

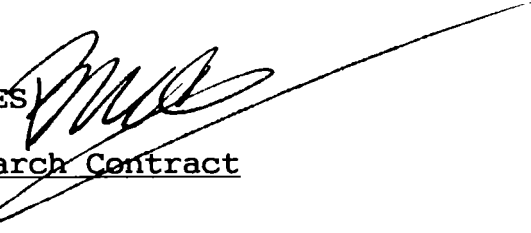
| ONDCP RESEARCH CONTRACTS |



OFFICE OF NATIONAL DRUG CONTROL POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
Washington, D.C. 20500

March 1, 1993

MEMORANDUM FOR JOSE CERDA

FROM: BRUCE CARNES 
SUBJECT: ONDCP Research Contract

I understand from Ricia McMahon that you are working drugs and crime issues for the Domestic Policy Council.

Attached are several recent products which I think you will find of interest. We can provide more, or arrange a briefing for you on our full research agenda, if you like.

If you have questions about these or about other research projects underway, please feel free to contact me, at 467-9860.

Attachment

LIST OF ATTACHMENTS

- TAB 1 --- WHAT AMERICA'S USERS SPEND ON ILLEGAL DRUGS
- TAB 2 --- TRACKING THE INCIDENCE OF HEROIN USE: IS THERE A POSSIBLE EPIDEMIC?
- TAB 3 --- CHARACTERISTICS OF HEAVY COCAINE USERS, INCLUDING POLYDRUG USE, CRIMINAL ACTIVITY, AND HEALTH RISKS
- TAB 4 --- INFORMATION BRIEF: RECENT EFFECTS OF INCREASED DRUG OFFENSE SANCTIONS ON STATE PRISON POPULATIONS
- TAB 5 --- PRIMARY AND SECONDARY APPROACHES TO SUBSTANCE ABUSE PREVENTION: WHAT WORKS AND WHY?
- TAB 6 --- PRELIMINARY PLAN FOR ESTIMATING THE NUMBER OF HARD-CORE USERS

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1

Divider Title: _____

WHAT AMERICA'S USERS SPEND ON ILLEGAL DRUGS, 1988-1991

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Paul Scheiman
Kenneth Carlson

Abt Associates, Inc.
February 23, 1993

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WHAT AMERICA'S USERS SPEND ON DRUG CONSUMPTION

Introduction

EXECUTIVE SUMMARY

As part of an ongoing project to determine how much Americans spend on illegal drugs, this report focuses on the amount and retail sales value of cocaine, heroin, marijuana, and other illegal drugs Americans consumed from 1988 through 1991. We used two approaches to make these estimates. First, we estimated the amount of illicit drugs Americans consume. From this perspective, we estimate that:

- In 1991, Americans spent about \$49 billion on these drugs: \$30 billion on cocaine, \$9 billion on heroin, \$8 billion on marijuana, and \$2 billion on other illegal drugs and legal drugs used illicitly (Table A).¹
- Between 1988 and 1991, the expenditures on cocaine and heroin appear to have been stable.²
- Between 1988 and 1991, consumption of marijuana fell markedly (although dollar expenditures on marijuana fell less because the price increased throughout this period).
- Between 1988 and 1991, expenditures on other illicit drugs, and on legal drugs used illicitly, both fell.

A second approach to estimating the retail sales value of illicit drugs consumed in the United States is to estimate the amounts supplied to the domestic market. From this perspective, we estimate that:

- About 274 to 442 metric tons of cocaine were available for domestic consumption in 1991 (Table B) (for reasons discussed in the report, it is not practical to develop estimates for heroin, marijuana, and other drugs).³ There has been about a 1 percent decrease in the amount of cocaine available for consumption in the United States between 1988 and 1991.

¹ Money is not the only form of payment for illicit drugs. Dealers often keep drugs for personal use. users help dealers in exchange for drugs, and users perform sex for drugs (especially crack cocaine). When such "income in kind" is valued at current retail prices, an additional \$2 billion to \$3 billion must be added to the total for cocaine and about \$3 billion to the total for heroin.

² A temporary rise in the price of cocaine in 1990 probably caused a reduction in consumption. Total expenditures remained about the same, however, as the higher price partly offset the decline in use.

³ About 331.140 metric tons of coca leaf crop were cultivated in South America during 1991, yielding about 930 metric tons of cocaine hydrochloride. To arrive at the total available for domestic consumption, we subtracted from this amount losses in shipment, shipments to other consumer countries, and Federal seizures.

- The street value of the 274 to 442 metric tons of cocaine is \$42 to \$68 billion (Table B).⁴ Between 1988 and 1991, Americans spent \$38 billion to \$68 billion annually on cocaine.

Note that the \$38 billion to \$68 billion range on cocaine expenditures from the supply model is larger than the consumption-based estimates of \$27 billion to \$30 billion (Table A). There are two reasons for this. First, the supply model does not take into account most losses and consumption within the producer countries or State and local seizures in this country. Second, the United States may transship more drugs to Europe than our model assumes. Had we been able to account for these factors, the \$38 billion to \$68 billion supply-based estimate (Table B) would have been lower. Still, the estimates based on drug consumption are remarkably close to those based on drug supply.

Although these estimates are imprecise, they are sufficiently reliable to conclude that the trade in illicit substances was roughly \$45 billion to \$51 billion between 1988 and 1991, according to consumption-based estimates (Table A).⁵ The costs to society from drug consumption, however, exceed this amount. Drug use fosters crime; causes catastrophic health problems, such as hepatitis, endocarditis, and AIDS; and disrupts personal, familial, and legitimate economic relationships. The public bears much of the burden of these indirect costs because it finances the criminal justice response to drug-related crime, a public treatment system, and anti-drug prevention programs.

The importance of these estimates is that they facilitate the development of a systematic methodology for integrating the various indicators (e.g., crops in foreign countries, drugs seized at the borders, arrests made in American cities) that can help policymakers to better understand the dynamics of the drug trade and to better fashion appropriate policy responses.

⁴ Prevailing retail prices are used to convert drug supply to a dollar equivalent value when sold to final users.

⁵ By comparison, Americans spent \$26 billion on alcohol and \$23 billion on tobacco in 1988. State and local governments spent \$26 billion on law enforcement and \$170 billion on public education.

79

80

TABLE A

81

Total U.S. Expenditures on Illicit Drugs, 1988-1991

82

(\$ in billions)

83

84

1988198919901991

85

Cocaine

\$26.5

\$30.0

\$26.9

\$29.7

86

Heroin

\$9.7

\$9.4

\$8.2

\$8.9

87

Marijuana

\$9.5

\$8.5

\$7.5

\$7.7

88

Other Drugs

\$3.2

\$2.8

\$2.3

\$2.4

89

Total

\$48.9

\$50.7

\$44.9

\$48.6

90

91

Note: Columns may not add due to rounding.

92

Source: See Tables 1 through 13

93

94
95
96
97
98
99

TABLE B

Trends in Cocaine Supply, 1989-1991
(in metric tons unless otherwise noted)

		<u>1989</u>	<u>1990</u>	<u>1991</u>
100	Coca Leaf Crop ¹	295,072	305,893	331,140
101	Maximum Potential Cocaine			
102	HCl Produced ²	826	858	930
103	Seized in Foreign Countries ³	70	152	199
104	Shipped to the United States	377-544	361-525	382-550
105	Seized by Federal Authorities ⁴	99	107	108
106	Available for Consumption in			
107	the United States	278-445	254-418	274-442
108	Retail Value in the United States			
109	(in billions of dollars)	\$38-\$60	\$45-\$74	\$42-\$68

111 ¹International Narcotics Control Strategy Report (INCSR), 1992, 28. There
112 is an error in the coca leaf estimate for 1989 in Bolivia; refer to Bolivia
113 Statistical Table (p. 97) for the correct number.

114 ²This is the amount of cocaine HCl (or pure cocaine) that could have been
115 produced had there been no seizures, consumption, or losses at any stage of
116 production.

117 ³INCSR, 1992; United Nations, International Narcotics Control Board
118 (INCB), Narcotic Drugs, Statistics for 1990; and the Royal Canadian Mounted
119 Police, National Drug Intelligence Estimate 1990.

