Prevalence of Marijuana Use Disorders in the United States
1991-1992 and 2001-2002

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M ARIJUANA HAS BEEN THE most common illicit substance used in the United States for several decades.[1,2] Understanding changes in the use of marijuana over time is important for a number of reasons. Marijuana use is associated with impaired educational attainment,[3] reduced workplace productivity,[4] and increased risk of use of other substances.[5] Marijuana use plays a major role in motor vehicle crashes[6] and has adverse effects on the respiratory and cardiovascular systems.[7-10]

Marijuana use also is a necessary, although not a sufficient, condition for developing marijuana abuse and dependence as defined in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*), which are clear indicators of problems in and of themselves.[11] *Marijuana abuse* is defined in the *DSM-IV* as repeated instances of use under hazardous conditions; repeated, clinically meaningful impairment in social/occupational/educational functioning, or legal problems related to marijuana use. *Marijuana dependence* is defined in the *DSM-IV* as increased tolerance, compulsive use, impaired control, and continued use despite physical and psy-

Context Among illicit substance use disorders, marijuana use disorders are the most prevalent in the population. Yet, information about the prevalence of current *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*) marijuana use disorders and how prevalence has changed is lacking.

Objective To examine changes in the prevalence of marijuana use, abuse, and dependence in the United States between 1991-1992 and 2001-2002.

Design, Setting, and Participants Face-to-face interviews were conducted in 2 large national surveys conducted 10 years apart: the 1991-1992 National Longitudinal Alcohol Epidemiologic Survey ([NLAES] n=42862) and the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions ([NESARC] n=43093).

Main Outcome Measures Rates of past year marijuana use, abuse, and dependence.

Results Among the adult US population, the prevalence of marijuana use remained stable at about 4.0% over the past decade. In contrast, the prevalence of *DSM-IV* marijuana abuse or dependence significantly (*P*=.01) increased between 1991-1992 (1.2%) and 2001-2002 (1.5%), with the greatest increases observed among young black men and women (*P*<.001) and young Hispanic men (*P*=.006). Further, marijuana use disorders among marijuana users significantly increased (*P*=.002) in the absence of increased frequency and quantity of marijuana use, suggesting that the concomitant increase in potency of delta-9-tetrahydrocannabinol (Δ^9-THC) may have contributed to the rising rates.

Conclusions Despite the stability in the overall prevalence of marijuana use, more adults in the United States had a marijuana use disorder in 2001-2002 than in 1991-1992. Increases in the prevalence of marijuana use disorders were most notable among young black men and women and young Hispanic men. Although rates of marijuana abuse and dependence did not increase among young white men and women, their rates have remained high. The results of this study underscore the need to develop and implement new prevention and intervention programs targeted at youth, particularly minority youth.

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chological problems caused or exacerbated by use. Beyond the seriousness of these disorders in their own right, marijuana abuse and dependence increase the risk of other serious consequences, most significantly, major mood, anxiety, and personality psychopathology.[12-14]

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Despite the seriousness of *DSM-IV* marijuana abuse and dependence, no long-term trend information is available about whether the prevalence of these disorders is increasing, decreasing, or remaining stable in the United States. Such information was recently added to the National Household Survey on Drug Abuse, but this has only been since 2000.[1] For public health efforts, accurate information on changes in potentially vulnerable groups may highlight the need for focused planning on both a national and local level and form the basis of rational, scientifically based prevention and intervention programs. The current study was designed, in part, to address this gap.

To assess changes in marijuana use, abuse, and dependence in the US population, we compared data from the 1991-1992 National Longitudinal Alcohol Epidemiologic Survey ([NLAES] n=42862) and the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions ([NESARC] n=43093).[15,16] Both surveys were conducted by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Because changes in the prevalence of marijuana use may not reflect changes in the prevalence of marijuana use disorders, rates are presented separately for marijuana use and abuse or dependence in the total population. To assess the risk of marijuana abuse or dependence independent of these baseline rates, conditional rates of past-year marijuana abuse or dependence among users also are presented.

