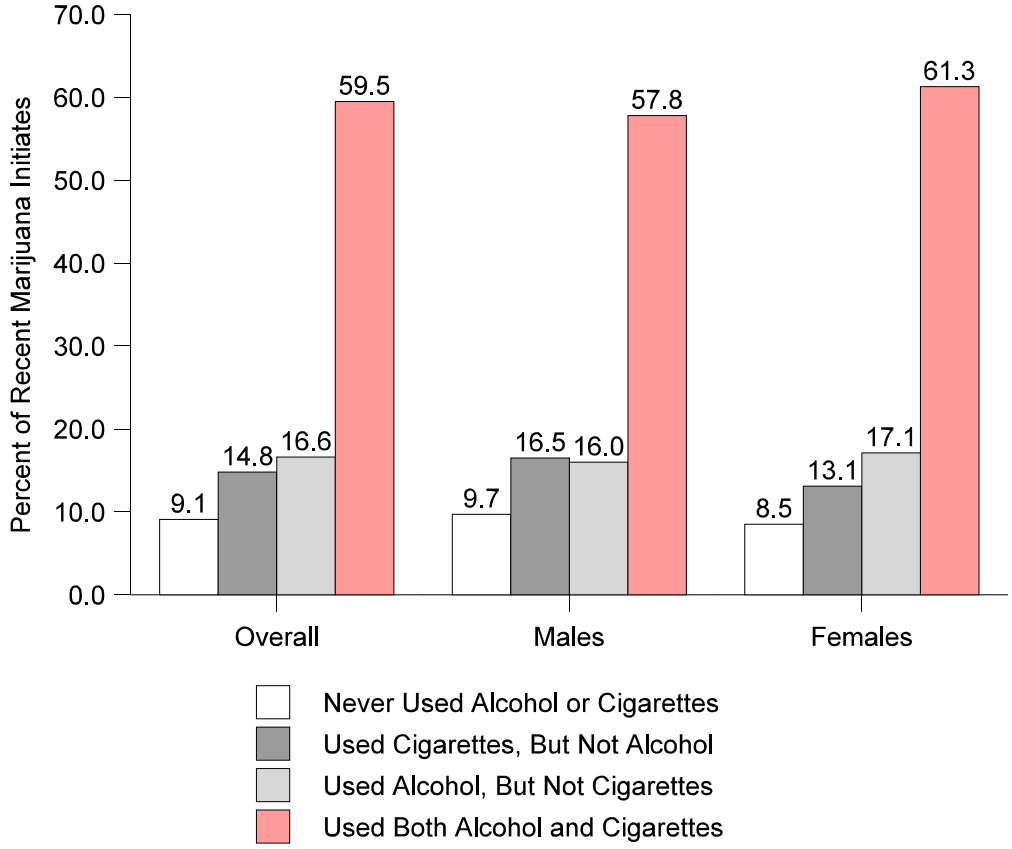
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Figure 5.3 shows the overall and gender-specific average number of new marijuana users per day for each month. On average, there were 3,197 male initiates and 2,989 female initiates per day. Among males, this number of daily initiates increased to approximately 4,300 in June and July. Among females, the estimated initiates per day rose to 3,625 in July and 3,519 in January. Of all recent initiates who started using marijuana before age 18, June (11.6 percent) and July (12.0 percent) also had the most new users, while adult-onset marijuana users tended to have initiated use in January (10.9 percent), December (9.2 percent), or July (9.1 percent).

5.4 Logistic Regression Models

Data on potential predictors of marijuana initiation provide important information for prevention and treatment interventions. This section reports the findings about suspected predictors of recent marijuana initiation (defined as first use in 1998 for the 1999 NHSDA and

Figure 5.2 Prior Alcohol and Cigarette Use among Recent Marijuana Initiates, by Gender



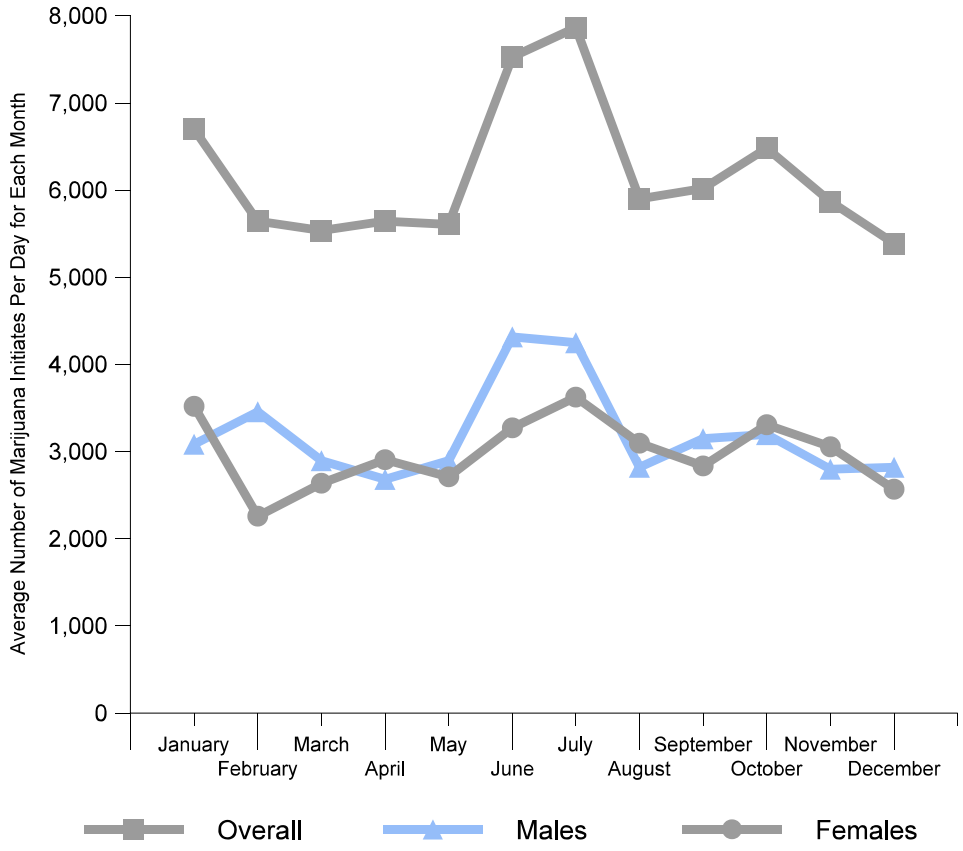
Note: Recent initiates are persons who used marijuana for the first time in 1998 or 1999.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

first use in 1999 for the 2000 NHSDA). Logistic regression procedures were used to determine the relationship between prior use of alcohol and/or cigarettes and marijuana initiation among persons aged 12 to 25 years (age on January 1st). The analysis sample included persons in the 1999 NHSDA who had never used marijuana as of January 1, 1998, and persons in the 2000 NHSDA who had never used marijuana as of January 1, 1999. Of this sample, 5.6 percent (weighted estimate) initiated marijuana use within 1 year (i.e., by December 31th, 1998, in the 1999 sample and by December 31th, 1999, in the 2000 sample).

Prior cigarette use, alcohol use, and daily cigarette use were examined as predictors of marijuana initiation during a 1-year period. Using data about the date of first use, three categories of onset variables for use of alcohol and cigarettes were defined: (1) initial use at age 13 or younger, (2) initial use at age 14 or older, and (3) no use. The following characteristics were also included in the logistic regression models: age, gender, race/ethnicity, geographic

Figure 5.3 Estimated Average Number of Marijuana Initiates Per Day for Each Month: Overall and by Gender



Note: Estimates are based on respondents who gave a substantive response to the month of first use question; hence, only those respondents who did not require their month of first use to be imputed are included. Initiates are defined as those respondents whose difference between their current age and age of first using marijuana is less than 2 years. The average number of initiates per day was calculated by applying the percentage distribution (Table 5.3) to the estimated number of initiates in 1998 and 1999 (Table 3.1) and adjusting for the number of days in each month.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

region, and population density. In the model for youths aged 12 to 14, two categories of prior use of alcohol and/or cigarettes were defined (i.e., ever used vs. never used). In these logistic regression analyses, age was defined as "age as of January 1, 1998" in the 1999 NHSDA and "age as of January 1, 1999" in the 2000 NHSDA. Five separate logistic regression models were reported for five age groups: 12 to 25 years, 12 to 14 years, 15 to 17 years, 18 to 20 years, and 21 to 25 years (Tables 5.4 to 5.8). Schooling status, employment, and marital status were also examined in the two models for adults aged 18 to 20 and 21 to 25.

5.4.1 Results for Persons Aged 12 to 25

Adjusted odds ratios (ORs) of recent marijuana initiation and corresponding 95 percent confidence intervals (CIs) from a multiple logistic regression analysis of persons aged 12 to 25 are summarized in Table 5.4. The model included age, gender, race/ethnicity, region of residence, population density, and prior use of alcohol or cigarettes (i.e., any cigarette smoking, daily cigarette smoking, any alcohol use).

Antecedent use of alcohol or cigarettes and all demographics examined in the model were found to be associated with recent marijuana initiation. Consistent with the literature and the descriptive analyses, the odds of becoming a new marijuana user were relatively low among persons aged 21 to 25 compared with those under age 21. Relative to adults aged 21 to 25, youths aged 17 or younger had particularly increased odds of initiating use (OR = 9.6 for youths aged 12 to 15; OR = 8.4 for youths aged 15 to 17). In this model, males were only slightly more likely than females to initiate marijuana use (OR = 1.1). Whites, Hispanics, and Asians or Pacific Islanders or Native Hawaiians, relative to blacks, had decreased odds of starting to use marijuana, while American Indians or Alaska Natives were more likely than blacks to do so (OR = 2.0). There was no significant difference in the odds of marijuana initiation between blacks and persons reporting more than one race. Persons living in the West were significantly more likely than those in other U.S. regions to become initiates. Increased rates of new use also were more likely among persons living in either large or small metropolitan areas than those in nonmetropolitan areas.

In addition, prior use of alcohol or cigarettes was highly associated with becoming a new marijuana user. Regardless of onset age, cigarette smokers were an estimated 6 times more likely than nonsmokers to initiate marijuana use. Alcohol users were an estimated 7 to 9 times more likely than nonusers to start using marijuana. Daily cigarette smoking was associated with a twofold increase in risk for marijuana initiation.

5.4.2 Results for Persons Aged 12 to 14

Among youths aged 12 to 14 (Table 5.5), the odds of becoming a new marijuana user increased with increasing age. Males were an estimated 1.5 times more likely than females to start using marijuana. Black youths had greater odds of initiation than white youths, but there were no significant differences between blacks and other racial/ethnic groups. The West relative to the Northeast and South regions and small metropolitan areas relative to nonmetropolitan areas had increased rates of marijuana initiation. Antecedent use of cigarettes and alcohol was highly associated with the risk of onset of marijuana use (OR = 12.0 for any cigarette use, OR = 4.0 for daily cigarette use, and OR = 5.6 for any alcohol use).

5.4.3 Results for Persons Aged 15 to 17

Age, as a continuous variable, was associated with decreased risk of marijuana initiation in the adjusted logistic regression model of youths aged 15 to 17 (Table 5.6). Gender was not related to marijuana initiation. American Indian or Alaska Native youths had the highest odds of becoming new marijuana users, and blacks had higher odds than whites and Asians, Pacific Islanders, or Native Hawaiians. Youths living in the West or metropolitan areas also had increased odds of becoming new marijuana users. Consistent with the model for youths aged 12 to 14, prior use of alcohol or cigarettes signaled elevated odds of marijuana initiation. Regardless of the age group of onset, the adjusted ORs of marijuana initiation were around 6.0 for any alcohol or cigarette use and 2.0 to 3.0 for daily cigarette use.

5.4.4 Results for Persons Aged 18 to 20

Among young adults aged 18 to 20 (Table 5.7), increased age was associated with decreased risk of marijuana initiation. In this adult age group, education, employment, and marital status were also included in the logistic regression model. Gender, education, employment, and region of residence were not found to be associated with marijuana initiation. Blacks, relative to Hispanics, had increased odds of initiation. Being married was associated with decreased odds of initiation compared with being never married. Young adults living in large metropolitan areas were more likely than those in nonmetropolitan areas to initiate marijuana use. Antecedent use of alcohol or cigarettes increased the risk of recent marijuana initiation (OR ~ 4.0 for any cigarette use, OR ~ 8.0 for any alcohol use). Onset of daily cigarette smoking at age 14 or older predicted an onset of marijuana use (OR = 1.9), while onset before age 14 was not found to be significant.

5.4.5 Results for Persons Aged 21 to 25

Consistent with previous analyses, the risk of marijuana initiation among adults aged 21 to 25 decreased with older age (Table 5.8). In this age group, gender, employment, region of residence, and population density were not found to be associated with marijuana initiation. Blacks, relative to whites, Hispanics, or Asians/Pacific Islanders/Native Hawaiians, had increased odds of initiation. Young adults aged 21 to 25 who attended college had greater odds of becoming new marijuana users than high school graduates. Married persons had decreased odds of initiation compared with those who had never been married. Prior use of alcohol or any cigarette and daily cigarette smoking at age 14 or older predicted increased odds of initiation, but daily cigarette smoking before age 14 predicted decreased odds of initiation.

Table 5.1 Characteristics of Recent Marijuana Initiates

Characteristics	Total		Male		Female	
	Number of Initiates (1,000s)	%	Number of Initiates (1,000s)	%	Number of Initiates (1,000s)	%
Total	4,515	100.0	2,302	100.0	2,214	100.0
Race/Ethnicity						
White	3,138	69.5	1,587	68.9	1,551	70.1
Black	584	12.9	269	11.7	315	14.2
Hispanic	565	12.5	326	14.1	240	10.8
Asian/Pacific Islander/ Native Hawaiian	120	2.7	61	2.6	59	2.7
American Indian or Alaska Native	49	1.1	25	1.1	24	1.1
More than one race	60	1.3	35	1.5	25	1.1
Age at First Marijuana Use						
< 12	66	1.5	45	2.0	20	0.9
12	200	4.4	104	4.5	97	4.4
13	422	9.3	240	10.4	182	8.2
14	572	12.7	282	12.2	290	13.1
15	681	15.1	340	14.8	341	15.4
16	642	14.2	341	14.8	301	13.6
17	509	11.3	285	12.4	224	10.1
18	404	9.0	206	8.9	198	9.0
19	225	5.0	102	4.4	124	5.6
20	181	4.0	79	3.4	102	4.6
21	121	2.7	53	2.3	68	3.1
22	83	1.8	35	1.5	49	2.2
23	61	1.3	28	1.2	32	1.5
24	53	1.2	26	1.1	26	1.2
25	46	1.0	26	1.1	20	0.9
26 or older	249	5.5	110	1.8	139	6.3

Note: Recent initiates are persons who used marijuana for the first time in 1998 based on both 1999 and 2000 NHSDA data or for the first time in 1999 based on 2000 NHSDA data only.
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 5.2 Prior Alcohol and Cigarette Use among Recent Marijuana Initiates

Gender and Age of First Use of Marijuana	Alcohol and Cigarette Use at Time of Marijuana Initiation			
	Never Used Alcohol or Cigarettes in Lifetime	Used Cigarettes, But Not Alcohol in Lifetime	Used Alcohol, But Not Cigarettes in Lifetime	Used Both Alcohol and Cigarettes in Lifetime
	% of Marijuana Initiates	% of Marijuana Initiates	% of Marijuana Initiates	% of Marijuana Initiates
Total				
Total	9.1	14.8	16.6	59.5
< 15	16.5	24.2	13.1	46.2
15-17	9.0	16.4	15.3	59.3
18-20	4.3	6.8	21.2	67.8
21 or older	0.5	1.3	21.6	76.7
Male				
Total	9.7	16.5	16.0	57.8
< 15	16.8	26.1	13.7	43.4
15-17	9.9	18.1	14.9	57.1
18-20	3.3	7.0	19.9	69.8
21 or older	0.7	0.9	20.3	78.1
Female				
Total	8.5	13.1	17.1	61.3
< 15	16.1	22.1	12.4	49.4
15-17	8.0	14.6	15.7	61.6
18-20	5.3	6.5	22.3	65.9
21 or older	0.3	1.7	22.6	75.5

Note: Recent initiates are persons who used marijuana for the first time in 1998 based on either 1999 or 2000 NHSDA data or for the first time in 1999 based on 2000 NHSDA data only.
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 5.3 Distribution of Month of First Marijuana Use among Persons Aged 12 or Older

	% of Initiates				
Month	**Total**	**Male**	**Female**	**Initiating Marijuana Before Age 18**	**Initiating Marijuana ≥18**
Total	100.0	100.0	100.0	100.0	100.0
January	9.2	8.2	10.0	7.8	10.9
February	7.0	8.3	5.8	6.9	7.1
March	7.6	7.7	7.5	6.7	8.8
April	7.5	6.9	8.0	7.5	7.5
May	7.7	7.7	7.7	7.5	7.9
June	10.0	11.1	9.0	11.6	8.0
July	10.8	11.3	10.3	12.0	9.1
August	8.1	7.5	8.8	8.1	8.2
September	8.0	8.1	7.8	8.9	6.8
October	8.9	8.5	9.4	9.8	7.9
November	7.8	7.2	8.4	7.2	8.6
December	7.4	7.5	7.3	6.0	9.2

Note: Estimates are based on respondents who gave a substantive response to the month of first use question; hence, only those respondents who did not require their month of first use to be imputed are included. Initiates are defined as those respondents whose difference between their current age and age of first using marijuana is less than 2 years.
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 5.4 Adjusted Odds Ratios of Marijuana Initiation Within 1 Year among Persons *Aged 12 to 25*

Model Covariates	Adjusted Odds Ratio	95% Confidence Interval
Age on January 1[1]		
Under 15	9.58	(7.76 - 11.82)
15-17	8.40	(6.87 - 10.26)
18-20	3.29	(2.63 - 4.13)
21 or older	1.00	(1.00 - 1.00)
Gender		
Male	1.12	(1.03 - 1.22)
Female	1.00	(1.00 - 1.00)
Race/Ethnicity		
White	0.65	(0.56 - 0.76)
Black	1.00	(1.00 - 1.00)
Hispanic	0.62	(0.51 - 0.75)
Asian/Pacific Islander/Native Hawaiian	0.56	(0.40 - 0.80)
American Indian or Alaska Native	2.03	(1.25 - 3.29)
More than one race	0.85	(0.55 - 1.32)
Region		
Northeast	0.84	(0.72 - 0.98)
Midwest	0.80	(0.69 - 0.92)
South	0.74	(0.64 - 0.85)
West	1.00	(1.00 - 1.00)
Population Density		
Large metro	1.30	(1.15 - 1.47)
Small metro	1.29	(1.15 - 1.46)
Nonmetro	1.00	(1.00 - 1.00)
Cigarette Use		
Initiation at age 13 or younger	5.58	(4.81 - 6.48)
Initiation at age 14 or older	5.68	(4.90 - 6.60)
Never used	1.00	(1.00 - 1.00)
Daily Cigarette Use		
Initiation at age 13 or younger	2.05	(1.71 - 2.46)
Initiation at age 14 or older	1.96	(1.75 - 2.20)
Never used	1.00	(1.00 - 1.00)
Alcohol Use		
Initiation at age 13 or younger	7.26	(6.08 - 8.67)
Initiation at age 14 or older	9.00	(7.51 - 10.78)
Never used	1.00	(1.00 - 1.00)

Note: Recent initiation is defined as starting in the calendar year 1998 based on 1999 data or starting in the calendar year 1999 based on 2000 data.

[1]Age on January 1st is the respondent's age on January 1, 1998, if the respondent is from 1999 data or January 1, 1999, if the respondent is from 2000 data.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 5.5 Adjusted Odds Ratios of Marijuana Initiation Within 1 Year among Persons *Aged 12 to 14*

Model Covariates	Adjusted Odds Ratio	95% Confidence Interval
Age on January 1[1]	1.30	(1.14 - 1.48)
Gender		
Male	1.47	(1.20 - 1.79)
Female	1.00	(1.00 - 1.00)
Race/Ethnicity		
White	0.56	(0.41 - 0.78)
Black	1.00	(1.00 - 1.00)
Hispanic	1.08	(0.71 - 1.64)
Asian/Pacific Islander/Native Hawaiian	0.67	(0.24 - 1.86)
American Indian or Alaska Native	3.08	(0.98 - 9.71)
More than one race	0.55	(0.26 - 1.17)
Region		
Northeast	0.68	(0.48 - 0.96)
Midwest	0.76	(0.56 - 1.02)
South	0.63	(0.47 - 0.86)
West	1.00	(1.00 - 1.00)
Population Density		
Large metro	1.12	(0.86 - 1.47)
Small metro	1.61	(1.25 - 2.08)
Nonmetro	1.00	(1.00 - 1.00)
Cigarette Use		
Ever used	12.00	(8.50 - 16.94)
Never used	1.00	(1.00 - 1.00)
Daily Cigarette Use		
Ever used	3.95	(2.91 - 5.36)
Never used	1.00	(1.00 - 1.00)
Alcohol Use		
Ever used	5.55	(4.02 - 7.67)
Never used	1.00	(1.00 - 1.00)

Note: Recent initiation is defined as starting in the calendar year 1998 based on 1999 data or starting in the calendar year 1999 based on 2000 data.

[1]Age on January 1st is the respondent's age on January 1, 1998, if the respondent is from 1999 data or January 1, 1999, if the respondent is from 2000 data.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 5.6 Adjusted Odds Ratios of Marijuana Initiation Within 1 Year among Persons *Aged 15 to 17*

Model Covariates	Adjusted Odds Ratio	95% Confidence Interval
Age on January 1[1]	0.90	(0.84 - 0.97)
Gender		
Male	1.08	(0.95 - 1.23)
Female	1.00	(1.00 - 1.00)
Race/Ethnicity		
White	0.63	(0.51 - 0.79)
Black	1.00	(1.00 - 1.00)
Hispanic	0.79	(0.60 - 1.04)
Asian/Pacific Islander/Native Hawaiian	0.45	(0.27 - 0.75)
American Indian or Alaska Native	2.62	(1.13 - 6.10)
More than one race	1.06	(0.55 - 2.02)
Region		
Northeast	0.85	(0.70 - 1.04)
Midwest	0.74	(0.61 - 0.91)
South	0.70	(0.58 - 0.84)
West	1.00	(1.00 - 1.00)
Population Density		
Large metro	1.35	(1.14 - 1.59)
Small metro	1.29	(1.10 - 1.51)
Nonmetro	1.00	(1.00 - 1.00)
Cigarette Use		
Initiation at age 13 or younger	6.09	(4.99 - 7.42)
Initiation at age 14 or older	6.14	(5.07 - 7.44)
Never used	1.00	(1.00 - 1.00)
Daily Cigarette Use		
Initiation at age 13 or younger	2.16	(1.66 - 2.81)
Initiation at age 14 or older	3.15	(2.68 - 3.70)
Never used	1.00	(1.00 - 1.00)
Alcohol Use		
Initiation at age 13 or younger	6.18	(4.91 - 7.77)
Initiation at age 14 or older	6.47	(5.21 - 8.03)
Never used	1.00	(1.00 - 1.00)

Note: Recent initiation is defined as starting in the calendar year 1998 based on 1999 data or starting in the calendar year 1999 based on 2000 data.

[1]Age on January 1st is the respondent's age on January 1, 1998, if the respondent is from 1999 data or January 1, 1999, if the respondent is from 2000 data.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 5.7 Adjusted Odds Ratios of Marijuana Initiation Within 1 Year among Persons *Aged 18 to 20*

Model Covariates	Adjusted Odds Ratio	95% Confidence Interval
Age on January 1[1]	0.73	(0.66 - 0.82)
Gender		
Male	1.19	(0.99 - 1.44)
Female	1.00	(1.00 - 1.00)
Race/Ethnicity		
White	0.79	(0.55 - 1.12)
Black	1.00	(1.00 - 1.00)
Hispanic	0.49	(0.31 - 0.77)
Asian/Pacific Islander/Native Hawaiian	0.56	(0.29 - 1.07)
American Indian or Alaska Native	1.29	(0.46 - 3.62)
More than one race	0.50	(0.21 - 1.18)
Education		
High school dropout	0.89	(0.62 - 1.28)
High school student	0.86	(0.67 - 1.12)
High school graduate	0.85	(0.68 - 1.06)
At least some college	1.00	(1.00 - 1.00)
Employment Status		
Not employed	0.96	(0.78 - 1.19)
Employed	1.00	(1.00 - 1.00)
Marital Status		
Never married	2.76	(1.48 - 5.15)
Married or previously married	1.00	(1.00 - 1.00)
Region		
Northeast	0.81	(0.58 - 1.14)
Midwest	0.87	(0.64 - 1.19)
South	0.85	(0.61 - 1.18)
West	1.00	(1.00 - 1.00)
Population Density		
Large metro	1.37	(1.07 - 1.76)
Small metro	1.22	(0.98 - 1.52)
Nonmetro	1.00	(1.00 - 1.00)
Cigarette Use		
Initiation at age 13 or younger	3.19	(2.26 - 4.49)
Initiation at age 14 or older	3.95	(3.04 - 5.15)
Never used	1.00	(1.00 - 1.00)
Daily Cigarette Use		
Initiation at age 13 or younger	1.32	(0.70 - 2.48)
Initiation at age 14 or older	1.86	(1.51 - 2.30)
Never used	1.00	(1.00 - 1.00)
Alcohol Use		
Initiation at age 13 or younger	7.41	(4.08 - 13.44)
Initiation at age 14 or older	8.01	(4.67 - 13.74)
Never used	1.00	(1.00 - 1.00)

Note: Recent initiation is defined as starting in the calendar year 1998 based on 1999 data or starting in the calendar year 1999 based on 2000 data.