120 ⁴Drug Enforcement Administration, Federal-Wide Drug Seizure System, 1989-
121 1991.
122

WHAT AMERICA'S USERS SPEND ON ILLEGAL DRUGS

In 1991, the Office of National Drug Control Policy (ONDCP), working with Abt Associates, reported that Americans spent an estimated \$40 billion to \$52 billion a year between 1988 and 1990 for illicit drugs and for licit drugs used illegally. New data and methodology have enabled us to improve those estimates.

To estimate the retail sales value of illicit drugs consumed in the United States, we examined both the demand for and the supply of drugs. The demand or *consumption approach* estimates the number of drug users, how much they spend on drugs, and the amount of drugs they consume. The *supply approach* estimates the volume of drugs available for consumption. To determine the amount of drugs available in this country and the retail value of these drugs, we estimated the amount of base crop raised in producer countries, and reduced it by the amounts lost, seized, or consumed in other countries and by the amount seized in or shipped through the United States to other countries. We then multiplied the result by retail prices.

For a number of reasons, neither of these approaches yields precise estimates of the yearly retail value of the illegal drug trade. First, the secretive nature of drug crop production and manufacturing prevents accurate assessments of drug production. Second, with some exceptions, drug dealers and their customers transact business away from public view. Finally, drug users misrepresent their drug use when interviewed. Thus, estimates of retail expenditures must be based on incomplete, inaccurate, and often inconsistent data, as well as assumptions that occasionally lack strong justification.

Therefore, we encourage an evaluation of our findings in three ways. First, the reader can compare our estimates with those reported elsewhere. Second, the reader should also consider whether or not the two independent approaches used in this report (supply and consumption) reach similar conclusions about the amount American drug users spend on drugs. Finally, our calculations can be replicated using alternative assumptions the reader finds more plausible than the ones we use.

The report is divided into three sections. Section I reports estimates derived using the consumption approach. Section II reports estimates for cocaine derived from a supply approach. Section III summarizes and reconciles the differences between the two approaches.

I. CONSUMPTION APPROACH

COCAINE AND HEROIN

Between 1988 and 1991, American users spent \$27 billion to \$30 billion yearly on cocaine and \$8 billion to \$10 billion yearly on heroin. To arrive at these estimates, we multiplied the number of users by their average expenditures.

The number of cocaine and heroin users

The National Household Survey on Drug Abuse (NHSDA), the Nation's most comprehensive survey of drug use, measures drug use among the American household population age 12 and older as well as people living in group quarters and the homeless.⁶ The NHSDA misses a part of the population that may be a key to determining the extent of drug use: those who, although not homeless, are too unstable to be considered as part of a household, or who, if part of the household, are unlikely to answer surveys.⁷

However, this population is well represented in data collected by the Drug Use Forecasting (DUF) program, which questions a random sample of arrestees in 22 central city jails and lockups about their drug use.⁸ DUF also asks arrestees to

⁶ The NHSDA excludes military personnel, those incarcerated in jails and prison, and those who are residents of treatment facilities. Military personnel, whose consumption of illicit substances is monitored through urinalysis, do not have the opportunity to be heavy drug users. Those incarcerated in jails and lockups may use drugs, but that consumption must necessarily be limited by restricted availability. Sources at the National Institute on Drug Abuse consider drug use by those in residential treatment facilities to be minimal.

⁷ Evidence that a large segment of the drug-using population is excluded from the NHSDA comes from a number of sources. According to the 1991 NHSDA, drug use is twice as high among respondents who lived in households considered unstable than it is among those who lived in more stable environments, indicating that the NHSDA's bias towards reporting on stable households is likely to miss many heavy drug users. Available evidence indicates that household numbers understate their drug use (A. Harrell, K. Kapsak, I. Cisin, and P. Wirtz, "The Validity of Self-Reported Drug Use Data: The Accuracy of Responses on Confidential Self-Administered Answer Sheets," paper prepared for the National Institute on Drug Abuse, Contract Number 271-85-8305).

Additional evidence also comes from interviews with nearly 35,000 intravenous drug users who were contacted by National Institute on Drug Abuse-sponsored researchers as part of an AIDS outreach project. Abt tabulations show that an estimated 40 percent of these drug users lived in unstable households and about 10 percent could be considered homeless.

Finally, a comparison of the demographic characteristics of the heavy cocaine users in the NHSDA with those of heavy cocaine users based on other sources (the Drug Use Forecasting program, the Drug Abuse Warning Network, and the National AIDS Demonstration Research project) shows a marked difference in populations. Incomes are greater, unemployment is lower, and there are fewer respondents using more than one drug in the NHSDA population.

⁸ A large percentage of heavy drug users are arrested at some time in their drug-using "careers," so the criminal justice system provides valuable supplemental data when counting heavy drug users. For example, in the 1991 Household Survey, about half of the heavy cocaine users surveyed in the 1991 NHSDA, had been arrested and booked at some time, 19 percent during the year prior to the survey. In the National AIDS Demonstration Research data, 81 percent of heavy cocaine users had been arrested at some time in their lives.

212 voluntarily produce samples for urinalysis. This helps confirm
213 whether the interviewees have used up to 10 types of drugs during
214 the two to three days before the interview. Although urinalysis
215 is subject to error and tells us nothing about the frequency of
216 drug use, it adds credence to estimates of drug use when self-
217 reports are unreliable.

218 The heavy user is identified in the NHSDA as one who used
219 cocaine at least one or two days a week every week during the
220 year before the survey, or one who used heroin on more than 10
221 days during the month before the survey. In this analysis, heavy
222 users in the DUF data are defined as those who admitted using
223 cocaine or heroin on at least 11 days of the month before being
224 arrested. Casual users are identified in the NHSDA as those
225 whose drug use was less frequent than the heavy drug use criteria
226 described above. Casual use cannot be estimated from DUF.⁹

227 Table 1 provides estimates of the number of heavy and casual
228 cocaine and heroin users derived from the NHSDA and the DUF
229 data.¹⁰ (Drug users who use other drugs will be discussed
230 later.) Note that because the NHSDA was not administered in
231 1989, the 1989 NHSDA estimates used in this report are the

232 and one-third had been in jail or prison during the six months prior to the interview.

233 ⁹ Because urinalysis will detect cocaine and heroin use within two to three days of its consumption, it
234 is unlikely that urinalysis will fail to identify an individual who uses cocaine on at least a weekly basis.
235 (Most weekly users use it more frequently than once a week.) However, a casual user is likely not to have used
236 cocaine or heroin within two to three days of his or her arrest. Consequently, DUF would frequently fail to
237 identify casual users. Arguably, the EMIT test used by DUF understates drugs in the urine of arrestees. C.
238 Visser and K. McFadden, A Comparison of Urinalysis Technologies for Drug Testing in Criminal Justice, NCJ-
239 129292, June 1991. However, it seems reasonable that casual users are more likely than heavy users to have an
240 erroneous negative urine test, so we have not adjusted the DUF urine test results to reflect the EMIT test's
241 false negative rate of about 20 percent. For evidence supporting this decision, see T. Mieczkowski,
242 "Immunochemical Hair Assays, Urinalysis, Self Reported Use and the Measurement of Arrestee Cocaine and Marijuana
243 Exposure in a Large Sample," paper presented at the Annual Meetings, American Society of Criminology, New
244 Orleans, November 7-22, 1992.

