



# National Institute of Justice

## Research in Brief

June 2001

### Issues and Findings

**Discussed in this Brief:** Trends in marijuana use detected through urinalysis among booked adult arrestees at 23 locations across the Nation served by the Arrestee Drug Abuse Monitoring (ADAM) program from 1987 through 1999 as well as trends within the mainstream population based on self-reports of past-month marijuana use recorded by the National Household Survey on Drug Abuse (NHSDA) and Monitoring the Future (MTF) programs.

**Key issues:** An epidemiological perspective is taken to place in context the increased use of marijuana among arrestees and the general population. The course of the recent marijuana upsurge is compared with that observed for previous crack and heroin epidemics in which four phases with distinct variations in prevalence and age of users occurred. The analysis also compares time trends in marijuana use across age groups, populations, and geographic locations.

#### Key findings:

- Increases in marijuana use during the study period were limited primarily to youths. Starting around 1991, most ADAM locations experienced a rapid increase in recent use among youthful adult arrestees (ages 18–20),

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## The Rise of Marijuana as the Drug of Choice Among Youthful Adult Arrestees

By Andrew Golub and Bruce D. Johnson

Various surveys have identified a rapid increase in marijuana use during the 1990s, especially among youths. This raises a variety of questions about the future of the Nation's drug problems. On one hand, the gateway theory posits that youthful use of alcohol and/or tobacco and marijuana tends to precede use of other illicit drugs like crack and heroin (see "The Gateway Theory"). The recent increase in youthful marijuana use has fueled speculation that a new epidemic of hard drug abuse may be imminent<sup>1</sup> and that the burden of drug abuse will be dramatically increasing in the near future.<sup>2</sup> On the other hand, the start of this new epidemic coincides with the decline of the crack epidemic. This suggests that youthful subcultures may have shifted from the destructive nature of crack abuse to the use of less dangerous drugs.

The recent upsurge in marijuana use is referred to as the New Marijuana Epidemic to distinguish it from widespread use of marijuana prevailing in the 1960s and 1970s.<sup>3</sup> This Research in Brief examines trends in marijuana use detected through urinalysis to track the progress of the recent epidemic among arrestees at 23

locations across the Nation served by the Arrestee Drug Abuse Monitoring (ADAM) program—formerly the Drug Use Forecasting (DUF) program—from 1987 through 1999.

In addition, this report identifies nationwide drug use trends within the mainstream population on the basis of self-reports of past-month use, a measure roughly parallel to the length of time in which marijuana can be detected by urinalysis. Those trends were derived from data collected by the National Household Survey on Drug Abuse (NHSDA) and Monitoring the Future (MTF) programs. (See "The Study's Data Sources.")

Overall, study findings suggest the following:

- **Recent increases in youthful marijuana use followed a natural pattern similar to previous drug epidemics.** Use of a particular drug sometimes follows a wave of popularity: starting from a lull, expanding rapidly, leveling to a plateau, and subsequently fading away. Prior research with ADAM/DUF data suggests that the popularity of heroin injection (which mostly peaked in the

## Issues and Findings

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from an average low of 25 percent in 1991 to 57 percent in 1996, as detected by urinalysis. The MTF and NHSDA surveys also recorded rapid but more modest increases in youthful marijuana use within the mainstream population starting in 1992 (1 year later than among ADAM arrestees). Around 1996, the rates of marijuana use among arrestee and mainstream populations reached a plateau.

- With exceptions at a few ADAM locations, the pattern of growth in marijuana use among youthful adult arrestees was similar to that observed previously for heroin and crack: lull, rapid expansion, and plateau. Use of both heroin and crack is now in decline.

- Marijuana appears to be the drug of choice for arrestees born since 1970, who seem much less likely to progress to crack or heroin injection than their predecessors.

**Target audience:** Local law enforcement and public health officials, drug-crime researchers, administrators of juvenile justice agencies and youth departments, and local criminal justice policymakers.

1960s and early 1970s) and crack (which mostly peaked in the late 1980s) followed this pattern. The current analysis suggests that the recent wave of marijuana use has followed a similar pattern so far, although unlike the previous epidemics, the increases in use were primarily limited to youths.

- **Local differences are important.** There were exceptions at a few ADAM locations to every one of the major regularities in the New Marijuana Epidemic. Some locations did not observe an epidemic. At other locations, the epidemic either was not limited to youthful adult arrestees (ages 18–20), expanded more slowly, expanded for a longer period, or was less prevalent at its peak.
- **In the 1990s, marijuana replaced crack cocaine as the drug of choice among youthful adult arrestees.** Arrestees born since 1970 have been increasingly likely to be detected as recent marijuana users. Unlike their predecessors, however, few of them had progressed to crack or heroin by 1998. This provides some evidence to suggest that viewing marijuana as a gateway drug may be inappropriate for this new generation. Ethnographic evidence from New York City suggests that use of marijuana by youths may be associated with strong cultural and subcultural norms that militate against use of more dangerous drugs.
- **The New Marijuana Epidemic had plateaued by 1996 at most affected locations and by 1999 at all affected locations.** From 1996 to 1999, most ADAM locations as well as the MTF and NHSDA surveys identified stable, high levels of recent marijuana use among youths.

- **The New Marijuana Epidemic had a larger impact on youthful adult arrestees than on youths in the general population.** The epidemic in youthful marijuana use recorded by the MTF and NHSDA programs started 1 year later, increased more slowly, and was less prevalent at its peak than the epidemic among youths who tended to get in trouble with the law as recorded by the ADAM program.

## A conceptual model of the New Marijuana Epidemic

Much research suggests that drug epidemics tend to follow a predictable course. This analysis employs a conceptual model that distinguishes the characteristics of four phases: incubation, expansion, plateau, and decline. This model was originally developed to explain the course of the Crack Epidemic.<sup>4</sup> It has since been used to study the Heroin Injection Epidemic and has been adapted for the study of the recent increase in marijuana use.<sup>5</sup> This study found that the dynamics of recent increases in marijuana use followed a pattern similar to that of the Crack and Heroin Injection Epidemics, suggesting that all three epidemics were the result of a comparable diffusion phenomenon.

Theoretically, the passing of each phase of the New Marijuana Epidemic should result in a distinguishable pattern for the prevalence of marijuana use detected by the ADAM program, particularly among youthful adult arrestees and, to a lesser extent, among the overall population of adult arrestees (ages 18 and older).<sup>6</sup>

**Incubation phase.** Historical evidence suggests that a drug epidemic typically grows out of a specific social context; the Heroin Injection Epidemic grew out of the jazz era<sup>7</sup> and the Crack Epidemic started among inner-city drug dealers.<sup>8</sup>

In both cases, there was an initial incubation phase during which the new drug-use practice was developed and nurtured among a relatively small, cohesive group of adult users. Marijuana use has been widespread since the 1960s; however, the prevalence of its use had been declining since 1979.<sup>9</sup> During the incubation phase, the ADAM program would be expected to detect relatively low levels of marijuana use by adult arrestees, including those in the youthful category.

Ethnographic research in New York City suggests that the reemergence of interest in marijuana use was pioneered as part of the youthful, inner-city, predominately black hip-hop movement.<sup>10</sup> These youths celebrated marijuana use in their music and on

T-shirts. In New York City, they also preferred to smoke their marijuana in a blunt (an inexpensive cigar whose contents are replaced with marijuana). The extent to which the New Marijuana Epidemic outside of New York City is associated with blunt smoking is not clear. Unfortunately, major national surveys, such as MTF, NHSDA, and ADAM, do not distinguish among ways of consuming marijuana. A number of focus groups across the Nation on cigar use<sup>11</sup> and reports by leading drug abuse experts<sup>12</sup> provide limited (but far from conclusive) support for the idea that blunt smoking may be a national phenomenon.

**Expansion phase.** Eventually, marijuana use spread rapidly as part of a newly emerging subculture indigenous

to youths. In contrast, the Crack and Heroin Injection Epidemics spread first among adults and only afterward to youths. This dynamic suggests that the ADAM program would be expected to detect rapidly increasing marijuana use among youthful adult arrestees during an expansion phase. The rate of use among all adult arrestees would be expected to increase more slowly and for a longer period as members of the New Marijuana Generation aged and came to constitute a larger portion of the ADAM sample and as the renewed interest in marijuana diffused to older arrestees.

**Plateau phase.** Subsequent to its expansion, the New Marijuana Epidemic could be expected to enter a plateau phase at each ADAM location. During

## M The Gateway Theory

Much research has identified that most American youths tend to progress through as many as four stages of substance use: nonuse, alcohol/tobacco, marijuana, and other drugs including cocaine and heroin.<sup>a</sup> Individuals who do not use substances associated with one stage rarely use those associated with later stages, but not all users at one stage progress to the next.<sup>b</sup> Because of their intermediary role, alcohol, tobacco, and marijuana have come to be regarded as “gateway drugs.” Today, policies pertaining to substance use prevention seek to forestall or delay youthful use of gateway drugs to reduce the likelihood of subsequent abuse of drugs like heroin and crack.

In contrast, several analyses suggest the gateway sequence may not be as relevant to the inner-city populations that

disproportionately generate youths who get in trouble with both drug abuse and the law.<sup>c</sup> Moreover, the gateway sequence may no longer characterize the experiences of mainstream youths. Calculations based on National Household Survey on Drug Abuse data suggest that youths coming of age in the 1990s were much less likely to progress from marijuana to cocaine powder, crack, or heroin than were youths born previously.<sup>d</sup>

These recent studies suggest that youthful substance use progression reflects cultural or subcultural norms among youths about which substances are acceptable and that these norms vary over time and across locations. Thus, it seems essential to monitor not just which substances youths are using but what that substance use represents to them.

a. Kandel, Denise B., “Stages in Adolescent Involvement in Drug Use,” *Science* 190(1975): 912–914.

b. Ibid. For a review of replications, see Kandel, Denise B., ed., *Stages and Pathways of Involvement in Drug Use: Examining the Gateway Hypothesis*, New York: Cambridge, forthcoming.

c. Golub, Andrew, and Bruce D. Johnson, “Substance Use Progression and Hard Drug Abuse in Inner-City New York,” in *Stages and Pathways of Involvement in Drug Use: Examining the Gateway Hypothesis*, ed. Denise B. Kandel, New York: Cambridge, forthcoming.

d. Golub, Andrew, and Bruce D. Johnson, “Variation in Youthful Risk of Progression From Alcohol and Tobacco to Marijuana and Hard Drugs Across Generations,” *American Journal of Public Health* 91(2)(2001):225–232.

this period, youths coming of age and getting involved with illegal drugs would use the current drug of choice, marijuana. During this phase, the ADAM program would be expected to detect stable and high levels of marijuana use among youthful adult arrestees and slowly increasing rates of use overall.