[1]Age on January 1st is the respondent's age on January 1, 1998, if the respondent is from 1999 data or January 1, 1999, if the respondent is from 2000 data.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 5.8 Adjusted Odds Ratios of Marijuana Initiation Within 1 Year among Persons *Aged 21 to 25*

Model Covariates	Adjusted Odds Ratio	95% Confidence Interval
Age on January 1[1]	0.70	(0.63 - 0.78)
Gender		
Male	0.92	(0.70 - 1.21)
Female	1.00	(1.00 - 1.00)
Race/Ethnicity		
White	0.52	(0.36 - 0.75)
Black	1.00	(1.00 - 1.00)
Hispanic	0.31	(0.17 - 0.57)
Asian/Pacific Islander/Native Hawaiian	0.43	(0.20 - 0.94)
American Indian or Alaska Native	0.85	(0.19 - 3.91)
More than one race	1.79	(0.57 - 5.64)
Education		
Not completed high school[2]	0.58	(0.33 - 1.01)
High school graduate	0.43	(0.30 - 0.60)
At least some college	1.00	(1.00 - 1.00)
Employment Status		
Not employed	1.08	(0.76 - 1.53)
Employed	1.00	(1.00 - 1.00)
Marital Status		
Never married	2.13	(1.41 - 3.23)
Married or previously married	1.00	(1.00 - 1.00)
Region		
Northeast	0.85	(0.55 - 1.33)
Midwest	0.66	(0.43 - 1.01)
South	0.76	(0.50 - 1.15)
West	1.00	(1.00 - 1.00)
Population Density		
Large metro	1.08	(0.77 - 1.51)
Small metro	1.02	(0.73 - 1.42)
Nonmetro	1.00	(1.00 - 1.00)
Cigarette Use		
Initiation at age 13 or younger	2.85	(1.69 - 4.81)
Initiation at age 14 or older	2.99	(2.06 - 4.33)
Never used	1.00	(1.00 - 1.00)
Daily Cigarette Use		
Initiation at age 13 or younger	0.17	(0.03 - 0.88)
Initiation at age 14 or older	1.50	(1.10 - 2.03)
Never used	1.00	(1.00 - 1.00)
Alcohol Use		
Initiation at age 13 or younger	20.82	(4.10 - 105.78)
Initiation at age 14 or older	29.27	(6.46 - 132.71)
Never used	1.00	(1.00 - 1.00)

Note: Recent initiation is defined as starting in the calendar year 1998 based on 1999 data or starting in the calendar year 1999 based on 2000 data.

[1] Age on January 1st is the respondent's age on January 1, 1998, if the respondent is from 1999 data; or January 1, 1999, if the respondent is from 2000 data.

[2] Includes high school students and dropouts.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

6. Early Marijuana Use and Later Drug Use Patterns

6.1 Introduction

In addition to providing useful information for prevention planning, incidence data can be used to help policymakers anticipate future trends in the nature and extent of the need for substance abuse treatment services. Marijuana incidence data have been used to make projections of drug abuse treatment need in the year 2020 (Gfroerer & Epstein, 1999). That study and others have shown the importance of early marijuana use as a predictor of later substance use patterns and associated problems (Brook, Gordon, Brook, & Cohen, 1989; Brook, Cohen, & Brook, 1998b; Brook et al., 1999b; DeWit, Hance, Offord, & Ogborne, 2000; Grant & Dawson, 1998). Given the substantial increases in marijuana incidence rates during the 1990s and the continuing high rates as recently as 1999, data showing the relationship between early initiation and later substance use patterns are needed. This chapter provides such data, primarily focusing on age at first use of marijuana as a predictor.

The remainder of this chapter focuses on three topics. Section 6.2 discusses the estimated proportions of drug use patterns among adults aged 26 or older by age at first marijuana use and by age groups. Section 6.3 provides adjusted odds ratios (ORs) of illicit drug use, heavy illicit drug use, and substance dependence/abuse from the multiple logistic regression models. Each logistic regression model includes age of marijuana initiation, age group, gender, race/ethnicity, and educational level. Section 6.4 includes findings for a subset of the analysis focusing on past year marijuana users aged 26 or older. This subset examined the relationship between age at first marijuana use and past year drug dependence (e.g., marijuana dependence, illicit drug dependence other than marijuana, illicit drug dependence, alcohol dependence or abuse, and alcohol or illicit drug dependence/abuse).

Heavy marijuana use was defined as using marijuana on at least 300 days in the past year. Heavy illicit drug use other than marijuana was defined as using at least one of the following: cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic used nonmedically on at least 50 days in the past year, regardless of marijuana/hashish use. Marijuana/hashish users who also had used any of the other listed drugs on at least 50 days in the past year were counted as heavy users of illicit drugs other than marijuana. Because of changes in the measures of dependence and abuse in the 2000 survey, estimates for alcohol or illicit drug abuse and dependence were based only on data from the 2000 survey. In brief, the 2000 NHSDA includes a series of questions on dependence that assess health or emotional problems, attempts to cut down on use, tolerance, withdrawal, and other symptoms associated with substances used. The questions on abuse assess problems at work, home, and school; problems with family or friends; physical danger; and trouble with the

law due to substances used. The changes in measures of abuse and dependence limit the comparisons between 2000's estimates and estimates from prior surveys.

6.2 Estimated Prevalence of Illicit Drug Use, Heavy Illicit Drug Use, Substance Abuse, and Dependence, by Age of Marijuana Initiation

6.2.1 Use of Heroin, Cocaine, and Psychotherapeutics Nonmedically

The prevalence of lifetime and past year use of heroin, cocaine, and nonmedical psychotherapeutics in relation to age at first marijuana use is presented in Table 6.1 and Figure 6.1. Among adults aged 26 or older, the highest prevalence of use of heroin, cocaine, and psychotherapeutics in the lifetime was noted among those who initiated marijuana before they were 15 years old (9.2, 62.0, and 53.9 percent, respectively, for heroin, cocaine, and psychotherapeutics). There was a tendency for the prevalence of lifetime illicit drug use to decrease with older age of first marijuana use. Among lifetime marijuana users reporting their onset after age 20, an estimated 1.1 percent used heroin, 16.4 percent used cocaine, and 20.6 percent used any psychotherapeutics nonmedically in their lifetime. Among persons who had never used marijuana, less than 1 percent had ever used cocaine or heroin, but 5.1 percent had used psychotherapeutics nonmedically.

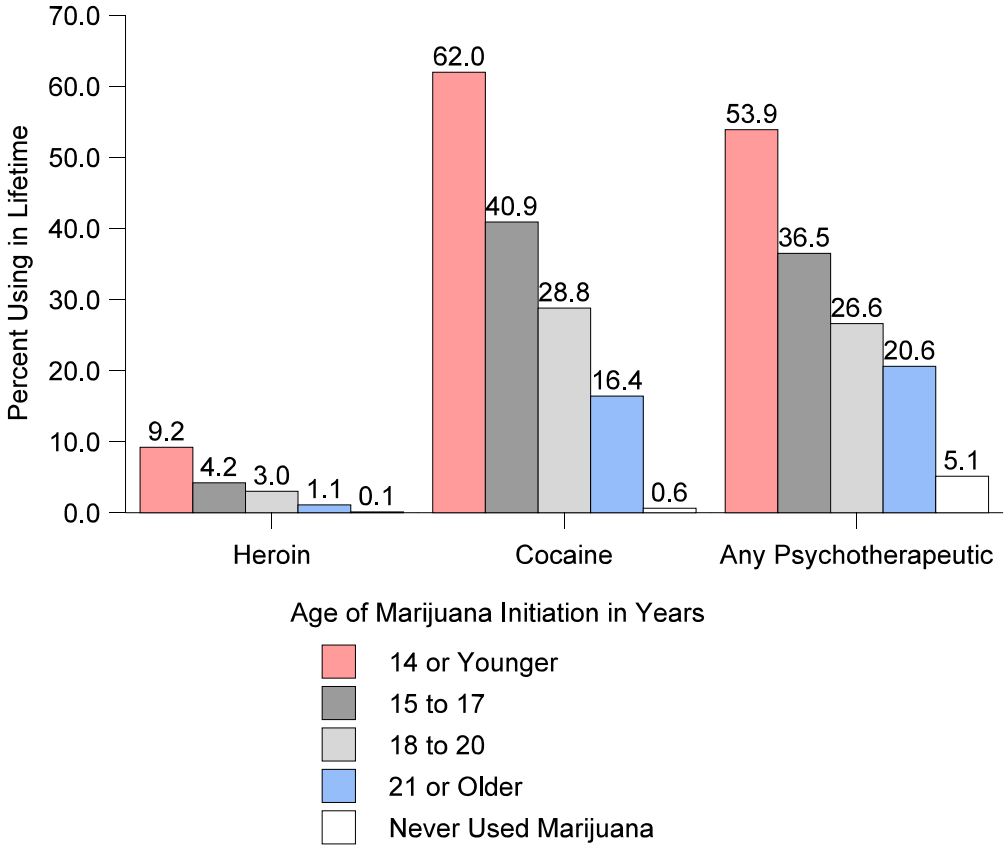
Similar patterns of past year use of these illicit drugs across the four groups of age at first marijuana use were observed. An estimated 6.9 percent of early-onset marijuana users (onset at age 14 or younger) used cocaine in the past year compared with only 0.8 percent of those initiating after age 20. An estimated 11.5 percent of early-onset marijuana users (onset at age 14 or younger) used any psychotherapeutics in the past year, while 2.9 percent of those initiating after age 20 did so.

For marijuana users aged 26 to 34 and those aged 35 to 49, rates of lifetime illicit drug use were generally higher among adolescence-onset marijuana users than among users initiating during adulthood. Because of a low prevalence of other illicit drug use among marijuana users aged 50 or older and very low proportions of past year heroin use across all three age groups (less than 1 percent), the relationship between the use of these illicit drugs and the onset age of marijuana use was less clear for them.

6.2.2 Heavy Illicit Drug Use

Among all lifetime marijuana users aged 26 or older, early-onset users not only had relatively higher proportions of recent (past year) heavy marijuana use than adult-onset users,

Figure 6.1 Prevalence of Lifetime Use of Heroin, Cocaine, and Psychotherapeutics among Adults Aged 26 or Older, by Age of Marijuana Initiation: 1999 and 2000

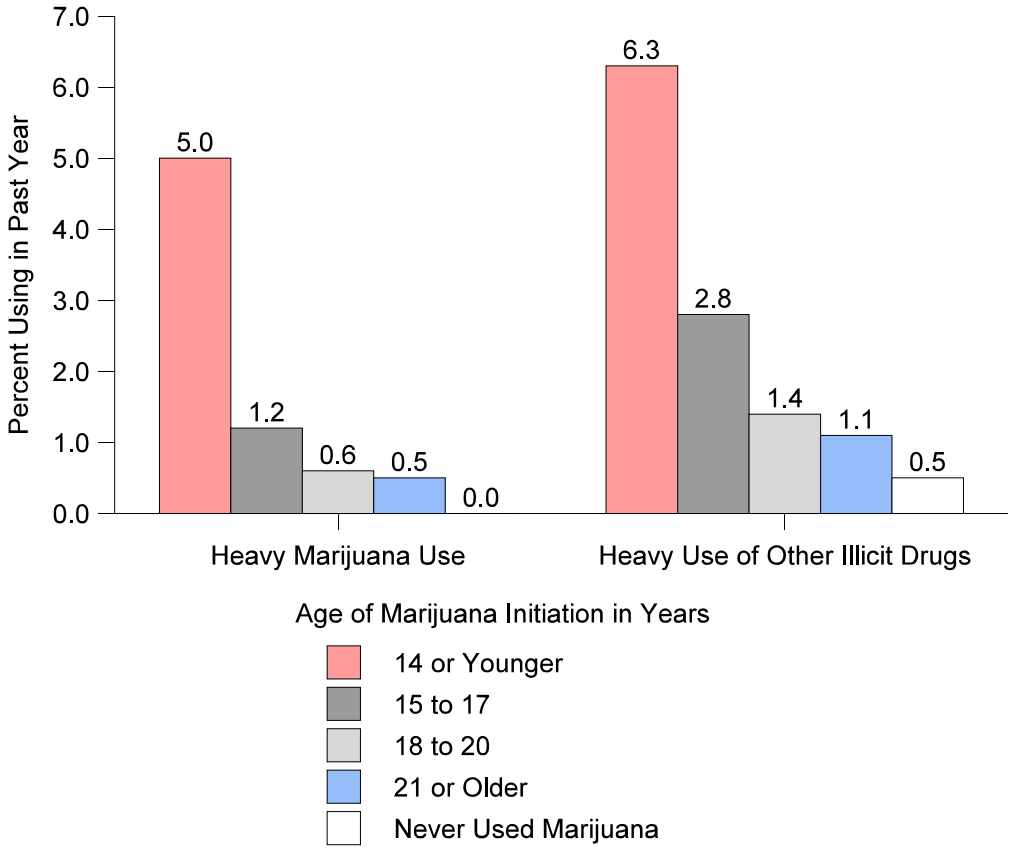


Note: Nonmedical use of any prescription-type psychotherapeutic indicates using pain relievers, tranquilizers, stimulants, or sedatives at least once. Indicated use does not include over-the-counter drugs.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

but they also reported high proportions of heavy use of other illicit drugs (Table 6.2 and Figure 6.2). An estimated 5.0 percent of those initiating marijuana at age 14 or younger were recent heavy marijuana users compared with less than 1 percent of those with an onset age of 18 years or older. Likewise, 6.3 percent of those initiating marijuana at age 14 or younger were recent heavy users of other illicit drugs in comparison with about 1 percent of those with an onset age of 18 years or older. A similar pattern also was observed among two age groups of marijuana users (i.e., adults aged 26 to 34 and those aged 35 to 49). There was an insufficient number of heavy illicit drug users among the older age group (i.e., aged 50 or older) to allow for such a comparison. Less than 1 percent of adults who had never used marijuana reported heavy use of other illicit drugs.

Figure 6.2 Prevalence of Past Year Heavy Marijuana Use and Heavy Use of Other Illicit Drugs among Adults Aged 26 or Older, by Age of Marijuana Initiation: 1999 and 2000



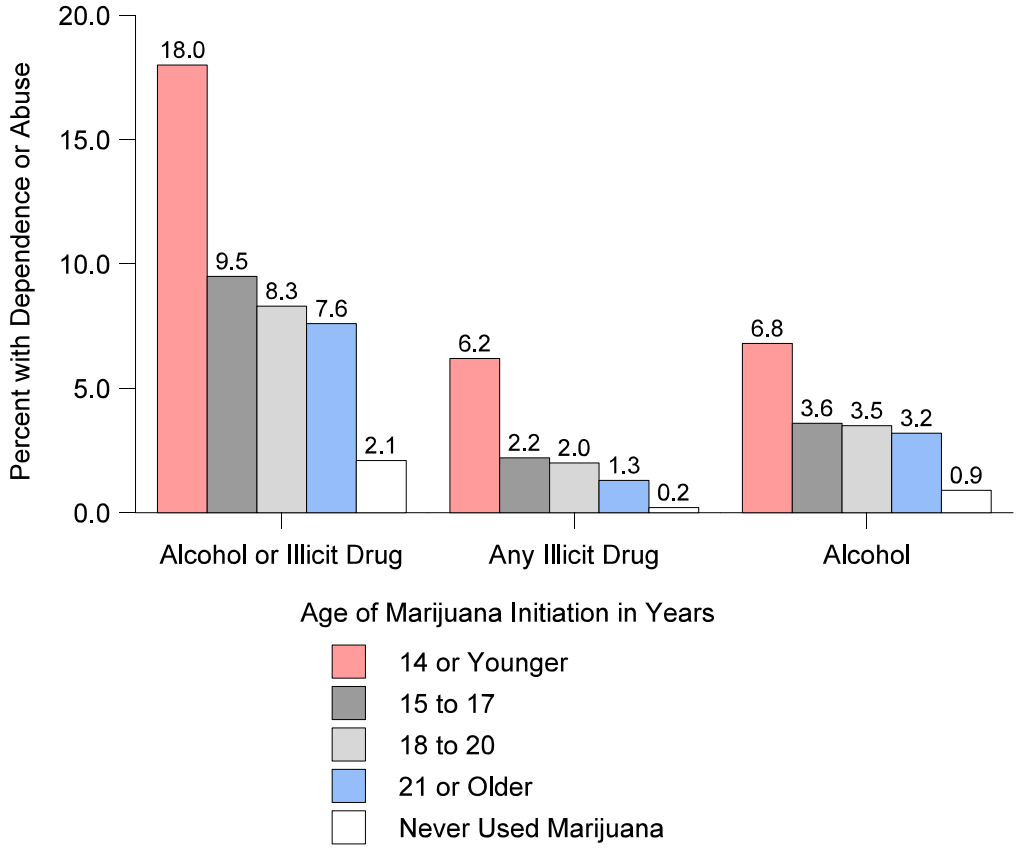
Note: Heavy marijuana use refers to using marijuana on 300 or more days in the past year. Heavy use of other illicit drugs refers to using cocaine, hallucinogens, inhalants, heroin, or any prescription-type psychotherapeutic used nonmedically (i.e., pain relievers, sedatives, tranquilizers, or stimulants) on at least 50 days in the past year.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

6.2.3 Substance Dependence and/or Abuse

The estimated past year prevalence of dependence on and abuse of alcohol or illicit drugs by age at first use of marijuana is summarized in Table 6.3 and Figure 6.3. Overall and among those aged 26 to 49, prevalence rates of dependence on or abuse of an illicit drug and prevalence rates of dependence on or abuse of either alcohol or an illicit drug were highest among those who started to use marijuana at age 14 or younger. An estimated 6.2 percent of those initiating marijuana before age 15 abused or were dependent on an illicit drug in the past year compared with 1.3 percent of those initiating marijuana at age 21 or older. Similarly, 18.0 percent of early-onset (onset before age 15) marijuana users were classified with dependence on or abuse

Figure 6.3 Prevalence of Past Year Alcohol and/or Illicit Drug Dependence or Abuse among Adults Aged 26 or Older, by Age of Marijuana Initiation: 2000



Note: Illicit drug dependence or abuse indicates dependence on or abuse of at least one of the following drugs: marijuana/hashish, cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic used nonmedically. The alcohol-only data refer to just dependence on alcohol, not alcohol abuse. Dependence or abuse is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (APA, 1994).

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

of either alcohol or an illicit drug in comparison with 7.6 percent of those who first used marijuana after age 20.

Even when the prevalence was restricted to dependence and was specific to alcohol, an illicit drug, marijuana, or an illicit drug other than marijuana, prevalence rates of dependence for each outcome were consistently found to be highest among marijuana users who started their first use at age 14 or younger.

Among adults who had never used marijuana, the prevalence of past year alcohol and/or illicit drug abuse or dependence was very low. Only about 0.2 percent of them were classified with dependence on or abuse of an illicit drug and 0.9 percent were dependent on alcohol. In

addition, there was a tendency among those who had never used marijuana for the prevalence of illicit drug abuse or dependence to be higher among young adults aged 26 to 34 years (0.4 percent), but for the prevalence of alcohol dependence to be slightly higher among persons aged 35 to 49 (1.4 percent).

6.3 Multiple Logistic Regression Models

The estimated strength of associations of age at first marijuana use with the use of other illicit drugs and/or recent substance dependence and abuse was determined via multiple logistic regression procedures. Each logistic regression model also included age, gender, race/ethnicity, and educational level. Adjusted ORs, denoting the estimated association, that were derived from the multiple logistic regression procedures are discussed in this section.

6.3.1 Adjusted Odds Ratios of Use of Heroin, Cocaine, and Psychotherapeutics Nonmedically

Adjusted ORs for use of heroin, cocaine, and psychotherapeutics among lifetime marijuana users aged 26 or older are displayed in Table 6.4 (lifetime use) and Table 6.5 (past year use).

6.3.1.1 Heroin

With statistical adjustment for demographic characteristics, age at onset of marijuana use was significantly associated with lifetime heroin use (Table 6.4). In particular, onset before age 15 strongly predicted lifetime heroin use. Adjusted ORs of ever using heroin among lifetime marijuana users were 15.5 for those reporting first marijuana use at age 14 or younger, 6.1 for those initiating between the ages of 15 and 17, and 3.5 for those initiating between the ages of 18 and 20 as compared with those experiencing onset at age 21 or older. Among marijuana users, younger adults were significantly less likely to have ever used heroin than older adults aged 50 or older (OR = 0.2 for adults aged 26 to 34; OR = 0.5 for adults aged 35 to 49). Male marijuana users were an estimated 1.6 times more likely than female users to have ever used heroin. Relative to blacks, whites were at lower odds of using heroin in the lifetime. Educational level was not found to be associated with odds of lifetime heroin use. Age at first marijuana use was not associated with past year heroin use in the adjusted logistic regression model (Table 6.5).

6.3.1.2 Cocaine

Age at onset of marijuana use was highly associated with lifetime and recent cocaine use, particularly for those who initiated before age 15. These persons were 7 to 8 times

more likely than those who initiated at age 21 or older to use cocaine (Tables 6.4 and 6.5). Lifetime marijuana users who were male and American Indian or Alaska Native (relative to black) also had increased rates of lifetime cocaine use. The analysis of recent cocaine use found that male gender and less than a high school education predicted increased odds of using cocaine in the past year (Table 6.5). In addition, white and Asian/Pacific Islander/Native Hawaiian lifetime marijuana users were less likely than black users to use cocaine recently.

6.3.1.3 Psychotherapeutics

Early onset of marijuana use also predicted increased odds of nonmedical use of any psychotherapeutic drug in the lifetime and past year (OR = 5.3 for lifetime use; OR = 3.4 for past year use). Younger adult marijuana users (aged 26 to 34) were less likely than older users (aged 50 or older) to report using psychotherapeutics in the lifetime, but they were significantly more likely to use them in the past year. Male marijuana users had decreased odds of using psychotherapeutics in the past year (OR = 0.8). Compared with black marijuana users, white, Hispanic, and American Indian/Alaska Native users had increased odds of recent psychotherapeutic use. Persons with less than high school schooling also had an increased likelihood of using psychotherapeutics in the past year.

6.3.2 Adjusted Odds Ratios of Heavy Illicit Drug Use

Adjusted ORs of past year (recent) heavy illicit drug use (marijuana and other illicit drugs) are summarized in Table 6.6. Early-onset of marijuana use (before age 15) was significantly associated with the increased odds of heavy use of marijuana (OR = 5.3) and other illicit drugs (OR = 4.5). Marijuana initiation between the ages of 15 and 17 also predicted heavy use of other illicit drugs (OR = 2.1). Male marijuana users were an estimated 2.1 times more likely than female users to report heavy marijuana in the past year. Lifetime marijuana users who did not attend college also were at increased odds of using an illicit drug heavily in the past year.

6.3.3 Adjusted Odds Ratios of Substance Dependence and/or Abuse

This section includes results of multiple logistic regression analyses of the following outcomes in relation to age at first use of marijuana among lifetime marijuana users aged 26 or older (Tables 6.7 to 6.9): (1) illicit drug dependence or abuse, (2) alcohol or illicit drug dependence or abuse, (3) alcohol dependence, (4) illicit drug dependence, (5) marijuana dependence, and (6) other illicit drug dependence.

Onset of marijuana use before age 15 significantly predicted increased odds of meeting the criteria for dependence on and/or abuse of either alcohol and/or an illicit drug in the past year (OR = 4.7 for an illicit drug; OR = 1.9 for alcohol or other illicit drugs). Black marijuana users

had an increased likelihood of being dependent on or abusing an illicit drug than white and Asian/Pacific Islander/Native Hawaiian users. Less educated lifetime marijuana users (less than high school) were an estimated 1.8 times more likely to be classified with dependence on or abuse of an illicit drug recently, while age and gender were not associated with any odds of being dependent on or abusing illicit drugs (Table 6.7). Lifetime marijuana users who were aged 26 to 34, male, or had not attended college at the time of the survey had slightly increased odds of being dependent on or abusing alcohol or an illicit drug in the past year.