245 ¹⁰ Methods used to convert the DUF data into estimates of heavy drug users throughout the criminal
246 justice system have been described in W. Rhodes, "Synthetic Estimation Applied to the Prevalence of Drug Use,"
247 Journal of Drug Issues, (in press). To summarize, the DUF program is not a probability sample of arrestees,
248 so a weighting scheme was used to derive an estimate of the percentage of arrestees who would be expected to
249 test positive in each of the DUF sites. The DUF sites overrepresent large city lockups, so a mathematical model
250 was used to infer the percentage of arrestees who would have tested positive in non-DUF sites if DUF programs
251 had operated in those sites. There is an unknown number of active drug users who run more than a negligible
252 risk of being arrested at some time between the first and last times they used drugs - that is, during their
253 drug use careers. The DUF data provide estimates of the number who were arrested during a given year. A mathe-
254 matical model, based on a truncated Poisson process, then provides estimates of the number who were at risk of
255 being arrested during that year. An estimate of that at-risk group, those who are "involved with the criminal
256 justice system," is reported here. These figures do not include heavy users who are incarcerated. A Bureau
257 of Justice Statistics study reports "In State correctional facilities, 3.6 percent of the tests for cocaine,
258 1.3 percent for heroin, 2.0 percent for methamphetamine, and 6.3 percent for marijuana found evidence of drug
259 use. In Federal prisons 0.4 percent of the tests for cocaine, 0.4% for heroin, 0.1 percent for methamphetamine,
260 and 1.1 percent for marijuana were positive" (C. Harlow, "Drug Enforcement and Treatment in Prison, 1990," NCJ-
261 134724, July 1992). These percentages are probably high because tests are most likely to be conducted when drug
262 use is suspected. In any case, drug use in prisons cannot account for much of the drug use that occurs in
263 America.

average of 1988 and 1990 data. To obtain a composite estimate, we added estimates from DUF, and then subtracted the overlap.¹¹ The result shows that between 1988 and 1991, there were about 2.0 million to 2.3 million Americans who were heavy users¹² of cocaine and approximately 5.4 million to 7.3 million who were casual users. Another 515,000 to 642,000 Americans were heavy users of heroin, and 471,000 to 539,000 were casual users.¹³ Although imprecise, these estimates are consistent with those reported by others whose methodologies and data differed from those used here.

¹¹ DUF data are used to produce estimates of the number of adult heavy users who are at risk of arrest during a given year. However, some heavy drug users manage to avoid criminal justice involvement, perhaps because their drug purchases are discreet and their consumption is private. Also, juveniles who are heavy users are not reflected in DUF. When deriving a composite figure, only the percentage of adults who avoided the criminal justice system and juveniles are counted in the heavy use category of the NHSDA. The remainder are assumed to have already been included in the DUF heavy user tally. For the years 1988 through 1991, the percentages of NHSDA respondents who were included in our estimates of heavy users were 56 percent, 58 percent, 60 percent, and 56 percent for cocaine and heroin. These percentages were based on arrest histories as reported in the NHSDA.

¹² The DUF data and the Uniform Crime Reports data, used in the computing algorithm, were not available for 1991 at the time these calculations were made. Instead, the number of heavy users of cocaine and heroin for 1991 was projected based on an assumed proportionality between emergency room mentions of cocaine/heroin and the number of heavy users. Between 1988 and 1990, the ratio of the number of cocaine users who were involved with the criminal justice system compared with the number of emergency room mentions reported through the Drug Abuse Warning Network was about 17 to 1. For heroin, the ratio was 15 to 1. Abt analysts applied these ratios for cocaine and heroin to 1991 emergency room mentions to get the estimate of heavy users in 1991, reported in Table 1.

¹³ A large number of drug users use both heroin and cocaine. For example, 26 percent of the heavy cocaine users in the DUF sample are current heroin users, and 16 percent of them use heroin daily.

TABLE 1				
Estimated Number of Heavy and Casual Users of Cocaine and Heroin, 1988-1991				
	1988*	1989*	1990*	1991
NHSDA				
Cocaine				
Heavy	884,148	776,765	668,328	625,000
Casual	7,347,000	6,466,000	5,585,000	5,440,000
Heroin				
Heavy	13,000	13,000	13,000	13,000
Casual	539,000	505,000	471,000	381,492
DUF				
Cocaine				
Heavy	1,587,052	1,884,778	1,561,351	1,790,946
Heroin				
Heavy	635,780	619,241	509,603	580,248
COMPOSITE				
Cocaine				
Heavy	2,082,321	2,334,509	1,965,544	2,142,597
Casual	7,347,000	6,466,000	5,585,000	5,440,000
Heroin				
Heavy	641,664	625,126	515,487	586,132
Casual	539,000	505,000	471,000	381,492
* The NHSDA estimates of cocaine users is adjusted for 1988 and 1990 to account for the survey's limited coverage during those years. The adjustment adds an estimate of heavy drug users who live in college dormitories to the estimate of heavy users derived from the NHSDA. Students living in college dormitories are represented in the 1991 NHSDA. The NHSDA was not administered in 1989. Estimates for 1989 are the averages for 1988 and 1990.				
Sources: NHSDA 1988, 1990, 1991; DUF 1988, 1989, 1990; Uniform Crime Reports (UCR) 1988, 1989, 1990				

Figure 1 displays the number of heavy users reported in Table 1 and the Drug Abuse Warning Network (DAWN) emergency room (ER) mentions of cocaine and heroin. The annual changes in the number of heavy users closely follow changes in the number of ER mentions for cocaine and heroin. This lends credibility to the patterns reported in Table 1.¹⁴

Note that the number of heavy cocaine users fell by about 370,000 from 1989 to 1990 before increasing by about 180,000 in 1991. One explanation for the decline in 1990 concerns changes in the price of cocaine. One pure gram of cocaine sold for about

¹⁴ The dramatic decreases in use in 1990 mean that although some people may have stopped using drugs it is more plausible that they used cocaine and heroin less than weekly during 1990.

\$135 in 1989, \$178 in 1990, and \$154 in 1991. Since the use of cocaine fluctuates with changing prices, the price increase in 1990 may have resulted in a smaller amount of cocaine being consumed that year.¹⁵ More troubling, however, is determining why cocaine prices rose during 1990. As explained in section II, the cocaine supply during this three-year period did not change enough to have a large impact on the price of cocaine. This seeming contradiction will be discussed later in the report.

The number of heavy heroin users fell by about 110,000 from 1989 to 1990 before increasing by about 70,000 in 1991.¹⁶ It is difficult to account for the drop in heroin users in 1990. It may be that since heroin users frequently consume cocaine and heroin together, less cocaine use may result in less apparent heroin use.

Average amount spent on cocaine and heroin

The NHSDA interview asks its respondents, "How much did you spend on cocaine during the last 30 days?" Based on answers to that question, Table 2 reports the average weekly expenditures for drugs. Although these tabulations are useful, their utility is diminished because so few respondents answered this question.¹⁷ This makes the estimate of average expenditures imprecise, and year-to-year variations may reflect sampling error rather than changes in behavior. Furthermore, since the NHSDA does not report expenditure for heroin, we used a provisional figure of \$50 a week for casual users.

TABLE 2

Average Weekly Expenditures Reported by Household Members, 1988-1991

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
Cocaine				
Heavy use	\$133	\$130	\$127	\$90
Casual use	\$15	\$19	\$23	\$28
Heroin				
Casual use	\$50	\$50	\$50	\$50

Source: NHSDA 1988, 1990, 1991

¹⁵ See R. Hyatt and W. Rhodes, Abt Associates, Inc., Price and Purity of Cocaine: The Relationship to Emergency Room Visits and Deaths, and to Drug Use among Arrestees, ONDCP White Paper, October 1992.

¹⁶ The 1991 estimate of heavy users is based on the numbers of ER mentions for 1991, so the agreement between 1991 estimates of the number of heavy users and the 1991 ER mentions provides no independent confirmation.

¹⁷ In the 1991 NHSDA, 89 respondents reported that they used cocaine weekly during the past year and also reported some expenditure during the month prior to the interview.

The 1989 and 1990 DUF interview also asked respondents how much they spent on drugs during a week.¹⁸ But the question did not separate cocaine from heroin spending or exclude other drugs, so we must distinguish between how much is spent on cocaine and how much is spent on heroin. Also, some respondents gave answers that were implausibly large,¹⁹ so we adjusted estimates to moderate the effect of extreme values.

Based on the methodology explained in the technical appendix, heavy cocaine users spend less than \$220 a week on cocaine and heavy heroin users spend somewhat more than \$250 a week on heroin (Table 3).²⁰ These DUF estimates lack precision, but they are reasonable considering other data about expenditures on illicit drugs (see technical appendix).

TABLE 3

Weekly Median Cocaine and Heroin Expenditures
Reported by Arrestees, 1989-1990

	<u>1989</u>	<u>1990</u>
Cocaine		
Heavy use	\$211	\$217
Heroin		
Heavy use	\$250	\$261

Source: DUF 1989, 1990

¹⁸ The 1988 interview did not ask about expenditures; the 1991 data are not yet available.