METHODS
Samples
Both the 1991-1992 NLAES and the 2001-2002 NESARC are nationally representative samples of the adult population of the United States and have been described in detail elsewhere.[15,16] The target population for each survey was the civilian noninstitutionalized population, 18 years and older, residing in the United States. The fieldwork for both studies was conducted by the US Census Bureau, under the direction of NIAAA staff. For the NESARC, the overall survey response rate was 81% and for the NLAES, 90%.

The NESARC's sample consisted of 655 primary sampling units (PSUs); however, in the final NESARC datafile, only 435 PSUs are shown because smaller PSUs were collapsed to minimize disclosure risks. The NLAES sample consisted of 198 PSUs. Oversampling of blacks and Hispanics in the NESARC and of blacks in the NLAES, completed at the design phase, increased the proportion of each of these groups in the total samples. In the final selection phase, 1 individual was randomly selected from a list of persons living in the household. At this stage of the survey, young adults (ages 18-24 years in the NESARC and ages 18-29 years in the NLAES) were oversampled at a rate of 2.25:1.00.

The complex sampling design necessitated weighting the data from both surveys to reflect the probability of the following: selection of a PSU within stratum, selection of housing units within the sample PSU, oversampling of young adults, and nonresponse at the household and person levels. The NESARC data were also adjusted to reduce the variance arising from selecting 2 PSUs to represent an entire stratum. The weighted data for both groups were then adjusted to be representative of the US population for a variety of socioeconomic variables including region, age, sex, and race/ethnicity using the Decennial Census of Population and Housing (1990 for the NLAES and 2000 for the NESARC). All potential NESARC respondents were informed in writing about the nature of the survey, the statistical uses of the survey data, the voluntary aspect of their participation, and the federal laws that rigorously provided for the strict confidentiality of the identifiable survey information. Those respondents consenting to participate after receiving this information were interviewed. The research protocol, including informed consent procedures, received full ethical review and approval from the US Census Bureau and US Office of Management and Budget.

Interviewers and Training
All interviews for both the NLAES and NESARC were conducted by professional interviewers from the US Census Bureau. On average, the 1000 NLAES and 1800 NESARC interviewers had 5 years of survey administration experience. All completed a 5-day self-study course followed by a 5-day in-person training session at one of the US Census Bureau's 12 regional offices.

Quality of interviewing was ensured by regional supervisors who recontacted a random 10% of all respondents by telephone and reasked a set of 30 questions from different parts of the interview to verify answers.

Diagnostic Assessment
All diagnoses in the NLAES and NESARC were made according to the criteria of the *DSM-IV* using the NIAAA *Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version* (*AUDADIS-IV*), a fully structured diagnostic interview designed for use by professional interviewers who are not clinicians.[17] Although the *DSM-IV* classification was not published until 1994, proposed diagnostic criteria for *DSM-IV* marijuana abuse and dependence were published by the American Psychiatric Association prior to the fieldwork for the NLAES and were incorporated into the *AUDADIS-IV* in their entirety.[18] What was not known at the time was which diagnostic criteria would be assigned to the abuse or dependence categories. However, since all proposed *DSM-IV* diagnostic criteria had been incorporated into the *AUDADIS-IV*, computer algorithms were able to produce diagnoses of abuse and dependence that accurately represented the placement of the criteria within abuse and dependence categories of the final *DSM-IV* revision.

The NLAES and NESARC included the same core questions to assess marijuana abuse and dependence. One minor difference is that, in the NLAES, duration associated with a particular criterion was assessed separately from the criterion itself. For example, if a respondent endorsed a particular crite-

rion symptom for marijuana, the next question asked whether that criterion had happened more than once with marijuana. In the NESARC, duration associated with marijuana abuse and dependence criteria was embedded directly into the symptom questions. Another difference is that, in the NLAES, the *AUDADIS-IV* was administered using a paper-and-pencil instrument, while in the NESARC, the *AUDADIS-IV* was computerized and responses were entered directly into laptop computers. However, in both studies, all questions were asked by highly trained interviewers. Thus, the computerization did not change the way respondents were exposed to the questions.