Adjusted ORs of alcohol dependence and illicit drug dependence among lifetime marijuana users are shown in Table 6.8. Age at marijuana initiation, age, and race/ethnicity were not found to predict recent alcohol dependence. In comparison, male and less educated marijuana users were at increased odds of being alcohol dependent in the past year. When the outcome of the logistic regression model was specific to illicit drug dependence, early-onset marijuana users (before age 15) were an estimated 6.2 times more likely than adult-onset users to be dependent on one or more illicit drugs in the past year. Relative to black marijuana users, white, Asian/Pacific Islander/Native Hawaiian, and American Indian or Alaska Native users had decreased odds of being classified with illicit drug dependence.

Table 6.9 further examines the estimated association between the onset age of marijuana use and recent illicit drug dependence. The multiple regression procedures revealed that the onset of marijuana use before age 15 was associated with recent dependence on both marijuana and other illicit drugs. In fact, onset before age 15 was associated with close to a tenfold excess in the odds of being classified with marijuana dependence than those who initiated marijuana in adulthood, independent of the influences of age, gender, race/ethnicity, and educational level. Marijuana users with less than a high school education were 3 times more likely than those who had attended college to be dependent on other illicit drugs recently.

6.4 Substance Dependence and/or Abuse Among Past Year Marijuana Users

This section focuses on dependence on and abuse of substances among lifetime marijuana users aged 26 or older who also used marijuana in the past year. The analyses presented in Section 6.3 demonstrate a high correlation between age at first marijuana use and subsequent patterns of substance use among adults aged 26 or older. Early-onset marijuana users are clearly more likely than adult-onset users to use drugs heavily and to have dependence and abuse problems later in life. However, these results do not indicate whether the higher rate of problematic use is simply because early-onset users are more likely to continue using illicit drugs as they age, making them more susceptible to problems, or whether their use of marijuana at a young age is a predictor of problematic use independent of their use history. Although it is not possible to fully explore this question with the limited data available in the NHSDA on drug

use history, some indication of the independent effect of age at first use can be obtained by restricting analyses to persons who used marijuana in the past year.

6.4.1 Estimated Prevalence of Illicit Drug Dependence and/or Abuse, by Age of Marijuana Initiation

Table 6.10 displays past year prevalence of illicit drug dependence or abuse, alcohol or illicit drug dependence or abuse, and specific substance dependence among past year marijuana users aged 26 or older. These prevalence estimates are presented by age of marijuana initiation (14 or younger, 15 to 17 years, 18 to 20 years, and 21 or older).

The highest prevalence of illicit drug dependence or abuse, alcohol or illicit drug dependence or abuse, marijuana dependence, and other illicit drug dependence was found among those in the youngest group of age of first marijuana use. Among past year marijuana users, one fifth of those initiating marijuana before age 15 were classified with illicit drug dependence or abuse in the past year compared with approximately one tenth of those initiating marijuana after age 15. Similarly, about 40 percent of those with their onset of marijuana before age 14 met the criteria for dependence on or abuse of either alcohol or other illicit drugs compared with 16.7 percent of those with an onset after age 20.

With respect to alcohol dependence, approximately 10 percent of users with an onset of marijuana use before age 21 were dependent on alcohol in comparison with about 5 percent of those with an onset after age 20. The highest prevalence (15.2 percent) of illicit drug dependence was noted among those initiating use before age 15, while the lowest prevalence (3.4 percent) of illicit drug dependence was among those reporting their first use after age 20. Approximately 8 percent of those with an onset between ages 15 and 20 were dependent on an illicit drug.

Only 2.1 percent of those with their onset of marijuana after age 20 were dependent on marijuana in the past year, while 8.8 percent of those within the 14 or younger group, 4.7 percent of those within the 15 to 17 onset group, and 7.1 percent of those within the 18 to 20 onset group were dependent on marijuana. The prevalence of other illicit drug dependence decreased with increased age strata of first marijuana use. An estimated 8.6 percent of those with an onset before age 15 and 4.2 percent of those with an onset between the ages of 15 and 17 were dependent on other illicit drugs in the past year, while less than 3.0 percent of those with an onset at age 18 or older were classified with other illicit drug dependence.

6.4.2 Adjusted Odds Ratios of Substance Dependence and/or Abuse

The association between age at first use of marijuana and substance dependence and/or abuse among past year marijuana users aged 26 or older was examined using multiple logistic

regression procedures. Adjusted ORs denote the estimated strength, holding constant the potential confounding influence of other demographic characteristics. Table 6.11 summarizes the logistic regression models for two dependence/abuse outcomes: (a) illicit drug dependence or abuse and (b) alcohol or illicit drug dependence or abuse. Models for alcohol dependence and illicit drug dependence are displayed in Table 6.12. Finally, models for marijuana dependence and other illicit drug dependence are shown in Table 6.13.

With statistical adjustment for demographic characteristics, onset of marijuana use before age 18 predicted increased odds of being classified with dependence on or abuse of either alcohol or other illicit drugs among adult marijuana users who reported the use in the past year (Table 6.11). Relative to an onset of marijuana use after age 20, an onset of use between the ages of 18 and 20 was not significant in predicting recent substance dependence or abuse. Compared with black marijuana users, white users were at decreased odds of meeting the criteria for illicit drug dependence or abuse in the past year (OR = 0.5). Recent marijuana users with a high school diploma had decreased odds of illicit drug dependence or abuse when compared with users who attended college.

Among recent marijuana users, age at onset of marijuana use was not found to be associated with alcohol dependence in the model (Table 6.12). In comparison, an onset of marijuana use before age 21 was associated with an increased likelihood of being classified with illicit drug dependence as compared with users with an onset at age 21 or older. Those with an onset before age 15 were an estimated 8.3 times more likely than those with an onset after age 20 to be dependent on one or more illicit drugs. Those with an onset between the ages of 15 and 20 were about 3 times more likely than those with an onset after age 20 to be dependent on one or more illicit drugs. As noted in the finding for illicit drug dependence or abuse, white recent marijuana users were less likely than black users to be dependent on an illicit drug (OR = 0.4).

Finally, multiple logistic regression showed that, among adult recent marijuana users, early-onset of marijuana use increased the likelihood of being dependent on both marijuana and other illicit drugs (Table 6.13). Relative to those with an onset of marijuana use after age 20, those reporting an onset before age 15 had an estimated OR of 5.1 for marijuana dependence and an OR of 17.0 for other illicit drug dependence. In addition, recent marijuana users aged 50 years old or older and black users were more likely to be classified with dependence on other illicit drugs than younger and white recent marijuana users.

Table 6.1 Percentages with *Lifetime and Past Year Use of Heroin, Cocaine, and Psychotherapeutics* among Adults Aged 26 or Older, by Age at First Marijuana Use and Age Groups: 1999 and 2000

Age in Years	Age of Marijuana Initiation in Years	Heroin		Cocaine		Any Psychotherapeutic	
		Lifetime	Past Year	Lifetime	Past Year	Lifetime	Past Year
Total	14 or younger	9.2	0.6	62.0	6.9	53.9	11.5
	15-17	4.2	0.2	40.9	3.5	36.5	5.6
	18-20	3.0	0.1	28.8	1.8	26.6	3.9
	21 or older	1.1	0.2	16.4	0.8	20.6	2.9
	Never used marijuana	0.1	0.0	0.6	0.1	5.1	1.2
26-34	14 or younger	5.1	0.1	57.5	8.9	48.6	12.3
	15-17	2.3	0.3	34.5	4.5	29.8	7.0
	18-20	1.2	0.1	19.4	2.4	19.4	5.1
	21 or older	0.5	0.0	14.9	1.5	17.4	5.0
	Never used marijuana	0.1	0.0	1.0	0.1	6.6	1.8
35-49	14 or younger	11.6	1.0	65.7	5.2	57.7	10.9
	15-17	4.8	0.2	44.3	3.0	39.8	5.1
	18-20	3.0	0.1	32.2	1.5	27.6	3.4
	21 or older	0.8	0.5	20.2	1.4	20.5	3.3
	Never used marijuana	0.1	0.0	1.2	0.1	6.2	6.2
50+	17 or younger	13.4	0.0	37.4	6.0	38.5	4.1
	18-20	5.8	0.2	29.6	2.0	33.2	4.0
	21 or older	1.5	0.0	14.1	0.2	21.5	2.1
	Never used marijuana	0.0	0.0	0.2	0.0	4.1	1.0

Note: Nonmedical use of any prescription-type psychotherapeutic indicates using pain relievers, tranquilizers, stimulants, or sedatives at least once. Indicated use does not include over-the-counter drugs.
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 6.2 Percentages with *Past Year Heavy Marijuana Use and Heavy Use of Other Illicit Drugs* among Adults Aged 26 or Older, by Age at First Marijuana Use and Age Groups: 1999 and 2000

Age in Years	Age of Marijuana Initiation in Years	Heavy Marijuana Use	Heavy Use of Other Illicit Drugs
Total	14 or younger	5.0	6.3
	15-17	1.2	2.8
	18-20	0.6	1.4
	21 or older	0.5	1.1
	Never used marijuana	0.0	0.5
26-34	14 or younger	7.3	7.0
	15-17	1.7	3.2
	18-20	1.3	1.3
	21 or older	0.5	1.8
	Never used marijuana	0.0	0.6
35-49	14 or younger	3.5	5.5
	15-17	1.0	2.6
	18-20	0.4	1.6
	21 or older	0.7	1.7
	Never used marijuana	0.0	0.6
50+	17 or younger	0.0	6.1
	18-20	0.2	0.9
	21 or older	0.4	0.5
	Never used marijuana	0.0	0.4

Note: Heavy marijuana use refers to using marijuana on 300 or more days in the past year. Heavy use of other illicit drugs refers to using cocaine, hallucinogens, inhalants, heroin, or any prescription-type psychotherapeutic used nonmedically (i.e., pain relievers, sedatives, tranquilizers, or stimulants) on at least 50 days in the past year.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 6.3 Percentages with *Past Year Alcohol and/or Illicit Drug Dependence or Abuse* among Adults Aged 26 or Older, by Age at First Marijuana Use and Age Groups: 2000

Age in Years	Age of Marijuana Initiation in Years	Illicit Drug Dependence or Abuse	Alcohol or Illicit Drug Dependence or Abuse	Alcohol Dependence	Illicit Drug Dependence	Marijuana Dependence	Other Illicit Drug Dependence
Total	14 or younger	6.2	18.0	6.8	4.5	2.5	2.7
	15-17	2.2	9.5	3.6	1.4	0.7	0.9
	18-20	2.0	8.3	3.5	1.7	0.8	1.2
	21 or older	1.3	7.6	3.2	0.7	0.2	0.5
	Never used marijuana	0.2	2.1	0.9	0.1	0.0	0.1
26-34	14 or younger	7.7	19.2	6.7	5.7	3.3	3.2
	15-17	2.9	13.1	4.1	1.7	0.8	1.1
	18-20	1.8	11.4	4.3	1.3	0.9	0.5
	21 or older	3.0	13.7	4.0	0.7	0.6	0.1
	Never used marijuana	0.4	3.4	1.0	0.2	0.0	0.2
35-49	14 or younger	5.0	17.3	6.5	3.4	2.0	2.0
	15-17	1.7	7.8	3.5	1.4	0.7	0.8
	18-20	1.8	7.5	3.2	1.7	0.8	1.1
	21 or older	1.7	8.0	3.8	1.2	0.0	1.2
	Never used marijuana	0.2	2.6	1.4	0.1	0.0	0.1
50+	17 or younger	8.2	9.8	4.6	3.6	0.0	3.6
	18-20	2.8	7.2	3.4	2.1	0.4	2.1
	21 or older	0.6	5.7	2.7	0.4	0.2	0.2
	Never used marijuana	0.1	1.4	0.6	0.1	0.0	0.1

Note: Illicit drug dependence or abuse indicates dependence on or abuse of at least one of the following drugs: marijuana/hashish, cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic used nonmedically. Other illicit drug dependence indicates meeting the dependence criteria of at least one of the following drugs: cocaine, hallucinogens, inhalants, heroin, pain relievers, sedatives, tranquilizers, or stimulants. Dependence or abuse is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

Table 6.4 Adjusted Odds Ratios of *Lifetime Use of Heroin, Cocaine, and Psychotherapeutics* among Lifetime Marijuana Users Aged 26 or Older: 1999 and 2000

	Lifetime Heroin Use		Lifetime Cocaine Use		Lifetime Psychotherapeutic Use	
Variables	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**
Age at First Marijuana Use in Years						
14 or younger vs. 21 or older	15.45	(7.56 - 31.55)	7.95	(6.53 - 9.68)	5.25	(4.37 - 6.31)
15-17 vs. 21 or older	6.10	(2.95 - 12.58)	3.27	(2.76 - 3.87)	2.47	(2.09 - 2.92)
18-20 vs. 21 or older	3.53	(1.73 - 7.20)	1.88	(1.57 - 2.25)	1.49	(1.24 - 1.78)
Age in Years						
26-34 vs. 50 or older	0.22	(0.13 - 0.38)	0.91	(0.73 - 1.12)	0.63	(0.51 - 0.77)
35-49 vs. 50 or older	0.53	(0.30 - 0.91)	1.41	(1.14 - 1.74)	0.93	(0.76 - 1.12)
Gender						
Male vs. female	1.61	(1.21 - 2.13)	1.33	(1.21 - 1.46)	1.04	(0.94 - 1.14)
Race/Ethnicity						
White vs. black	0.43	(0.29 - 0.64)	1.12	(0.93 - 1.34)	1.78	(1.48 - 2.13)
Hispanic vs. black	0.65	(0.38 - 1.12)	1.14	(0.88 - 1.48)	1.20	(0.92 - 1.58)
Other[1] vs. black	0.52	(0.23 - 1.16)	--	(-- - --)	--	(-- - --)
Asian/Pacific Islander/Native Hawaiian vs. black	--	(-- - --)	0.60	(0.38 - 0.95)	0.73	(0.45 - 1.19)
American Indian or Alaska Native vs. black	--	(-- - --)	1.82	(1.13 - 2.93)	2.85	(1.75 - 4.66)
More than one race vs. black	--	(-- - --)	1.19	(0.67 - 2.10)	1.57	(0.94 - 2.61)
Education						
Less than high school vs. at least some college	1.44	(0.96 - 2.17)	1.04	(0.88 - 1.21)	0.93	(0.79 - 1.10)
High school graduate vs. at least some college	1.03	(0.77 - 1.38)	0.90	(0.80 - 1.00)	0.91	(0.82 - 1.02)

-- Not available.

Note: Nonmedical use of any prescription-type psychotherapeutic indicates using pain relievers, tranquilizers, stimulants, or sedatives at least once. Indicated use does not include over-the-counter drugs.

[1] Asian/Pacific Islander/Native Hawaiian, American Indian/Alaska Native, and more than one race.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 6.5 Adjusted Odds Ratios of *Past Year Use of Heroin, Cocaine, and Psychotherapeutics* among Lifetime Marijuana Users Aged 26 or Older: 1999 and 2000

Variables	Past Year Heroin Use		Past Year Cocaine Use		Past Year Psychotherapeutic Use	
	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval
Age at First Marijuana Use in Years						
14 or younger vs. 21 or older	2.46	(0.54 - 11.28)	7.01	(3.60 - 13.66)	3.44	(2.37 - 5.00)
15-17 vs. 21 or older	0.91	(0.21 - 3.96)	3.81	(1.99 - 7.31)	1.67	(1.19 - 2.34)
18-20 vs. 21 or older	0.56	0.10 - 3.09)	2.04	(1.02 - 4.09)	1.26	(0.85 - 1.87)
Age in Years						
26-34 vs. 50 or older	2.12	(0.23 - 19.96)	1.87	(0.83 - 4.23)	1.75	(1.04 - 2.93)
35-49 vs. 50 or older	6.04	(0.71 - 51.38)	1.19	(0.51 - 2.78)	1.33	(0.81 - 2.20)
Gender						
Male vs. female	0.60	(0.26 - 1.41)	1.35	(1.03 - 1.76)	0.76	(0.63 - 0.92)
Race/Ethnicity						
White vs. black	0.55	(0.20 - 1.52)	0.54	(0.39 - 0.76)	1.62	(1.18 - 2.24)
Hispanic vs. black	--	(-- - --)	0.74	(0.43 - 1.29)	1.86	(1.13 - 3.07)
Other[1] vs. black	1.51	(0.40 - 5.78)	--	(-- - --)	--	(-- - --)
Asian/Pacific Islander/Native Hawaiian vs. black	--	(-- - --)	0.23	(0.07 - 0.76)	0.65	(0.27 - 1.55)
American Indian or Alaska Native vs. black	--	(-- - --)	1.56	(0.57 - 4.27)	3.23	(1.25 - 8.34)
More than one race vs. black	--	(-- - --)	0.81	(0.32 - 2.06)	0.99	(0.42 - 2.29)
Education						
Less than high school vs. at least some college	1.74	(0.60 - 5.03)	2.29	(1.54 - 3.40)	1.78	(1.33 - 2.39)
High school graduate vs. at least some college	0.93	(0.36 - 2.35)	1.28	(1.00 - 1.64)	1.10	(0.90 - 1.35)

-- Not available.

Note: For past year heroin use, three racial/ethnic categories were used: white; black; and Hispanic, American Indian/Alaska Native, Asian/Pacific Islander/Native Hawaiian, and more than one race. Black was used as the reference group. Nonmedical use of any prescription-type psychotherapeutic indicates using pain relievers, tranquilizers, stimulants, or sedatives at least once. Indicated use does not include over-the-counter drugs.

[1] Hispanic, Asian/Pacific Islander/Native Hawaiian, American Indian/Alaska Native, and more than one race.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 6.6 Adjusted Odds Ratios of *Past Year Heavy Marijuana Use and Heavy Use of Other Illicit Drugs* among Lifetime Marijuana Users Aged 26 or Older: 1999 and 2000

	Heavy Marijuana Use		Heavy Use of Other Illicit Drugs	
Variables	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**
Age at First Marijuana Use in Years				
14 or younger vs. 21 or older	5.30	(2.43 - 11.56)	4.49	(2.56 - 7.87)
15-17 vs. 21 or older	1.36	(0.63 - 2.95)	2.12	(1.24 - 3.64)
18-20 vs. 21 or older	0.82	(0.32 - 2.13)	1.15	(0.62 - 2.11)
Age in Years				
26-34 vs. 50 or older	4.73	(1.33 - 16.83)	1.72	(0.83 - 3.55)
35-49 vs. 50 or older	2.31	(0.64 - 8.29)	1.52	(0.75 - 3.08)
Gender				
Male vs. female	2.12	(1.47 - 3.05)	1.11	(0.86 - 1.42)
Race/Ethnicity				
White vs. black	1.25	(0.77 - 2.02)	0.62	(0.42 - 0.91)
Hispanic vs. black	1.01	(0.53 - 1.95)	1.23	(0.69 - 2.18)
Other[1] vs. black	1.17	(0.45 - 3.01)	--	(-- - --)
Asian/Pacific Islander/Native Hawaiian vs. black	--	(-- - --)	0.54	(0.21 - 1.40)
American Indian or Alaska Native vs. black	--	(-- - --)	2.63	(1.06 - 6.54)
More than one race vs. black	--	(-- - --)	0.77	(0.26 - 2.29)
Education				
Less than high school vs. at least some college	2.43	(1.47 - 3.99)	2.99	(2.02 - 4.41)
High school graduate vs. at least some college	2.74	(1.24 - 2.43)	1.57	(1.15 - 2.13)

-- Not available.

Note: For heavy marijuana use, four racial/ethnic categories were used: white; black; Hispanic; and American Indian/Alaska Native, Pacific Islander/Native Hawaiian, and more than one race. Black was used as the reference group. Heavy marijuana use refers to using marijuana on 300 or more days in the past year. Heavy use of other illicit drugs refers to using cocaine, hallucinogens, inhalants, heroin, or any prescription-type psychotherapeutic used nonmedically (i.e., pain relievers, sedatives, tranquilizers, or stimulants) on at least 50 days in the past year.

[1] Asian/Pacific Islander/Native Hawaiian, American Indian/Alaska Native, and more than one race.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 6.7 Adjusted Odds Ratios of *Past Year Illicit Drug Dependence or Abuse and Alcohol or Illicit Drug Dependence or Abuse* among Lifetime Marijuana Users Aged 26 or Older: 2000

	Illicit Drug Dependence or Abuse		Alcohol or Illicit Drug Dependence or Abuse	
Variables	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**
Age at First Marijuana Use in Years				
14 or younger vs. 21 or older	4.74	(1.86 - 12.08)	1.90	(1.33 - 2.72)
15-17 vs. 21 or older	1.74	(0.69 - 4.36)	0.99	(0.71 - 1.37)
18-20 vs. 21 or older	1.51	(0.61 - 3.72)	0.94	(0.67 - 1.32)
Age in Years				
26-34 vs. 50 or older	1.31	(0.44 - 3.95)	2.20	(1.41 - 3.43)
35-49 vs. 50 or older	0.88	(0.31 - 2.52)	1.43	(0.92 - 2.22)
Gender				
Male vs. female	1.12	(0.72 - 1.74)	1.94	(1.56 - 2.42)
Race/Ethnicity				
White vs. black	0.52	(0.30 - 0.88)	0.93	(0.70 - 1.25)
Hispanic vs. black	0.89	(0.45 - 1.75)	0.95	(0.62 - 1.47)
Asian/Pacific Islander/Native Hawaiian vs. black	0.13	(0.03 - 0.63)	0.79	(0.27 - 2.28)
American Indian or Alaska Native vs. black	0.96	(0.26 - 3.46)	1.36	(0.59 - 3.13)
More than one race vs. black	3.01	(0.85 - 10.74)	1.59	(0.54 - 4.67)
Education				
Less than high school vs. at least some college	1.81	(1.05 - 3.13)	1.91	(1.42 - 2.56)
High school graduate vs. at least some college	0.75	(0.51 - 1.10)	1.32	(1.07 - 1.63)

Note: Illicit drug dependence or abuse indicates dependence on or abuse of at least one of the following drugs: marijuana/hashish, cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic used nonmedically. Dependence or abuse is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

Table 6.8 Adjusted Odds Ratios of *Past Year Alcohol Dependence and Illicit Drug Dependence* among Lifetime Marijuana Users Aged 26 or Older: 2000

	Alcohol Dependence		Illicit Drug Dependence	
Variables	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**
Age at First Marijuana Use in Years				
14 or younger vs. 21 or older	1.64	(0.91 - 2.95)	6.19	(2.22 - 17.21)
15-17 vs. 21 or older	0.97	(0.57 - 1.65)	1.98	(0.74 - 5.27)
18-20 vs. 21 or older	1.02	(0.56 - 1.84)	2.29	(0.79 - 6.64)
Age in Years				
26-34 vs. 50 or older	1.51	(0.75 - 3.03)	1.20	(0.36 - 4.00)
35-49 vs. 50 or older	1.33	(0.67 - 2.64)	0.99	(0.30 - 3.30)
Gender				
Male vs. female	1.72	(1.23 - 2.41)	1.00	(0.61 - 1.64)
Race/Ethnicity				
White vs. black	0.83	(0.50 - 1.36)	0.49	(0.26 - 0.91)
Hispanic vs. black	0.67	(0.34 - 1.33)	0.57	(0.22 - 1.44)
Asian/Pacific Islander/Native Hawaiian vs. black	1.15	(0.23 - 5.64)	0.17	(0.03 - 0.87)
American Indian/Alaska Native vs. black	0.96	(0.23 - 3.99)	0.27	(0.08 - 0.95)
More than one race	0.81	(0.24 - 2.77)	1.09	(0.30 - 3.97)
Education				
Less than high school vs. at least some college	3.34	(2.21 - 5.07)	1.81	(0.90 - 3.62)
High school graduate vs. at least some college	1.62	(1.15 - 2.30)	0.69	(0.43 - 1.12)

Note: Illicit drug dependence indicates dependence on at least one of the following drugs: marijuana/hashish, cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic used nonmedically. Dependence is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

Table 6.9 Adjusted Odds Ratios of *Past Year Marijuana Dependence and Other Illicit Drug Dependence* among Lifetime Marijuana Users Aged 26 or Older: 2000

	Marijuana Dependence		Other Illicit Drug Dependence	
Variables	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**
Age at First Marijuana Use in Years				
14 or younger vs. 21 or older	9.77	(2.82 - 33.89)	5.67	(1.51 - 21.29)
15-17 vs. 21 or older	2.67	(0.76 - 9.38)	1.94	(0.56 - 6.74)
18-20 vs. 21 or older	2.98	(0.79 - 11.25)	2.52	(0.64 - 9.94)
Age in Years				
26-34 vs. 50 or older	2.47	(0.69 - 8.83)	0.76	(0.19 - 3.14)
35-49 vs. 50 or older	1.70	(0.46 - 6.27)	0.80	(0.19 - 3.33)
Gender				
Male vs. female	1.31	(0.71 - 2.40)	0.83	(0.44 - 1.56)
Race/Ethnicity				
White vs. black	0.52	(0.21 - 1.31)	0.53	(0.24 - 1.16)
Hispanic vs. black	--	(-- - --)	0.80	(0.27 - 2.35)
Other[1] vs. black	0.47	(0.12 - 1.77)	--	(-- - --)
Other[2] vs. black	--	(-- - --)	0.70	(0.20 - 2.50)
Education				
Less than high school vs. at least some college	0.95	(0.41 - 2.24)	2.98	(1.29 - 6.89)
High school graduate vs. at least some college	0.46	(0.23 - 0.92)	1.05	(0.59 - 1.88)

-- Not available.