¹⁹ For example, there are physiological limits to drug consumption. Given the duration of a single administration of heroin, it is unnecessary to shoot heroin more often than four times a day every day. Given New York State Department of Substance Abuse Services approximations of typical drug use, it seems unlikely that a heavy user could spend any more than \$420 per week, and even this would be an extremely high level of consumption (New York State Department of Substance Abuse Services, Memorandum, n.d.).

Cocaine use triggers the desire for more of the drug. Binge use exhausts the body, so rest is necessary before another binge. Also, heavy cocaine use can quickly exhaust a user's financial resources. Except for the rare cocaine user, expenditures greater than those assumed here are unlikely.

²⁰ These estimates are median values; mean values are about twice as large. However, the median expenditure seemed more justifiable given other studies of drug expenditure patterns.

423 Several studies provided estimates consistent with ours.²¹
424 A few others, however, reported drug expenditures that were much
425 higher.²² Many of these latter studies, however, were derived
426 from samples of people who had just entered treatment. Because
427 people often enter treatment when their habits have become too
428 expensive, these individuals may be at the peak of their drug
429 use, which is higher than that of most heavy users.

430 Total expenditures on cocaine and heroin

431 Between 1988 and 1991, American users spent \$27 billion to
432 \$30 billion yearly on cocaine and \$8 billion to \$10 billion
433 yearly on heroin (Table 4). We derived these estimates by
434 multiplying the number of heavy and casual users in Table 1 by
435 the expenditures in Tables 2 and 3 (after eliminating the
436 overlap) and adding results.²³

437 ²¹ Johnson and Wish surveyed property criminals in 1983 and estimated their weekly expenditures on
438 cocaine to be \$203 and expenditures on heroin to be \$203. Reuter, et al. interviewed a sample charged with
439 selling drugs in Washington, D.C. from 1985 to 1987. They estimated median weekly expenditures on illicit drugs
440 at \$100. However, Reuter's sample included users who did not use drugs heavily, so his estimate is expected
441 to be lower than ours. Johnson and colleagues surveyed about 200 heroin users who lived on the streets of
442 Harlem and who had engaged in property or drug crimes. They estimated the dollar value of drugs used per week
443 at \$250. Mieczkowski appended queries to the DUF questionnaire administered in Detroit and determined a median
444 weekly expenditure on crack of \$150. B. Johnson and E. Wish, "The Robbery-Hard Drug Connection: Do Robbers
445 and Robberies Influence Criminal Returns and Cocaine-Heroin Purchases?" (Paper presented at the Criminology
446 Section of the American Sociological Association, August 17, 1987); P. Reuter et al., Money from Crime: A Study
447 of the Economics of Drug Dealing in Washington, D.C. (Santa Monica, California: RAND Corporation, 1990), RAND
448 publication R-3894-RF; B. Johnson et al., Taking Care of Business: The Economics of Crime by Heroin Abusers
449 (Lexington, Massachusetts: Lexington Books, 1985); T. Mieczkowski, "Crack Distribution in Detroit," Contem-
450 porary Drug Problems (Spring 1990): 9.

451 ²² All of the highest estimates come from estimations of former use by patients in drug treatment; this
452 group may represent the heaviest users in the country. Using a sample drawn from Detroit drug treatment
453 programs from 1987 through 1989, Mieczkowski estimated prior weekly expenditures on crack at a median of \$600.
454 Schnoll and colleagues reported a weekly expenditure of \$800 per week on cocaine in a Chicago treatment
455 population. Gawin and Kleber described a New Haven treatment population whose weekly expenditures on cocaine
456 would have been between \$500 and \$900, applying Abt's estimates for the price of cocaine to reported consumption
457 patterns. T. Mieczkowski, "The Economic Dimensions of Crack Use and Distribution: Some Preliminary Data" (Paper
458 presented to the American Society of Criminology Annual Meeting, Reno, Nevada, November 1989); S. Schnoll et
459 al., "Characteristics of Cocaine Abusers Presenting for Treatment," in Cocaine Use in America: Epidemiological
460 and Chemical Perspectives, ed. N. Kozel and E. Adams (Rockville, Maryland: National Institute on Drug Abuse,
461 1985), NIDA Research Monograph 61, 171-181; P. Gawin and H. Kleber, "Cocaine Use in a Treatment Population:
462 Patterns and Diagnostic Distinctions," in Cocaine Use in America, 182-192.

463 ²³ See footnote 11.

TABLE 4

Total Expenditures on Cocaine and Heroin, 1988-1991
(\$ in billions)

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
Cocaine Expenditures				
Heavy users	\$20.8	\$23.7	\$20.3	\$21.9
Casual users	\$5.6	\$6.3	\$6.6	\$7.8
Total users	\$26.5	\$30.0	\$26.9	\$29.7
Heroin Expenditures				
Heavy users	\$8.3	\$8.1	\$7.0	\$7.9
Casual users	\$1.4	\$1.3	\$1.2	\$1.0
Total users	\$9.7	\$9.4	\$8.2	\$8.9

* Since weekly expenditures from DUF data were not available for 1988 and 1991, we used the 1989 amounts as a proxy for 1988 and the 1990 amounts as a proxy for 1991 in calculating total expenditures.

Source: See Tables 1, 2, and 3.

How are the estimates affected by varying the assumptions

The estimates of expenditures may vary due to assumptions made about the number of heavy and casual users and about their average expenditures.²⁴ Because heavy users account for the bulk of drug spending,²⁵ our estimates of total expenditures are especially sensitive to the accuracy of estimates about expenditures by heavy users. Consequently, we tested how sensitive our expenditure estimates are to assumptions made about the number of heavy users and their typical expenditures.

First, we determined how the expenditure estimates would be affected if we used lower or higher estimates of the number of users than we reported in Table 1. Based on a review of published literature and on additional tests on the data, we estimated that there are between 1.5 million and 2.5 million heavy users of cocaine and between 400,000 and 800,000 heavy

²⁴ Because the factors that entered the calculations were not derived from probability samples, it is impractical to develop a statistically based margin of error.

²⁵ Heavy cocaine users represent less than one-fourth of the total number of cocaine users, but they account for 79 percent of all cocaine expenditures. Apparently because of heroin's stigma, casual use of heroin is less frequent than casual use of cocaine. Consequently, heavy users account for the bulk of that market - 86 percent of all heroin expenditures.

505 users of heroin in America.²⁶ Because the retail sales estimates
506 are roughly proportional to the number of heavy users, if the
507 estimate of heavy users is off by plus or minus 25 percent, then
508 the retail sales estimates would be off by the same
509 proportion.²⁷

510 Second, we determined how the expenditure estimates would
511 be affected if we varied our assumption about average
512 expenditures. As noted earlier, some studies are based on
513 reports of expenditures by cocaine users entering treatment. If
514 these expenditures were considered typical, the retail sales
515 value of cocaine would be four times the amount reported here.
516 This seems an implausibly large expenditure that would exceed not
517 only available income for most users but, the value of the supply
518 of the drugs as well.²⁸ (For a further discussion of this
519 topic, see the technical appendix.)

520 Although an average expenditure figure based on a treatment
521 population is certainly too high, it might be realistic to adopt
522 the average (rather than the median) drug spending numbers
523 reported by DUF as a high estimate. Then the composite totals on
524 both cocaine and heroin use would be twice as high as reported in
525 Table 4. For the reasons we cited above, it is doubtful that
526 expenditures in the United States approach this high estimate.

527 At the opposite extreme, heavy users who report their use in
528 the NHSDA appear to consume about half as much cocaine as heavy
529 users represented in the DUF data. Their expenditures might be
530 considered a low estimate of typical cocaine spending by heavy
531 users. Giving more weight to the NHSDA expenditure figures would
532 reduce the amount reported in Table 4 by half. However, it is
533 difficult to reconcile estimates that are half as large with the
534 amount of heroin and cocaine that enters the country.

535 ²⁶ That is, the true number of heavy cocaine and heroin users would seem to fall within these ranges.
536 See W. Rhodes, "Synthetic Estimation Applied to the Prevalence of Drug Use," Journal of Drug Issues (in press).