**Decline phase.** In the 1990s, both the Heroin Injection and Crack Epidemics

were experiencing their decline phases. These drugs have been much less popular among youths coming of age in the 1990s than among their predecessors. However, heroin injection and crack smoking are still quite widespread because many older users have persisted in their habits. By analogy, when the New Marijuana Epidemic enters a decline phase, the ADAM program would be expected to detect

a rapid decrease in marijuana use among youthful adult arrestees but a slower, more drawn-out decline among all adult arrestees.

## Results

If data had conformed to the conceptual model described above, the expansion phase of marijuana use should be readily distinguished by steady increases in each year (perhaps

## The Study's Data Sources

The authors collected data from three major programs: Arrestee Drug Abuse Monitoring (ADAM), National Household Survey on Drug Abuse (NHSDA), and Monitoring the Future (MTF). The absolute magnitude in the prevalence of recent marijuana use was expected to differ among the foregoing data sources because of differences in sample populations (across ADAM locations and across NHSDA and MTF surveys), differences in survey procedures, and the use of urine tests for ADAM in contrast to self-reports for NHSDA and MTF.

**Arrestee Drug Abuse Monitoring program.** In 1987, the National Institute of Justice (NIJ) established the Drug Use Forecasting (DUF) program to measure trends in illicit drug use among booked arrestees in most large cities (or counties) with a total population of at least 1 million, as well as in many smaller cities for geographical diversity. In 1997, DUF evolved into the ADAM program, which plans to expand to 75 locations over the next few years.<sup>a</sup> The program collects urine samples (along with self-reported information) from about 300 adult arrestees each quarter at each location. Female arrestees are oversampled at many locations and constitute about 30 percent of the total. Some locations also

recruit samples of juvenile arrestees. This study examined trends at the 23 locations using information obtained from more than 300,000 arrestees between 1987 and 1999. ADAM samples typically are not representative of the general population in communities where data collection occurs. Given the drug-crime nexus, ADAM data provide excellent information about drug use among many of the most serious drug abusers at each location. This information is of particular interest to criminal justice and other agencies. Analyses of ADAM data may be of even broader interest to the extent that drug use among arrestees tends to parallel or perhaps even lead trends in the general population.

At inception, the DUF program sought to monitor substance use among serious offenders: individuals charged with a felony offense were oversampled; individuals charged with a citation offense were excluded from DUF samples at most locations; and individuals charged with drug offenses were not allowed to exceed 20 percent of the sample.<sup>b</sup> As part of the transition to ADAM, NIJ phased in sampling strategies so that ADAM samples would be representative of arrestees passing through the central booking facility at each location. Starting in 1998, the prevalence of arrestees for drug offenses and

citations increased substantially. Several locations experienced increases in detected marijuana use in 1999 inconsistent with the trend in previous years, including, most notably, Atlanta, Birmingham, Houston, Miami, Phoenix, San Diego, and San Jose. Continuation of the upward trend in Los Angeles and Portland also may have been due to the change in sampling strategy.

Throughout the life of the DUF and ADAM programs, urine testing and many core questions have remained constant, allowing for analysis of trends over time. Urine test results provide particularly valid indications of recent marijuana use. Marijuana metabolites tend to remain in the body. Marijuana consumption can be detected by the EMIT (Enzyme Multiplied Immunoassay Testing) urinalysis screen used by ADAM up to 7 days after last use for infrequent users and 30 days or longer for chronic users. In contrast, the drug detection period for opiates (such as heroin) and cocaine is only 2 to 3 days. In 1996, the cutoff level for determining recent marijuana use was lowered from 100 to 50 nanograms.<sup>c</sup> More than 34,000 samples from 1995 were tested at both cutoff levels. Overall, the prevalence of detected marijuana use increased 5 to 7 percentage points when the lower cutoff

as large as 5 percentage points or more per year), the plateau phase distinguished by high rates of use in each year (perhaps varying by no more than 2 percentage points from year to year), and the decline phase distinguished by steady decreases in youthful marijuana use comparable in size to the increases observed during the expansion phase. The rate of increase and subsequent decrease would depend

on the speed at which marijuana use spread within the target population represented by each survey sample.

The findings from the NHSDA and MTF surveys in exhibit 1 fit this overall pattern quite well, although the rate of increase during the apparent expansion phase was modest. Nationwide, overall marijuana use had steadily declined from 13 percent in 1979 to a low of 4 percent in 1992. Marijuana

use among high school seniors declined from a peak of 37 percent in 1978 to a low of 12 percent in 1992 (an average decline of 1.8 percentage points per year). NHSDA recorded a remarkably similar decline in use among youthful household members (ages 18–20) for this period. Then from 1992 to 1996, the rate among high school seniors steadily increased to 22 percent (an average increase of 2.5 percentage

level was used. The difference was most pronounced among very young arrestees (under age 15) and older arrestees (over age 30), two groups that tend to use marijuana less frequently.

**National Household Survey on Drug Abuse program.** NHSDA was established in 1971 to measure the prevalence and correlates of illegal drug use and monitor trends over time in the noninstitutionalized population of the United States.<sup>d</sup> The survey tends to undersample many of the most serious drug abusers, who are prone to incarceration, residence in other institutions, and unstable living arrangements. Eligible participants are visited and interviewed in their homes. Through 1998, respondents were given a separate sheet to record their confidential answers to questions about drug use to help ensure disclosure of sensitive information. The survey was conducted in 1971 and 1972 and then every 2 or 3 years until 1990, when it became an annual survey. Analyses presented in this report are based on more than 200,000 responses available in public use data files for surveys conducted in 1979, 1982, 1985, 1988, and 1990–97 and in a published report for 1998.<sup>e</sup> NHSDA employs a complex sampling design and oversamples Hispanics, blacks, and youths ages

12 to 17. The authors used sample weights in all calculations to obtain unbiased estimates.

**Monitoring the Future program.** Each spring since 1975, the University of Michigan’s Institute for Social Research has conducted a survey to estimate the prevalence of drug use among high school seniors in the United States and to monitor trends over time.<sup>f</sup> The survey tends to under-sample many of the most serious drug users, who are disproportionately likely to drop out of school or be absent on the day of the survey. Students at selected schools complete confidential questionnaires at their own pace during a normal class period. Analyses presented in this report are based on more than 350,000 responses obtained in the 1976–97 period and contained in a published report for 1998–99.<sup>g</sup> The MTF program employs a complex sampling design. The authors used sample weights in all analyses to obtain unbiased estimates of substance use.

a. National Institute of Justice, *1998 Annual Report on Drug Use Among Adult and Juvenile Arrestees*, Washington, DC: U.S. Department of Justice, National Institute of Justice, 1999, NCJ 175656.

b. National Institute of Justice, *1999 Annual Report on Drug Use Among Adult and*

*Juvenile Arrestees*, Washington, DC: U.S. Department of Justice, National Institute of Justice, 2000, NCJ 181426.

c. National Institute of Justice, *Drug Use Forecasting: Annual Report on Adult and Juvenile Arrestees, 1996*, Washington, DC: U.S. Department of Justice, National Institute of Justice, 1997, NCJ 176800.

d. Substance Abuse and Mental Health Services Administration, *National Household Survey on Drug Abuse Series: H-10. Summary of Findings from the 1998 National Household Survey on Drug Abuse*, Rockville, MD: Office of Applied Studies, 1999, U.S. Department of Health and Human Services Publication No. (SMA) 99–3295.

e. Ibid.

f. Johnston, Lloyd D., Patrick M. O’Malley, and Jerald G. Bachman, *National Survey Results on Drug Use from the Monitoring the Future Study, 1975–1998*, vol. 1, Bethesda, MD: National Institutes of Health, National Institute on Drug Abuse, 1999, NIH Publication No. 99–4660.

g. Johnston, Lloyd D., Patrick M. O’Malley, and Jerald G. Bachman, *Drug Trends in 1999 Are Mixed*, press release, Ann Arbor, MI: University of Michigan News and Information Services, 1999. Available online at [www.monitoringthefuture.org/pressreleases/99drugpr.html](http://www.monitoringthefuture.org/pressreleases/99drugpr.html).



points per year); the rate among youthful household members rose more modestly to 17 percent. Relatively stable rates were subsequently recorded through 1999 for high school seniors and through 1998 for household members, which suggests that the epidemic in the general population may have reached a plateau around 1996.

The trend data on individual ADAM locations were often somewhat ambiguous. The increases in youthful marijuana use detected during the expansion phase were sometimes unsteady and the year-to-year variations during the plateau phase were sometimes greater than 5 percentage points. There are numerous possible reasons for year-to-year variations, including changes in policing priorities and random chance (samples for individual ADAM locations are much smaller than MTF and NHSDA samples). Sometimes this variation confounded the study's efforts to precisely pinpoint the timing of the phases of the New Marijuana Epidemic. In response, small variations from one year to the next were often disregarded by the authors as potentially attributable to the limited precision of the ADAM estimates. Such ambiguous trends are clearly identified in this report and the basis for an interpretation is provided. The most credence was placed on strong trends consistently affecting marijuana use across multiple years.