Note: For marijuana dependence, three racial/ethnic categories were used: white; black; and Hispanic, American Indian/Alaska Native, Asian/Pacific Islander/Native Hawaiian, and more than one race. Black was used as the reference group. Other illicit drug dependence indicates meeting the dependence criteria of one or more of the following drugs: cocaine, hallucinogens, inhalants, heroin, pain relievers, sedatives, tranquilizers, or stimulants. Dependence is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

[1] Hispanic, Asian/Pacific Islander/Native Hawaiian, American Indian/Alaska Native, and more than one race.

[2] Asian/Pacific Islander/Native Hawaiian, American Indian/Alaska Native, and more than one race.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

Table 6.10 Percentages with *Past Year Alcohol and/or Illicit Drug Dependence or Abuse* among Past Year Marijuana Users Aged 26 or Older, by Age at First Marijuana Use: 2000

Age of Marijuana Initiation in Years	Illicit Drug Dependence or Abuse	Alcohol or Illicit Drug Dependence or Abuse	Alcohol Dependence	Illicit Drug Dependence	Marijuana Dependence	Other Illicit Drug Dependence
14 or younger	20.7	39.5	11.7	15.2	8.8	8.6
15-17	12.6	27.8	9.4	8.0	4.7	4.2
18-20	9.7	22.9	11.0	7.9	7.1	3.0
21 or older	7.5	16.7	5.4	3.4	2.1	1.3

Note: Illicit drug dependence or abuse indicates dependence on or abuse of at least one of the following drugs: marijuana/hashish, cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic used nonmedically. Other illicit drug dependence indicates meeting the dependence criteria of one or more of the following drugs: cocaine, hallucinogens, inhalants, heroin, pain relievers, sedatives, tranquilizers, or stimulants. Dependence or abuse is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

Table 6.11 Adjusted Odds Ratios of *Illicit Drug Dependence or Abuse and Alcohol or Illicit Drug Dependence or Abuse* among Lifetime Marijuana Users Aged 26 or Older Who Also Used Marijuana in the Past Year: 2000

	Illicit Drug Dependence or Abuse		Alcohol or Illicit Drug Dependence or Abuse	
Variables	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**
Age at First Marijuana Use in Years				
14 or younger vs. 21 or older	5.69	(2.12 - 15.28)	3.63	(1.86 - 7.06)
15-17 vs. 21 or older	2.94	(1.03 - 8.36)	2.17	(1.09 - 4.32)
18-20 vs. 21 or older	1.80	(0.71 - 4.59)	1.63	(0.88 - 3.01)
Age in Years				
26-34 vs. 50 or older	0.38	(0.13 - 1.09)	0.80	(0.32 - 1.97)
35-49 vs. 50 or older	0.37	(0.14 - 1.01)	0.76	(0.32 - 1.82)
Gender				
Male vs. female	0.89	(0.57 - 1.39)	1.16	(0.83 - 1.63)
Race/Ethnicity				
White vs. black	0.46	(0.26 - 0.80)	1.01	(0.64 - 1.59)
Hispanic vs. black	1.37	(0.59 - 3.19)	1.31	(0.65 - 2.64)
Other[1] vs. black	1.13	(0.49 - 2.62)	--	(-- - --)
Asian/Pacific Islander/Native Hawaiian vs. black	--	(-- - --)	0.23	(0.06 - 0.90)
American Indian/Alaska Native vs. black	--	(-- - --)	1.24	(0.38 - 4.04)
More than one race vs. black	--	(-- - --)	1.68	(0.56 - 5.06)
Education				
Less than high school vs. at least some college	1.02	(0.62 - 1.68)	1.44	(0.91 - 2.26)
High school graduate vs. at least some college	0.62	(0.40 - 0.98)	0.92	(0.63 - 1.34)

-- Not available.

Note: Illicit drug dependence or abuse indicates dependence on or abuse of at least one of the following drugs: marijuana/hashish, cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic used nonmedically. Dependence or abuse is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

[1] Asian/Pacific Islander/Native Hawaiian, American Indian/Alaska Native, and more than one race.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

Table 6.12 Adjusted Odds Ratios of *Past Year Alcohol Dependence and Illicit Drug Dependence* among Lifetime Marijuana Users Aged 26 or Older Who Also Used Marijuana in the Past Year: 2000

	Alcohol Dependence		Illicit Drug Dependence	
Variables	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**
Age at First Marijuana Use in Years				
14 or younger vs. 21 or older	2.45	(0.79 - 7.63)	8.33	(2.99 - 23.19)
15-17 vs. 21 or older	2.09	(0.69 - 6.32)	3.68	(1.22 - 11.05)
18-20 vs. 21 or older	2.56	(0.94 - 6.95)	3.16	(1.06 - 9.44)
Age in Years				
26-34 vs. 50 or older	0.77	(0.17 - 3.49)	0.41	(0.14 - 1.19)
35-49 vs. 50 or older	0.86	(0.19 - 3.84)	0.45	(0.15 - 1.36)
Gender				
Male vs. female	1.16	(0.69 - 1.95)	0.81	(0.49 - 1.33)
Race/Ethnicity				
White vs. black	1.45	(0.58 - 3.62)	0.41	(0.23 - 0.75)
Hispanic vs. black	1.61	(0.56 - 4.65)	0.68	(0.24 - 1.92)
Other[1] vs. black	1.09	(0.22 - 5.33)	0.41	(0.11 - 1.54)
Education				
Less than high school vs. at least some college	2.94	(1.55 - 5.59)	0.90	(0.47 - 1.70)
High school graduate vs. at least some college	1.35	(0.76 - 2.41)	0.56	(0.32 - 1.00)

Note: Illicit drug dependence indicates dependence on at least one of the following: marijuana/hashish, cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic used nonmedically. Dependence is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

[1] Asian/Pacific Islander/Native Hawaiian, American Indian/Alaska Native, and more than one race.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

Table 6.13 Adjusted Odds Ratios of *Past Year Marijuana Dependence and Other Illicit Drug Dependence* among Lifetime Marijuana Users Aged 26 or Older Who Also Used Marijuana in the Past Year: 2000

	Marijuana Dependence		Other Illicit Drug Dependence	
Variables	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**
Age at First Marijuana Use in Years				
14 or younger vs. 21 or older	5.05	(1.49 - 17.15)	17.03	(3.44 - 84.16)
15-17 vs. 21 or older	2.27	(0.63 - 8.15)	7.73	(1.41 - 42.32)
18-20 vs. 21 or older	3.55	(0.90 - 14.03)	3.97	(0.72 - 21.80)
Age in Years				
26-34 vs. 50 or older	1.05	(0.27 - 4.11)	0.19	(0.05 - 0.70)
35-49 vs. 50 or older	1.08	(0.26 - 4.53)	0.25	(0.06 - 1.07)
Gender				
Male vs. female	0.84	(0.45 - 1.57)	0.82	(0.41 - 1.65)
Race/Ethnicity				
White vs. black	0.62	(0.25 - 1.50)	0.38	(0.19 - 0.74)
Other[1] vs. black	0.58	(0.16 - 2.16)	0.83	(0.27 - 2.51)
Education				
Less than high school vs. at least some college	0.75	(0.33 - 1.72)	1.69	(0.71 - 4.00)
High school graduate vs. at least some college	0.42	(0.20 - 0.85)	0.99	(0.46 - 2.16)

Note: Other illicit drug dependence indicates meeting the dependence criteria of one or more of the following drugs: cocaine, hallucinogens, inhalants, heroin, pain relievers, sedatives, tranquilizers, or stimulants. Dependence is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

[1] Hispanic, Asian/Pacific Islander/Native Hawaiian, American Indian/Alaska Native, and more than one race.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

7. Discussion

Marijuana has continued to be the most commonly used illicit drug among both youths and adults. The rate of marijuana initiation increased during the late 1960s and early 1970s, with a peak in 1976 and 1977 (21.0 per 1,000 potential new users). After that period, the rate of new marijuana users decreased to 8.5 in 1990, followed by an increase to 16.8 in 1996, then a decrease to 13.6 in 1999. Aggregated 1999 and 2000 data indicate that there were approximately 2.5 million new marijuana users annually in 1997-1998 and 2.0 million new users in 1999. Although the number of new users had decreased in 1999, it was still above the levels for 1989 and 1990 (1.4 million each year).

Incidence rates of marijuana use were generally higher among males than among females. Among males, the highest peak was noted in 1976 and 1977 (close to 24.0). Since the early 1980s, incidence rates declined, and the most recent peak for males was in 1997 (19.3). Similar to the pattern of males, the incidence rate for females was lower during the 1980s. The most recent peak for females was in 1996 (15.5). For both genders, the rate in 1999 was lower than the rates from 1996 to 1998. The estimated mean age at first marijuana use was slightly younger among males than females, but the trend suggested an increasing similarity for both genders in some recent years. The mean age of first marijuana use remained at 17 years during most of the 1990s.

Recent initiates were much more likely to be among youths and young adults than among adults aged 21 or older. The annual age- and gender-specific incidence rate per 1,000 potential users was highest among youths aged 15 to 17. Young adults aged 18 to 20 had slightly higher incidence rates than youths aged 12 to 14, while adults aged 21 or older had a very low rate of new use. Recently, American Indians/Alaska Natives appeared to have particularly high rates of new users and younger age of first use than members of other racial/ethnic groups.

Recent initiation of marijuana use also varied by States and age groups. Colorado, Delaware, Massachusetts, New Hampshire, and Vermont were ranked in the category with the highest incidence rate for the overall, youth, and young adult groups. New Mexico had the highest rate for the overall and youth groups. Minnesota was in the highest category for the overall and young adult groups. By comparison, Louisiana had the lowest rate of recent new users for the overall, youth, and young adult groups. In addition, Texas and Utah had the lowest rate of recent initiation among youths and young adults.

Marijuana initiation varied somewhat by month of year. Overall, the annual average number of marijuana initiates per day was 6,186 (3,197 and 2,989, respectively, for males and females). Among males, the highest number of first marijuana users per day was noted in June

and July (around 4,300 initiates per day). Among females, increased rates of initiates were in January (3,519 initiates per day) and July (3,625 initiates per day). Of all recent initiates who started using marijuana before age 18, June (11.6 percent of all recent initiates) and July (12.0 percent) also had the most new users, while adult-onset marijuana users tended to have initiated the use in January (10.9 percent), December (9.2 percent), or July (9.1 percent).

Any prior use of alcohol and/or cigarettes was strongly related to the onset of recent marijuana initiation, regardless of the age when alcohol or cigarettes were first used. Of all recent marijuana initiates, 60 percent used both alcohol and cigarettes before starting their marijuana use. Fewer than 10 percent had never used alcohol and cigarettes at the time of marijuana initiation, and the remaining recent initiates had used either alcohol only (16.6 percent) or cigarettes only (14.8 percent) prior to their first marijuana use.

Multiple logistic regression of persons aged 12 to 25 found that younger persons under age 21, males, blacks, American Indians/Alaska Natives, and persons living in the West or metropolitan areas were likely to become new marijuana users recently. For some young adults aged 18 to 25, the assumption of adult roles (e.g., becoming married) may protect them from marijuana initiation. Multiple logistic regression also confirmed that the risk of recent marijuana initiation increased with increasing age among youths aged 12 to 14, but the risk decreased with increasing age among those aged 15 to 25.

Logistic regression models, holding constant demographic characteristics, revealed that earlier age at first use of marijuana, particularly an onset before age 15, predicted increased odds for the following: (a) heavy use of marijuana and other illicit drugs, (b) dependence on or abuse of alcohol and/or other illicit drugs, and (c) dependence on marijuana or other illicit drugs in the past year.

These national estimates on incidence and trend data provide useful information for planning and delivering substance abuse services, as well as baseline data for further investigations. The strength of the association between alcohol and cigarette use with later marijuana initiation suggests that reducing the onset of alcohol or cigarette use may have some positive influences on the prevention of marijuana initiation. Some new marijuana users, particularly early-onset users, may have a significant impact on the future demand for substance abuse treatment because of their increased odds of progressing into heavier drug involvement and probably other drug-related health risk behaviors. Substance abuse service needs for young marijuana users warrant further study because recent data reveal a younger population of drug users seeking treatment for marijuana abuse (OAS, 2001c). Early identification of subgroups vulnerable to heavier substance use and increasing their access to substance abuse services may prevent them from more serious substance use involvement and decrease subsequent societal costs related to substance use or abuse. These national estimates reveal emerging trends of new

marijuana use by some subgroups that could be targeted for prevention (e.g., blacks and American Indians/Alaska Natives).

The pathways to illicit drug use and/or dependence involve multiple factors and processes. To better inform policy for substance use prevention, further research should focus on (a) identifying the processes that account for subgroup variations in illicit drug use and/or dependence and (b) understanding the factors that explain the developmental sequence of substance use involvement, including determinants of early initial use of marijuana or other substances.

In conclusion, the data indicate a decreased rate of new marijuana use in 1999. Youths aged 15 to 17 had the highest rate of becoming new marijuana users in recent years. Whites were less likely than blacks to start to use marijuana recently, and young American Indians/Alaska Natives appeared to have an elevated risk of becoming new marijuana users in recent years. Further analysis of these and future NHSDA data will help to confirm the findings from the 1999 and 2000 surveys and to track changes in the trend of new marijuana use by at-risk subgroups.

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Aquilino, W. S. (1994). Interview mode effects in surveys of drug and alcohol use: A field experiment. *Public Opinion Quarterly, 58*, 210-240.

Bailey, S. L., & Hubbard, R. L. (1990). Developmental variation in the context of marijuana initiation among adolescents. *Journal of Health and Social Behavior, 31*(1), 58-70.

Brook, J. S., Brook, D. W., De La Rosa, M., Duque, L. F., Rodriguez, E., Montoya, I. D., & Whiteman, M. (1998a). Pathways to marijuana use among adolescents: Cultural/ecological, family, peer, and personality influences. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 759-766.

Brook, J. S., Cohen, P., & Brook, D. W. (1998b). Longitudinal study of co-occurring psychiatric disorders and substance use. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 322-330.

Brook, J. S., Gordon, A. S., Brook, A., & Brook, D.W. (1989). The consequences of marijuana use on intrapersonal and interpersonal functioning in black and white adolescents. *Genetic, Social, and General Psychology Monographs, 115*, 349-369.

Brook, J. S., Kessler, R. C., & Cohen, P. (1999a). The onset of marijuana use from preadolescence and early adolescence to young adulthood. *Developmental Psychopathology, 11*, 901-914.

Brook, J. S., Richter, L., Whiteman, M., & Cohen, P. (1999b). Consequences of adolescent marijuana use: Incompatibility with the assumption of adult roles. *Genetic, Social, and General Psychology Monographs, 125*, 193-207.

Catalano, R. F., Morrison, D. M., Wells, E. A., Gillmore, M. R., Iritani, B., & Hawkins, J. D. (1992). Ethnic differences in family factors related to early drug initiation. *Journal of Studies on Alcohol, 53*, 208-217.

Chen, K., & Kandel, D. B. (1995). The natural history of drug use from adolescence to the mid-thirties in a general population sample. *American Journal of Public Health, 85*, 41-47.

Chilcoat, H. D., & Anthony, J. C. (1996). Impact of parent monitoring on initiation of drug use through late childhood. *Journal of the American Academy of Child and Adolescent Psychiatry, 35*, 91-100.

Chromy, J. R. (in press). Changes in the definition and computation of 1999 NHSDA incidence rates. In J. C. Gfroerer, J. D. Eyerman, & J. R. Chromy (Eds.), *Methodological issues in the redesign of the 1999 NHSDA* (Chapter 9). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies.

Clark, D. B., Kirisci, L., & Tarter, R. E. (1998). Adolescent versus adult onset and the development of substance use disorders in males. *Drug and Alcohol Dependence, 49*, 115-121.

Clayton, R. R. (1992). Transition in drug use: Risk and protective factors. In M. Glantz & R. Pickens (Eds.), *Vulnerability to drug abuse* (Chapter 1). Washington, DC: American Psychological Association.

Costello, E. J., Erkanli, A., Federman, E., & Angold, A. (1999). Development of psychiatric comorbidity with substance abuse in adolescents: Effects of timing and sex. *Journal of Clinical Child Psychology, 28*, 298-311.

DeWit, D. J., Hance, J., Offord, D. R., & Ogborne, A. (2000). The influence of early and frequent use of marijuana on the risk of desistance and of progression to marijuana-related harm. *Preventive Medicine, 31*, 455-464.

Donnermeyer, J. F. (1993). Rural youth usage of alcohol, marijuana, and "hard" drugs. *International Journal of the Addictions, 28*, 249-255.

Duncan, S. C., Duncan, T. E., & Hops, H. (1998). Progressions of alcohol, cigarette, and marijuana use in adolescence. *Journal of Behavioral Medicine, 21*, 375-388.

DuRant, R. H., Smith, J. A., Kreiter, S. R., & Krowchuk, D. P. (1999). The relationship between early age of onset of initial substance use and engaging in multiple health risk behaviors among young adolescents. *Archives of Pediatrics and Adolescent Medicine, 153*, 286-291.

Ellickson, P. L., Hays, R. D., & Bell, R. M. (1992). Stepping through the drug use sequence: Longitudinal scalogram analysis of initiation and regular use. *Journal of Abnormal Psychology, 101*, 441-451.

Ellickson, P. L., & Morton, S. C. (1999). Identifying adolescents at risk for hard drug use: Racial/ethnic variations. *Journal of Adolescent Health, 25*, 382-395.

Fleming, R., Leventhal, H., Glynn, K., & Ershler, J. (1989). The role of cigarettes in the initiation and progression of early substance use. *Addictive Behaviors, 14*, 261-272.

Gfroerer, J. (1993). An overview of the National Household Survey on Drug Abuse and related methodological research. In *Proceedings of the Survey Research Section of the American Statistical Association, Joint Statistical Meetings, Boston, Massachusetts, August 1992* (pp. 464-469). Alexandria, VA: American Statistical Association.

Gfroerer, J., & Brodsky, M. (1992). The incidence of illicit drug use in the United States, 1962-1989. *British Journal of Addiction, 87*, 1345-1351.

Gfroerer, J. C., & Epstein, J. F. (1999). Marijuana initiates and their impact on future drug abuse treatment need. *Drug and Alcohol Dependence, 54*, 229-237.

Gfroerer, J. C., Eyerman, J. D., & Chromy, J. R. (Eds.). (in press). *Methodological issues in the redesign of the 1999 NHSDA*. Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies.

Gfroerer, J., Wright, D., & Kopstein, A. (1997). Prevalence of youth substance use: The impact of methodological differences between two national surveys. *Drug and Alcohol Dependence, 47*(1), 19-30.

Gillmore, M. R., Catalano, R. F., Morrison, D. M., Wells, E. A., Iritani, B., & Hawkins, J. D. (1990). Racial differences in acceptability and availability of drugs and early initiation of substance use. *American Journal of Drug and Alcohol Abuse, 16*, 185-206.

Grant, B. F., & Dawson, D. A. (1998). Age of onset of drug use and its association with DSM-IV drug abuse and dependence: Results from the National Longitudinal Alcohol Epidemiologic Survey. *Journal of Substance Abuse, 10*, 163-173.

Greenberg, R. S., Daniels, S. R., Flanders, W. D., Eley, J. W., & Boring, J. R. (1996). *Medical epidemiology*. Norwalk, CT: Appleton & Lange.

Harrell, A. V. (1997). The validity of self-reported drug use data: The accuracy of responses on confidential self-administered answer sheets. In L. Harrison & A. Hughes (Eds.), *The validity of self-reported drug use: Improving the accuracy of survey estimates* (NIDA Research Monograph 167, NIH Publication No. 97-4147, pp. 37-58; available at http://165.112.78.61/pdf/monographs/monograph167/download167.html). Rockville, MD: National Institute on Drug Abuse.

Harrison, L., & Hughes, A. (Eds.). (1997). *The validity of self-reported drug use: Improving the accuracy of survey estimates* (NIDA Research Monograph 167, NIH Publication No. 97-4147; available at http://165.112.78.61/pdf/monographs/monograph167/download167.html). Rockville, MD: National Institute on Drug Abuse.

Huang, L. X., Schildhaus, S., & Wright, D. (1999, September). *Seasonality of substance use: National Household Survey on Drug Abuse 1992-96* (OAS working paper). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies.

Johnson, R. A., & Gerstein, D. R. (1998). Initiation of use of alcohol, cigarettes, marijuana, cocaine, and other substances in US birth cohorts since 1919. *American Journal of Public Health, 88*, 27-33.

Johnson, R. A., Gerstein, D. R., Ghadialy, R., Choi, W., & Gfroerer, J. (1996). *Trends in the incidence of drug use in the United States, 1919-1992* (DHHS Publication No. SMA 96-3076; available in WordPerfect 6.1 file format at http://www.samhsa.gov/oas/analytic.htm). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies.

Johnson, R. A., Gerstein, D. R., & Rasinski, K. A. (1998). Adjusting survey estimates for response bias: An application to trends in alcohol and marijuana use. *Public Opinion Quarterly, 62*, 354-377.

Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (2001). *Monitoring the Future national survey results on drug use, 1975-2000. Volume I: Secondary school students* (NIH Publication No. 01-4924). Rockville, MD: National Institute on Drug Abuse.

Kandel, D. B., Griesler, P. C., Lee, G., Davies, M., & Schaffsan, C. (2001). *Parental influences on adolescent marijuana use and the baby boom generation: Findings from the 1979-1996 National Household Surveys on Drug Abuse* (DHHS Publication No. SMA 01-3531, Analytic Series: A-13; available at http://www.samhsa.gov/oas/analytic.htm). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies.

Kandel, D. B., & Logan, J. A. (1984). Patterns of drug use from adolescence to young adulthood: I. Periods of risk for initiation, continued use, and discontinuation. *American Journal of Public Health, 74*, 660-666.

Kandel, D. B., & Yamaguchi, K. (1985). Developmental patterns of the use of legal, illegal, and medically prescribed psychotropic drugs from adolescence to young adulthood. In C. L. Jones & R. J. Battjes (Eds.), *Etiology of drug abuse: Implications for prevention* (NIDA Research Monograph 56, DHHS Publication No. SMA 97-3128, pp. 193-235). Rockville, MD: National Institute on Drug Abuse.

Kandel, D. B., Yamaguchi, K., & Chen, K. (1992). Stages of progression in drug involvement from adolescence to adulthood: Further evidence for the gateway theory. *Journal of Studies on Alcohol, 53*, 447-457.

Kosterman, R., Hawkins, J. D., Guo, J., Catalano, R. F., & Abbott, R. D. (2000). The dynamics of alcohol and marijuana initiation: Patterns and predictors of first use in adolescence. *American Journal of Public Health, 90*, 360-366.

Kovalenko, P. A., Hoven, C. W., Wicks, J., Moore, R. E., Mandell, D. J., & Liu, H. (2000). Seasonal variations in internalizing, externalizing, and substance use disorders in youth. *Psychiatry Research, 15*, 103-119.

Lane, J., Gerstein, D., Huang, L., & Wright, D. (2001, February). *Risk and protective factors for adolescent drug use: Findings from the 1997 National Household Survey on Drug Abuse*. (DHHS Publication No. SMA 01-3499, Analytic Series: A-12; available at http://www.samhsa.gov/oas/analytic.htm). Rockville, MD: Substance Abuse and Mental Health Services Administration.

McKee, M., Sanderson, C., Chenet, L., Vassin, S., & Shkolnikov, V. (1998). Seasonal variation in mortality in Moscow. *Journal of Public Health Medicine, 20*, 268-274.

Neumark-Sztainer, D., Story, M., French, S., Cassuto, N., Jacobs, D. R., Jr., & Resnick, M. D. (1996). Patterns of health-compromising behaviors among Minnesota adolescents: Sociodemographic variations. *American Journal of Public Health, 86*, 1599-1606.

Office of Applied Studies. (2001a). *Development of computer-assisted interviewing procedures for the 1999 National Household Survey on Drug Abuse*. Retrieved August 15, 2001, from http://www.samhsa.gov/oas/nhsda/CompAssistInterview/toc.htm.

Office of Applied Studies. (2001b). *Summary of findings from the 2000 National Household Survey on Drug Abuse* (DHHS Publication No. SMA 01-3549, NHSDA Series H-13; available at http://www.samhsa.gov/oas/nhsda.htm). Rockville, MD: Substance Abuse and Mental Health Services Administration.

Office of Applied Studies. (2001c). *Treatment Episode Data Set (TEDS): 1994-1999: National admissions to substance abuse treatment services* (DHHS Publication No. SMA 01-3550, Drug and Alcohol Services Information System Series S-14; available at http://www.samhsa.gov/oas/dasis.htm#teds2). Rockville, MD: Substance Abuse and Mental Health Services Administration.