537 ²⁷ Some might argue that the margin of error should be even greater because the estimate of spending by
538 heavy drug users is not precise and because some studies report much higher spending levels than those reported
539 here.

540 ²⁸ Two factors make the assumption of higher spending questionable. First, incomes of most drug users
541 cannot support a high level of drug use. Second, heavy drug users have a high level of unemployment and
542 underemployment (D. Hunt and W. Rhodes, Abt Associates Inc., "Characteristics of Heavy Cocaine Users, Including
543 Polydrug Use, Criminal Activity and Health Risks," paper prepared for ONDCP, December 14, 1992). As discussed
544 in the appendix, illegal income from property crimes and prostitution accounts for much of the expenditure on
545 drug use. However, illegal income cannot account for higher expenditures than are reported in this study. Drug
546 dealing is often advanced as a way to support heavy drug use, but in total, street-level dealing cannot generate
547 the dollars that ultimately must go to satisfy the cash demands of middle-level and upper-level dealers. If
548 expenditures are much greater than reported here, the income source for supporting that level of consumption
549 is suspect.

In sum, it seems plausible that cocaine and heroin expenditures could be twice as large or half as large as estimates. But, for the reasons noted above, high- and low-end estimates should be discounted. In addition, other analysts have made clever use of available data to derive their own estimates of retail expenditures on cocaine and heroin. After adjusting for the limitations of these other studies, our estimates are consistent with theirs.²⁹

Accounting for income in kind

Our expenditure estimates reflect money that actually changed hands at the retail level. But drugs are often obtained as "income in kind," sometimes as payment for serving a role in the distribution chain and sometimes as payment for sex. For reasons explained in the technical appendix, we assume that heavy users of heroin receive 22 percent of their drugs as in-kind payment and that heavy users of cocaine receive half that amount.

If we add in-kind payments to street prices, then the dollar expenditure on cocaine would increase by between \$2 billion and \$3 billion, and the dollar expenditure on heroin would increased by almost \$3 billion. These totals, however, are not reflected in Table 4 but we do take them into account later when we estimate the bulk amounts of cocaine and heroin used in America.

How much cocaine and heroin is consumed?

To estimate how much cocaine and heroin Americans consume, we used data from the System to Retrieve Drug Evidence (STRIDE)³⁰ to estimate the street price paid for cocaine and heroin. The price varies with the size of the purchase lot.

²⁹ Reuter and Kleiman estimated that the market for cocaine was about \$8 billion in 1982. Because of the accelerating use of cocaine from that time until the mid-1980s, it is not surprising that their estimate is less than the figure reported here. Their \$8 billion estimate for heroin expenditures is more difficult to reconcile with what is reported here for two reasons. First, the number of heroin users has not fallen much over the last decade. Second, the price of heroin has dropped dramatically. We would expect their estimates to be greater than those reported here, but that is not the case. P. Reuter and M. Kleiman, "Risks and Prices: An Economic Analysis of Drug Enforcement," in Crime and Justice: An Annual Review of Research, volume 7, ed. M. Tonry and N. Morris (Chicago: University of Chicago Press, 1986), 194. Carlson, who conducted a study of the underground economy for the Internal Revenue Service, reported that an estimated \$11 billion was spent on cocaine in 1982 (K. Carlson et al., Abt Associates Inc., "Unreported Taxable Income for Selected Illegal Activities: Volume I: Consensual Crimes," Paper prepared for the Internal Revenue Service under contract number TIR-81.57, September 1984, 33.45). In an update of his study, Carlson estimated that cocaine expenditures dropped from \$6 billion to \$7 billion between 1988 and 1991 (K. Carlson, Abt Associates Inc., "Unreported Illegal Source Income 1983-1995," Paper prepared for the Internal Revenue Service under order number 89-11565, May 15, 1990). Since he relied heavily on the NHSDA, it is not surprising that his estimate is much lower than the one reported here. Carlson's estimate of heroin expenditures, based on the National Narcotics Intelligence Consumers Committee estimates for 1982, was in keeping with Reuter and Kleiman's \$8 billion figure. His updated study, based on NHSDA data, put that figure at roughly \$7 billion a year between 1988 and 1991. Thus, his estimates are consistent with those reported here.

³⁰ These data come from laboratory analyses of purchases by Drug Enforcement Administration agents, other Federal agents, and some State and local agents.

599 Cocaine is much less expensive when bought as a large purchase
600 lot (3 grams) than when purchased as a smaller lot (1 gram).
601 This is also true of heroin when purchased as a large lot (0.3
602 grams) rather than as a small lot (0.1 grams).

TABLE 5

Retail Prices Per Pure Gram for Cocaine and Heroin,
1988-1991

	1988	1989	1990	1991
Cocaine				
High Price	\$154	\$157	\$207	\$179
Low Price	\$111	\$113	\$148	\$128
Heroin				
High Price	\$1,634	\$1,492	\$1,672	\$1,646
Low Price	\$1,007	\$888	\$962	\$917

Source: STRIDE, 1981-1991.

Unfortunately, there are no good estimates of the amount of cocaine and heroin typically transacted at the retail level, but it appears that transaction sizes often exceed single doses. Given this uncertainty, we assume two price series each for cocaine and heroin: at 1 and 3 grams for cocaine and at 0.1 and 0.3 grams for heroin. These amounts are much higher than typical dosage amounts, but they are smaller than amounts that are sometimes transacted on the retail level.

Results based on statistical analysis used to estimate these prices between 1988 and 1991 are reported in Table 5.³¹ Regardless of the size of the lot, the price of cocaine, fell throughout the early 1980s and reached a low point in late 1988 or in early 1989. It increased during 1990 and then declined again in 1991. The price of heroin also fell throughout most of the 1980s, reached a low point sometime late in that decade, and has remained relatively constant (with some fluctuations) since then (Table 5).

Table 6 shows estimates of the amount of cocaine and heroin that was consumed based on the expenditures reported in Table 4 (adjusted to account for drugs earned as income in kind)³² and the retail prices reported in Table 5. According to the data for

³¹ Because the purchases are usually made at the wholesale level, statistical analysis is required to infer what those prices would have been had the transactions been made at the retail level. For an explanation of that methodology, see W. Rhodes and R. Hyatt, Abt Associates Inc., "The Price of Illicit Drugs, 1981-1991," Paper prepared for ONDCP, May 19, 1992. Price per pure gram was used as the dependent variable in a regression that had the amount of drugs sold as an independent variable. The regression was used to predict the price of cocaine and heroin when purchasing a given amount. The regression was then used to predict the price paid at different times for a purchase lot that was deemed typical of retail purchases.

³² In-kind expenditures (in billions) for cocaine were estimated at \$2.5 in 1988, \$3.0 in 1989, \$2.5 in 1990, and \$2.9 in 1991. For heroin in-kind, expenditures were estimated at \$2.8 in 1988, \$2.7 in 1989, \$2.3 in 1990, and \$2.6 in 1991.

the 1988 to 1991 period, cocaine users consumed somewhere between 140 and 290 metric tons of pure cocaine each year. Heroin users consumed between 6 and 14 metric tons of pure heroin each year during the same period.

TABLE 6

Total Amount of Cocaine and Heroin Used
(In metric tons)

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
Cocaine				
High Price	188	210	142	182
Low Price	269	292	199	254
Heroin				
High Price	8	8	6	7
Low Price	12	14	11	13

Source: See Tables 1 through 5.

Because the retail prices in Table 5 are not totally accurate, trends are uncertain. However, it appears that the amount of money spent on cocaine and heroin has fluctuated very little over the last four years. The bulk amount of cocaine used decreased in 1990, apparently in response to a significant price increase that year. The increase in cocaine prices in 1991 is speculative because data from DUF are not yet available for estimating 1991 consumption.

Like cocaine, heroin consumption fell in 1990 and rose in 1991 (although again, figures for 1991 are speculative). The decrease in 1990 might be attributed to a small increase in price; to AIDS, which has undoubtedly reduced the activity of most intravenous heroin users and has killed a significant number of others; and to the increasing number of heroin users who were incarcerated between 1988 and 1991.