In the *AUDADIS-IV*, symptom questions associated with *DSM-IV* abuse and dependence were asked separately for marijuana and each other substance. Consistent with *DSM-IV,* past-year diagnoses of marijuana abuse required a respondent to report at least 1 of the 4 criteria of marijuana abuse within the 12 months prior to the interview.[11] These included recurrent marijuana use resulting in failure to fulfill major role obligations, recurrent marijuana use in physically hazardous situations, recurrent marijuana-related legal problems, and continued marijuana use despite having persistent or recurrent social or interpersonal problems caused by or exacerbated by use. The diagnosis of marijuana dependence required that at least 3 criteria from a list of 6 during the preceding 12 months be met: (1) need for increased amounts of marijuana to achieve the desired effect or markedly diminished effect with continued use of the same amount of marijuana; (2) using marijuana in larger amounts or over a longer period than intended; (3) persistent desire or unsuccessful efforts to cut down or reduce marijuana use; (4) a great deal of time spent obtaining, using, or recovering from the effects of marijuana; (5) giving up important social, occupational, or recreational activities in favor of using marijuana; and (6) continued marijuana use despite persistent

or recurrent physical or psychological problems caused or exacerbated by use.

Consistent with the *DSM-IV,* diagnoses of marijuana abuse and dependence were mutually exclusive. A marijuana dependence diagnosis preempts a diagnosis of marijuana abuse. Thus, respondents classified with marijuana abuse had marijuana abuse only, and respondents classified as dependent included those who were dependent with and without abuse. Because the *DSM-IV* does not include specific criteria for marijuana withdrawal, no criterion for marijuana withdrawal is included in the diagnosis and the typical list of 7 *DSM-IV* dependence criteria is reduced to 6 criteria for marijuana. While a number of studies have indicated that a withdrawal syndrome can be defined and assessed for marijuana,[19,20] this point has not yet been fully resolved. Our method of diagnosing marijuana dependence is therefore consistent with the *DSM-IV* in its current standard form.

The reliability and validity of the *AUDADIS-IV* are well documented in numerous national and international psychometric studies conducted in clinical, and particularly in general, population studies, the population for which it was designed.[21-32] The psychometric properties of the *AUDADIS-IV* alcohol and drug modules also were shown to be good in numerous countries in the World Health Organization/National Institutes of Health Joint Project on Reliability and Validity.[22,23,28-32]

Data Analysis

To account for the complex sample designs of both the NLAES and NESARC, SUDAAN software was used to estimate standard errors of all prevalence estimates in both studies across sex, age, and race-ethnic subgroups of the population.[33] Prevalence estimates and standrad errors, derived separately for the NLAES and NESARC, were compared using *t* tests designed for independent samples. To take into account the sampling design, all standard errors of the prevalence estimates were calculated using SUDAAN, a software program that

uses Taylor series linearization to make adjustments for weighted data. In all cases, results are not displayed when standard errors are greater than or equal to 50% of the weighted prevalence because these are too imprecise to be reliable.

RESULTS
Past-Year Marijuana Use

Past-year marijuana use was reported by 4.0% of the respondents in the 1991-1992 NLAES and 4.1% of the respondents in the 2001-2002 NESARC (**TABLE 1**). Marijuana use did not significantly increase in the full sample or among males or females, or among whites, blacks, or Hispanics overall. However, some subgroups did show significant increases and no subgroups showed significant decreases. Increased rates of marijuana use were observed among 18- to 29-year-old black and Hispanic women. The prevalence of marijuana use also increased significantly over the last decade among 45- to 64-year-old men and women overall and white men and black women in this age group.