Exhibit 2 depicts the status in 1999 of the New Marijuana Epidemic at each ADAM location across the Nation. By 1999, the marijuana epidemic among arrestees had clearly reached the plateau phase at ADAM locations in the Northeast, Midwest, and Southwest. Miami and San Diego did not appear to have observed epidemics. The epidemic had shown signs of possibly having plateaued at almost all of

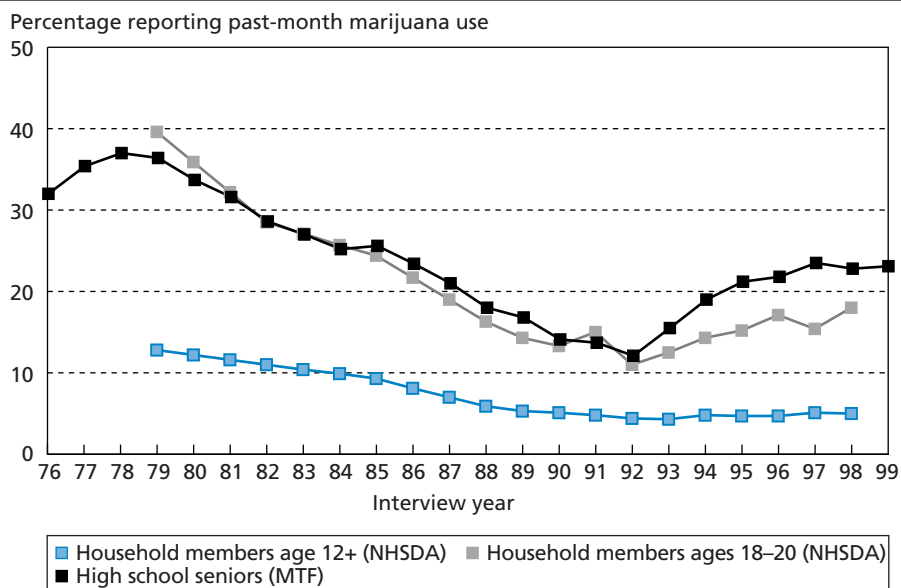
the other Southeast and West Coast ADAM locations. The similarity in findings across ADAM locations suggests that the New Marijuana Epidemic was national in scope. Based on this finding, an ADAM program average was calculated to facilitate presentation of the general characteristics of the phenomenon by simply averaging findings across locations. This program average does not necessarily represent the average across arrestees nationwide. Furthermore, it is not necessarily a good idea to focus on this type of an average when determining the rate of detected use of such other drugs as cocaine/crack, amphetamines, and heroin because prevalence rates vary more widely across locations. Indeed, even marijuana use was affected by important local differences, which are depicted in exhibit 2.

Exhibit 3 shows that, on average, the variation in recent marijuana use detected among youthful ADAM

arrestees conformed to the conceptual model for the New Marijuana Epidemic and that year-to-year distortions of the overall pattern were quite modest. From 1988 to 1990, detected marijuana use among all adult arrestees declined, on average, from 35 percent to 19 percent and declined among youthful adult arrestees from 44 percent to 24 percent. Subsequently, the rate among youthful adult arrestees increased steadily from 25 percent in 1991 to 57 percent in 1996 (an average of 6.4 percentage points per year), suggesting that the expansion phase, on average, occurred among arrestees from 1991 to 1996.

This doubling of marijuana use among youthful ADAM arrestees provides some of the strongest evidence to suggest that a New Marijuana Epidemic has occurred, primarily among youths and especially among youths who tend to get in trouble with the law. This increase preceded the ADAM

Exhibit 1. Variation in past-month marijuana use within the U.S. general population, NHSDA and MTF surveys\*



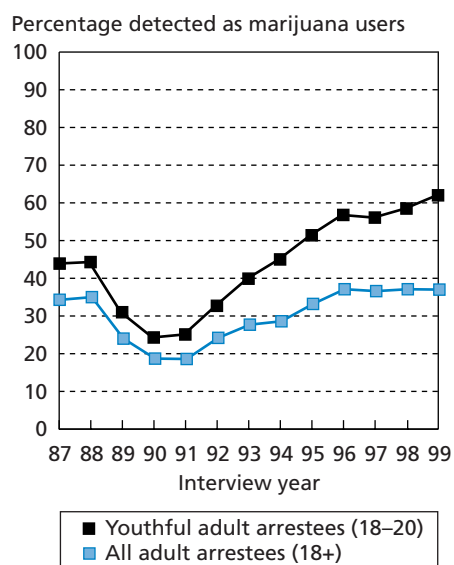
\*NHSDA: National Household Survey on Drug Abuse; MTF: Monitoring the Future

Exhibit 2. Status of the new marijuana epidemic among ADAM\* arrestees, 1999



\*Arrestee Drug Abuse Monitoring

Exhibit 3. Variation in recent marijuana use detected among U.S. arrestee population, ADAM\* program average



\*Arrestee Drug Abuse Monitoring

program’s 1996 change in the standard for determining marijuana use and, therefore, could not have been caused by that methodological improvement. From 1996 to 1999, the rate of use among youthful adult arrestees held steady at around 60 percent and the rate among all adult arrestees held constant at around 37 percent. The modest increase of use among youthful adult arrestees to 62 percent in 1999 may have resulted from changes in the ADAM sampling procedure. Thus, the plateau phase among arrestees appears to have set in by 1996 and lasted, on average, at least through 1999.

All three major national surveys (NHSDA, MTF, and ADAM) recorded a similar overall pattern in youthful marijuana use: a decline in the 1980s reaching a low in the early 1990s, followed by a rise in the mid-1990s and

stabilization in the late 1990s. These findings, along with the ethnographic information cited previously, strongly suggest that a new nationwide epidemic in marijuana use passed through its expansion phase by 1996 and was in its plateau phase through 1999.

There were several important differences across surveys. The increase in marijuana use started among youthful adult arrestees (ADAM) about 1 year before it started within the general population (NHSDA and MTF). In addition, the peak rate of reported past-month use among high school seniors occurring during the plateau phase (about 22 percent) was far below the previous peak (37 percent) recorded in the late 1970s. It was also far below the peak rate of detected marijuana use among youthful adult arrestees in the same period (about 57 percent) as well as

their rate of reported past-month use (about 60 percent).<sup>13</sup> This suggests that the New Marijuana Epidemic started among those individuals who tended to get in trouble with the law and spread more widely within this group than among youths in the general population. Conceivably, the prevalence of marijuana use in the general population could undergo another expansion if use diffused to other youthful subpopulations. Further research is clearly needed to identify which groups of mainstream youth have been most affected so far.

The following sections examine geographic variation among ADAM arrestees across the program's locations in the following regions: Northeast, Midwest, Southeast, Southwest, and West Coast. From 1996 to 1999, the majority of ADAM locations detected rates of marijuana use among adult and youthful adult arrestees close to the ADAM program average shown in exhibit 3. However, five Midwest locations (Chicago, Detroit, Indianapolis, Omaha, and St. Louis) had substantially higher rates, while five Southwest and West Coast locations (Houston, Los Angeles, Phoenix, San Antonio, and San Jose) had substantially lower rates.

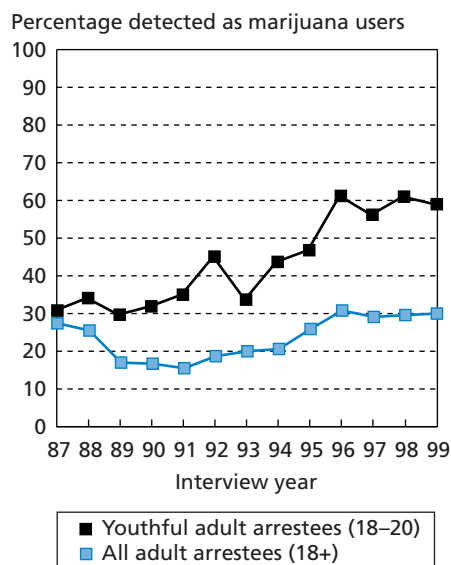
### The New Marijuana Epidemic among ADAM arrestees in the Northeast

#### Manhattan—plateau since 1996.

Marijuana use in Manhattan had dropped from 27 percent overall (i.e., among all adult arrestees) in 1987 to 16 percent in 1991. From 1991 to 1993, the popularity of marijuana started to rise among youthful adult arrestees (hereinafter referred to as “youthful arrestees”). Assessing the

start date of the increase in the rate of use is difficult because the upward trend was quite slow at first and a 1-year dip in youthful marijuana use occurred in 1993. Subsequently, the popularity of marijuana among youthful arrestees increased to a peak of 61 percent in 1996. From 1996 to 1999, the rate of marijuana use among youthful arrestees held steady at about 60 percent, with the overall rate holding at about 30 percent.

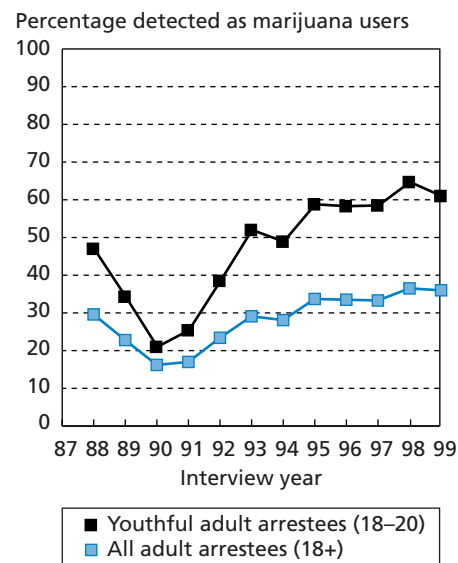
#### Manhattan



#### Philadelphia—plateau since 1995.

Marijuana use among all adult arrestees in Philadelphia dropped precipitously from 30 percent in 1988 to 16 percent in 1990. From 1990 to 1993, marijuana use among youthful arrestees expanded rapidly and the rate among all adult arrestees returned to its former level. In 1993, the rate among youthful arrestees appeared to have entered a plateau at about 52 percent, but it subsequently inched up to 59 percent in 1995. The rate among youthful arrestees remained around 60 percent from 1995 through 1999, and the overall rate held steady around 35 percent.