The consumption of cocaine and heroin, like the consumption of licit goods, is sensitive to price. However, while the amount of drugs consumed increases and decreases inversely with price, the amount of money spent seems to remain constant over time (Table 4). That is, as the price increases, heavy users appear to consume less cocaine, but they pay a higher price per unit and the smaller the amount at a higher price seems to result in a

fairly constant total amount of money spent. Less evidence is available for heroin, but the same patterns appear to prevail.³³

MARIJUANA

In this section, we estimate the dollar value of marijuana consumption by multiplying the following factors: number of users, by the average number of joints used per month, by the weight of an average joint, and by the cost per ounce.³⁴

Number of marijuana users

More Americans use marijuana than either cocaine or heroin. During 1991, for example, about 19 million Americans used marijuana or hashish at least once. The number of marijuana users decreased 9 percent between 1988 and 1991 (Table 7). Among the heaviest users (those reporting use on three days a week or more), the decrease was nearly 20 percent. In all years, about one-half of the users reported using marijuana less than once a month.³⁵

³³ In economic terms, these findings suggest a price elasticity of one - as prices increase by 1 percent, the amount consumed decreases by 1 percent. On balance, total expenditures remain the same. The evidence of a unitary elasticity is strongest for cocaine because the price of cocaine was much higher in 1990 than in 1989, the only two years for which DUF data are available. The evidence of a unitary elasticity for heroin is less convincing because heroin prices increased only modestly from 1989 to 1990. Sampling errors are too high in the NHSDA to draw conclusions about expenditure patterns.

³⁴ Estimates of all of these factors except cost per ounce are based on the NHSDA. The NHSDA asks the following questions regarding quantity of marijuana consumed: (1) On the average, how often in the past 12 months have you used marijuana? (2) On about how many different days did you use marijuana or hash during the past 30 days? (3) About how many marijuana cigarettes or joints did you smoke each day on the average during the past 30 days? (4) What is the total amount of marijuana that you used, in all, during the past 30 days? Collectively, these questions permit testing for internal consistency. For example, use in the past 30 days should not exceed use in the past year. Most users (88 percent) provided valid and internally consistent responses to enough of these questions to permit a calculation of the total number of joints used in the past 30 days. In preparation for this analysis, extreme and inconsistent responses were individually examined. In some instances, the source of the respondent's confusion was clear. Many of the inconsistent respondents, for example, appeared to be confused by the question about average daily number of joints, reporting a monthly total rather than a daily average. Estimates of total consumption include adjustments for missing or inconsistent data. Since resolution of some inconsistencies is a judgmental process, other analyses of these same data may differ slightly in detail from the results presented here. In general, however, the effect of these adjustments is within the margin of error of the NHSDA itself. (Some tables presented here exclude missing observations and, therefore, do not sum to the total estimates presented.)

³⁵ Table 7 appears to show a shift in response from daily use to use several times a day. Detailed examination of these responses, however, shows that the two usage classes are similar in total consumption. The difference appears to be more semantic than practical.

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TABLE 7

**Number of Persons Using Marijuana in Past Year
and Frequency of Use, 1988-1991**

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	<u>1988</u>	<u>1990</u>	<u>1991</u>
All users (thousands)	21,099	20,454	19,235
	100.0%	100.0%	100.0%

739

Frequency of use in past year:

740

Several times a day 4.2% 3.2% 4.9%

741

Daily 5.3% 4.3% 2.9%

742

3 to 6 days per week 10.3% 10.2% 9.6%

743

1 to 2 days per week 12.3% 12.4% 12.1%

744

25 to 51 days per year 10.2% 7.7% 8.6%

745

12 to 24 days per year 12.1% 13.1% 13.2%

746

6 to 11 days per year 10.7% 11.9% 12.2%

747

3 to 5 days per year 13.4% 14.9% 14.1%

748

1 to 2 days per year 21.5% 22.3% 22.4%

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Source: NHSDA 1988, 1990, and 1991

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Average number of joints used each month

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We obtained an estimate of an individual's total monthly use by multiplying the number of days of marijuana use by the number of joints used per occasion. As Table 8 shows, the average number of marijuana joints used in the past month decreased by 25 percent between 1988 and 1991.³⁶

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³⁶ Marijuana users report they used marijuana on fewer days each month than in the past. On average, respondents used marijuana on 3.9 days in 1991, down from 4.6 days in 1988 (a 15 percent decrease). The number of marijuana joints used every month is also decreasing. For example, those who used marijuana over 20 days in the past month used an average of about 75 joints per month, down more than 13 percent from 1988.

TABLE 8			
Number of Marijuana Joints Used in Past Month, 1988-1991			
	1988	1990	1991
Average number of joints (all users)	10.8	9.5	8.1
	100.0%	100.0%	100.0%
None	52.2%	55.9%	57.5%
1 joint	6.0%	7.9%	7.4%
2 to 4 joints	12.0%	10.6%	10.3%
5 to 10 joints	9.5%	8.3%	8.4%
11 to 20 joints	7.5%	6.9%	6.3%
21 to 50 joints	7.3%	4.9%	6.3%
51 to 100 joints	4.1%	3.8%	3.1%
Over 100 joints	1.5%	1.7%	0.8%
Source: NHSDA 1988, 1990, and 1991			

Average weight of joints by quantity purchased

Persons who use one or two ounces of marijuana a month roll about 40 to 50 joints for each ounce of marijuana used. This quantity does not appear to have changed over time or to depend on the amount of use. Table 9 reports the average weight of marijuana joints (reported in units of 1/100 of an ounce) by year and by total amount used. These estimates were derived by dividing marijuana used in the last 30 days by joints used in the last 30 days.

TABLE 9			
Average Weight of Joints, by Weight of Marijuana Used, 1988-1991 (units in ounces)			
<u>Total Weight Marijuana Used in Past 30 Days</u>	<u>Average Weight of Joints</u>		
	1988	1990	1991
1 ounce	.0219	.0195	.0220
2 ounces	.0244	.0198	.0230
All weight amounts	.0231	.0200	.0210
Source: NHSDA 1988, 1990, and 1991			

803 Price

804 Price is the final factor in calculating the total value of
805 marijuana consumption.³⁷ Marijuana prices fell slightly from
806 1988 to 1989 and then rose during the next two years (Table 10).
807 Small purchases (under one ounce) appear to be only slightly more
808 expensive than larger (one- to two-ounce) purchases. In general,
809 prices varied chiefly with the year of purchase and not with the
810 quantity. Therefore, in this analysis, we used the price of one-
811 ounce of marijuana as a proxy for the retail price of all
812 purchases.

813
814

TABLE 10

815 Retail Price Per Ounce of Marijuana,
816 By Quantity Purchased, 1988-1991

817	818	819	820	821	822	823	824
	<u>Ounces Purchased</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>		
	0.50	\$157	\$140	\$177	\$219		
	0.75	\$160	\$131	\$174	\$218		
	1.00	\$150	\$131	\$164	\$195		
	1.50	\$158	-	\$174	\$212		
	2.00	\$155	\$130	\$162	\$194		
	3.00	\$139	-	\$165	-		

825
826
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Source: Abt Associates calculation from DEA STRIDE data

828 Total consumption estimates

829 The factors required to calculate total marijuana
830 consumption are shown in Table 11. In 1991, average users consumed
831 8.1 joints a month. A typical joint weighed about 0.021 ounces,
832 requiring an average monthly purchase of 0.17 ounces (that is, the
833 average number of joints each month multiplied by the average
834 weight each joint). At a retail price of \$195 an ounce, these
835 users spent an average of \$33 each month (\$400 a year) on
836 marijuana. This number, multiplied by the 19.2 million users
837 (Table 7), yields a consumption estimate of \$7.7 billion, about the

838 ³⁷ Our analysis was restricted to purchases of quantities typical of a user's total monthly consumption
839 - between 10 and 100 grams (roughly one-half ounce to four ounces). Extreme observations (for example, \$1 an
840 ounce) were removed from the analysis. Total purchase price was modeled as a log linear function of nominal
841 quantity and date of purchase. Nominal weights are the amounts that consumers think they are buying, rather
842 than the amounts they actually buy. Nominal rather than exact weights were used because it appears from the
843 STRIDE data that many transactions involve slight consumer fraud: quantities of 25 to 27 grams were much more
844 common than quantities of 28 grams (and there were no instances of 29 or 30 gram purchases). We assumed that
845 marijuana consumers believe that they are getting the weight contracted for and that this impression governs
846 their responses on the NHSDA.