Rao, J. N. K., & Wu, C.F.J. (1985). Inference from stratified samples: Second-order analysis of three methods of nonlinear statistics. *Journal of the American Statistical Association 80*, 620-630.

Rouse, B. A., Kozel, N. J., & Richards, L. G. (Eds.). (1985). *Self-report methods of estimating drug use: Meeting current challenges to validity* (NIDA Research Monograph 57, DHHS Publication No. ADM 85-1402). Rockville, MD: National Institute on Drug Abuse.

Shah, B. V., Barnwell, B. G., & Bieler, G. S. (1996). *SUDAAN software for the statistical analysis of correlated data*. Research Triangle Park, NC: Research Triangle Institute.

Turner, C. F., Lessler, J. T., & Gfroerer, J. C. (Eds.). (1992). *Survey measurement of drug use: Methodological studies* (DHHS Publication No. ADM 92-1929). Rockville, MD: National Institute on Drug Abuse.

Van Etten, M. L., & Anthony, J. C. (1999). Comparative epidemiology of initial drug opportunities and transitions to first use: Marijuana, cocaine, hallucinogens and heroin. *Drug and Alcohol Dependence, 54*, 117-125.

Warren, C. W., Kann, L., Small, M. L., Santelli, J. S., Collins, J. L., & Kolbe, L. J. (1997). Age of initiating selected health-risk behaviors among high school students in the United States. *Journal of Adolescent Health, 21*, 225-231.

Wright, D. (in press). *State estimates of substance use from the 2000 National Household Survey on Drug Abuse* (NHSDA Series H-15 & H-16, DHHS Publication Nos. SMA 02-3731 & SMA 02-3732; two volumes to be available at http://www.samhsa.gov/oas/nhsda.htm). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies.

Wright, D., & Davis, T. R. (2001). *Youth substance use: State estimates from the 1999 National Household Survey on Drug Abuse* (DHHS Publication No. SMA 01-3546, Analytic Series: A-14; available at http://www.samhsa.gov/oas/analytic.htm). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies.

Yamaguchi, K., & Kandel, D. B. (1984). Patterns of drug use from adolescence to young adulthood: II. Sequences of progression. *American Journal of Public Health, 74*, 668-672.

Zingraff, M. T., & Belyea, M. J. (1983). Drug arrest statistics: A proposal for their use. *International Journal of Addiction, 18*, 465-478.

Appendix A: Statistical Methods and Limitations of the Data

Appendix A: Statistical Methods and Limitations of the Data

A.1 Target Population

An important limitation of the National Household Survey on Drug Abuse (NHSDA) estimates of drug use prevalence is that they are only designed to describe the target population of the survey—the civilian, noninstitutionalized population aged 12 or older. Although this population includes almost 98 percent of the total U.S. population aged 12 or older, it excludes some important and unique subpopulations who may have very different drug-using patterns. For example, the survey excludes active military personnel, who have been shown to have significantly lower rates of illicit drug use. Persons living in institutional group quarters, such as prisons and residential drug treatment centers, are not included in the NHSDA and have been shown in other surveys to have higher rates of illicit drug use. Also excluded are homeless persons not living in a shelter on the survey date, another population shown to have higher than average rates of illicit drug use.

A.2 Sampling Error and Statistical Significance

The sampling error of an estimate is the error caused by the selection of a sample instead of conducting a census of the population. Sampling error is reduced by selecting a large sample and by using efficient sample design and estimation strategies, such as stratification, optimal allocation, and ratio estimation.

With the use of probability sampling methods in the NHSDA, it is possible to develop estimates of sampling error from the survey data. These estimates have been calculated for all estimates presented in this report using a Taylor series linearization approach that takes into account the effects of the complex NHSDA design features. The sampling errors are used to identify unreliable estimates and to test for the statistical significance of differences between estimates.

A.2.1 Variance Estimation for Totals

Estimates of proportions, such as drug use prevalence rates, take the form of nonlinear statistics where the variances cannot be expressed in closed form. Variance estimation for nonlinear statistics is performed using a first-order Taylor series approximation in the SUrvey DAta ANalysis (SUDAAN) statistical software package developed by RTI (Shah et al., 1996). The approximation is unbiased for sufficiently large samples and has proven to be at least as

accurate and less costly to implement than its competitors, such as balanced repeated replication or jackknife methods (Rao & Wu, 1985).

Corresponding to proportion estimates, $\hat{p}_d$, the number of drug users, Y_d, can be estimated as

$$\hat{Y}_d = \hat{N}_d \hat{p}_d$$

where $\hat{N}_d$ is the estimated population total for domain *d,* and $\hat{p}_d$ is the estimated proportion for domain *d*. The standard error (*SE*) for the total estimate is obtained by multiplying the *SE* of the proportion by $\hat{N}_d$, that is,

$$SE(\hat{Y}_d) = \hat{N}_d \, SE(\hat{p}_d) \; .$$

This approach is theoretically correct when the domain size estimates $\hat{N}_d$ are among those forced to Census Bureau population projections through the weight calibration process. In these cases, $\hat{N}_d$ is clearly not subject to sampling error.

For domain totals Y_d where $\hat{N}_d$ is not fixed, this formulation may still provide a good approximation if we can reasonably assume that the sampling variation in $\hat{N}_d$ is negligible relative to the sampling variation in $\hat{p}_d$. In most analyses conducted for prior years, this has been a reasonable assumption. SUDAAN also provides an option to directly estimate the variance of the linear statistic that estimates a population total. Using this option did not affect the *SE* estimates for the corresponding proportions presented in the same sets of tables.

A.2.2 Suppression Criteria for Unreliable Estimates

As has been done in past NHSDA reports, direct survey estimates considered to be unreliable due to unacceptably large sampling errors are not shown in this report and are noted by asterisks (*) in the tables containing such estimates found in the appendices. The criterion used for suppressing all direct survey estimates was based on the relative standard error (*RSE*), which is defined as the ratio of the standard error (*SE*) over the estimate.

Proportion estimates (p) within the range [$0<p<1$], rates, and corresponding estimated number of users were suppressed if

$$RSE[-\ln(p)] > 0.175 \quad \text{when } p < 0.5$$

or

$$RSE[-\ln(1 - p)] > 0.175 \quad \text{when } p \geq 0.5 \; .$$

Using a first-order Taylor series approximation to estimate $RSE[-\ln(p)]$ and $RSE[-\ln(1-p)]$, we have the following, which was used for computational purposes:

$$[SE(p)/p \div -1n(p)] > 0.175 \text{ when } p < 0.5$$

or

$$[SE(p)/(1-p) \div -1n(1-p)] > 0.175 \text{ when } p \geq 0.5 .$$

The separate formulas for $p < 0.5$ and $p \geq 0.5$ produce a symmetric suppression rule; that is, if p is suppressed, then so will $1 - p$. This is an ad hoc rule that requires an effective sample size in excess of 50. When $0.05 < p < 0.95$, the symmetric properties of the rule produces a local maximum effective sample size of 68 at $p = 0.5$. Thus, estimates with these values of p along with effective sample sizes falling below 68 are suppressed. A local minimum effective sample size of 50 occurs at $p = 0.2$ and again at $p = 0.8$ within this same interval; so, estimates are suppressed for values of p with effective sample sizes below 50.

In NHSDAs prior to the 2000 NHSDA, these varying sample size restrictions sometimes produced unusual occurrences of suppression for a particular combination of prevalence rates. For example, in some cases, lifetime prevalence rates near $p = 0.5$ were suppressed (effective sample size was <68 but >50), while not suppressing the corresponding past year or past month estimates near $p = 0.2$ (effective sample sizes were >50). To reduce the occurrence of this type of inconsistency, a minimum effective sample size of 68 was added to the suppression criteria. As p approached 0.00 or 1.00 outside the interval (0.05, 0.95), the suppression criteria still required increasingly larger effective sample sizes. For example, if $p = 0.01$ and 0.001, the effective sample size must exceed 152 and 684, respectively.

Also new to the 2000 survey were minimum nominal sample size suppression criteria ($n = 100$) that protect against unreliable estimates caused by small design effects and small nominal sample sizes. Prevalence estimates were also suppressed if they were close to 0 or 100 percent (i.e., if $p < 0.00005$ or if $p \geq 0.99995$). Estimates of other totals (e.g., number of initiates) along with means and rates (both not bounded between 0 and 1) were suppressed if $RSE(p) > 0.5$. Additionally, estimates of the mean age at first use were suppressed if the sample size was smaller than 10 respondents; moreover, the estimated incidence rate and number of initiates were suppressed if they rounded to 0. The suppression criteria for various NHSDA estimates are summarized in Table A.1.

A.3 Nonsampling Error

Nonsampling errors can occur from nonresponse, coding errors, computer processing errors, errors in the sampling frame, reporting errors, and other errors not due to sampling. Nonsampling errors are reduced through data editing, statistical adjustments for nonresponse,

close monitoring and periodic retraining of interviewers, and improvement in various quality control procedures.

Although nonsampling errors can often be much larger than sampling errors, measurement of most nonsampling errors is difficult or impossible. However, some indication of the effects of some types of nonsampling errors can be obtained through proxy measures, such as response rates and from other research studies.

A.3.1 Screening and Interview Response Rate Patterns

Response rates for the NHSDA were stable for the period from 1994 to 1998, with the screening response rate at about 93 percent and the interview response rate at about 78 percent (response rates discussed in this appendix are weighted). In 1999, the computer-assisted interviewing (CAI) screening response rate was 89.6 percent and the interview response rate was 68.6 percent. A more stable and experienced field interviewer (FI) workforce improved these rates in 2000. Of the 182,576 eligible households sampled for the 2000 NHSDA main study, 169,769 were successfully screened, for a weighted screening response rate of 92.8 percent (Table A.2). In these screened households, a total of 91,961 sample persons were selected, and completed interviews were obtained from 71,764 of these sample persons, for a weighted interview response rate of 73.9 percent (Table A.3). A total of 10,109 (15.0 percent) sample persons were classified as refusals, 4,834 (5.5 percent) were not available or never at home, and 5,254 (5.5 percent) did not participate for various other reasons, such as physical or mental incompetence or language barrier. Tables A.4 and A.5 show the distribution of the selected sample by interview code and age group. The weighted interview response rate was highest among 12 to 17 year olds (82.6 percent), females (75.1 percent), blacks and Hispanics (76.2 and 78.0 percent, respectively), in nonmetropolitan areas (77.6 percent), and among persons residing in the South (76.4 percent) (Table A.6).

The increase in nonresponse between the 1998 and 1999 NHSDAs can be attributed primarily to the hiring of many new and inexperienced FIs in 1999 and a larger than usual turnover. By the end of 2000, the interviewer workforce primarily consisted of experienced interviewers, with fewer FIs leaving for other jobs. In 1999, there were 1,997 FIs hired and trained to conduct the CAI and paper-and-pencil interviewing (PAPI) surveys. More than a third of them did not complete the survey year (37.7 percent). In 2000, the number of trained interviewers decreased to 1,356 (because only CAI interviews were conducted in 2000), and the attrition rate dropped to 29.8 percent. Both prior NHSDA experience and on-the-job experience were shown to be related to nonresponse. Previously experienced interviewers and interviewers with one, two, or three quarters of on-the-job experience were more successful at obtaining an interview.

The overall weighted response rate, defined as the product of the weighted screening response rate and weighted interview response rate, was 61.5 percent in 1999 and 68.6 percent in 2000 (an 11.5 percent improvement over the 1999 rate). Nonresponse bias can be expressed as the product of the response rate (R) and the difference between the characteristic of interest between respondents and nonrespondents in the population ($P_r - P_{nr}$). Thus, assuming the quantity ($P_r - P_{nr}$) is fixed over time, the improvement in response rates in 2000 should result in estimates with lower nonresponse bias.

A.3.2 Inconsistent Responses and Item Nonresponse

Among survey participants, item response rates were above 98 percent for most questionnaire items. However, inconsistent responses for some items, including the drug use items, were common. Estimates of substance use from the NHSDA are based on the responses to multiple questions by respondents, so that the maximum amount of information is used in determining whether a respondent is classified as a drug user. Inconsistencies in responses are resolved through a logical editing process that involves some judgment on the part of survey analysts and is a potential source of nonsampling error. Because of the automatic routing through the CAI questionnaire (e.g., lifetime drug use questions that skip entire modules when answered "no"), there is less editing of this type than in the PAPI questionnaire used in previous years.

In addition, less logical editing is used because with the CAI data, statistical imputation is relied upon more heavily to determine the final values of drug use variables in cases where there is the potential to use logical editing to make a determination. The combined amount of editing and imputation in the CAI data is still considerably less than the total amount used in prior PAPI surveys. For the 2000 CAI data, for example, 3.2 percent of the estimate of past month hallucinogen use is based on logically edited cases and 5.4 percent on imputed cases, for a combined amount of 8.6 percent. For the 1999 CAI data, 1.7 percent of the estimate of past month hallucinogen use is based on logically edited cases and 4.6 percent on imputed cases, for a combined amount of 6.2 percent. In the 1998 NHSDA (administered using PAPI), the amount of editing and imputation for past month hallucinogen use was 60 and 0 percent, respectively, for a total of 60 percent. The combined amount of editing and imputation for the estimate of past month heroin use is 5.0 percent for the 2000 CAI, 14.8 percent for the 1999 CAI, and 37.0 percent for the 1998 PAPI data.

A.3.3 Validity of Self-Reported Use

NHSDA estimates are based on self-reports of drug use, and their value depends on respondents' truthfulness and memory. Although many studies have generally established the validity of self-report data and the NHSDA procedures were designed to encourage honesty and recall, some degree of underreporting is assumed (Harrell, 1997; Harrison & Hughes, 1997;

Rouse, Kozel, & Richards, 1985). No adjustment to NHSDA data is made to correct for this. The methodology used in the NHSDA has been shown to produce more valid results than other self-report methods (e.g., by telephone) (Aquilino, 1994; Turner, Lessler, & Gfroerer, 1992). However, comparisons of NHSDA data with data from surveys conducted in classrooms suggest that underreporting of drug use by youths in their homes may be substantial (Gfroerer, 1993; Gfroerer et al., 1997).

A.4 Incidence Estimates

For diseases, the incidence rate for a population is defined as the number of new cases of the disease, *N,* divided by the person time, *PT*, of exposure or:

$$IR = \frac{N}{PT}.$$

The person time of exposure can be measured for the full period of the study or for a shorter period. The person time of exposure ends at the time of diagnosis (e.g., Greenberg, Daniels, Flanders, Eley, & Boring, 1996, pp. 16-19). Similar conventions are applied for defining the incidence of first use of a substance.

Beginning in 1999, the NHSDA questionnaire allows for collection of year and month of first use for recent initiates. Month, day, and year of birth are also obtained directly or imputed in the process. In addition, the questionnaire call record provides the date of the interview. By imputing a day of first use within the year and month of first use reported or imputed, the key respondent inputs in terms of exact dates are known. Exposure time can be determined in terms of days and converted to an annual basis.

Having exact dates of birth and first use also allows us to determine person time of exposure during the targeted period, *t*. Let the target time period for measuring incidence be specified in terms of dates; for example, for the period 1998 we would specify:

$$t = [t_1, t_2) = [1\ Jan\ 1998, 1\ Jan\ 1999),$$

a period that includes 1 January 1998 and all days up to but not including 1 January 1999. The target age group can also be defined by a half-open interval as $a = [a_1, a_2)$. For example, the age group 12 to 17 would be defined by $a = [12, 18)$ for persons at least age 12, but not yet age 18. If person *I* was in age group *a* during period *t*, the time and age interval, $L_{t,a,i}$,can then be determined by the intersection:

$$L_{t,a,i} = [t_1,t_2) \cap [DOB_i\, MOB_i\, YOB_i + a_1, DOB_i\, MOB_i\, YOB_i + a_2)$$

assuming we can write the time of birth as in terms of day (DOB_i), month (MOB_i), and year (YOB_i). Either this intersection will be empty ($L_{t,a,i} = \varnothing$) or we will designate it by the half-open interval $L_{t,a,i} = [m_{1,i}, m_{2,i})$ where:

$$m_{1,i} = Max\{t_1, (DOB_i\, MOB_i\, YOB_i + a_1)\}$$

and

$$m_{2,i} = Min\{t_2, (DOB_i\, MOB_i\, YOB_i + a_2)\}.$$

The date of first use, $t_{fu,d,i}$, is also expressed as an exact date. An incident of first drug *d* use by person *I* in age group *a* occurs in time *t* if $t_{fu,d,i} \in [m_{1,i}, m_{2,i})$. The indicator function $I_i(d, a, t)$ used to count incidents of first use is set to 1 when $t_{fu,d,i} \in [m_{1,i}, m_{2,i})$, and to 0 otherwise. The person time exposure measured in years and denoted by $e_i(d,a,t)$ for a person *I* of age group *a* depends on the date of first use. If the date of first use precedes the target period ($t_{fu,d,i} < m_{1,i}$), then $e_i(d,a,t) = 0$. If the date of first use occurs after the target period or if person *I* has never used drug *d*, then

$$e_i(d,a,t) = \frac{m_{2,i} - m_{1,i}}{365}.$$

If the date for first use occurs during the target period $L_{t,a,i}$, then

$$e_i(d,a,t) = \frac{t_{fu,d,i} - m_{1,i}}{365}.$$

Note that both $I_i(d,a,t)$ and $e_i(d,a,t)$ are set to zero if the target period $L_{t,a,i}$ is empty; that is, person *I* is not in age group *a* during time *t*. The incidence rate is then estimated as a weighted ratio estimate:

$$IR(d,a,t) = \frac{\sum_i w_i I_i(d,a,t)}{\sum_i w_i e_i(d,,a,t)}$$

where the w_i are the analytic weights.

Prior to the 1999 survey, exact date data were not available for computing incidence rates. For these rates, a person was considered to be of age *a* during the entire time interval *t* if his or her a^{th} birthday occurred during time interval *t* (generally, a single year). If the person initiated use during the year, the person time exposure was approximated as one-half year for all such persons rather than computing it exactly for each person.

Because of the new methodology, incidence estimates discussed in this report are not strictly comparable with the estimates presented before the 1999 NHSDA. Because they are

based on retrospective reports by survey respondents, as was the case for earlier estimates, they may be subject to some of the same kinds of biases.

Bias due to differential mortality occurs because some persons who were alive and exposed to the risk of first drug use in the historical periods shown in the tables died before the 1999 NHSDA was conducted. This bias is probably very small for estimates shown in this report. Incidence estimates are also affected by memory errors, including recall decay (tendency to forget events occurring long ago) and forward telescoping (tendency to report that an event occurred more recently than it actually did). These memory errors would both tend to result in estimates for earlier years (i.e., 1960s and 1970s) that are downwardly biased (because of recall decay) and estimates for later years that are upwardly biased (because of telescoping). There is also likely to be some underreporting bias due to social acceptability of drug use behaviors and respondents' fear of disclosure. This is likely to have the greatest impact on recent estimates, which reflect more recent use and reporting by younger respondents. Finally, for drug use that is frequently initiated at age 10 or younger, estimates based on retrospective reports 1 year later underestimate total incidence because 11-year-old children are not sampled by the NHSDA. Prior analyses showed that alcohol and cigarette (any use) incidence estimates could be significantly affected by this.

Johnson et al. (1998) concluded that the marijuana incidence trend from the NHSDA was biased because the reporting of initiation declines as the length of time between initiation and the survey increases. However, their study did not address very recent estimates (i.e., 1996 to 1998), which could be biased because they reflect recent drug use and because they are heavily based on the reports of adolescents. To better understand the size of the biases and to assess the reliability of estimates for recent years, OAS performed an analysis of estimates based on single years of NHSDA data. This analysis focused on three drugs: cocaine, heroin, and marijuana. Using the survey data from 1994 to 1998, estimates were made of the number of initiates, the rate of initiation for youths aged 12 to 17, and the rate of initiation for persons aged 18 to 25. For the 1994 survey, an estimate was made for the year 1993. For the 1995 survey, another estimate was made for the year 1993. In this way, two recent estimates of the same year could be compared. Similarly, the 1995 and 1996 data provided two estimates for 1994, the 1996 and 1997 surveys provided two estimates for 1995, and the 1997 and 1998 surveys provided two estimates for 1996. Because these calculations represent two measurements of the same population characteristic, they would ideally be the same. Examples of these estimates are shown in Table A.7.

Drug initiation rates for youths aged 12 to 17 for the more hard-core drugs (e.g., cocaine and heroin) appeared to be most prone to bias. For example, on average across the 4 survey years, the estimate for the rate of initiation of cocaine use among youths aged 12 to 17 was 48 percent higher the first time the estimate could be made than the second time. This indicates a

probable bias in the estimation; however, it is unclear which estimate is the correct one. As a result, one should be cautious in interpreting any changes between the prior year and the most recent year in the initiation rates for youths of the more stigmatized drugs. Because only 5 years of data were used to estimate how the rate of incidence changed between the first year it could be estimated and the second, one should be cautious about inferring the magnitude of the bias (e.g., that it was 48 percent for cocaine).

In Table A.7, the *average* ratio of 1-year recall to 2-year recall is calculated across 4 "years." Implicit in the table is the fact that the estimates for each ratio vary around the average. For example, taking the 18 to 25 marijuana incidence numbers, the four individual ratios can be calculated as 1.13, .75, 0.89, and 1.06. Although the average ratio was 0.96, the year-to-year variation was much larger, ranging from 0.75 to 1.13. So, it is clear that for any single year, the bias implied by the sample estimates could be negative or positive. Because we are not clear whether the 1-year recall or the 2-year recall estimate is closer to an unbiased true value, the estimate that we use for the most recent year could be as much as 25 percent too high or too low in this example. The samples for 1999 and 2000 based on the new CAI method were significantly larger than those in prior years; therefore, estimates of bias should suffer from less sampling variability and the estimates should be less variable than before. Nevertheless, because there are only 2 years under the new CAI method, and, therefore, only one calculation possible of the ratio of the 1- to 2-year recall, more analysis is needed to see how stable the new estimates from CAI will be.

A.5 Changes in NHSDA Measures of Substance Use Initiation

The redesign of the NHSDA in 1999 introduced some changes in the initiation of use questions and the method of administration. In the presence of these changes, the overall data processing and estimation methodologies were revised. A new incidence rate methodology was developed. This section discusses the impact of methodological change on substance use initiation measures: the change in the incidence rate estimation method and its impact, the impact of the editing and imputing changes, and the questionnaire wording and administration mode effects.

A.5.1 Impact of Imputation and Incidence Rate Calculation Method

Prior to 1999, the only questions about initiation of drug use asked the respondent to report his or her age at first use for specified drugs. Each respondent's year at first use was imputed based on the reported age at first use, the interview date, and the respondent's date of birth. The imputed year was used to develop estimates of annual initiates and to develop the respondent-level numerator and denominator inputs to the incidence rate calculation.

For the redesigned CAI instrument, additional questions about initiation of drug use were included. Recent users (persons who first used at their current age or at their current age minus 1 year) were asked to report not only their age at first use for specified drugs, but also the month and year of that first use. As a result, the exact month of first use for specified drugs was known completely or in part (sometimes month or year were not reported) for 7 to 16 percent of the drug users (depending on the drug) in the 1999 NHSDA sample. The questionnaire also changed due to the routing logic used in the CAI instrument, which helped automatically resolve data inconsistencies between related items. For example, respondents were asked their age at first substance use and were prompted to review their response if the reported age at first use was inconsistent with their reported current age.

These changes led to three methodology changes used in the calculation of the 1999 NHSDA drug incidence rates. First, missing age at first use data were imputed, which resulted in consistent and nonmissing age at first use data for all users. Prior to the 1999 data, respondents with a missing age at first use were simply excluded from the calculation of incidence numbers and rates. Second, the assignment of the date of first use was refined such that the assigned date was now consistent with other reported related information, such as drug use recency and frequency data. Third, the improved data on age at first drug use and date of first drug use allow a more exact person time of exposure during the targeted period to be determined. For example, if a respondent was deemed a drug user and did not answer the age at first use question, the response was statistically imputed to eliminate missing data. An exact date of first use (i.e., the month, day, and year of first use) was then assigned by randomly picking a date within the 365 days corresponding to the respondent's age at first drug use. By using this date of first use in conjunction with the birth date, the computation of the period of exposure can be determined exactly in terms of whole days.

The new combined editing and imputation procedures flag more inconsistencies, impute for both missing and inconsistent reports, and retain the imputed date of first use consistent with reported age at first use and other drug use measures. The availability of an imputed date of first use for each lifetime substance user enabled consideration of a more precise approach to calculate substance use incidence rates. The new incidence rate calculation method accounts for the fact that this person's age does not exactly intersect calendar time in whole years. Details on the new methodology are reported by Gfroerer et al. (in press).

A.5.2 Impact on Incidence Rate Estimates

Incidence rate estimates are impacted by both the new editing and imputation procedures and the incidence rate calculation method. To sort out the separate impacts of these two changes, age-specific incidence rates were computed from the 1999 CAI data using three methods: (1)

new methodology using imputed data, (2) new methodology using edited data, and (3) old methodology using imputed data.