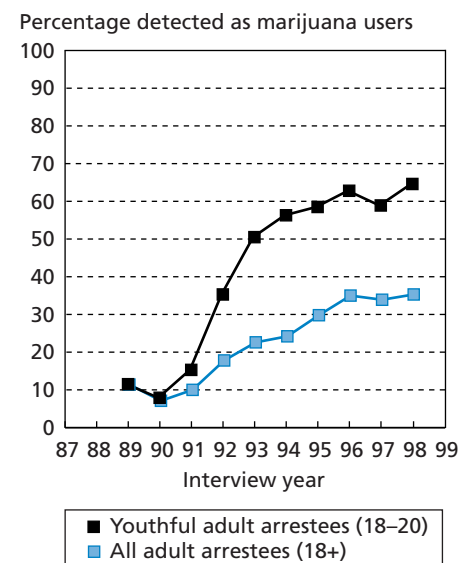
#### Philadelphia



#### Washington, D.C.—plateau since 1996.

In 1990, only 7 percent of all Washington, D.C., adult arrestees were detected as recent marijuana users. The rate increased rapidly among youthful arrestees and then among older arrestees. By 1996, about 60 percent of youthful arrestees and 35 percent of all arrestees were detected as recent marijuana users.

#### Washington, D.C.

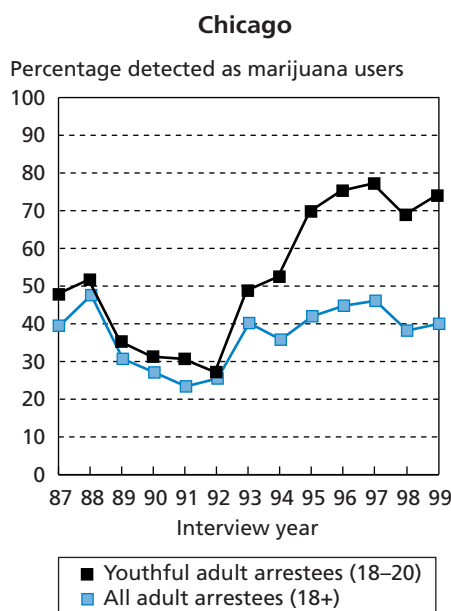




These rates remained relatively stable from 1996 through 1998. (This location did not collect a full sample in 1999.)

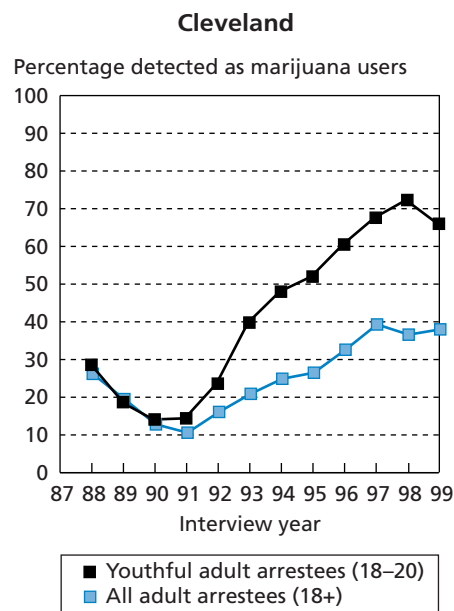
### The New Marijuana Epidemic among ADAM arrestees in the Midwest

**Chicago—plateau since 1996.** Marijuana use among all adult arrestees in Chicago dropped from 48 percent in 1988 to 23 percent in 1991. In 1993, however, the overall rate bounced up to about 40 percent, where it approximately remained through 1999. The rate of recent marijuana use detected among youthful arrestees rose dramatically from 27 percent in 1992 to 75 percent in 1996, where it approximately remained through 1999.

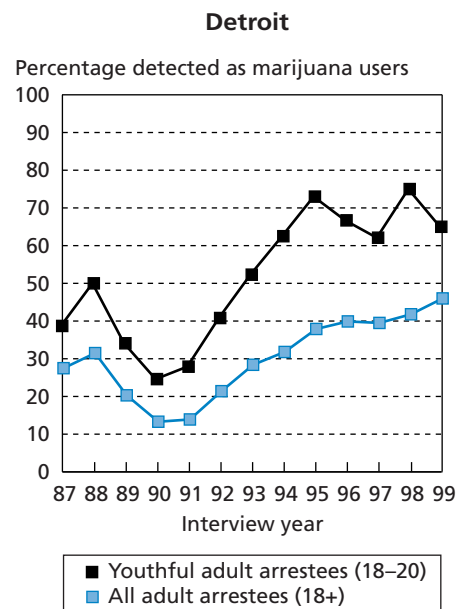


**Cleveland—plateau since 1998.** Marijuana use among all adult arrestees in Cleveland dropped from 26 percent in 1988 to 11 percent in 1991. Subsequently, the rate among

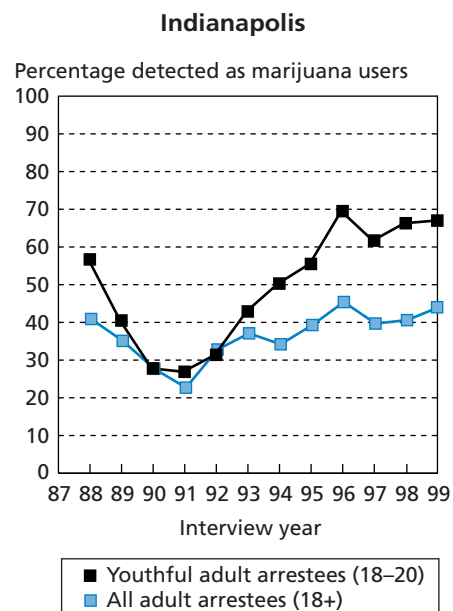
youthful arrestees began a steady rise from 14 percent in 1991 to 72 percent by 1998. The overall rate reached just below 40 percent in 1997, where it remained through 1999. The rate of marijuana use detected among youthful arrestees in 1999 dipped slightly, suggesting that the epidemic in Cleveland had entered a plateau in 1998.



**Detroit—plateau since 1995.** Marijuana use among all adult arrestees in Detroit dropped from 32 percent in 1988 to 13 percent by 1990. Subsequently, the rate among youthful arrestees increased steadily from 25 percent in 1990 to 73 percent in 1995. The rate of marijuana use detected among youthful arrestees fluctuated in a broad range from 62 percent to 75 percent from 1995 through 1999. The rate of recent marijuana use detected among all adult arrestees inched upward from 38 percent in 1995 to 46 percent in 1999.

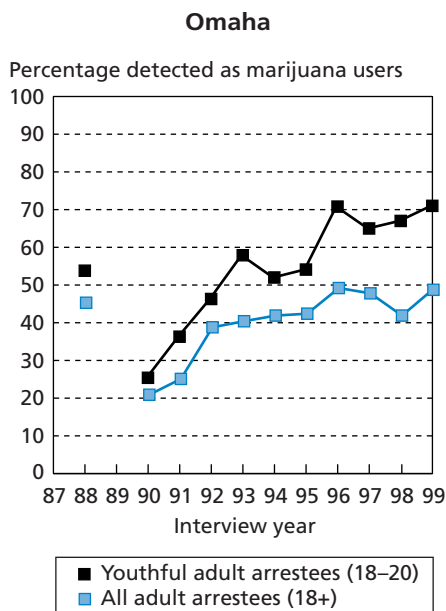


**Indianapolis—plateau since 1996.** Marijuana use among all adult arrestees in Indianapolis dropped steadily from 41 percent in 1988 to 23 percent in 1991. Subsequently, the rate among youthful arrestees increased steadily from a low of 27 percent in 1991 to 70 percent in 1996 and remained around that level through

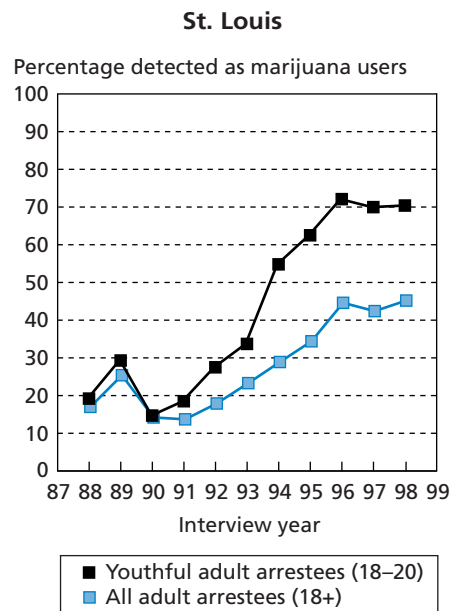


1999. Overall, the rate of recent marijuana use ranged from 39 to 45 percent from 1995 through 1999.

**Omaha—plateau since 1996.** Marijuana use among all adult arrestees in Omaha dropped from 45 percent in 1988 to 21 percent in 1990. Subsequently, that rate rose steadily to 39 percent in 1992 and to 49 percent by 1996. The rate among youthful arrestees rose from 25 percent in 1990 and then held steady around 55 percent from 1993 through 1995. In 1996, the rate of marijuana use detected among youthful arrestees jumped to 71 percent, where it approximately remained through 1999. This change was probably not attributable to a change in the ADAM cutoff standard for determining recent marijuana use. (The prevalence of marijuana use among Omaha’s youthful arrestees in 1995 increased only slightly from 53 percent under the previous 100 nanogram cutoff to 56 percent under the new 50 nanogram standard.)