same as in 1990, but about 19 percent lower than the 1988 estimate. These estimates of total spending are in line with estimates by others.³⁸

TABLE 11

Recapitulation of Elements in Calculation of
Total Marijuana Consumption, 1988-1991

Factors Used in Computing
Total Consumption

	1988	1990	1991
Number of Users (thousands)	21,099	20,454	19,235
Number of Joints Used in Past Month	10.80	9.50	8.10
Average Ounces per Joint	0.023	0.020	0.021
Ounces per Month	.25	.19	.17
Retail Price per Ounce	\$150	\$164	\$195
Spending per Month	\$37	\$31	\$33
Spending per Year	\$449	\$367	\$400
Total Spending (billions)	\$9.48	\$7.51	\$7.69

Note: Calculations do not replicate totals due to rounding error
Source: Tables 7, 8, 9, 10

OTHER DRUGS

Most of the money spent on illicit drugs in America is spent on cocaine, heroin, and marijuana. However, the expenditures on other illicit substances (inhalants and hallucinogens) and on licit substances consumed illegally (stimulants, sedatives, tranquilizers, and analgesics) is not small. Much of this drug use appears to be reported to the NHSDA.³⁹ We do note, however, that the NHSDA undoubtedly misses some users, and those who are reached probably have an incentive to misrepresent their consumption.

Table 12 shows the number of respondents who, according to the NHSDA, used these other drugs between 1988 and 1991. Those respondents who admitted use during the year were asked how

³⁸ Kleiman estimated the number of those who use marijuana 20 or more times a month at 4 million in 1986. He estimated the number of heavy users (two or more joints each day) at 1.75 million. Using National Narcotics Intelligence Consumer Committee (NNICC) estimates of marijuana supply and price. Kleiman estimated that marijuana costs \$84 an ounce and that an ounce could be divided into 56 joints, yielding a unit price of \$1.30 per joint. Based on these assumptions, Kleiman estimated that Americans spent \$14 billion on 4.695 tons of marijuana in 1986. This estimate is in line with the trends presented in this analysis. M. Kleiman, Marijuana: Costs of Abuse, Costs of Control (New York: Greenwood Press, 1989), p. 34-46.

³⁹ We noted previously that heavy cocaine users and heavy heroin users frequently appear in the DUF data but infrequently appear in the NHSDA data. The reverse occurs for other illicit substances. With few exceptions, which are specific to cities, other illicit substances have relatively low prevalence among arrestees.

frequently they used the drug.⁴⁰ We then used these data to compute an average number of days a year that the respondents used a drug.⁴¹ Since the survey does not have information about the number of doses taken on days that the drug was used, we assumed that each day of use resulted in a single dose. This is most certainly an underestimate.

It is difficult to determine prices per dose. Both the Drug Enforcement Administration's (DEA) Illegal Drug Price/Purity Report and the National Institute on Drug Abuse's Community Epidemiological Working Group (CEWG) provided wide ranges. For current purposes, we assumed that each dose costs \$5, a price that was consistent with those reported by the DEA and the CEWG. However, these street prices may be too high because many of the legal drugs were likely to have been purchased at prescription prices and diverted to illegal use.

To estimate the yearly expenditures on these drugs, we multiplied three factors: the number of users, by the average number of doses per year, by the price per dose. Our best estimate is that Americans spent between \$2 billion and \$3 billion on other drugs during each of the last four years (Table 12).

TABLE 12

Other Drugs: Total Yearly Users (thousands) and Expenditures (billions), 1988-1991

<u>Drug Used</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
Number of Users				
Inhalants	2,632	2,509	2,385	2,585
Hallucinogens	3,085	2,676	2,266	2,490
Stimulants	4,957	4,033	3,109	2,894
Sedatives	3,099	2,666	2,233	2,130
Tranquilizers	4,407	3,473	2,538	3,358
Analgesics	5,342	5,171	4,999	5,078
Expenditures	\$3.2	\$2.8	\$2.3	\$2.4

Source: NHSDA 1988, 1990, and 1991

⁴⁰ Their answers, which were in ranges of days per year, were converted to a fixed number. For instance, the range three to five days became four days.

⁴¹ We derived estimates of frequency of use from the 1991 NHSDA and applied them to the other years.

935 These estimates are imprecise for the reasons noted above.
936 However, even if we halve or double the estimates to reflect
937 uncertainty, drugs other than cocaine, heroin, and marijuana must
938 be a relatively small part of the total expenditure that
939 Americans make on illicit substances and on legal substances
940 consumed illegally.

941 CONCLUSION

942 According to the consumption-based procedure, Americans
943 spent about \$49 billion on heroin, cocaine, marijuana and other
944 illegal drugs in 1991: \$30 billion on cocaine, \$9 billion on
945 heroin, \$8 billion on marijuana, and \$2 billion on other illegal
946 drugs (Table 13). During the period from 1988 to 1991, marijuana
947 consumption fell markedly, although dollar expenditures on
948 marijuana fell less because the price increased throughout this
949 period. Cocaine and heroin consumption remained fairly constant
950 except for temporary decreases in 1990, a year in which the price
951 of cocaine was especially high. Expenditures on other illicit
952 drugs also fell over the last four years.

953 In this section of the report we examined the use of drugs,
954 that is, the demand for illicit drugs and for licit drugs used
955 illegally. In the next section we examine the availability of
956 illegal drugs in the domestic market.

957
958 **TABLE 13**

959 **Total Expenditure of Illicit Drugs, 1988-1991**
960 **(\$ in billions)**

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
963 Cocaine	\$26.5	\$30.0	\$26.9	\$29.7
964 Heroin	\$9.7	\$9.4	\$8.2	\$8.9
965 Marijuana	\$9.5	\$8.5	\$7.5	\$7.7
966 Other Drugs	\$3.2	\$2.8	\$2.3	\$2.4
967 Total	\$48.9	\$50.7	\$44.9	\$48.6

968
969 Note: Columns may not add due to rounding error.

970 Source: Tables 1 through 12
971

II. THE SUPPLY APPROACH

A second approach to estimating the retail sales value of illicit drugs consumed in the United States is to estimate the amounts *supplied* to the domestic markets. This section discusses the information and assumptions we used to estimate the supply of cocaine to the United States. For reasons discussed below, it is not practical to develop estimates for heroin, marijuana, and other illegal drugs.

COCAINE

This section focuses on the production and distribution of cocaine. Although the production and distribution data we use are the best available, we doubt that they totally reflect the real processes by which coca leaves are converted into cocaine and distributed. Further, both the cocaine production and distribution processes are subject to numerous losses such as spoilage, seizures,⁴² and consumption⁴³ in countries other than America. *Rather than making highly speculative estimates of the amount of losses, we make no estimates of losses.*⁴⁴ As a

⁴² Information about seizures is of questionable reliability. Besides providing an incentive for both over- and undercounting at various junctures, mislabeling of seizures can result in errors of calculation. Some of the estimates that have been made are quite speculative. For example, the 1991 *INCSR* noted that an estimated 3.2 metric tons of base were available in Venezuela for conversion to cocaine HCl during 1990. The government there reported seizing 1.7 metric tons of base, about half of the estimated supply. However, in *INCSR*, 1992, the 1.7 metric tons were considered paste. This resulted in an inaccurate accounting in earlier versions of the model.