The effect of the new editing and imputation procedures can be evaluated using the new incidence rate calculation method and comparing the results from the fully imputed data (the first two data columns) with the results from edited data only (the middle two data columns). The annual estimates for marijuana in Table A.8 show 11 statistically significant differences for youths aged 12 to 17, and 7 of the 11 differences were higher with imputation. At ages 18 to 25, all six significant differences favor the imputed data. The general tendency was for incidence rates based on fully edited and imputed data to be higher than those based on the older edit-only approach. The average effects on marijuana incidence estimates for youths aged 12 to 17 were 58.3 with imputation and 57.3 with editing only, a relative increase of 1.5 percent (data not shown). For persons aged 18 to 25, the averages were 40.8 with imputation and 39.9 with editing only, a relative increase of 2.3 percent.

A second set of comparisons looked at the differences between the old and new method of calculating age-specific rates using imputed data in both methods. This comparison illustrates the difference in the two calculation methodologies holding the editing and imputation constant (at the fully edited and imputed level). These differences based on 1999 CAI data are shown by years in Table A.8 by comparing the first two data columns (new method - imputed variables) with the last two data columns (old method - imputed variables).

The new methodology removed some of these borderline cases from the calculation of the 18 to 25 age-specific rates and correctly placed them into the calculation of the 12 to 17 age-specific rates. Although both the numerator (new initiates) and the denominator (exposure time) were influenced by the change in method, the main impact was through the classification of initiates by age group in the numerator. Under the new method, new initiates were assigned to an age group based on their attained age at the date of initiation. Under the old method, new initiates were assigned to an age group based on their age at their birthday during the current year. Under the old methodology, many of the 17-year-old initiates were being counted in the 18 to 25 age-specific rate. However, the new methodology placed them in a correct age group based on their attained age at the date of initiation. On average, this resulted in an increase of almost 13 percent for marijuana incidence rates at ages 12 to 17 and a decrease of about 10 percent at ages 18 to 25 (data not shown).

A.5.3 Impact of the New Editing and Imputation Procedures

Table A.9 shows the impact of the new editing and imputation for 1999 CAI data on the annual number of marijuana initiates and the mean age at first use for marijuana. Estimates

based on 1994-1998 combined PAPI data are also presented in the table as an indication of the overall impact of interview mode and revised editing and imputation procedures.[1]

Comparisons of the estimated numbers of marijuana initiates based on edited versus imputed 1999 CAI showed an increase for the imputed data: 25 significant differences showing higher marijuana estimates from imputed data. The multiyear average numbers of marijuana initiates increased 2.4 percent (data not shown).

The impact of the 1999 editing and imputation procedures on estimates of average age at first use were small and mixed. Comparisons against edited 1999 CAI data showed two significant differences favoring the imputed data and six favoring the edited data for marijuana. Multiyear averages showed a 0.02 percent increase in average age at first use for marijuana (data not shown). In general, the relative impact of the 1999 imputation procedures on estimated average age at first use was small relative to the impact on estimates of initiates or of incidence rates. With so few significant differences and no correction for multiple comparisons, there is little evidence for concluding any differences between the 1994-1998 PAPI data and the 1999 CAI data with respect to average age at first use.

A.5.4 Impact of Questionnaire Mode Change on Estimates of Marijuana Use Initiation

The changes in questionnaire mode (i.e., switching from the PAPI to the CAI questionnaire in 1999) could affect the incidence rate estimates, including the fact that the CAI instrument allowed for more internal consistency and more complete responses. In addition, the format of the CAI questionnaire gave the respondent more privacy when answering sensitive questions. The 1999 CAI data showed a higher level of inconsistent data (0.2 percent for 1994-1998 PAPI and 0.5 percent for 1999 CAI). This probably reflected the more comprehensive editing for inconsistencies within the whole substance module employed with the 1999 CAI data. This increased rigor in the edit process produced an increase in inconsistencies in spite of the programmed consistency checks within the CAI instrument.

Table A.10 displays the 12 to 17 and 18 to 25 age-specific incidence marijuana rates for PAPI and CAI. Annual estimates are provided for PAPI combined data for 1994-1998, for 1999 PAPI data,[2] and for 1999 CAI data. For both PAPI and CAI, edited data and the old incidence methodology were used to compute these estimates. For comparability, nonimputed edited data

[1] This comparison is partially confounded with respondent recall effects for surveys conducted in different years. Sample sizes for 1999 PAPI data were not adequate to permit a meaningful comparison with 1999 CAI. Note also that for each year beginning with 1994, only initiation prior to that year could be estimated using the PAPI data.

[2] The weights applied to the PAPI analysis were the initially computed and calibrated weights without any adjustment to match the distribution of field interviewer experience to prior years.

was used because the PAPI data did not have imputed versions of the age at first use data. Only a small number of years showed a significant difference between the CAI and PAPI estimates.

Another way to deal with high variability in annual incidence estimates is to average the annual estimates over several years. This approach found a 5.4 percent increase in CAI marijuana estimates at ages 12 to 17 and a 1.2 percent decrease in CAI estimates at ages 18 to 25 (data not shown).

Even though the statistical results were mixed, there was evidence of some overall increased reporting of drug use initiation under the CAI mode, which in turn increased estimates of incidence rates. Any appreciable effect on mean age at first use could not be concluded.

A.5.5 Summary

Although the estimates for individual years were quite variable, the overall average impact of editing and imputation was to increase incidence rates for both age groups (12 to 17 and 18 to 25) and to increase the estimated number of new initiates. The new incidence rate calculation rules treated respondents as 17 year olds right up (but not including) their 18th birthday. The old rule classified respondents as 18 year olds for the entire year in which their 18th birthday occurred. This had the effect of increasing the estimates of time at risk and the number of initiates for 17 year olds. However, because the number of initiates was high at age 17, the overall impact was greater on the numerator than the denominator. As a result, the incidence rates for youths aged 12 to 17 increased and the incidence rate for persons aged 18 to 25 usually decreased somewhat.

Mode effects could not be cleanly isolated because of some accompanying changes in the question routing process and supplementary questions on date of first use for recent users that were implemented in conjunction with the implementation of CAI. One somewhat surprising result was that the level of missing or inconsistent data actually increased with the introduction of CAI. The increase in detected inconsistencies may have resulted because of the increased number of checks employed to identify inconsistent data in the post-survey processing. The increase in the proportion of missing age at first use data may have been facilitated by the respondent's option to answer "don't know" or "refused."

The overall impact of the conversion from PAPI to CAI was assessed by comparing the results from the 1999 PAPI and CAI samples using the edited data. The old method of rate calculation was applied to both samples for mode comparison purposes. Annual estimates were highly variable, and few statistically significant differences were identified.

The larger national sample sizes available since 1999 will help make the study of the initiation of substance use more feasible and more precise. The revisions and corrections introduced in the CAI questionnaire, in the coordinated editing and imputation procedures, and in rate computation methodology in 1999 should also increase the utility of the survey data for these purposes. Based on the analyses reported in this section, any comparisons of 1999 and subsequent years' data with data from 1998 and prior years' data should either be avoided or tempered with an understanding of the methodological effects reported earlier.

Table A.1 Summary of 2000 NHSDA Suppression Rules

Estimate	Suppress if:
Prevalence rate, p, with nominal sample size, n, and design effect, *deff*	The estimated prevalence rate, p, is < 0.00005 or >0.99995, or $\frac{SE(p)/p}{-\ln(p)} > 0.175$ when $p < 0.5$, or $\frac{SE(p)/(1-p)}{-\ln(1-p)} > 0.175$ when $p \geq 0.5$, or $Effective\ n < 68$, or $n < 100$ where $Effective\ n = \frac{n}{deff}$ Note: The rounding portion of this suppression rule for prevalence rates will produce some estimates that round at one decimal place to 0.0% or 100.0% but are not suppressed from the tables.
Estimated number (numerator of p)	The estimated prevalence rate, p, is suppressed. Note: In some instances when p is not suppressed, the estimated number may appear as a 0 in the tables; this means that the estimate is >0 but <500 (estimated numbers are shown in thousands).
Mean age at first use, $\bar{x}$, with nominal sample size, n	$RSE(\bar{x}) > 0.5$, or $n < 10$
Incidence rate, $\hat{r}$	Rounds to < 0.1 per 1,000 person-years of exposure, or $RSE(\hat{r}) > 0.5$
Number of initiates, $\hat{t}$	Rounds to <1,000 initiates, or $RSE(\hat{t}) > 0.5$

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

Table A.2 Weighted Percentages and Sample Sizes for 1999 and 2000 NHSDAs, by Screening Result Code

	1999 NHSDA		2000 NHSDA	
Screening Result	**Sample Size**	**Weighted Percentage**	**Sample Size**	**Weighted Percentage**
Total Sample	223,868	100.00	215,860	100.00
Ineligible cases	36,026	15.78	33,284	15.09
Eligible cases	187,842	84.22	182,576	84.91
Ineligibles	36,026	100.00	33,284	100.00
Vacant	18,034	49.71	16,796	50.76
Not a primary residence	4,516	12.90	4,506	13.26
Not a dwelling unit	4,626	12.70	3,173	9.33
All military personnel	482	1.22	414	1.21
Other, ineligible	8,368	23.46	8,395	25.43
Eligible Cases	187,842	100.00	182,576	100.00
Screening complete	169,166	89.63	169,769	92.84
No one selected	101,537	54.19	99,999	55.36
One selected	44,436	23.63	46,981	25.46
Two selected	23,193	11.82	22,789	12.03
Screening not complete	18,676	10.37	12,807	7.16
No one home	4,291	2.38	3,238	1.82
Respondent unavailable	651	0.36	415	0.24
Physically or mentally incompetent	419	0.24	310	0.16
Language barrier—Hispanic	102	0.06	83	0.05
Language barrier—other	486	0.28	434	0.27
Refusal	11,097	5.92	7,535	4.14
Other, access denied	1,536	1.08	748	0.45
Other, eligible	38	0.02	7	0.00
Other, problem case	56	0.03	37	0.02

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table A.3 Weighted Percentages and Sample Sizes for 1999 and 2000 NHSDAs, by Final Interview Code, *among Persons Aged 12 or Older*

	1999 NHSDA		2000 NHSDA	
Final Interview Code	**Sample Size**	**Weighted Percentage**	**Sample Size**	**Weighted Percentage**
Total Selected Persons	89,883	100.00	91,961	100.00
Interview complete	66,706	68.55	71,764	73.93
No one at dwelling unit	1,795	2.13	1,776	2.02
Respondent unavailable	3,897	4.53	3,058	3.52
Breakoff	50	0.07	72	0.09
Physically/mentally incompetent	1,017	2.62	1,053	2.57
Language barrier—Spanish	168	0.12	109	0.08
Language barrier—Other	480	1.46	441	1.06
Refusal	11,276	17.98	10,109	14.99
Parental refusal	2,888	1.01	2,655	0.88
Other	1,606	1.53	924	0.86

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table A.4 Weighted Percentages and Sample Sizes for 1999 and 2000 NHSDAs, by Final Interview Code, *among Youths Aged 12 to 17*

	1999 NHSDA		2000 NHSDA	
Final Interview Code	**Sample Size**	**Weighted Percentage**	**Sample Size**	**Weighted Percentage**
Total Selected Persons	32,011	100.00	31,242	100.00
Interview complete	25,384	78.07	25,756	82.58
No one at dwelling unit	322	1.09	278	0.86
Respondent unavailable	872	3.04	617	2.05
Breakoff	13	0.03	18	0.05
Physically/mentally incompetent	244	0.76	234	0.76
Language barrier—Spanish	15	0.03	10	0.03
Language barrier—Other	58	0.18	50	0.20
Refusal	1,808	5.97	1,455	4.52
Parental refusal	2,885	9.50	2,641	8.35
Other	410	1.33	183	0.59

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table A.5 Weighted Percentages and Sample Sizes for 1999 and 2000 NHSDAs, by Final Interview Code, *among Persons Aged 18 or Older*

	1999 NHSDA		2000 NHSDA	
Final Interview Code	**Sample Size**	**Weighted Percentage**	**Sample Size**	**Weighted Percentage**
Total Selected Persons	57,872	100.00	60,719	100.00
Interview complete	41,322	67.41	46,008	72.92
No one at dwelling unit	1,473	2.25	1,498	2.16
Respondent unavailable	3,025	4.71	2,441	3.69
Breakoff	37	0.07	54	0.09
Physically/mentally incompetent	773	2.85	819	2.78
Language barrier—Spanish	153	0.13	99	0.09
Language barrier—Other	422	1.62	391	1.16
Refusal	9,468	19.41	8,654	16.22
Parental refusal	3	0.00	14	0.01
Other	1,196	1.55	741	0.89

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table A.6 Response Rates and Sample Sizes for the 1999 and 2000 NHSDAs, by Demographic Characteristics

	1999 NHSDA			2000 NHSDA		
	Selected Persons	Completed Interviews	Weighted Response Rate	Selected Persons	Completed Interviews	Weighted Response Rate
Total	**89,883**	**66,706**	**68.55%**	**91,961**	**71,764**	**73.93%**
Age in Years						
12-17	32,011	25,384	78.07%	31,242	25,756	82.58%
18-25	30,439	22,151	71.21%	29,424	22,849	77.34%
26 or older	27,433	19,171	66.76%	31,295	23,159	72.17%
Gender						
Male	43,883	31,987	67.12%	44,899	34,375	72.68%
Female	46,000	34,719	69.81%	47,062	37,389	75.09%
Race/Ethnicity						
Hispanic	11,203	8,755	74.59%	11,454	9,396	77.95%
White	63,211	46,272	67.98%	64,517	49,631	73.39%
Black	10,552	8,044	70.39%	10,740	8,638	76.19%
All other races	4,917	3,635	59.28%	5,250	4,099	67.31%
Region						
Northeast	16,794	11,830	64.03%	18,959	14,394	71.68%
Midwest	24,885	18,103	69.63%	25,428	19,355	73.23%
South	27,390	21,018	70.93%	27,217	22,041	76.38%
West	20,814	15,755	67.47%	20,357	15,974	72.68%
County Type						
Large metropolitan	36,101	25,901	65.15%	37,754	28,744	71.77%
Small metropolitan	30,642	22,612	69.98%	31,400	24,579	74.96%
Nonmetropolitan	23,140	18,193	74.97%	22,807	18,441	77.58%

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table A.7 Comparison of Initiation Rates, by Year of Initiation and Survey Year

	Year of Initiation								Average of Ratio of 1-Year Recall to 2-Year Recall
	1993		1994		1995		1996		
	Year of Survey								
	1994	1995	1995	1996	1996	1997	1997	1998	
Rate for Age 12 to 17									
Marijuana	59.2	53.7	74.2	75.2	75.7	73.6	83.2	75.6	1.055
Cocaine	8.9	5.0	10.2	5.7	10.6	8.0	11.3	11.0	1.480
Heroin	0.7	0.5	2.1	1.4	2.5	1.8	3.9	1.5	1.722
Rate for Age 18 to 25									
Marijuana	46.9	41.4	42.1	55.9	47.7	53.4	53.6	50.5	0.960
Cocaine	12.8	12.8	9.9	11.8	13.8	14.7	14.8	13.9	0.961
Heroin	0.1	1.4	1.4	2.1	2.4	1.9	2.3	3.0	0.692
Number of Initiates									
Marijuana	2,035	1,783	2,251	2,548	2,368	2,443	2,540	2,384	1.015
Cocaine	595	538	533	530	652	654	675	664	1.031
Heroin	41	62	122	97	141	93	171	127	1.195

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994-1998.

Table A.8 Marijuana Annual Age-Specific Rates at First Use Per 1,000 Person-Years of Exposure: 1999

	New Method - Imputed Variable		New Method - Edited Variable		Old Method - Imputed Variable	
Year	**12-17**	**18-25**	**12-17**	**18-25**	**12-17**	**18-25**
1965	9.6	7.5	8.9	6.7	9.1	7.7
1966	19.3	32.1	19.5[b]	32.1	17.9	32.6
1967	20.7	30.8	20.6	30.9	19.1	29.4
1968	20.3	43.5	20.2	41.2	16.3	44.6
1969	34.1	56.7	34.5[b]	56.4	29.2[b]	55.7
1970	55.8	47.7	55.0	46.7	49.1[b]	50.9
1971	46.7	49.7	46.2	48.5	41.8[a]	54.0[a]
1972	59.7	50.2	59.7	47.8[a]	54.3[b]	52.7
1973	59.0	39.4	59.6[a]	36.8	53.3[b]	43.5[a]
1974	66.6	53.0	65.6	52.4	56.6[b]	62.2[b]
1975	65.3	53.7	63.6	53.4	58.3[b]	56.8
1976	76.5	60.5	75.4	60.1	63.2[b]	72.3[b]
1977	86.5	51.2	86.5	50.0	77.9[b]	57.8[a]
1978	84.2	49.6	81.7	48.8	75.0[b]	56.7
1979	86.3	54.5	84.2	54.4	75.7[b]	63.2[b]
1980	75.9	48.2	75.5	44.6	66.6[b]	53.3
1981	51.8	35.1	51.3	35.0	50.1	36.3
1982	59.0	36.3	59.5[b]	35.1	51.9[b]	40.7[a]
1983	55.3	33.1	53.1[a]	32.5	48.5[b]	38.8[b]
1984	58.5	38.5	58.5	38.3	52.1[b]	43.7[b]
1985	58.4	38.7	57.8	37.2	51.8[b]	44.9[b]
1986	53.2	29.8	53.3	28.4[a]	47.6[b]	33.7[a]
1987	56.1	37.3	54.3	36.7	49.8[b]	42.4[b]
1988	55.7	31.6	54.6[a]	31.4	49.4[b]	33.1
1989	46.7	26.8	46.2	25.8	40.2[b]	32.2[b]
1990	48.4	29.0	48.2	28.6	42.5[b]	32.7[a]
1991	46.1	31.9	45.6	31.4	39.5[b]	37.5[b]
1992	51.0	30.5	50.4	29.5[a]	45.7[b]	34.2[b]
1993	60.0	36.7	59.7	36.3	53.4[b]	41.5[b]
1994	74.3	42.1	72.9[b]	41.2	67.2[b]	47.1[b]
1995	78.3	46.1	76.7[b]	45.6	70.8[b]	53.1[b]
1996	89.9	44.1	87.7[b]	42.7[b]	80.0[b]	52.8[b]
1997	90.0	45.1	87.3[b]	44.5[a]	79.6[b]	53.8[b]
1998	82.6	46.5	79.2[b]	45.6[b]	73.5[b]	54.5[b]

Note: The numerator of each rate is the number of persons in the age group who first used the drug in the year, while the denominator is the person-time exposure measured in thousands of years.

[a] Difference between the estimate and New Method - Imputed is statistically significant at the 0.05 level.

[b] Difference between the estimate and New Method - Imputed is statistically significant at the 0.01 level.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999.

Table A.9 Comparison of Numbers of Marijuana Initiates (in Thousands) and Mean Age at First Marijuana Use: 1994-1998 PAPI Versus 1999 CAI

	Initiates (1,000s)			Mean Age (Years)		
Year	1994-1998 PAPI	1999 CAI-Edited Data	1999 CAI-Imputed Data	1994-1998 PAPI	1999 CAI-Edited Data	1999 CAI-Imputed Data
1965	601	442	478	18.95	21.77	21.61
1966	977	1,229	1,234	20.05	18.68	18.68
1967	1,423	1,199	1,210	19.76	18.92	18.91
1968	1,621	1,470	1,533	18.97	18.89	18.91
1969	2,245	2,301	2,317	19.19	19.43	19.43
1970	2,611	2,501[a]	2,585	19.21	18.20	18.34
1971	2,710	2,403	2,456	18.78	17.87	17.84
1972	2,861	2,676[b]	2,747	18.62	18.16[a]	18.24
1973	2,897	2,610[a]	2,697	18.28	19.03	19.15
1974	2,966	2,873[b]	2,938	18.50	17.85	17.82
1975	3,128	2,923[a]	2,989	18.51	18.90[a]	18.84
1976	2,786	3,216	3,267	18.69	18.38	18.34
1977	2,889	3,195[a]	3,251	18.95	18.03	18.07
1978	2,846	2,959[a]	3,046	17.77	18.14	18.10
1979	2,654	2,983[b]	3,052	18.22	18.22	18.18
1980	2,499	2,564[a]	2,680	18.41	18.13	18.38
1981	2,115	1,820[a]	1,840	17.94	18.29	18.26
1982	1,964	2,056[a]	2,090	18.19	18.85	18.98
1983	2,143	1,889[b]	1,954	17.85	18.90[a]	18.77
1984	2,010	2,029	2,040	19.19	18.56	18.54
1985	1,775	1,890[a]	1,938	17.85	18.05	18.03
1986	1,845	1,604[b]	1,633	19.32	17.15	17.18
1987	1,756	1,708[b]	1,763	17.92	17.48	17.45
1988	1,565	1,595[a]	1,620	17.49	17.49[a]	17.47
1989	1,371	1,353[a]	1,388	17.87	17.21	17.29
1990	1,423	1,451[a]	1,470	17.66	17.42	17.44
1991	1,415	1,519[b]	1,545	17.47	17.78	17.76
1992	1,644	1,544[b]	1,578	17.60[b]	16.49	16.49
1993	1,983	1,930[b]	1,972	16.96	17.33	17.45
1994	2,380	2,235[b]	2,293	16.90	16.61	16.59
1995	2,409	2,359[b]	2,421	16.57	16.65[b]	16.59
1996	2,462	2,532[b]	2,616	16.62	17.24[b]	17.18
1997	2,114[b]	2,493[b]	2,571	17.09	17.16[b]	17.08
1998	--	2,345[b]	2,437	--	17.63[b]	17.52

-- Not available.

[a] Difference between the estimate and 1999 CAI-Imputed is statistically significant at the 0.05 level.

[b] Difference between the estimate and 1999 CAI-Imputed is statistically significant at the 0.01 level.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994-1998 PAPI and 1999 CAI.

Table A.10 Comparison of Mode Effect: Marijuana Annual Age-Specific Rates at First Use Per 1,000 Person-Years of Exposure with PAPI and CAI Data

	PAPI 1994-1998		PAPI 1999 Old Method - Edited		CAI 1999 Old Method - Edited	
Year	**12-17**	**18-25**	**12-17**	**18-25**	**12-17**	**18-25**
1965	8.7	13.7[a]	11.8	13.8	8.4	6.9
1966	13.9	23.5	7.4[a]	38.8	18.1	32.6
1967	15.6	38.8	18.4	36.7	18.9	29.5
1968	20.1	45.2	35.0[a]	47.0	16.2	42.5
1969	31.7	54.1	29.0	50.9	29.5	55.3
1970	35.1	64.3	27.1[a]	50.1	48.3	50.5
1971	40.8	65.9	41.6	49.3	41.4	52.8
1972	48.4	64.1	44.3	69.4	54.5	50.5
1973	60.2	57.7[a]	52.4	68.0	54.1	40.8
1974	57.6	61.7	68.7	58.0	55.4	61.7
1975	67.8	57.8	48.7	43.7	56.7	56.4
1976	59.5	52.4[a]	74.0	61.0	62.2	72.1
1977	66.7	50.2	34.5[b]	58.5	77.8	56.8
1978	75.2	49.9	62.2	61.1	74.9	53.1
1979	60.6	59.0	63.5	45.6	73.7	62.9
1980	59.2	56.0	58.0	47.9	66.4	49.9
1981	54.3	43.1	54.4	69.2[a]	49.6	36.3
1982	48.2	42.3	55.8	35.5	52.2	39.6
1983	56.4[a]	45.1	52.1	39.9	46.3	38.2
1984	53.1	38.4	54.3	28.4[a]	52.2	43.6
1985	48.8	38.6	52.6	37.9	51.2	43.4
1986	48.4	41.3[a]	38.4	43.4	47.7	32.3
1987	48.4	40.5	41.6	29.8	48.1	41.7
1988	44.9	36.9	39.8	29.3	48.5	32.9
1989	37.0	32.8	38.1	40.4	40.0	31.1
1990	36.9	36.6	38.9	33.8	42.3	32.3
1991	38.4	34.0	45.4	23.3[a]	39.0	37.0
1992	44.5	37.0	44.7	25.4	45.2	33.5
1993	55.1	45.9	65.3	39.1	53.1	41.2
1994	72.8	47.9	76.7	41.7	66.0	46.1
1995	74.1	52.6	72.5	47.7	69.1	52.5
1996	79.3	52.1	56.3[b]	56.8	77.9	51.3
1997	64.4[a]	47.1	84.4	57.5	76.9	53.2
1998	--	--	55.2[a]	53.5	70.2	53.2

-- Not available.

[a] Difference between PAPI and CAI is statistically significant at the 0.05 level.

[b] Difference between PAPI and CAI is statistically significant at the 0.01 level.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994-1998 PAPI and 1999 CAI.