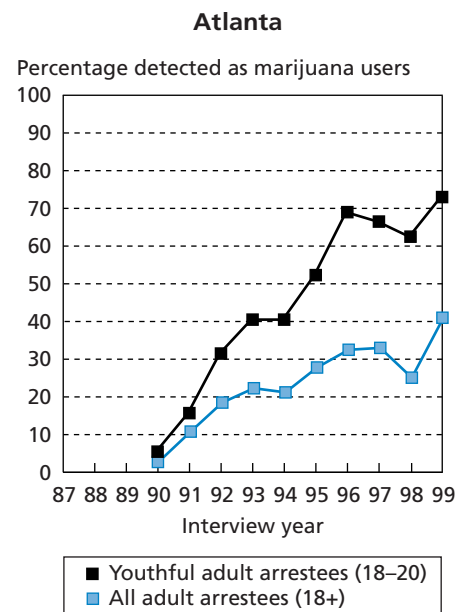
**St. Louis—plateau since 1996.** Marijuana use among youthful arrestees in St. Louis rose steadily from a low of 15 percent in 1990 to 72 percent in 1996, where it approximately remained through 1998. The rate of overall use increased from a low of 14 percent in 1991 to a steady 45 percent by 1996, where it remained through 1998. (This ADAM location did not collect a sample in 1999.)



**The New Marijuana Epidemic among ADAM arrestees in the Southeast**

**Atlanta—plateau/possibly expansion.** In 1990, the prevalence of recent marijuana use detected among youthful (6 percent) and all adult (3 percent) arrestees in Atlanta was the lowest of any ADAM location. The rate among all adult arrestees increased to 33 percent by 1996. The epidemic did not appear centered on youthful arrestees only; rather, the rate of recent marijuana use detected increased among all adult arrestees as early as 1991.

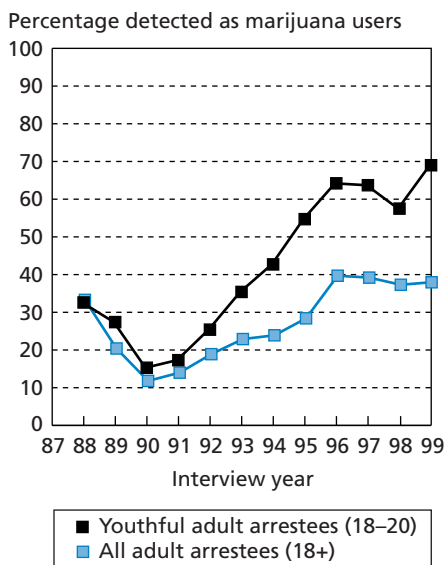
The rate among youthful arrestees, however, did increase the most, reaching 69 percent in 1996. From 1996 to 1998, the rate among youthful arrestees drifted slightly downward to 62 percent. The rate of use among all adult arrestees also decreased, from 33 percent in 1997 to 25 percent in 1998. Both rates bounced back to new peaks in 1999, suggesting the New Marijuana Epidemic in Atlanta could still have been in its expansion phase. On the other hand, the relatively steady rate observed from 1996 to 1998 suggests that the epidemic might have plateaued by 1996 and that the 1999 jump was an anomalous fluctuation.



**Birmingham—plateau/possible expansion.** Marijuana use among all adult arrestees in Birmingham dropped precipitously from 33 percent in 1988 to 12 percent by 1990. Subsequently, the rate among youthful arrestees increased dramatically from 15 percent in 1990 to 64 percent in 1996. The overall rate reached 40 percent in 1996. In 1998, the rate among youthful arrestees declined modestly

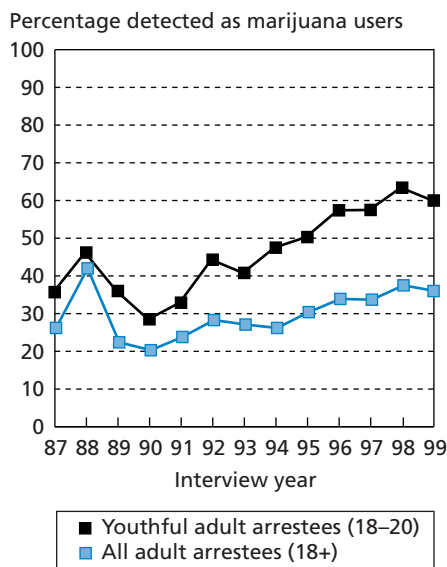
to 57 percent and then jumped to 69 percent in 1999. This suggests that the expansion phase may have continued through 1999. On the other hand, the lack of any increase in the rate of use from 1996 to 1998 suggests that the epidemic may have plateaued by 1996 and that the 1999 jump was an anomalous fluctuation.

**Birmingham**



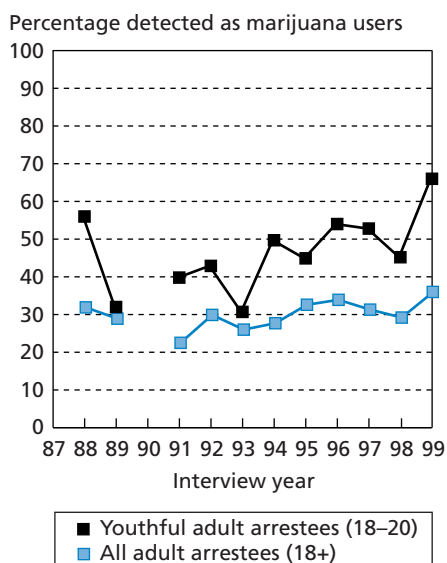
**Fort Lauderdale—plateau/possible expansion.** Marijuana use among all adult arrestees in Fort Lauderdale dropped from 42 percent in 1988 to 20 percent in 1990. The rate of detected marijuana use among youthful arrestees started a very slow but steady increase from a low of 28 percent in 1990 to 63 percent in 1998. The overall rate increased even more slowly, from 20 percent in 1990 to 38 percent in 1998. The modest dip in the rate in 1999 suggests that the epidemic might have reached a plateau in 1998. On the other hand, the relatively slow expansion and a history of 2 previous years in which the expansion appeared to have halted (1992–93 and 1996–97) suggest that the expansion may not have plateaued by 1999.

**Fort Lauderdale**



**Miami—no epidemic.** From 1988 through 1999, marijuana use among all adult arrestees in Miami fluctuated around 30 percent. The rate among youthful arrestees fluctuated within a wider range—between 31 and 66 percent. The dramatic 1-year jump in marijuana use among youthful arrestees, from 45 percent in 1998 to 66 percent in 1999, may have been caused by changes to the ADAM sampling procedures. The data suggest

**Miami**

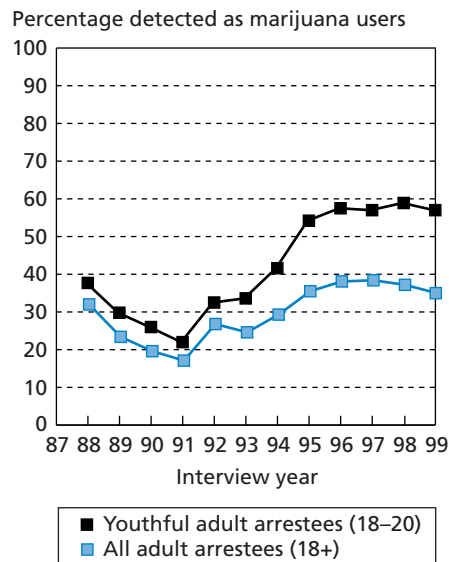


no sustained trend in marijuana use has occurred among arrestees. Miami experienced neither a sustained decline in marijuana use among arrestees nor the epidemic-like growth in use among youthful arrestees observed at other ADAM locations.

**The New Marijuana Epidemic among ADAM arrestees in the Southwest**

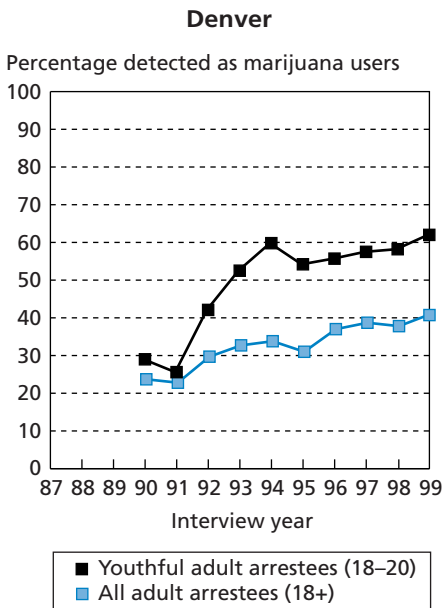
**Dallas—plateau since 1996.** Marijuana use among all adult arrestees in Dallas had dropped steadily from 32 percent in 1988 to 17 percent in 1991. The rate of detected marijuana use among youthful arrestees subsequently increased from 22 percent in 1991 to 57 percent in 1996. The overall rate increased to 38 percent. Both rates remained stable from 1996 through 1999.

**Dallas**

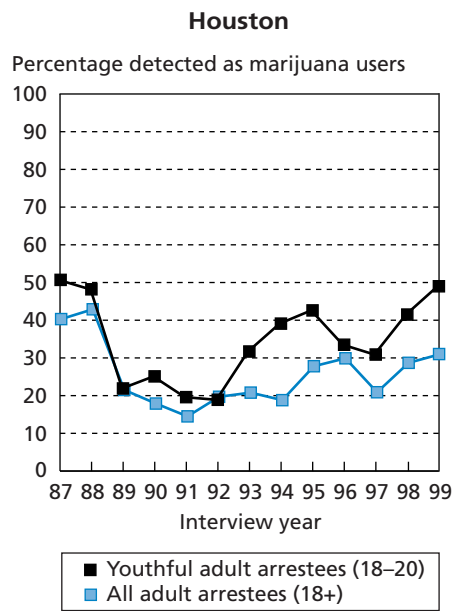


**Denver—plateau since 1994.** In Denver, the rate of detected marijuana use among youthful arrestees rose rapidly from 26 percent in 1991 to 60 percent in 1994, dropped modestly to 54 percent in 1995, and inched up to 62 percent by 1999. The overall rate

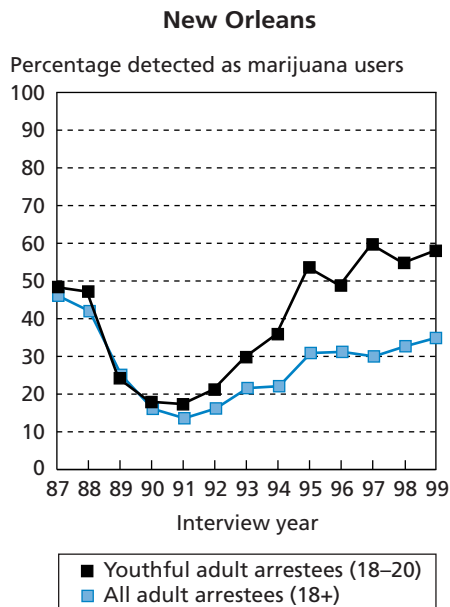
rose more slowly, from 23 percent in 1991 to 41 percent by 1999.