Past-Year Marijuana Abuse and Dependence

In both the NLAES and NESARC, past-year marijuana abuse was more common than dependence. For the total population in 1991-1992 (the NLAES), past-year prevalence of marijuana abuse was 0.9% and dependence was 0.3%. Similarly, in 2001-2002 (the NESARC), past-year marijuana abuse was reported by 1.1% and dependence by 0.4%. This pattern of abuse, representing approximately 75% to 80% of the total marijuana use disorder cases, was consistent across age, sex, and race-ethnic subgroups, and all further results are described for combined abuse and dependence rates (**TABLE 2**). For instance, in the total population, past-year prevalence of marijuana abuse or dependence increased from 1.2% in 1991-1992 to 1.5% in 2001-2002 (*P*=.01). This can be translated into an increase from 2.2 million to 3.0 million, respectively, in terms of population estimates.

While most subgroups showed increases over the decade, these reached statistical significance for females, blacks, Hispanics, and those ages 18 to 29 years and 45 to 64 years overall, for 18- to 29-year-old women, for 45- to 64-year-old men, for black men and women overall, for 18- to 29-year-old black men and women, and for Hispanic men and Hispanics ages 18 to 29 years overall as well as 18- to 29-year-old Hispanic men.

Past-Year Marijuana Abuse and Dependence Among Past-Year Marijuana Users

Among past-year marijuana users, overall rates of past-year abuse or dependence increased from 30.2% in 1991-1992 to 35.6% in 2001-2002 (*P*<.01) (**TABLE 3**). Almost without exception,

the conditional rates of abuse or dependence were larger in the more recent survey, although not all increases were significant. However, significant increases in the prevalence of marijuana abuse or dependence among users were found for both males (33.9% to 38.9%) and females (22.7% to 29.2%), and most notably among 18- to 29-year-old black men (21.8% to 43.0%), 18- to 29-year-old black women (19.1% to 47.2%), and 18- to 29-year-old Hispanic men (29.8% to 53.7%).

COMMENT

The results of this study show that marijuana use in the total adult population has remained substantially unchanged over the decade from 1991-1992 to 2001-2002. However, significant increases in use among some

subgroups are important to note, for instance, young black and Hispanic women. In contrast to the results for use among the overall population, rates of abuse or dependence increased from 1991-1992 to 2001-2002. What is perhaps even more significant is that marijuana abuse or dependence increased among marijuana users by 18% from 30.2% in 1991-1992 to 35.6% in 2001-2002.

These results, taken together, suggest that factors affecting addiction potential are operating to produce the increase in prevalence in marijuana abuse or dependence. A number of factors could have led to increases in addiction potential, operating either independently or conjointly. The first is increased marijuana potency. The potency of delta-9-tetrahydrocannabinol

Table 1. Past-Year Prevalence of Marijuana Use, NLAES 1991-1992 and NESARC 2001-2002*