Appendix B: Selected Standard Error Tables

Table 3.1S Standard Errors of Estimated Numbers (in Thousands) of Persons Who First Used Marijuana During the Years 1965 to 1999, Their Mean Age at First Use, and the Annual Incidence Rates of First Use (Per 1,000 Person-Years of Exposure), for All Ages

Year	Number of Initiates (1,000s)	Mean Age at First Use	Incidence Rates[1]
1965	75	1.2	0.5
1966	114	0.5	0.8
1967	119	0.4	0.8
1968	136	0.4	0.9
1969	147	0.3	1.0
1970	164	0.3	1.1
1971	158	0.3	1.0
1972	157	0.3	1.0
1973	154	0.4	1.0
1974	150	0.3	1.0
1975	150	0.4	1.0
1976	163	0.3	1.1
1977	157	0.3	1.0
1978	162	0.3	1.0
1979	144	0.3	1.0
1980	127	0.5	0.8
1981	97	0.3	0.6
1982	101	0.5	0.6
1983	101	0.6	0.6
1984	95	0.4	0.6
1985	85	0.4	0.5
1986	74	0.3	0.4
1987	71	0.3	0.4
1988	73	0.2	0.4
1989	67	0.4	0.4
1990	59	0.6	0.4
1991	62	0.5	0.4
1992	54	0.2	0.3
1993	58	0.3	0.4
1994	63	0.2	0.4
1995	56	0.1	0.4
1996	66	0.3	0.4
1997	59	0.3	0.4
1998	61	0.4	0.4
1999[2]	61	0.2	0.4

[1] The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years.

[2] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.2S Standard Errors of Estimated Age-Gender Numbers (in Thousands) of Persons Who First Used Marijuana During the Years 1965 to 1999

	Number of Initiates (1,000s)							
Year	Males 12-14	Females 12-14	Males 15-17	Females 15-17	Males 18-20	Females 18-20	Males 21+	Females 21+
1965	19	*	42	17	19	30	21	33
1966	22	*	42	32	66	44	42	39
1967	32	26	40	28	54	41	60	34
1968	27	16	47	26	83	47	69	51
1969	26	25	63	41	75	53	50	64
1970	38	43	64	51	67	46	62	51
1971	52	41	53	42	66	44	60	71
1972	48	31	82	61	56	40	57	59
1973	47	37	65	48	56	44	63	63
1974	40	45	68	56	45	49	50	56
1975	43	51	55	59	58	42	45	63
1976	38	34	84	69	62	45	53	63
1977	45	38	69	67	56	52	49	52
1978	41	40	79	68	42	54	45	55
1979	42	29	66	67	62	45	34	46
1980	24	20	61	54	36	50	47	49
1981	24	18	44	39	38	39	29	37
1982	24	19	37	37	41	38	46	47
1983	25	19	37	29	32	28	59	28
1984	29	21	34	31	32	26	39	40
1985	24	21	34	30	28	26	39	28
1986	19	17	33	33	26	22	30	25
1987	11	14	32	33	27	22	20	29
1988	14	9	36	31	24	19	31	33
1989	12	10	33	25	23	23	27	22
1990	12	10	28	19	24	18	21	30
1991	16	10	20	19	25	21	39	17
1992	14	14	21	17	23	19	19	17
1993	16	17	19	22	21	19	20	22
1994	18	19	24	22	17	22	25	17
1995	19	16	24	20	16	17	19	17
1996	17	16	26	25	17	17	18	28
1997	16	15	24	23	19	16	21	19
1998	17	14	23	20	17	18	31	19
1999[1]	20	18	28	24	17	19	22	27

* Low precision; no estimate reported.

[1] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.3S Standard Errors of Estimated Numbers (in Thousands) of Persons Who First Used Marijuana During the Years 1965 to 1999, Their Mean Age at First Use, and the Annual Incidence Rates of First Use (Per 1,000 Person-Years of Exposure), by Gender

	Number of Initiates (1,000s)		Mean Age at First Use		Incidence Rates[1]	
Year	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
1965	55	50	0.8	2.4	0.9	0.7
1966	92	70	0.5	0.9	1.4	0.9
1967	97	67	0.4	1.0	1.5	0.9
1968	122	76	0.4	1.0	1.8	1.0
1969	110	101	0.4	0.5	1.6	1.3
1970	123	94	0.4	0.5	1.8	1.2
1971	124	102	0.4	0.5	1.8	1.3
1972	126	101	0.5	0.4	1.8	1.3
1973	115	105	0.5	0.5	1.7	1.3
1974	106	105	0.4	0.4	1.6	1.3
1975	105	107	0.5	0.5	1.6	1.3
1976	122	111	0.3	0.4	1.7	1.4
1977	110	107	0.4	0.4	1.6	1.3
1978	107	114	0.4	0.5	1.5	1.4
1979	107	97	0.4	0.5	1.5	1.2
1980	85	93	0.8	0.6	1.2	1.1
1981	68	70	0.4	0.5	1.0	0.8
1982	77	72	0.7	0.6	1.1	0.9
1983	79	57	1.0	0.4	1.1	0.7
1984	68	61	0.8	0.4	0.9	0.7
1985	65	54	0.5	0.6	0.9	0.6
1986	55	50	0.4	0.3	0.7	0.6
1987	47	51	0.4	0.4	0.6	0.6
1988	56	50	0.3	0.3	0.7	0.6
1989	49	41	0.6	0.4	0.6	0.5
1990	42	42	0.5	1.3	0.6	0.5
1991	54	33	0.8	0.4	0.7	0.4
1992	38	34	0.2	0.2	0.5	0.4
1993	37	43	0.3	0.4	0.5	0.5
1994	44	42	0.4	0.2	0.6	0.5
1995	39	37	0.1	0.1	0.6	0.4
1996	42	46	0.2	0.5	0.6	0.6
1997	41	36	0.4	0.3	0.6	0.5
1998	48	36	0.7	0.3	0.7	0.5
1999[2]	44	44	0.2	0.4	0.7	0.6

[1] The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years.

[2] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.4S Standard Errors of Estimated Annual Age-Gender Specific Incidence Rates of First Use (Per 1,000 Person-Years of Exposure) of Persons Who First Used Marijuana During the Years 1965 to 1999

	Age-Gender Specific Incidence Rates[1]							
Year	Males 12-14	Females 12-14	Males 15-17	Females 15-17	Males 18-20	Females 18-20	Males 21+	Females 21+
1965	3.3	*	7.9	2.7	4.9	5.6	0.9	1.1
1966	3.9	*	8.0	5.5	15.0	7.5	1.7	1.3
1967	5.7	4.2	7.5	4.9	11.9	6.5	2.4	1.1
1968	4.7	2.5	9.0	4.4	18.4	8.3	2.6	1.5
1969	4.4	3.8	12.1	7.2	18.4	10.1	1.8	1.8
1970	5.9	6.5	12.1	8.9	16.4	9.1	2.2	1.4
1971	8.0	6.4	11.1	7.3	17.5	8.9	2.1	1.8
1972	7.9	4.6	16.1	10.4	14.8	8.8	1.9	1.5
1973	8.0	5.5	12.8	8.3	15.3	9.1	2.0	1.5
1974	6.6	7.0	14.2	10.1	12.7	10.5	1.6	1.3
1975	6.9	8.2	11.9	10.8	15.8	9.3	1.4	1.5
1976	6.0	5.7	17.5	12.4	16.5	10.4	1.6	1.4
1977	7.6	6.1	14.2	12.9	16.7	12.5	1.4	1.1
1978	7.5	6.8	16.0	13.5	13.3	13.1	1.3	1.2
1979	8.2	5.1	14.3	13.4	19.8	11.0	1.0	1.0
1980	4.9	3.7	13.9	11.2	11.2	13.1	1.3	1.0
1981	4.6	3.4	10.4	8.1	10.9	10.3	0.8	0.8
1982	4.6	3.3	9.2	7.9	11.8	10.3	1.2	0.9
1983	4.8	3.4	9.1	6.2	9.8	7.5	1.5	0.5
1984	5.5	3.8	8.0	6.6	9.8	6.8	1.0	0.8
1985	5.0	3.8	7.8	6.5	8.7	6.8	1.0	0.5
1986	4.1	3.5	7.5	6.9	8.0	5.6	0.7	0.5
1987	2.5	2.9	7.7	6.9	8.2	5.9	0.5	0.5
1988	3.1	1.8	8.7	6.8	7.1	5.1	0.7	0.6
1989	2.5	1.9	8.2	5.7	6.9	5.8	0.6	0.4
1990	2.5	2.1	7.3	4.4	7.1	4.7	0.5	0.5
1991	3.2	1.8	5.2	4.5	7.8	5.5	0.8	0.3
1992	2.7	2.6	5.1	3.9	7.5	5.2	0.4	0.3
1993	3.0	3.0	4.7	4.9	6.8	5.1	0.4	0.4
1994	3.2	3.4	5.8	4.9	5.6	6.1	0.5	0.3
1995	3.3	2.9	5.6	4.5	5.4	5.0	0.4	0.3
1996	3.1	2.8	6.0	5.6	5.8	5.2	0.4	0.4
1997	2.9	2.8	5.5	5.1	6.9	4.6	0.4	0.3
1998	2.9	2.6	5.6	4.6	5.7	5.6	0.6	0.3
1999[2]	3.5	3.4	7.1	5.9	5.8	5.5	0.4	0.4

* Low precision; no estimate reported.

[1] The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years.

[2] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.5S Standard Errors of Estimated Numbers (in Thousands) of Persons Who First Used Marijuana During the Years 1965 to 1999, by Racial/Ethnic Subgroups

	Number of Initiates (1,000s)					
Year	White	Black	Hispanic	Asian / Pacific Islander / Native Hawaiian	American Indian / Alaska Native	More Than One Race
1965	57	*	*	*	*	*
1966	102	42	*	*	*	*
1967	111	35	22	*	*	*
1968	115	63	26	*	*	*
1969	139	37	30	*	*	*
1970	152	41	22	18	*	10
1971	139	46	42	*	7	*
1972	144	47	35	5	8	8
1973	148	46	24	*	*	*
1974	137	41	50	5	*	8
1975	137	49	34	6	*	*
1976	153	53	37	*	12	*
1977	140	49	37	26	*	12
1978	141	46	44	32	*	6
1979	125	52	28	*	3	7
1980	114	43	30	*	*	*
1981	89	33	24	*	3	*
1982	92	32	31	*	7	3
1983	90	23	32	18	5	*
1984	80	37	16	*	3	2
1985	71	24	28	20	3	5
1986	63	26	22	8	8	6
1987	63	21	20	22	4	4
1988	66	19	26	8	10	6
1989	57	18	25	9	*	4
1990	51	21	21	16	3	2
1991	55	20	16	15	5	5
1992	46	22	18	7	4	7
1993	47	22	18	8	7	5
1994	52	25	19	7	6	5
1995	47	20	17	10	3	6
1996	53	22	21	13	4	6
1997	48	25	20	7	5	6
1998	51	19	20	12	4	6
1999[1]	54	23	21	10	8	7

[1] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.6S Standard Errors of Estimated Mean Ages at First Use of Persons Who First Used Marijuana During the Years 1965 to 1999, by Racial/Ethnic Subgroups

	Mean Age at First Use					
Year	White	Black	Hispanic	Asian / Pacific Islander / Native Hawaiian	American Indian / Alaska Native	More Than One Race
1965	1.5	*	*	*	*	*
1966	0.5	1.6	*	*	*	*
1967	0.5	0.9	2.9	*	*	*
1968	0.5	0.8	3.0	*	*	*
1969	0.4	0.8	2.1	*	*	*
1970	0.3	1.2	0.4	0.8	*	*
1971	0.4	1.7	0.8	*	*	*
1972	0.4	0.7	1.8	*	1.4	*
1973	0.4	1.3	1.7	*	*	*
1974	0.3	1.3	0.8	*	*	1.0
1975	0.4	0.6	1.1	*	*	*
1976	0.3	1.1	0.7	*	1.0	0.6
1977	0.4	0.6	0.9	0.3	0.9	*
1978	0.4	0.6	1.7	1.4	*	*
1979	0.4	0.7	0.5	*	0.8	1.0
1980	0.6	1.2	1.0	0.8	*	*
1981	0.4	1.3	0.7	*	*	*
1982	0.5	1.7	0.6	*	2.2	*
1983	0.7	1.0	1.1	1.1	1.9	1.1
1984	0.3	2.2	0.4	7.6	2.4	1.1
1985	0.5	0.6	0.8	1.3	0.7	1.6
1986	0.3	0.5	0.7	0.4	0.5	1.4
1987	0.4	0.5	0.6	1.4	2.5	2.8
1988	0.2	0.4	1.2	1.2	2.4	0.6
1989	0.5	0.4	0.6	1.5	0.6	1.2
1990	0.8	0.7	0.9	0.7	2.2	0.8
1991	0.6	0.4	0.4	0.9	2.9	0.7
1992	0.2	0.4	0.4	0.7	0.9	0.7
1993	0.3	1.1	0.4	1.9	4.7	0.4
1994	0.3	0.3	0.3	0.4	0.5	0.6
1995	0.1	0.3	0.3	1.1	0.5	0.3
1996	0.4	0.4	0.5	0.6	0.6	0.7
1997	0.4	0.7	0.3	0.5	0.9	0.4
1998	0.6	0.3	0.3	1.0	0.8	0.9
1999[1]	0.3	0.3	0.4	1.4	0.7	0.9

* Low precision; no estimate reported.
[1] Estimated using 2000 data only.
Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 3.7S Standard Errors of Estimated Annual Incidence Rates of First Use (Per 1,000 Person-Years of Exposure) of Persons Who First Used Marijuana During the Years 1965 to 1999, by Racial/Ethnic Subgroups

	Racial/Ethnic Specific Incidence Rates[1]					
Year	White	Black	Hispanic	Asian / Pacific Islander / Native Hawaiian	American Indian / Alaska Native	More Than One Race
1965	0.5	*	*	*	*	*
1966	1.0	3.0	*	*	*	*
1967	1.0	2.4	1.8	*	*	*
1968	1.0	4.2	2.0	*	*	*
1969	1.2	2.5	2.3	*	*	*
1970	1.4	2.6	1.7	3.5	*	10.6
1971	1.2	3.0	3.0	*	9.9	*
1972	1.3	3.0	2.4	0.8	12.3	8.0
1973	1.3	2.9	1.6	*	*	*
1974	1.2	2.6	3.3	0.9	*	7.7
1975	1.2	3.0	2.3	0.9	*	*
1976	1.4	3.2	2.4	*	15.9	16.9
1977	1.3	3.0	2.3	4.1	*	11.5
1978	1.2	2.8	2.7	5.1	*	5.4
1979	1.1	3.1	1.6	*	4.2	6.4
1980	1.0	2.5	1.8	*	*	*
1981	0.8	1.9	1.4	*	*	*
1982	0.8	1.8	1.7	*	9.3	2.8
1983	0.8	1.3	1.7	2.7	6.4	*
1984	0.7	2.0	0.9	*	4.2	2.0
1985	0.6	1.2	1.5	2.8	3.9	3.8
1986	0.5	1.4	1.1	1.1	9.9	4.3
1987	0.5	1.1	1.0	2.9	5.1	3.1
1988	0.6	1.0	1.3	1.1	12.3	4.2
1989	0.5	0.9	1.3	1.2	*	3.2
1990	0.4	1.1	1.1	2.2	3.9	1.3
1991	0.5	1.0	0.8	2.1	6.9	3.6
1992	0.4	1.1	0.9	1.0	5.3	5.4
1993	0.4	1.2	0.9	1.2	9.2	3.9
1994	0.5	1.3	1.1	1.1	7.7	3.9
1995	0.4	1.1	1.0	1.4	4.4	4.7
1996	0.5	1.2	1.2	1.9	5.2	5.2
1997	0.5	1.4	1.1	1.0	6.7	5.0
1998	0.5	1.1	1.1	1.7	6.3	5.2
1999[2]	0.5	1.3	1.2	1.4	14.8	6.8

* Low precision; no estimate reported.

[1] The numerator of each rate is the number of persons who first used marijuana in the year, while the denominator is the person-time exposure measured in thousands of years.

[2] Estimated using 2000 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 6.1S Standard Errors and Suppression Rule for Percentages with *Lifetime and Past Year Use of Heroin, Cocaine, and Psychotherapeutics* among Adults Aged 26 or Older, by Age at First Marijuana Use and Age Groups: 1999 and 2000

Age in Years	Age of Marijuana Initiation in Years	Heroin				Cocaine				Any Psychotherapeutic			
		Lifetime		Past Year		Lifetime		Past Year		Lifetime		Past Year	
		Standard Error	Suppression[1]	Standard Error	Suppression[1]	Standard Error	Suppression[1]	Standard Error	Suppression[1]	Standard Error	Suppression[1]	Standard Error	Suppression[1]
Total	14 or younger	0.81	0	0.23	0	1.28	0	0.63	0	1.24	0	0.84	0
	15-17	0.43	0	0.08	0	0.89	0	0.31	0	0.89	0	0.40	0
	18-20	0.46	0	0.07	0	1.06	0	0.32	0	1.00	0	0.45	0
	21 or older	0.35	0	0.11	0	0.94	0	0.18	0	1.09	0	0.37	0
	Never used marijuana	0.02	0	0.00	0	0.06	0	0.01	0	0.20	0	0.10	0
26-34	14 or younger	0.62	0	0.05	0	1.39	0	0.82	0	1.39	0	0.85	0
	15-17	0.37	0	0.14	0	0.97	0	0.44	0	0.96	0	0.54	0
	18-20	0.29	0	0.07	0	1.17	0	0.41	0	1.16	0	0.60	0
	21 or older	0.41	0	0.00	1	1.53	0	0.43	0	1.54	0	0.79	0
	Never used marijuana	0.03	0	0.01	0	0.12	0	0.03	0	0.32	0	0.17	0
35-49	14 or younger	1.24	0	0.39	0	1.85	0	0.88	0	1.89	0	1.28	0
	15-17	0.56	0	0.10	0	1.26	0	0.40	0	1.23	0	0.55	0
	18-20	0.57	0	0.10	0	1.45	0	0.40	0	1.29	0	0.56	0
	21 or older	0.35	0	0.30	0	1.58	0	0.47	0	1.51	0	0.61	0
	Never used marijuana	0.05	0	0.00	1	0.17	0	0.04	0	0.38	0	0.19	0
50+	17 or younger	5.27	1	0.00	1	6.69	1	2.94	1	6.64	1	2.33	1
	18-20	1.79	0	0.19	0	3.50	0	1.09	0	3.20	0	1.56	0
	21 or older	0.65	0	0.00	1	1.39	0	0.10	0	1.78	0	0.55	0
	Never used marijuana	0.02	0	0.01	0	0.06	0	0.01	0	0.27	0	0.14	0

Note: Nonmedical use of any prescription-type psychotherapeutic indicates using pain relievers, tranquilizers, stimulants, or sedatives at least once. Indicated use does not include over-the-counter drugs.

[1] 1 = estimate should be suppressed due to low precision based either on small sample size or extreme variance; 0 = no suppression.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 6.2S Standard Errors and Suppression Rule for Percentages with *Past Year Heavy Marijuana Use and Heavy Use of Other Illicit Drugs* among Adults Aged 26 or Older, by Age at First Marijuana Use and Age Groups: 1999 and 2000

Age in Years	Age of Marijuana Initiation in Years	Heavy Marijuana Use		Heavy Use of Other Illicit Drugs	
		Standard Error	Suppression[1]	Standard Error	Suppression[1]
Total	14 or younger	0.51	0	0.61	0
	15-17	0.17	0	0.29	0
	18-20	0.12	0	0.28	0
	21 or older	0.21	0	0.21	0
	Never used marijuana	0.00	1	0.06	0
26-34	14 or younger	0.79	0	0.75	0
	15-17	0.28	0	0.40	0
	18-20	0.30	0	0.31	0
	21 or older	0.25	0	0.49	0
	Never used marijuana	0.00	1	0.10	0
35-49	14 or younger	0.64	0	0.86	0
	15-17	0.22	0	0.37	0
	18-20	0.14	0	0.42	0
	21 or older	0.38	0	0.49	0
	Never used marijuana	0.00	1	0.12	0
50+	17 or younger	0.00	1	2.84	0
	18-20	0.12	0	0.52	0
	21 or older	0.30	0	0.20	0
	Never used marijuana	0.00	1	0.09	0

Note: Heavy marijuana use refers to using marijuana on 300 or more days in the past year. Heavy use of other illicit drugs refers to using cocaine, hallucinogens, inhalants, heroin, or any prescription-type psychotherapeutic used nonmedically (i.e., pain relievers, sedatives, tranquilizers, or stimulants) on at least 50 days in the past year.

[1] 1 = estimate should be suppressed because of low precision based either on small sample size or extreme variance; 0 = no suppression.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1999 and 2000.

Table 6.3S Standard Errors and Suppression Rule for Percentages with *Past Year Alcohol and/or Illicit Drug Dependence or Abuse* among Adults Aged 26 or Older, by Age at First Marijuana Use and Age Groups: 2000

Age in Years	Age of Marijuana Initiation in Years	Illicit Drug Dependence or Abuse		Alcohol or Illicit Drug Dependence or Abuse		Alcohol Dependence		Illicit Drug Dependence		Marijuana Dependence		Other Illicit Drug Dependence	
		Standard Error	Suppression[1]	Standard Error	Suppression[1]	Standard Error	Suppression[1]	Standard Error	Suppression[1]	Standard Error	Suppresssion[1]	Standard Error	Suppression[1]
Total	14 or younger	0.84	0	1.28	0	0.78	0	0.73	0	0.58	0	0.55	0
	15-17	0.36	0	0.67	0	0.43	0	0.25	0	0.19	0	0.19	0
	18-20	0.48	0	0.75	0	0.60	0	0.47	0	0.25	0	0.43	0
	21 or older	0.33	0	0.91	0	0.65	0	0.25	0	0.13	0	0.21	0
	Never used marijuana	0.04	0	0.17	0	0.12	0	0.04	0	0.00	1	0.04	0
26-34	14 or younger	1.02	0	1.48	0	0.87	0	0.90	0	0.73	0	0.58	0
	15-17	0.47	0	0.98	0	0.60	0	0.34	0	0.20	0	0.31	0
	18-20	0.42	0	1.23	0	0.77	0	0.29	0	0.19	0	0.25	0
	21 or older	1.07	0	1.99	0	1.17	0	0.47	0	0.47	0	0.07	0
	Never used marijuana	0.11	0	0.31	0	0.18	0	0.10	0	0.00	1	0.10	0
35-49	14 or younger	1.13	0	1.85	0	1.08	0	0.97	0	0.79	0	0.70	0
	15-17	0.38	0	0.86	0	0.59	0	0.35	0	0.27	0	0.25	0
	18-20	0.58	0	1.01	0	0.77	0	0.57	0	0.40	0	0.47	0
	21 or older	0.69	0	1.48	0	1.13	0	0.57	0	0.00	1	0.57	0
	Never used marijuana	0.10	0	0.37	0	0.28	0	0.10	0	0.00	1	0.10	0
50+	17 or younger	5.30	1	5.37	1	3.29	1	3.15	1	0.00	1	3.15	0
	18-20	1.76	1	2.12	0	1.85	0	1.71	1	0.34	0	1.71	0
	21 or older	0.29	0	1.29	0	0.92	0	0.28	0	0.22	0	0.16	0
	Never used marijuana	0.05	0	0.24	0	0.15	0	0.04	0	0.00	1	0.04	0

Note: Illicit drug dependence or abuse indicates dependence on or abuse of at least one of the following drugs: marijuana/hashish, cocaine (including crack), heroin, hallucinogens (including LSD and PCP), inhalants, or any prescription-type psychotherapeutic used nonmedically. Other illicit drug dependence indicates meeting the dependence criteria of at least one of the following drugs: cocaine, hallucinogens, inhalants, heroin, pain relievers, sedatives, tranquilizers, or stimulants. Dependence or abuse is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

[1] 1 = estimate should be suppressed because of low precision based either on small sample size or extreme variance; 0 = no suppression.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 2000.

Appendix C: Selected Questionnaire Pages (1999 and 2000 NHSDAs)

Selected Demographic and Marijuana Questions from the 1999 National Household Survey on Drug Abuse: Specifications for Programming

Core Demographics

LANG INTERVIEWER: SELECT THE LANGUAGE TO BE USED IN THIS INTERVIEW.

1 ENGLISH
2 SPANISH
3 MULTIMEDIA LANGUAGE

NHSDA CAI Instrument Version 3.2

NOTE1 INTERVIEWER: DO NOT READ ALOUD UNLESS RESPONDENT QUESTIONS THE BURDEN ASSOCIATED WITH THIS INTERVIEW.

NOTICE: Public reporting for this collection of information is estimated to average 55 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to SAMHSA Reports Clearance Officer, Paperwork Reduction Project (0930-0110); Room 16-105; Parklawn Building; 5600 Fishers Lane; Rockville, MD 20857. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number for this project is 0930-0110.

REMINDFI INTERVIEWER: IF YOU HAVE NOT FULLY INFORMED THIS RESPONDENT ABOUT WHAT PARTICIPATION IN THIS STUDY ENTAILS, REFER TO THE INFORMATION IN YOUR SHOWCARD BOOKLET. WHEN RESPONDENT IS FULLY INFORMED, CONTINUE WITH THE INTERVIEW.