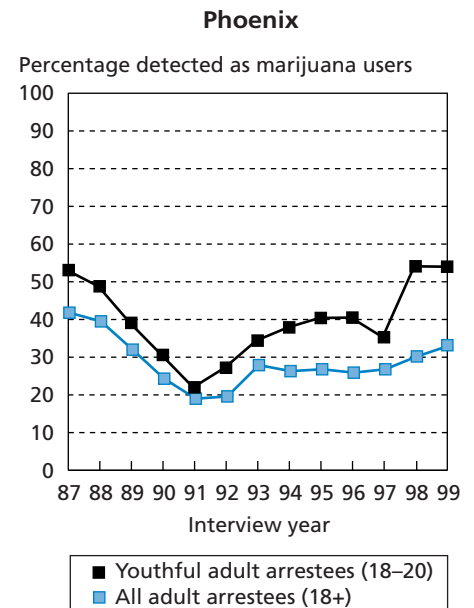
**Houston—plateau since 1995.** The rate of detected marijuana use among all adult arrestees in Houston dropped precipitously from 43 percent in 1988 to 14 percent by 1991. The rate among youthful arrestees bounced back from a low of 19 percent in 1992 to 43 percent in 1995. In 1996 and 1997, the rate among youthful arrestees dipped to about 31 percent and then returned to 49 percent by 1999. This increase in marijuana use among youthful arrestees—well above the previously established plateau level in 1995—may have been attributable to changes in ADAM sampling procedures. By 1999, the rate of detected marijuana use overall had returned to 31 percent, still far below the rate observed in the late 1980s and below the ADAM program average.



**New Orleans—plateau since 1995.** Marijuana use among all adult arrestees in New Orleans dropped precipitously from 46 percent in 1987 to 14 percent by 1991. Marijuana use among youthful arrestees subsequently increased from 17 percent (1991) to 54 percent (1995) and then fluctuated in the 50 percent to 60 percent range. The overall rate of detected marijuana use inched up to 35 percent by 1999, still well below the rate observed in the late 1980s.



**Phoenix—plateau since 1998.** The rate of detected marijuana use among all adult arrestees in Phoenix dropped steadily from 42 percent in 1987 to 19 percent in 1991. Subsequently, the rate among youthful arrestees entered a slow but steady expansion, increasing from 22 percent in 1991 to 40 percent in 1995. At that time, the marijuana epidemic appeared to have entered a plateau. However, youthful marijuana use jumped to 54 percent in 1998, where it remained in 1999. This increase suggests that the marijuana epidemic may have diffused in the 1997–98 period to another portion of the youths who tend to get arrested. This change could have also been caused by changes in police priorities or ADAM sampling procedures.

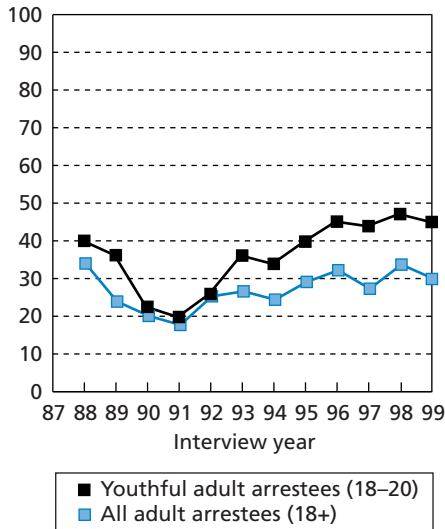


**San Antonio—plateau since 1996.** Marijuana use among all adult arrestees in San Antonio decreased from 34 percent in 1988 to 18 percent by 1991. The rate among youthful arrestees then slowly increased from 20 percent in 1991 to 45 percent in 1996, where it remained through 1999. Overall marijuana

use had increased to 32 percent by 1996 and fluctuated around this rate through 1999.

**San Antonio**

Percentage detected as marijuana users



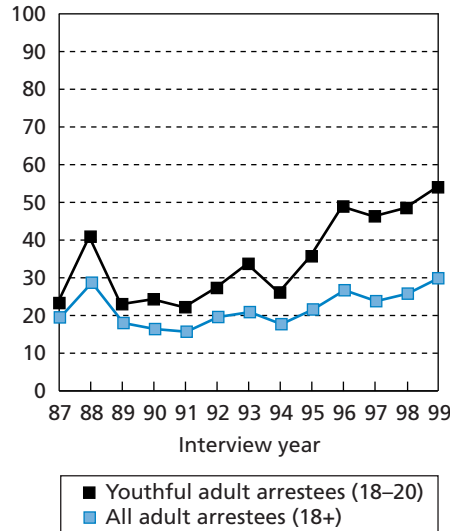
**The New Marijuana Epidemic among ADAM arrestees on the West Coast**

**Los Angeles—plateau/possible expansion.** It is difficult to determine the timing of a New Marijuana Epidemic in Los Angeles because the rate of increase in detected marijuana use among youthful arrestees was very slow in the early 1990s and because it took a dip in 1994, which suggests the rate had plateaued. However, the increase in detected marijuana use among youthful arrestees from 22 percent in 1991 to 49 percent in 1996 strongly suggests that a marijuana epidemic took place. In 1997, the rate among youthful arrestees declined modestly to 46 percent and inched up to 54 percent by 1999. This continued increase suggests that the epidemic may not yet have plateaued by 1999. However, it is possible that the modest increase in youthful marijuana use from 49 percent (1998) to 54 percent (1999)

was caused by changes in ADAM sampling procedures. If this was the case, the marijuana epidemic among youthful arrestees in Los Angeles may have plateaued as early as 1996. The overall rate of marijuana use inched up from 16 percent in 1991 to a high of 30 percent in 1999.

**Los Angeles**

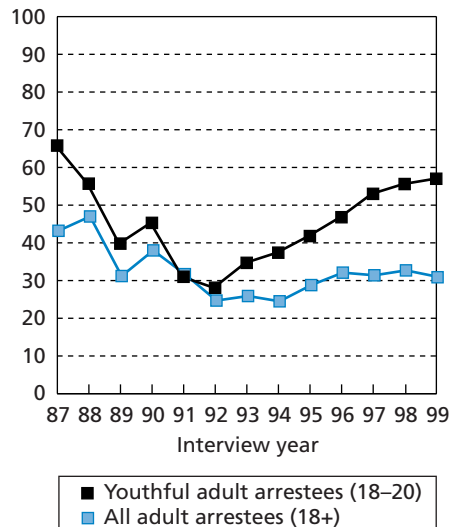
Percentage detected as marijuana users



**Portland (Oregon)—expansion 1992–99.** Marijuana use among all adult arrestees in Portland decreased

**Portland**

Percentage detected as marijuana users

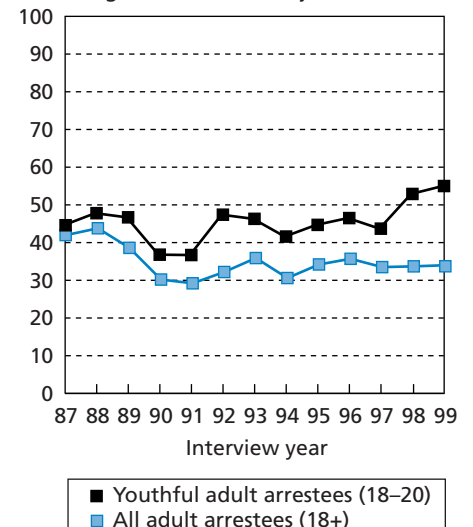


from 47 percent in 1988 to 25 percent in 1992. The rate of detected marijuana use among youthful arrestees subsequently expanded from 28 percent in 1992 to 57 percent in 1999. The overall rate increased only modestly to a peak of 33 percent in 1998.

**San Diego—no epidemic.** Marijuana use among San Diego’s youthful arrestees remained steady and relatively high from 1987 through 1999, ranging from 37 to 55 percent. Marijuana use among all adult arrestees exhibited a modest drop from 44 percent in 1988 to 29 percent in 1991. The rate then fluctuated around 34 percent through 1999. The rate of detected marijuana use among youthful arrestees exhibited a modest 1-year increase from 37 percent in 1991 to 47 percent in 1992. The rate among youthful arrestees subsequently fluctuated in the mid-40-percent range. The modest dip and recovery in youthful marijuana use from 1989 to 1992 seem much too small to constitute a new drug epidemic, although their timing is consistent with that of the New Marijuana Epidemic at other ADAM locations. Another steady but short

**San Diego**

Percentage detected as marijuana users

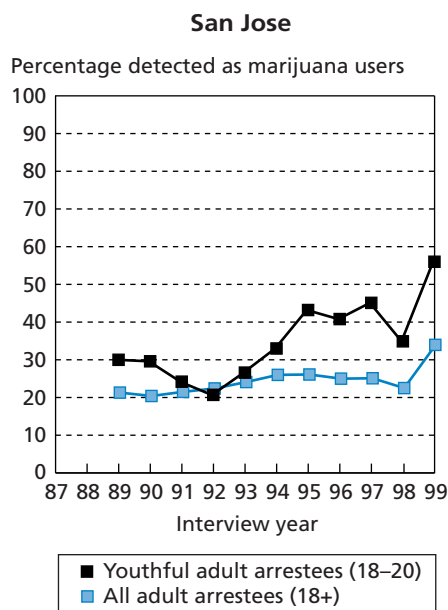




increase in youthful marijuana use occurred from 1997 to 1999, when the rate among youthful arrestees inched up from 44 to 55 percent. Again, the short period and rather modest increase suggest that this change was not part of a longer, sustained epidemic.