Sociodemographic Characteristic	Men		Women		Total	
	NLAES, % (SE)	NESARC, % (SE)	NLAES, % (SE)	NESARC, % (SE)	NLAES, % (SE)	NESARC, % (SE)
Total	5.5 (0.22)	5.6 (0.24)	2.5 (0.12)	2.6 (0.14)	4.0 (0.13)	4.1 (0.15)
Age group, y						
18-29	12.1 (0.68)	13.3 (0.72)	6.4 (0.37)	7.8 (0.50)†	9.3 (0.41)	10.5 (0.47)†
30-44	6.1 (0.35)	5.8 (0.42)	2.8 (0.20)	2.6 (0.22)	4.4 (0.20)	4.1 (0.24)
45-64	0.8 (0.15)	2.5 (0.26)‡	0.3 (0.07)	0.7 (0.10)‡	0.6 (0.08)	1.6 (0.14)‡
≥65	. . .	0.1 (0.04)	0.0 (0.00)	0.0 (0.00)	. . .	0.0 (0.00)
White						
Total	5.7 (0.25)	5.7 (0.29)	2.7 (0.14)	2.6 (0.17)	4.2 (0.15)	4.1 (0.17)
Age group, y						
18-29	13.9 (0.81)	15.1 (0.98)	7.7 (0.50)	8.6 (0.66)	10.8 (0.51)	11.8 (0.61)
30-44	6.5 (0.39)	6.2 (0.53)	3.1 (0.24)	2.9 (0.30)	4.8 (0.23)	4.5 (0.31)
45-64	0.8 (0.17)	2.5 (0.31)‡	0.3 (0.09)	0.6 (0.12)	0.5 (0.09)	1.6 (0.17)‡
≥65	. . .	. . .	0.0 (0.00)	0.0 (0.00)	. . .	. . .
Black						
Total	6.1 (0.66)	6.9 (0.73)	2.1 (0.26)	3.0 (0.32)†	3.9 (0.34)	4.7 (0.35)
Age group, y						
18-29	10.4 (1.50)	14.2 (1.94)	3.4 (0.59)	6.8 (0.97)‡	6.6 (0.79)	10.1 (1.03)‡
30-44	6.8 (1.20)	6.4 (1.01)	3.0 (0.51)	3.0 (0.52)	4.7 (0.62)	4.5 (0.51)
45-64	1.8 (0.66)	3.0 (0.76)	0.3 (0.14)	1.1 (0.32)†	1.0 (0.31)	1.9 (0.37)†
≥65	0.0 (0.00)	. . .	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.2 (0.11)
Hispanic						
Total	3.9 (0.61)	4.6 (0.51)	1.3 (0.25)	2.1 (0.34)	2.6 (0.34)	3.3 (0.31)
Age group, y						
18-29	6.3 (1.22)	8.7 (1.03)	2.7 (0.63)	5.1 (0.90)†	4.5 (0.70)	7.1 (0.71)†
30-44	4.3 (1.13)	3.3 (0.63)	0.8 (0.30)	0.9 (0.30)	2.6 (0.63)	2.1 (0.35)
45-64	. . .	1.0 (0.32)	. . .	. . .	. . .	0.7 (0.19)
≥65	0.0 (0.0)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Total§	n = 982	n = 996	n = 640	n = 607	n = 1622	n = 1603

Abbreviations: NESARC, National Epidemiologic Survey on Alcohol and Related Conditions; NLAES, National Longitudinal Alcohol Epidemiologic Survey.
*Ellipses indicate that the estimate does not meet precision standard.
†*P*<.05, 1991-1992 compared with 2001-2002.
‡*P*<.01, 1991-1992 compared with 2001-2002.
§Unweighted number of past-year marijuana users in each group.

(Δ^9-THC) in confiscated marijuana from police seizures increased by 66% from 3.08% in 1992 to 5.11% in 2002.[34,35] Average potency of Δ^9-THC in these studies was consistently calculated as the simple arithmetic mean (ie, the sum of the Δ^9-THC concentrations divided by the number of seizures), which is more useful in discerning changes over time relative to normalized averages. This increase could have led to greater addiction potential for marijuana use disorders over the last decade. Moreover, there was no systematic change in the frequency of marijuana use between 1991-1992 and 2001-2002: use every day or nearly every day (18.7% and 21.7%); use 1 to 4 times per week (23.8% and 19.7%); use 1 to 3 times per month (22.6% and 20.2%); and 1 to 11 times per year

(34.9% and 38.4%). Similarly, very little change in the usual quantity (ie, number of joints or joint equivalents) of marijuana used on smoking days was observed for each time period: 1 joint (65.6% and 63.7%), 2 to 3 joints (26.9% and 22.0%), 4 to 6 joints (4.0% and 8.1%), and 7 or more joints (3.5% and 6.2%). Increasing rates of marijuana use disorders among marijuana users in the absence of increased quantity and frequency of use strengthens the argument that the increasing rates may be attributable, in part, to increased potency of marijuana.