PRESS [ENTER] TO CONTINUE.

AGE1 What is your date of birth?

ENTER MM-DD-YYYY

DEFINE CALCAGE:
CALCAGE = AGE CALCULATED BY "SUBTRACTING" DATE OF BIRTH FROM DATE OF INTERVIEW.

CONFIRM That would make you [CALCAGE] years old. Is this correct?

1 YES
2 NO
DK/REF

UNDER12 [IF CONFIRM = 1 OR DK/REF AND CALCAGE < 12] Since you are [CALCAGE] years old, we cannot interview you for this study. Thank you for your cooperation. *PROGRAM SHOULD ROUTE TO ENDAUDIO*

FIXAGE [IF CONFIRM = 2] INTERVIEWER: USE THE [F9] KEY TO BACKUP TO THE SCREEN LABELED AGE1 AND CORRECT THE RESPONDENT'S DATE OF BIRTH.

DKREFAGE [IF (CALCAGE IS 12 OR OLDER AND CONFIRM = DK/REF) OR AGE1 = DK/REF] For this study it is very important that I collect your correct age so that you will be asked the right questions. Could you please tell me your correct age?

AGE: _____ [RANGE: 1 - 110]
DK/REF

IF DKREFAGE NOT (BLANK OR DK/REF) THEN CALCAGE = DKREFAGE

UNDER12b [IF DKREFAGE < 12] Since you are [CALCAGE] years old, we cannot interview you for this study. Thank you for your cooperation. *PROGRAM SHOULD ROUTE TO ENDAUDIO*

LASTCHANCE [IF DKREFAGE = DK/REF] Since I am not certain what your age is, I cannot interview you for this study. Thank you for your cooperation. *PROGRAM SHOULD ROUTE TO ENDAUDIO*

DEFINE CURNTAGE:
IF CALCAGE > 11 AND CONFIRM = 1, CURNTAGE = CALCAGE
IF CALCAGE > 11 AND CONFIRM = DK/REF AND DKREFAGE > 11, CURNTAGE = DKREFAGE
IF AGE1 = DK/REF AND DKREFAGE > 11, CURNTAGE = DKREFAGE
ELSE RESPONDENT IS INELIGIBLE; ROUTE TO ENDAUDIO

FIPE1 INTERVIEWER: WERE 2 PERSONS SELECTED FOR AN INTERVIEW AT THIS SDU?

1 YES
2 NO

FIPE2 [IF FIPE1 = 1 AND CURNTAGE = 18 OR OLDER] INTERVIEWER: WAS A 12 - 17 YEAR OLD CHILD SELECTED FOR AN INTERVIEW AT THIS SDU?

1 YES
2 NO

FIPE3 [IF FIPE2 = 1 OR (FIPE1 = 1 AND CURNTAGE = 12 - 17)] INTERVIEWER: IS **THIS** RESPONDENT THE PARENT OR LEGAL GUARDIAN OF THE 17 - 17 YEAR OLD CHILD WHO WAS SELECTED FOR AN INTERVIEW? (VERIFY THIS WITH THE RESPONDENT IF YOU ARE UNSURE.)

1 YES
2 NO

NOTE: IF FIPE3 = 1, SET THE FLAG TO ADMINISTER THE PARENTING EXPERIENCES MODULE DURING ACASI.

QD01 The first questions are for statistical purposes only, to help us analyze the results of the study.

INTERVIEWER: RECORD RESPONDENT'S SEX.

1 MALE
2 FEMALE
DK/REF

QD03 Are you of Hispanic, Latino, or Spanish origin or descent?

1 YES
2 NO
DK/REF

QD04 [IF QD03 = 1] HAND R SHOWCARD 1. Which of these groups best describes you? Just give me the number or numbers from the card.

TO SELECT MORE THAN ONE CATEGORY, PRESS THE SPACE BAR BETWEEN EACH CATEGORY YOU SELECT.

1 MEXICAN / MEXICAN AMERICAN / MEXICANO / CHICANO
2 PUERTO RICAN
3 CENTRAL OR SOUTH AMERICAN
4 CUBAN / CUBAN AMERICAN
5 OTHER (SPECIFY)
DK/REF

QDO4OTHR [IF QD04 = 5] SPECIFY OTHER HISPANIC COUNTRY OR ORIGIN

_____
DK/REF

QD05 HAND R SHOWCARD 2. Which of these groups describes you? Just give me the number or numbers from the card.

TO SELECT MORE THAN ONE CATEGORY, PRESS THE SPACE BAR BETWEEN EACH CATEGORY YOU SELECT.

1 WHITE
2 BLACK / AFRICAN AMERICAN
3 AMERICAN INDIAN OR ALASKA NATIVE
4 NATIVE HAWAIIAN
5 OTHER PACIFIC ISLANDER
6 CHINESE
7 FILIPINO
8 JAPANESE
9 ASIAN INDIAN
10 KOREAN
11 VIETNAMESE
12 OTHER ASIAN
13 OTHER (SPECIFY)
DK/REF

QD05OTHR [IF QD05 = 13] SPECIFY OTHER RACIAL GROUP

_____
DK/REF

DEFINE RACEFILL:
RACEFILL = RESPONSES GIVEN IN QD05 AND TEXT FROM QD05OTH IF APPLICABLE
Responses should appear in regular case and be separated by commas. The last response should be preceded by the word "or." For example, if a respondent selects categories 1, 3, and 6 in QD05, RACEFILL should be: "White, American Indian or Alaskan Native, or Chinese"

QD06 [IF MORE THAN ONE RESPONSE SELECTED IN QD05] Which **one** of these groups, that is [RACEFILL], **best** describes you?
SELECT ONLY **ONE** ANSWER.

1 WHITE
2 BLACK / AFRICAN AMERICAN
3 AMERICAN INDIAN OR ALASKA NATIVE
4 NATIVE HAWAIIAN
5 OTHER PACIFIC ISLANDER
6 CHINESE
7 FILIPINO
8 JAPANESE
9 ASIAN INDIAN
10 KOREAN
11 VIETNAMESE
12 OTHER ASIAN
13 IF QD05 = 13, FILL TEXT FROM QD05OTHR
IF QD05 NE 13 FILL WITH "OTHER (SPECIFY)"
DK/REF

[NOTE: ONLY CODES FOR RESPONSE CATEGORIES ENTERED IN QD05 WILL BE ACTIVE FOR THIS QUESTION. IF THE INTERVIEW ENTERS AN INACTIVE RESPONSE CATEGORY, THE RANGE ERROR BOX WITH APPEAR.]

QD07 [IF CURNTAGE = 15 OR OLDER] Which of the following best describes your current marital status? Are you married, widowed, divorced or separated, or have you never married?

1 MARRIED
2 WIDOWED
3 DIVORCED OR SEPARATED
4 NEVER MARRIED
DK/REF

INTERVIEWER NOTE:
If the respondent is divorced but currently remarried, code as married. By "divorce" we mean a legal cancellation or annulment of a marriage. By "separated" we mean legally or informally separating due to marital discord.

QD08 [IF QDO7 = 1 OR 2 OR 3] How many times have you been married?

NUMBER OF TIMES: _____ [RANGE: 1 - 9]
DK/REF

QD09 [IF CURNTAGE = 17 OR OLDER] Have you ever been in the United States' armed forces?

1 YES
2 NO
DK/REF

QD10 [IF QD09 = 1 OR DK/REF] Are you **currently** on active duty in the armed forces, in a reserves component, or now separated or retired from either reserves or active duty?

1 ON ACTIVE DUTY IN THE ARMED FORCES
2 IN A RESERVES COMPONENT
3 NOW SEPARATED OR RETIRED FROM EITHER RESERVES OR ACTIVE DUTY
DK/REF

MILTERM1 [IF QD10 = 1] I need to verify what I just entered into the computer. You said you are **currently** on active duty in the armed forces. Is that correct?

1 YES
2 NO
DK/REF

MILCONT [IF MILTERM1 = 2 OR DK/REF] INTERVIEWER: USE THE [F9] KEY TO BACKUP TO THE SCREEN LABELED QD10 AND CORRECT THE RESPONDENT'S CURRENT MILITARY STATUS.

MILTERM2 [IF MILTERM1 = 1] People who are currently on active duty in the armed forces are not eligible to be interviewed in this study. I appreciate you taking the time to speak with me. Thank you.

PRESS [ENTER] TO CONTINUE.
[ROUTE TO ENDAUDIO]

QD11 HAND R SHOWCARD 3. What is the highest grade or year of school you have **completed**?

Please tell me the number from the card.

INCLUDE JUNIOR OR COMMUNITY COLLEGE ATTENDANCE; DO NOT INCLUDE TECHNICAL SCHOOLS (BEAUTICIAN, MECHANIC, ETC.).

0 NEVER ATTENDED SCHOOL
1 1ST GRADE COMPLETED
2 2ND GRADE COMPLETED
3 3RD GRADE COMPLETED
4 4TH GRADE COMPLETED
5 5TH GRADE COMPLETED
6 6TH GRADE COMPLETED
7 7TH GRADE COMPLETED
8 8TH GRADE COMPLETED
9 9TH GRADE COMPLETED
10 10TH GRADE COMPLETED
11 11TH GRADE COMPLETED
12 12TH GRADE COMPLETED
13 COLLEGE OR UNIVERSITY / 1ST YEAR COMPLETED
14 COLLEGE OR UNIVERSITY / 2ND YEAR COMPLETED
15 COLLEGE OR UNIVERSITY / 3RD YEAR COMPLETED
16 COLLEGE OR UNIVERSITY / 4TH YEAR COMPLETED
17 COLLEGE OR UNIVERSITY / 5TH OR HIGHER YEAR COMPLETED
DK/REF

QD12 This question is about your overall health. Would you say your health in general is excellent, very good, good, fair, or poor?

1 EXCELLENT
2 VERY GOOD
3 GOOD
4 FAIR
5 POOR
DK/REF

CALENDAR

CALND1 CALENDAR

Throughout the rest of this questionnaire, I will be asking you to answer a number of questions about three specific time periods, namely the past 30 days, the past 12 months, and your lifetime. To help you remember the first two time periods, let's mark this calendar with the beginning dates for each one of them.

SHOW CALENDAR TO RESPONDENT.

Now let's think about the past 30 days. According to the calendar, **DATEFILL** was 30 days ago, so I will write **DATEFILL** here on the calendar. I'll call that your 30-day reference date.

WRITE 30-DAY REFERENCE DATE ON CALENDAR AND CIRCLE DAY; UNDERLINE ENTIRE 30-DAY PERIOD.

A number of questions will ask about the past 12 months, that is since this date last year. Let's look at the calendar and find that date — **DATEFILL**. I'll call that your 12-month reference date.

WRITE 12 MONTH REFERENCE DATE ON CALENDAR AND CIRCLE DAY ON CALENDAR.

Please use this calendar as we go through the interview to help you remember when different things happened. I will remind you to think about your 30-day reference date and your 12-month reference date when I ask you questions.

PRESS [ENTER] TO CONTINUE.

Marijuana

MRJINTRO The next questions are about marijuana and hashish. Marijuana is also called pot or grass. Marijuana is usually smoked, either in cigarettes, called joints, or in a pipe. It is sometimes cooked in food. Hashish is a form of marijuana that is also called "hash." It is usually smoked in a pipe. Another form of hashish is hash oil.

MJ01. Have you **ever**, even once, used marijuana or hashish?

1 Yes
2 No → COCINTRO
DK/REF → COCINTRO

MJ02. How old were you the **first time** you used marijuana or hashish?

AGE: _____ [RANGE 1 - 90]
DK/REF → MJLAST3

DEFINE AGE1STMJ:
AGE1STMJ = MJ02

IF CURNTAGE < AGE1STMJ:

MJCC1 The computer recorded that you were [AGE1STMJ] when you first used marijuana or hashish. Is this correct?

1 Yes
2 No → MJCC4
DK/REF → MJLAST3

MJCC2. The answers for the last question and an earlier question disagree. Which answer is correct?

*1 I am currently **[CURNTAGE]** years old → MJCC4*
*2 I was **[AGE1STMJ]** years old the first time I used marijuana or hashish*
3 Neither answer is correct
DK/REF → MJLAST3

*MJCC3. [IF MJCC2=2 OR MJCC2=3] Please answer this question again. What is your **current** age?*

AGE: _____
DK/REF → MJLAST3

MJCC3a [IF MJCC3 < 12] Since you have indicated that you are [MJCC3] years old, we cannot interview you for this study. Please tell your interviewer that you have finished the survey. Thank you for your cooperation. PROGRAM SHOULD ROUTE TO ENDAUDIO.

*MJCC4. [IF MJCC2=1 OR MJCC2=3 OR MJCC1=2] Please answer this question again. Think about the first time you used marijuana or hashish. How old were you the **first time** you used marijuana or hashish?*

AGE: _____ [RANGE 1 - 90]
DK/REF → MJLAST3

IF MJCC4 NOT(BLANK OR DK/REF) THEN AGE1STMJ = MJCC4

IF MJCC3 NOT(BLANK OR DK/REF) THEN CURNTAGE = MJCC3

IF AGE1STMJ = CURNTAGE OR AGE1STMJ <10:

MJCC5. The computer recorded that you were [AGE1STMJ] years old the first time you used marijuana or hashish. Is this correct?

1 Yes → MJ03a
2 No
DK/REF → MJLAST3

*MJCC6. [IF MJCC5=2] Please answer this question again. Think about the first time you used marijuana or hashish. How old were you the **first time** you used marijuana or hashish?*

AGE: _____ [RANGE 1 - 90]
DK/REF → MJLAST3

IF MJCC6 NOT(BLANK OR DK/REF) THEN AGE1STMJ = MJCC6

MJ03a [IF AGE1STMJ = CURNTAGE AND DATE OF INTERVIEW < DOB OR IF AGE1STMJ = CURNTAGE - 1 AND DATE OF INTERVIEW ≥ DOB] Did you first use marijuana or hashish in [CURRENT YEAR - 1] or [CURRENT YEAR]?

1 CURRENT YEAR - 1 (MJ03d)
2 CURRENT YEAR (MJ03d)
DK/REF (MJLAST3)

MJ03b [IF AGE1STMJ = CURNTAGE - 1 AND DATE OF INTERVIEW < DOB] Did you first use marijuana or hashish in [CURRENT YEAR - 2] OR [CURRENT YEAR - 1]?

1 CURRENT YEAR - 2 (MJ03d)
2 CURRENT YEAR - 1 (MJ03d)
DK/REF (MJLAST3)

MJ03c IF AGE1STMJ = CURNTAGE AND DATE OF INTERVIEW ≥ DOB] In what **month** in [CURRENT YEAR] did you first use marijuana or hashish?

1 January
2 February
3 March
4 April
5 May
6 June
7 July
8 August
9 September
10 October
11 November
12 December
DK/REF (MJLAST3)

SKIP TO (MJLAST3)

[Note: Insert range check if MJ03c > current month].

MJ03d In what **month** in [YEAR FROM MJ03a or MJ03b] did you first use marijuana or hashish?

1 January
2 February
3 March
4 April
5 May
6 June
7 July
8 August
9 September
10 October
11 November
12 December
DK/REF (MJLAST3)

MJLAST3. How long has it been since you **last** used marijuana or hashish?

1 Within the past 30 days -- that is, since **DATEFILL**
2 More than 30 days ago but within the past 12 months
3 More than 12 months ago → COCINTRO
DK/REF → COCINTRO

MJFRAME3. Now think about the past 12 months, from **[FILL DATE]** through today. We want to know how many days you've used marijuana or hashish during the past 12 months.

What would be the easiest way for you to tell us how many days you've used it?

1 Average number of **days per week** during the past 12 months → MJWKAVE
2 Average number of **days per month** during the past 12 months → MJMONAVE
3 Total number of days during the past 12 months
DK/REF → MJYRAVE

MJYRAVE On how many days in the past 12 months did you use marijuana or hashish?

TOTAL # OF DAYS:_____ [RANGE 1 - 366] → MJ06
DK/REF → MJMONAVE

MJMONAVE On average, how many days did you use marijuana or hashish **each month** during the past 12 months?

AVERAGE # OF DAYS PER MONTH: _____ [RANGE 1 - 31] → MJ06
DK/REF → MJWKAVE

MJWKAVE. On average, how many days did you use marijuana or hashish **each week** during the past 12 months?

AVERAGE # OF DAYS PER WEEK:_____ [RANGE 1 - 7]
DK/REF → MJ06

MJ06 [IF MJLAST3=1] Think specifically about the past 30 days, from **[FILL DATE]** up to and including today. During the past 30 days, on how many days did you use marijuana or hashish?

NUMBER OF DAYS: _____ [RANGE 0 - 30]
DK/REF → COCINTRO

DEFINE TOTMJ:

IF MJYRAVE NOT(BLANK OR DK/REF) THEN TOTMJ = MJYRAVE
ELSE IF MJMONAVE NOT(BLANK OR DK/REF) THEN TOTMJ = MJMONAVE*12
ELSE IF MJWKAVE NOT (BLANK OR DK/REF) THEN TOTMJ = MJWKAVE*52
ELSE TOTMJ = DK/REF
IF TOTMJ = DK/REF, SKIP TO COCINTRO

IF TOTMJ NOT DK/REF AND MJ06 > TOTMJ:

MJCC7 For the last question, the computer recorded that you used marijuana or hashish on [MJ06 FILL] of the past 30 days. Is this correct?

1 Yes
2 No → MJCC13
DK/REF → COCINTRO

DEFINE FILLMJ:

IF MJYRAVE NOT (BLANK OR DK/REF), THEN FILLMJ = "[MJYRAVE] days"
ELSE IF MJMONAVE NOT (BLANK OR DK/REF), THEN FILLMJ = "[MJMONAVE] days per month"
ELSE IF MJWKAVE NOT (BLANK OR DK/REF), THEN FILLMJ = "[MJWKAVE] days per week"

DEFINE FILLMJA:

IF FILLMJ = "[MJMONAVE] days per month" OR "[MJWKAVE] days per week" FILLMJA = "for a total of TOTMJ days"
ELSE FILLMJA = BLANK

MJCC8 The answers for the last question and an earlier question disagree. Which answer is correct?

*1 I used marijuana or hashish on **[FILLMJ]** in the past 12 months **[FILLMJA]***
*2 I used marijuana or hashish on **[MJ06]** days in the past 30 days*
3 Neither answer is correct
DK/REF → COCINTRO

MJCC9 [IF MJCC8 = 2 OR MJCC8 = 3] Please answer this question again. Think about the past 12 months, from [FILL DATE] through today. We want to know how many days you've used marijuana or hashish during the past 12 months.

What would be the easiest way for you to tell us how many days you've used it?

*1 Average number of **days per week** during the past 12 months → SKIP TO MJCC12*
*2 Average number of **days per month** during the past 12 months → SKIP TO MJCC11*
3 Total number of days during the past 12 months
DK/REF → COCINTRO

MJCC10 On how many days in the past 12 months did you use marijuana or hashish?

TOTAL # OF DAYS:_____ [RANGE 1 - 366] → MJCC12a
DK/REF → MJCC12a

*MJCC11 On average, how many days did you use marijuana or hashish **each month** during the past 12 months?*

 # OF DAYS/MONTH: _____ [RANGE 1 - 31] → MJCC12a
DK/REF → MJCC12a

*MJCC12 On average, how many days did you use marijuana or hashish **each week** during the past 12 months?*

 # OF DAYS PER WEEK:_____ [RANGE 1 - 7]
DK/REF → MjcC12a

MJCC12a:

IF MJCC10 NOT(BLANK OR DK/REF) THEN TOTMJ = MJCC10
*ELSE IF MJCC11 NOT(BLANK OR DK/REF) THEN TOTMJ = MJCC11*12*
*ELSE IF MJCC12 NOT(BLANK OR DK/REF) THEN TOTMJ = MJCC12*52*
ELSE TOTMJ = DK/REF

IF MJCC8 = 2 SKIP TO COCINTRO

*MJCC13 [IF MJCC7=2 OR MJCC8 = 1 OR MJCC8 = 3] Please answer this question again. Think specifically about the past 30 days — that is, since **[FILL DATE]**, up to and including today. During the past 30 days, on how many days did you use marijuana or hashish?*

 # OF DAYS: _____ [RANGE 0 - 30]
0 → COCINTRO
DK/REF → COCINTRO

IF MJ06 = 0:

*MJCC14 The computer recorded that you used marijuana or hashish on **0 days** during the past 30 days. Is this correct?*

1 Yes → COCINTRO
2 No → MJCC16
DK/REF → COCINTRO

*MJCC16 During the past 30 days, that is since **[DATE FILL]**, on how many days did you use marijuana or hashish?*

 # OF DAYS: _____ [RANGE 0 - 30]
0 → COCINTRO
DK/REF → COCINTRO

2000 National Household Survey on Drug Abuse
Specifications for Programming
Items on Marijuana Abuse and Dependence

DRMJ [IF MAR12MON = 1 - 3] Think about your use of **marijuana or hashish** during the past 12 months as you answer these next questions.

Press [ENTER] to continue.

DRMJ01 [IF MAR12MON= 1 - 3] During the past 12 months, was there a month or more when you spent a lot of your time getting or using **marijuana or hashish**?

1 Yes
2 No
DK/REF

DRMJ02 [IF DRMJ01 = 2 OR DK/REF] During the past 12 months, was there a month or more when you spent a lot of your time getting over the effects of the **marijuana or hashish** you used?

1 Yes
2 No
DK/REF

DRMJ04 [IF MAR12MON= 1 - 3] During the past 12 months, did you try to set limits on how often or how much **marijuana or hashish** you would use?

1 Yes
2 No
DK/REF

DRMJ05 [IF DRMJ04 = 1] Were you able to keep to the limits you set, or did you often use **marijuana or hashish** more than you intended to?

1 Usually kept to the limits set
2 Often used more than intended
DK/REF

DRMJ06 [IF MAR12MON = 1 - 3] During the past 12 months, did you need to use more **marijuana or hashish** than you used to in order to get the effect you wanted?

1 Yes
2 No
DK/REF

DRMJ07 [IF DRMJ06=2 OR DK/REF] During the past 12 months, did you notice that using the same amount of **marijuana or hashish** had less effect on you than it used to?

1 Yes
2 No
DK/REF

DRMJ08 [IF MAR12MON= 1 - 3] During the past 12 months, did you **want to** or **try to** cut down **or** stop using **marijuana or hashish**?

1 Yes
2 No
DK/REF

DRMJ09 [IF DRMJ08 = 1] During the past 12 months, were you **able to** cut down or stop using **marijuana or hashish every time** you wanted to or tried to?

1 Yes
2 No
DK/REF

DRMJ13 [IF MAR12MON= 1 - 3] During the past 12 months, did you have any problems with your emotions, nerves, or mental health that were probably caused or made worse by your use of **marijuana or hashish**?

1 Yes
2 No
DK/REF

DRMJ14 [IF DRMJ13 = 1] Did you continue to use **marijuana or hashish** even though you thought it was causing you to have problems with your emotions, nerves, or mental health?

1 Yes
2 No
DK/REF

DRMJ15 [IF DRMJ13 = 2 OR DK/REF OR DRMJ14 = 2 OR DK/REF] During the past 12 months, did you have any physical health problems that were probably caused or made worse by your use of **marijuana or hashish**?

1 Yes
2 No
DK/REF

DRMJ16 [IF DRMJ15 = 1] Did you continue to use **marijuana or hashish** even though you thought it was causing you to have physical problems?

1 Yes
2 No
DK/REF

DRMJ17 [IF MAR12MON= 1 - 3] This question is about important activities such as working, going to school, taking care of children, doing fun things such as hobbies and sports, and spending time with friends and family.

During the past 12 months, did using **marijuana or hashish** cause you to give up or spend less time doing these types of important activities?

1 Yes
2 No
DK/REF

DRMJ18 [IF MAR12MON= 1 - 3] Sometimes people who use **marijuana or hashish** have serious problems at home, work or school — such as:

- neglecting their children
- missing work or school
- doing a poor job at work or school
- losing a job or dropping out of school

During the past 12 months, did using **marijuana or hashish** cause you to have serious problems like this either at home, work, or school?

1 Yes
2 No
DK/REF

DRMJ19 [IF MAR12MON= 1 - 3] During the past 12 months, did you regularly use **marijuana or hashish** and then do something where using **marijuana or hashish** might have put you in physical danger?

1 Yes
2 No
DK/REF

DRMJ20 [IF MAR12MON= 1 - 3] During the past 12 months, did using **marijuana or hashish** cause you to do things that repeatedly got you in trouble with the law?

1 Yes
2 No
DK/REF

DRMJ21 [IF MAR12MON= 1 - 3] During the past 12 months, did you have any problems with family or friends that were probably caused by your use of **marijuana or hashish**?

1 Yes
2 No
DK/REF

DRMJ22 [IF DRMJ21 = 1] Did you continue to use **marijuana or hashish** even though you thought it caused problems with family or friends?

1 Yes
2 No
DK/REF