**San Jose—plateau since 1995.**

Overall, marijuana use among San Jose arrestees was relatively stable at about 24 percent from 1989 through 1998. The rate among youthful arrestees increased from 21 percent in 1992 to 43 percent in 1995, where it roughly remained through 1998. The sharp increase to 56 percent in 1999 may be an anomalous 1-year fluctuation.



**Conclusion**

This study identified that the increase in marijuana use among ADAM arrestees in the 1990s generally conformed to the conceptual model described earlier for the diffusion of a drug epidemic. Marijuana appears to have become the drug of choice among youths coming of age in the

1990s who tend to get in trouble with the law in the same way that crack had been the drug of choice previously. Analyses with two additional datasets of general population samples (the NHSDA and MTF surveys) further confirmed the existence and timing of this New Marijuana Epidemic. Continued monitoring of drug use among arrestees is essential to determine how long prevailing conditions will persist. Some of the key issues include the following:

- How long will marijuana remain the drug of choice among youths coming of age who tend to get in trouble with the law?
- Will marijuana-using members of the New Marijuana Generation continue to avoid use of other illicit drugs?
- To what extent will marijuana-using members of the New Marijuana Generation desist from such use as they grow older?

There are numerous ways to attempt to control drug abuse, including prevention, treatment, interdiction, and law enforcement. In response to recent trends, drug abuse control policies might logically shift much of their focus to marijuana. However, this is not as simple as just targeting marijuana use and users instead of crack or heroin users. For one, the nature of marijuana abuse is quite different, as noted by Grinspoon and Bakalar, who report that proportionately fewer marijuana smokers become dependent than users of alcohol, tobacco, heroin, or cocaine.<sup>14</sup> They suggest that psychotherapy may be the most appropriate treatment for a troubled youth who uses marijuana frequently, such as one who manifests alienation, emotional

withdrawal, overreaction to minor frustration, and antisocial behavior. They emphasize that the treatment is not for marijuana use itself but for an underlying problem that has marijuana abuse as one of its symptoms. They also suggest that the health risks of marijuana use are much less profound than those of cocaine or heroin use.

A standing argument for controlling marijuana use, based on the gateway theory, is that it can lead to use of more dangerous drugs. As determined in this study, however, the drug of choice for persons born in the 1970s and coming of age in the 1990s has been marijuana. These youths have been much less prone to progress to other drugs than their predecessors. This suggests that the gateway theory may be less relevant to their substance use experiences, which would be good news. It would also be good news if the marijuana use were associated with a rejection of crack and heroin due to their potentially devastating consequences.<sup>15</sup>

This rejection of other drugs may not be as characteristic of the broader population. From 1992 to 1997, the proportion of high school seniors reporting lifetime use of LSD increased from 8.6 percent to 13.6 percent, its highest recorded level since the start of the MTF program in 1975.<sup>16</sup> Use of hallucinogens in England and the United States has been frequently associated with the rave or dance party scene, typically involving white youths from middle- and upper-class suburban enclaves.<sup>17</sup> However, that is a different story about a different population of youths.

It would appear that more has changed than the prevailing drug of choice among arrestees. Ethnicographic studies

## E Distinguishing Age, Period, and Cohort Effects

Exhibit A shows the ADAM program average of detected marijuana use as a function of both an arrestee's birth year and the year of the ADAM interview. The exhibit distinguishes three types of social factors that can influence an individual's drug use: age, period, and cohort effects.\* Each row traces the marijuana use history of persons born in a

given year, known as a birth cohort. The entries in each row reflect changes in a birth cohort's level of marijuana use as arrestees age, to the extent that the ADAM program recruits from roughly the same population in a similar way each year. *Age effects* are those behaviors that develop as people grow older. Among the youngest birth cohorts, the preva-

lence of marijuana use typically increased in their late teens. For example, among the 1977 birth cohort, the rate of detected marijuana use grew from 32 percent at age 16 (in 1993) to 55 percent at age 18 (in 1995). To facilitate identification of age effects, the exhibit highlights three diagonals associated with ages 30, 25, and 18, respectively.

Exhibit A. Age-period cohort analysis of detected marijuana use among arrestees, ADAM program average

		Percentage Detected as Marijuana Users												
Interview Year	Birth Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total 18+
1901-39		8	9	9	5	5	8	11	8	10	10	9	9	8
1940-44		22	19	12	9	7	9	12	12	13	15	11	10	12
1945-49		22	22	15	10	9	12	15	15	13	14	16	14	14
1950-54		28	30	18	15	13	16	16	16	18	21	19	18	18
1955-59		33	34	21	16	15	19	21	18	21	22	21	21	21
1960		37	39	23	17	17	20	24	19	24	26	23	23	23
1961		38	37	27	20	18	21	26	20	25	28	27	26	25
1962		44	37	26	22	18	22	26	20	25	28	24	25	25
1963		43	41	28	20	20	24	24	24	27	33	25	25	27
1964		47	43	26	21	20	25	26	25	26	28	27	24	27
1965		43	46	28	22	19	26	25	27	29	32	28	29	28
1966		44	45	29	24	22	28	32	26	32	33	27	30	30
1967		39	42	30	24	22	27	29	28	32	32	31	32	30
1968		52	48	34	26	25	29	31	26	33	36	33	30	32
1969		37	44	32	24	27	31	33	30	34	38	35	34	33
1970		53	39	30	26	24	32	33	33	35	38	38	36	33
1971		19	32	31	24	26	35	35	35	40	40	38	35	34
1972			6	30	20	24	33	38	40	43	47	40	39	36
1973				8	22	24	35	38	41	46	44	46	38	39
1974					4	14	30	39	43	47	50	48	44	43
1975						14	29	41	47	50	53	52	50	49
1976							23	36	46	53	54	51	51	51
1977								32	47	55	59	54	53	55
1978									39	51	58	59	57	57
1979										51	62	59	62	53
1980											55	57	59	62
1981												59	56	60
1982													54	
<b>Total 18-20</b>		<b>44</b>	<b>44</b>	<b>31</b>	<b>24</b>	<b>25</b>	<b>33</b>	<b>40</b>	<b>45</b>	<b>51</b>	<b>57</b>	<b>56</b>	<b>58</b>	<b>42</b>
<b>Total 18+</b>		<b>34</b>	<b>35</b>	<b>24</b>	<b>19</b>	<b>19</b>	<b>24</b>	<b>28</b>	<b>29</b>	<b>33</b>	<b>37</b>	<b>37</b>	<b>37</b>	<b>30</b>

Each cell percentage represents an average across up to 23 ADAM locations and reflects data only from ADAM locations in which at least 25 responses were recorded. Highlighted in white, three diagonals indicate the arrestee's age at the time of the interview: age 30 (top diagonal), 25 (middle diagonal), and 18 (bottom diagonal). For example, when interviewed in 1990, persons in the 1960 birth cohort were 30 years old.

continued on page 16

in inner-city communities suggest that there has been a dramatic shift in the subculture of drug use and that interpersonal interactions have become more congenial and less violent.<sup>18</sup> In this way, drug-using members of the New Marijuana Generation are damaging themselves less physically and socially than the preceding generations of crack smokers and heroin injectors. They are also causing much less harm to the broader population.

In this regard, the potential for integrating persons from distressed inner-city communities into mainstream culture seems more promising than in the 1970s and 1980s. Perhaps this is the time to deemphasize “tough” drug enforcement policies in favor of indirect drug abuse control through the reduction of the economic, educational, and social barriers faced by many inner-city youths in establishing a healthy and productive mainstream lifestyle. Providing youths struggling

in distressed inner-city households with a greater stake in society may help create a more productive labor force and ensure further declines in drug abuse and its attendant criminality. If inner-city youths born in the 1970s who get in trouble with the law could be transformed into fully employable workers, their marijuana use might also decline as they assume conventional adult roles, just as marijuana use tends to recede among members of the general population.<sup>19</sup>

*continued from page 15*

### Distinguishing Age, Period, and Cohort Effects

The use of marijuana was affected by historical occurrences, or *period effects*, as shown by decreased levels of use (1988–90) and increased levels of use (1991–93) among persons from each birth cohort. Overall, as recorded in the bottom row of the exhibit, marijuana use among all adult arrestees (age 18+) declined from 35 percent in 1988 to 19 percent in 1990 and 1991. This broad decline could have been the result of increased drug law enforcement; greater involvement with other drugs, such as crack; or decreased availability of marijuana. The overall rate subsequently returned to 28 percent by 1993. This 5-year dip in usage (1988–93) was reflected in each birth cohort’s marijuana use experiences. For example, the marijuana use among arrestees born in 1960 declined from 39 percent (1988) to 17 percent (1990) and then returned to 24 percent (1993), where it remained relatively steady through 1998. The nature of this dip suggests that for the 1960 birth cohort, the period effect had an immediate impact of reducing marijuana use by 22 percentage points (from 39 to 17 percent) and a somewhat smaller long-term effect of reducing marijuana use by 15 percentage points. The older

birth cohorts experienced sharp short-term declines and more modest long-term declines from 1988 to 1993, except for the oldest arrestees. Arrestees born in the 1901–39 period had a relatively low level of marijuana use of 9 percent in 1988, which declined to 5 percent in 1990 but returned to a slightly higher level of 11 percent in 1993.

Some historical events permanently affect individuals at an impressionable age. Many persons who came of age during the Heroin Injection and Crack Epidemics persisted in their habits throughout much of their lives. In this manner, the use of each drug became associated with members of a particular birth cohort, a *cohort effect*. Marijuana use may have a similar effect on this new generation of drug users. The 1972 birth cohort reached age 18 in 1990, right at the lull in marijuana use among arrestees. Their rate of marijuana use dropped from 30 percent at age 17 (in 1989) to 20 percent at age 18 (1990) but continually increased to 47 percent by 1996. For this birth cohort, the period of lower marijuana use led them to postpone, but did not forestall, their involvement with marijuana. Unlike previous birth cohorts,

which had established their peak level of marijuana use by age 18, arrestees in the 1972–76 birth cohorts exhibited a rise in marijuana use in their early twenties. It would appear that more and more of them became involved with marijuana during the expansion phase of the New Marijuana Epidemic.