The increased prevalence of marijuana use disorders among marijuana users also may be due, in part, to increases in marijuana use among the youngest individuals observed in this and other studies (such as the Moni-

toring the Future and the National Survey of Drug Use and Health studies) during the past decade.[1,2] The early onset of drug use has been consistently associated with greater risk of the development of abuse and dependence.[5,36,37] Thus, the marked increase in marijuana use among the youngest age group may be linked to the increases in abuse and dependence. These factors, combined with factors increasing rates of marijuana use in certain subgroups, are all possible explanations of the increased prevalence in rates of marijuana abuse and dependence among marijuana users.

One of the most striking findings of this study was that the rates of marijuana use disorders did not increase among white young adults (ages 18-29 years), but did increase among young

Table 2. Past-Year Prevalence of *DSM-IV* Marijuana Abuse or Dependence, NLAES 1991-1992 and NESARC 2001-2002*

Sociodemographic Characteristic	Men		Women		Total	
	NLAES,% (SE)	NESARC, % (SE)	NLAES, % (SE)	NESARC, % (SE)	NLAES, % (SE)	NESARC, % (SE)
Total	1.9 (0.14)	2.2 (0.14)	0.6 (0.05)	0.8 (0.07)†	1.2 (0.07)	1.5 (0.08)†
Age group, y						
18-29	5.1 (0.46)	6.4 (0.51)	1.6 (0.18)	2.5 (0.27)‡	3.3 (0.26)	4.4 (0.30)‡
30-44	1.5 (0.16)	1.7 (0.19)	0.6 (0.09)	0.7 (0.11)	1.0 (0.09)	1.2 (0.12)
45-64	0.2 (0.08)	0.7 (0.15)‡	. . .	0.2 (0.06)	0.1 (0.04)	0.4 (0.08)‡
≥65	0.0 (0.00)	. . .	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	. . .
White						
Total	2.1 (0.17)	2.1 (0.17)	0.6 (0.06)	0.7 (0.08)	1.3 (0.09)	1.4 (0.10)
Age group, y						
18-29	6.3 (0.60)	7.2 (0.69)	2.0 (0.25)	2.7 (0.37)	4.2 (0.35)	4.9 (0.39)
30-44	1.6 (0.19)	1.7 (0.25)	0.6 (0.60)	0.7 (0.15)	1.1 (0.11)	1.2 (0.15)
45-64	. . .	0.7 (0.16)	. . .	. . .	. . .	0.4 (0.08)
≥65	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Black						
Total	1.3 (0.28)	2.6 (0.40)‡	0.4 (0.10)	1.2 (0.22)‡	0.8 (0.14)	1.8 (0.22)‡
Age group, y						
18-29	2.3 (0.71)	6.1 (1.19)‡	0.7 (0.21)	3.2 (0.66)‡	1.4 (0.34)	4.5 (0.67)‡
30-44	1.4 (0.48)	2.3 (0.56)	0.6 (0.23)	1.0 (0.34)	1.0 (0.26)	1.6 (0.30)
45-64	. . .	. . .	. . .	. . .	. . .	0.4 (0.17)
≥65	0.0 (0.00)	. . .	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	. . .
Hispanic						
Total	0.9 (0.26)	2.0 (0.30)‡	0.3 (0.10)	0.4 (0.10)	0.6 (0.14)	1.2 (0.17)‡
Age group, y						
18-29	1.9 (0.65)	4.7 (0.79)‡	0.6 (0.25)	0.9 (0.27)	1.2 (0.35)	2.9 (0.46)‡
30-44	. . .	0.9 (0.41)	. . .	. . .	0.4 (0.17)	0.5 (0.21)
45-64	. . .	. . .	0.0 (0.00)	. . .	. . .	. . .
≥65	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)

Abbreviations: *DSM-IV, Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; NESARC, National Epidemiologic Survey on Alcohol and Related Conditions; NLAES, National Longitudinal Alcohol Epidemiologic Survey.
*Ellipses indicate that estimate does not meet precision standard.
†*P*<.05, 1991-1992 compared with 2001-2002.
‡*P*<.01, 1991-1992 compared with 2001-2002.

adult black men and women and among young adult Hispanic men. It should also be noted that the prevalences of marijuana use disorders among white young adults have remained high, even though these rates have not significantly increased over the last decade.