By 1996, a solid plateau in marijuana use had been established. Approximately 60 percent of arrestees who reached age 18 from 1996 to 1998 (the 1978–80 birth cohorts) were detected as marijuana users in 1996 and as they aged subsequently. From 1996 to 1998, the rate of marijuana use within each birth cohort remained relatively constant or declined modestly.

\* Discerning age, period, and cohort effects is complicated by the multicollinearity of these parameters—specifically, age = (interview year) – (birth year). Hence, it is not possible to naively include all three factors as independent variables in an algebraic equation such as employed in regression analysis. However, all three types of effects result in a distinctive pattern of birth cohort participation over time that can be discerned in a two-way table such as the exhibit.

## I Three Generations of Drug Use Among Arrestees

In a previous study,<sup>a</sup> the authors used ADAM data for Manhattan to identify three generations of arrestees with distinct drug use patterns: the Heroin Injection Generation (born 1945–54), Cocaine/Crack Generation (born 1955–69), and Marijuana/Blunts Generation (born 1970 and later). These findings show variation across birth cohorts in reported lifetime (ever) heroin injection,<sup>b</sup> lifetime (ever) crack use, and detected marijuana use.<sup>c</sup> The authors performed a comparable analysis for each ADAM location and produced similar findings at each, with only two exceptions.<sup>d</sup> In Phoenix, it appears that, among arrestees, the Crack Epidemic had not ended by 1998. San Antonio

appears to have never experienced a serious epidemic of crack use.

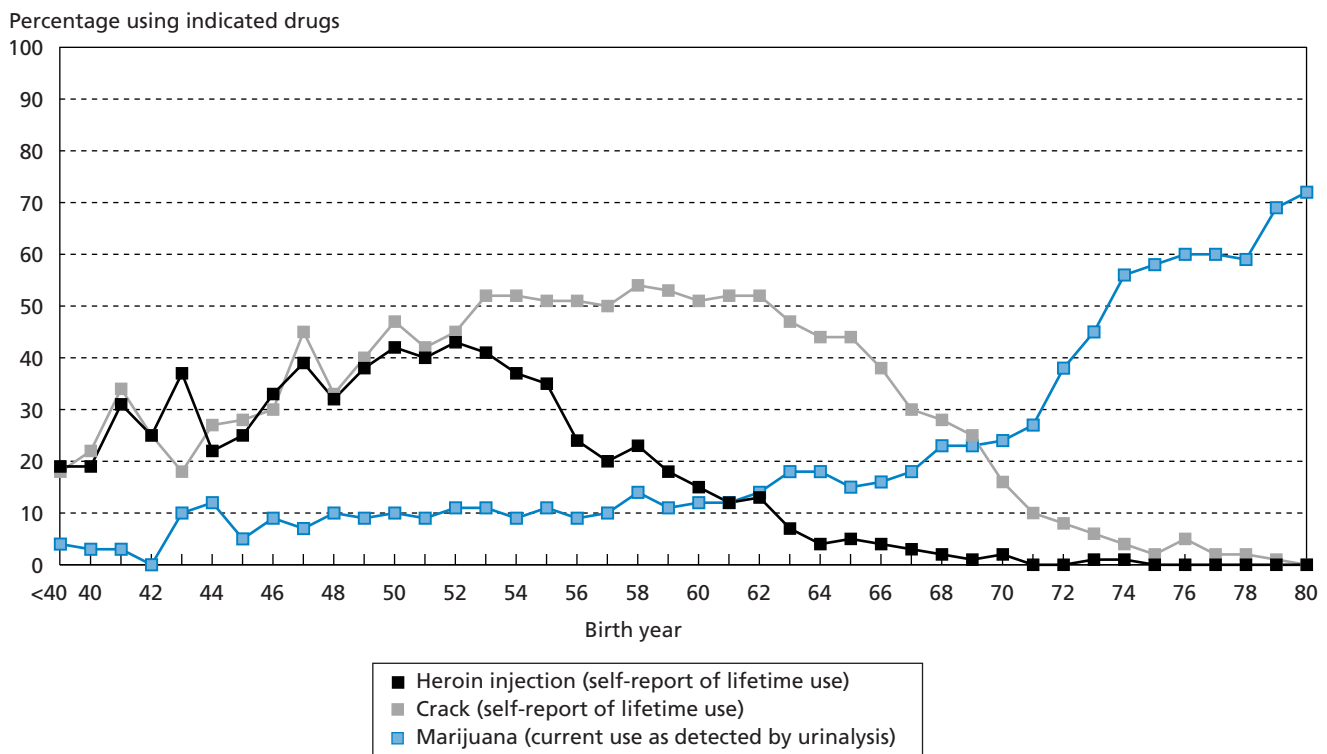
Findings based on all available ADAM data from 1989 to 1998 in Washington, D.C., were typical (see exhibit A). The prevalence of lifetime heroin injection peaked with persons born around 1950 and exhibited a sustained decline starting somewhere around the 1954 birth cohort, reaching near zero among birth cohorts of the 1970s. The prevalence of lifetime crack cocaine use peaked among persons born around 1960 and started to decline around the 1964 birth cohort. Recent marijuana use exhibited a dramatic and continuous increase with successive birth cohorts starting around

1970. Arrestees born since 1970, but especially after 1974, were likely to be detected as recent marijuana users and very unlikely to report lifetime heroin injection or crack use.

a. Golub, Andrew, and Bruce D. Johnson, "Cohort Changes in Illegal Drug Use Among Arrestees in Manhattan: From the Heroin Injection Generation to the Blunts Generation," *Substance Use and Misuse* 34(13)(1999):1733–1763.

b. Lifetime heroin injection was approximately determined from persons who reported both lifetime heroin use and lifetime injection of illicit drugs. This calculation was necessary because the ADAM questionnaire did not ask

Exhibit A. *Three generations\* of drug users among Washington, D.C., arrestees in the ADAM program*



\*Heroin Injection Generation: 1945–54; Cocaine/Crack Generation: 1955–69; Marijuana/Blunts Generation: 1970+

continued on page 18

continued from page 17

## Three Generations of Drug Use Among Arrestees

explicitly about heroin injection in all years of the survey. At some locations, many individuals reported injection drug use but not heroin use (they may have been injecting cocaine or amphetamines) and others reported heroin use but no injection drug use (many were presumably sniffers).

c. Variations in substance use across birth years can be caused by age, period, or cohort effects. The authors confirmed that heroin injection, crack smoking, and marijuana use among ADAM-Manhattan arrestees were the result of period effects in three separate age-period-cohort analyses for detected use of opiates, cocaine, and marijuana (see Golub, Andrew, and Bruce D. Johnson, "Cohort Changes in Illegal Drug Use Among Arrestees in Manhattan: From the Heroin Injection Generation to the Blunts Generation," *Substance Use and Misuse*). Similar confirmation was performed for each of the remaining ADAM sites for detected use of marijuana (see Golub, Andrew, and Bruce D. Johnson, "Monitoring the Marijuana Upsurge With DUF/ADAM Arrestees," final report submitted to the U.S. Department of Justice, National Institute of Justice, Washington, DC, 2000) and for detected use of cocaine (see Golub, Andrew, and Bruce D. Johnson, *Crack's Decline: Some Surprises Across U.S. Cities*, Research in Brief, Washington, DC: U.S. Department of Justice, National Institute of Justice, July 1997, NCJ 165707).

d. Golub, Andrew, and Bruce D. Johnson, "Monitoring the Marijuana Upsurge With DUF/ADAM Arrestees."

## Notes

1. Office of National Drug Control Policy, *The National Drug Control Strategy: 1997*, Washington, DC: Office of National Drug Control Policy, 1997:23, NCJ 163915.
2. Gfroerer, Joseph C., and Joan F. Epstein, "Marijuana Initiates and Their Impact on Future Drug Abuse Treatment Need," *Drug and Alcohol Dependence* 54(3)(1999):229–237.
3. Research in a wide variety of fields has documented that new innovations often spread within a population following a pattern similar to a disease epidemic (see Rogers, Everett M., *Diffusion of Innovations*, 4th ed., New York: Free Press, 1995). The term "epidemic" is employed in this report as a synonym for "diffusion of innovation" and refers to the rapid and broad spreading of a practice (such as smoking marijuana) within a population or sub-population (such as among 16- to 25-year-olds).
4. Golub, Andrew, and Bruce D. Johnson, "A Recent Decline in Cocaine Use Among Youthful Arrestees in Manhattan (1987–1993)," *American Journal of Public Health* 84(8)(1994): 1250–1254; Golub, Andrew, and Bruce D. Johnson, *Crack's Decline: Some Surprises Across U.S. Cities*, Research in Brief, Washington, DC: U.S. Department of Justice, National Institute of Justice, July 1997, NCJ 165707.
5. Golub, Andrew, and Bruce D. Johnson, "Cohort Changes in Illegal Drug Use Among Arrestees in Manhattan: From the Heroin Injection Generation to the Blunts Generation," *Substance Use and Misuse* 34(13)(1999):1733–1763; Johnson, Bruce D., and Andrew Golub, "Generational Trends in Heroin Use and Injection Among Arrestees in New York City," in *One Hundred Years of Heroin*, ed. David Musto, Westport, CT: Greenwood, forthcoming.
6. In a more detailed report, the authors provide analyses of marijuana use trends over time within five mutually exclusive age categories. See Golub, Andrew, and Bruce D. Johnson, "Monitoring the Marijuana Upsurge With DUF/ADAM Arrestees," final report submitted to the U.S. Department of Justice, National Institute of Justice, Washington, DC, 2000.
7. Johnson, Bruce D., and Andrew Golub, "Generational Trends in Heroin Use and Injection Among Arrestees in New York City."
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