The reasons for the rise in marijuana use disorders among these minority youth are not entirely known. Recently, researchers have highlighted the deleterious effects of acculturation on marijuana and other drug use disorders among the growing number of Hispanics faced with adapting to a new culture.[38,39] Lower educational and occupational expectations among minorities have also been implicated in this research. Alternatively, the growing number of minority youth attending college over the last decade might have been ex-

posed to the risks of marijuana use commonly noted among college students, among whom the prevalence of past year marijuana use has increased from 23.0% to 30.0% over the last decade.[40,41]

What is clear is that no single environmental factor can explain the increases in marijuana use disorders observed in this study among certain minority subgroups of the population. Numerous environmental factors, including sociodemographic (increases in single-parent households, urbanicity), socioeconomic (education, income), individual lifestyle (grades, truancy, religious commitment), and economic factors, are all likely to serve as mediators of the observed changes.[42,43] A recent study also has demonstrated that decreases in the perceived risk of harmfulness and in disapproval of mari-

juana use can explain the recent historic changes in marijuana use among youth.[44] With regard to putative economic factors, recent studies have examined how changes in prices, taxes, and policies affecting tobacco and alcoholic beverages may have had an impact on the prevalence of marijuana use disorders.[44] For example, one study has shown that increases occurring over the past decade in the minimum drinking age had the unintended consequence of increasing marijuana use among high school seniors.[45] Further research on how prices and policies affecting tobacco and alcoholic beverages can affect marijuana use among important subgroups of the population defined in terms of race/ethnicity and other sociodemographic and socioeconomic characteristics is sorely needed and may help

Table 3. Past-Year Prevalence of *DSM-IV* Marijuana Abuse or Dependence Among Past-Year Marijuana Users, NLAES 1991-1992 and NESARC 2001-2002*

Sociodemographic Characteristic	Men		Women		Total	
	NLAES, % (SE)	NESARC, % (SE)	NLAES, % (SE)	NESARC, % (SE)	NLAES, % (SE)	NESARC,% (SE)
Total	33.9 (1.83)	38.9 (1.86)†	22.7 (1.92)	29.2 (2.03)‡	30.2 (1.35)	35.6 (1.37)‡
Age group, y						
18-29	41.6 (2.46)	47.8 (2.66)†	25.4 (2.59)	32.2 (2.78)†	36.0 (1.97)	42.1 (1.97)†
30-44	23.7 (2.22)	29.2 (3.25)	19.6 (2.94)	25.0 (3.81)	22.4 (1.79)	27.9 (2.63)†
45-64	22.1 (8.89)	27.0 (4.83)	. . .	21.7 (6.99)	16.9 (6.51)	25.8 (4.22)
≥65	0.0 (0.00)	. . .	. . .	. . .	0.0 (0.00)	. . .
White						
Total	36.7 (2.17)	37.6 (2.34)	22.1 (2.10)	27.9 (2.72)†	31.8 (1.63)	34.4 (1.81)
Age group, y						
18-29	45.7 (2.90)	47.4 (3.29)	25.5 (2.91)	30.8 (3.64)	38.6 (2.36)	41.3 (2.45)
30-44	25.2 (2.52)	27.8 (3.76)	18.2 (3.10)	25.3 (4.73)	22.9 (2.01)	27.0 (3.11)
45-64	19.0 (10.73)	26.1 (5.26)	. . .	. . .	. . .	24.0 (4.48)
≥65	0.0 (0.00)	0.0 (0.00)	. . .	. . .	0.0 (0.00)	0.0 (0.00)
Black						
Total	21.6 (4.29)	37.9 (4.76)‡	20.1 (4.27)	39.9 (5.28)‡	21.2 (3.28)	38.6 (3.64)‡
Age group, y						
18-29	21.8 (6.25)	43.0 (7.39)†	19.1 (5.87)	47.2 (6.41)‡	21.0 (4.80)	44.5 (5.16)‡
30-44	21.0 (6.36)	36.7 (6.53)†	21.0 (6.35)	33.5 (9.13)	21.0 (4.76)	35.5 (5.50)†
45-64	24.4 (15.64)	. . .	. . .	21.0 (12.88)	. . .	18.4 (7.74)
≥65	. . .	61.6 (23.77)	. . .	0.0 (0.00)	. . .	61.6 (23.77)
Hispanic						
Total	24.1 (6.22)	44.8 (4.05)‡	22.6 (7.63)	19.3 (4.56)	23.7 (5.11)	37.1 (3.45)†
Age group, y						
18-29	29.8 (8.75)	53.7 (6.77)†	20.5 (8.65)	18.3 (4.94)	27.1 (6.74)	41.8 (4.84)†
30-44	. . .	26.0 (11.02)	. . .	. . .	15.2 (6.41)	24.3 (9.10)
45-64	70.4 (29.45)	. . .	0.0 (0.00)	. . .	. . .	26.6 (11.91)
≥65	. . .	. . .	. . .	. . .	. . .	. . .

Abbreviations: *DSM-IV, Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; NESARC, National Epidemiologic Survey on Alcohol and Related Conditions; NLAES, National Longitudinal Alcohol Epidemiologic Survey.
*Ellipses indicate that estimate does not meet precision standard.
†*P*<.05, 1991-1992 compared with 2001-2002.
‡*P*<.01, 1991-1992 compared with 2001-2002.

explain the increases observed among minority young adults.

Historical and cultural factors that shape the life history of various racial/ethnic minorities in the United States are potentially equally important in understanding the observed changes. Within this context, future research will need to more fully address the extraordinary heterogeneity within racial/ethnic groups in the search for the explanations of why rates of marijuana use disorders increased among some minority young adults as opposed to white young adults. For example, rates of marijuana use disorders are likely to differ among Mexican Americans, Cuban Americans, and Puerto Rican Americans. It is clear that achieving an understanding of changes in the prevalence of marijuana use disorders among minority young adults will require further research and is an important public health priority.

The results of this study indicate that the vast majority of individuals who use marijuana or have marijuana use disorders are young. Despite this generalization, this study is the first to report significant increases in marijuana use among 45- to 64-year-old men and women combined as well as a modest but significant increase in marijuana abuse or dependence among 45- to 64-year-old men. This indicates that the upper age limit for marijuana use, abuse, and dependence has shifted in a meaningful way. Such a shift is consistent with increased lifetime exposure to marijuana availability in the group who were adolescents in the late 1960s or early 1970s and were ages 45 to 64 years in 2001-2002. Given this shift, the extent to which marijuana use may be a contributing cause of illness in the aging population deserves further research attention.

The major findings from this study have significant research and public health implications. With regard to research, more periodic epidemiologic observational studies are needed to rapidly detect emerging epidemics in marijuana use disorders (and other drug use disorders) as revealed in this study.

The apparent epidemic of marijuana use disorders among young adult minorities has possibly been occurring for many years and the failure to detect it sooner lies in the lack of epidemiologic monitoring data. Concerning public health implications, it is important to communicate that the increased potency of marijuana over the past decade may, in part, be responsible for increases in abuse and dependence among users. This is critical information for parents, teachers, peers, physicians, and other health professionals. From a broader public health perspective, the results of this study highlight the need to strengthen existing prevention and intervention efforts and to develop and implement widely new programs with the sex, racial/ethnic, and age differentials observed in this study in mind. Specifically, programs targeting young adults, especially black and Hispanic young adults, need to be designed and tested for their effectiveness as quickly as possible.

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> If length of days be thy portion, make it not thy expectation. Reckon not upon a long life: think every day the last, and live always beyond thy account. He that so often surviveth his expectations lives many lives.
> —Sir Thomas Browne (1605-1682)