⁴³ Data are inadequate to drive estimates of drug use practices in Central and South American nations, but limited data indicate that consumption must be significant. For example, the Mexican government sampled 15,000 households in urban areas, interviewing individuals who were 12 to 65 years old. Roughly 0.5 percent of males (12-34 years old) in the northern part of the country used heroin in the year before the survey; cocaine was used by 3.4 percent in the northwest, 1.0 percent in the northeast, and 1.2 percent in the central north (M. MedinaMora, "Drug Abuse in Northern Mexico: Results from a National Household Survey," in *Epidemiologic Trends in Drug Abuse, Proceedings June 1990*, NIDA, 1990). Although estimates are elusive, internal consumption of coca leaves and its derivative is high in producing countries. For example, an estimated 1 million Peruvians across 20 cities chewed coca leaf, 200,000 smoked coca paste, and over 100,000 inhaled cocaine hydrochloride (F. Jeri, "Some Recent Facts about Drug Abuse in Peru," in *Epidemiologic Trends in Drug Abuse, Proceedings June 1990*, NIDA, 1990). Indeed, until recently, Bolivian and Peruvian law permitted limited domestic production of coca for domestic consumption - 12,000 kilograms in Bolivian and 14,000 kilograms in Peru, according to J. Inciardi (*The War on Drugs II*, Mayfield Publishing, California, 1992: p. 206). In addition to consumption within producer countries, spoilage and in-kind payments for shipping must be a major loss to the heroin and cocaine industries.

⁴⁴ These losses can be large. Abt Associates tabulated drug removal and asset seizure data for 1990 and 1991 from the U.S. Department of Justice, Bureau of Statistics, Drugs and Crime Data Center and Clearinghouse. State and local officials seized between 18 and 34 metric tons of cocaine per year between 1988 and 1990. Multijurisdictional drug control task force units alone seized about 15 metric tons over a three-year period from 1988 to 1990. (J. Coldren and M. Sabath, *Multijurisdictional Drug Control Task Forces 1988-1990: Critical Components of State Drug Control Strategies*, Bureau of Justice Assistance, April 1992). Some of these seizures may already be counted in the Federal seizures, so the estimates may overstate cocaine removed by State and local agents. However, some of the States report data only for seizures by State police. How these errors balance is unknown.

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result, our estimates of the amount of cocaine supplied to domestic markets are considerably higher than if we took into account the losses noted above.

1024 The cocaine supply model

1025 The production and distribution of cocaine starts in South
1026 America, principally in the Andean nations, with the cultivation
1027 of coca plants by farmers, and ends with retail-level drug
1028 dealers in the United States. Figure 2 depicts the first part of
1029 these processes. Coca leaves are harvested and then chemically
1030 treated to produce coca paste. The paste is treated further to
1031 create "base." Another chemical process turns the base into
1032 cocaine hydrochloride (HCl), or pure cocaine.

1033 We developed a computer model for each of the stages in this
1034 process (Figure 3) from cultivation through transportation of the
1035 product to consumer markets.⁴⁵ The letter next to each box in
1036 Figure 3 corresponds to the letters in Figure 2.

1037 **Coca cultivation (Box A).** Estimates of the amount of land
1038 under cultivation in the major coca producing countries (Peru,
1039 Bolivia, Colombia, and Ecuador⁴⁶) are published annually by the
1040 Department of State in the *International Narcotics Control*
1041 *Strategy Report (INCSR)*.⁴⁷ According to the INCSR, about
1042 212,778 hectares⁴⁸ were under cultivation for coca leaf during
1043 1991. This is less than the amount reported in 1989 (220,365
1044 hectares) and 1990 (220,850 hectares).

1045 Eradication efforts by the governments in producer
1046 countries, sometimes with the assistance of the United States,
1047 reduce harvestable coca leaves. In 1991, 6,538 hectares (3
1048 percent of the total area reported under cultivation) were
1049 eradicated,⁴⁹ leaving about 206,240 hectares under cultivation.
1050 This was slightly lower than the 1989 and 1990 estimates of
1051 215,850 and 211,820 hectares respectively.

1052 **Coca plant yields (Box B).** The State Department calculates
1053 coca leaf yields using the assumption that bushes can be

1054 ⁴⁵ The computer model is an adaptation of a preliminary version of a cocaine supply model developed by
1055 RAND Corporation. Our model uses various kinds of information. These include estimates of (1) land area under
1056 cultivation in known producer countries, (2) eradicated cultivation areas, (3) coca leaf crop yield, (4) the
1057 efficiency of the process for converting leaf to intermediary products and then to cocaine, and (5) losses,
1058 consumption, and seizures within producer countries.

1059 ⁴⁶ Coca is reportedly cultivated in Brazil and Venezuela, but estimates of hectares under cultivation
1060 are not available.

1061 ⁴⁷ Bureau of International Narcotics Matters, International Narcotics Control Strategy Report
1062 (Washington, D.C.: Department of State Publications, March 1992, and previous years). The Bureau bases its
1063 calculations of land under cultivation on "proven methods similar to those used to estimate the size of licit
1064 crops at home and abroad."

1065 ⁴⁸ One hectare equals 2.47 acres.

1066 ⁴⁹ INCSR, 1992, 27. We assume for the purposes of the model that eradication is evenly distributed among
1067 cultivated lands.

1068 harvested three or four times a year.⁵⁰ We use these
1069 assumptions in our model.⁵¹

1070 **Coca manufacturing (Boxes C through E).** Converting the coca
1071 leaves into cocaine HCl requires laboratory equipment and large
1072 quantities of chemicals. Information about processing and the
1073 network of clandestine laboratories⁵² is based on reports of
1074 laboratories destroyed, speculation about the production capabil-
1075 ities of laboratories in various countries, and the work of
1076 researchers who have studied the process.⁵³

1077
1078 **Leaf to Paste Conversion (Box C).** Two factors affect the
1079 amount of paste produced from treating coca leaves. First the
1080 leaves grown in different countries have different alkaloid
1081 content.⁵⁴ Because the conversion ratio varies with the leaves'
1082 alkaloid content, the conversion ratio varies from country to
1083 country. Second, the indigenous population in Bolivia and Peru
1084 consume coca leaves for dietary and medicinal purposes.⁵⁵
1085 Figure 3 shows consumption levels of 16,500 metric tons for both
1086 Peru and Bolivia.

1087 **Paste to Base Conversion (Box D).** This stage, which may not
1088 be followed in all regions, is a relatively simple "washing" of
1089 the coca paste in acetone before the final purification process.
1090 This increases the purity of the final product.

1091 ⁵⁰ In an earlier INCSR report, The State Department calculated all coca leaf yields using the assumption
1092 that bushes were are harvested once or twice a year. However, recent evidence indicates that mature coca plants
1093 (those two to 15 years old) in the largest cultivating regions of Peru and Bolivia can be harvested three or
1094 four times a year.

1095 ⁵¹ The conversion process can vary widely from one location to another in the processing countries.
1096 According to information now available from a variety of sources, the INCSR accurately reflects the conversion
1097 process in each of the producer countries (J. Inciardi, The War on Drugs (Palo Alto, CA: Mayfield Publishing
1098 Company, 1986), 71-89; and telephone interviews with E. Morales, West Chester University, PA). However, the
1099 State Department has indicated that further revisions to estimates may be necessary. The INCSR states that,
1100 "unfortunately, field studies indicate that potential yield of the coca crop may be higher than previously
1101 estimated. This could alter coca yield figures currently used to estimate the potential production of coca and
1102 cocaine" (INCSR, 1992, 95).

1103 ⁵² Clandestine laboratories are located in the cultivating countries and in Argentina, Brazil, and
1104 Venezuela.

1105 ⁵³ Where data are available, the model considers the transfers of leaf, paste, and base to other
1106 countries. See E. Morales, Cocaine: White Gold Rush in Peru (Tucson: University of Arizona Press, 1989).

1107 ⁵⁴ For example, Columbian coca leaf has about half the alkaloid content of leaf from Peru or Bolivia.
1108 INCSR, 1992, 107.

1109 ⁵⁵ Some medical and sociological studies place the number of persons who chew coca leaves in these two
1110 countries at 3 to 4 million (Memorandum from R. Flynn, dated 24 January 24, 1991). If each person who chews
1111 coca leaves ingests between 30 and 60 grams of dry coca leaves each day, between 33,000 and 66,000 metric tons
1112 of coca leaf are consumed in these two countries each year. Carter et al., in Cocaine 1980: Proceedings of
1113 the Interamerican Seminar on Medical and Sociological Aspects of Coca and Cocaine, ed. F.R. Jeri (Lima, Peru:
1114 Pacific Press, 1980).

1115 Base to Cocaine HCl (Box E). This stage requires
1116 chemicals⁵⁶ that are produced in many industrialized nations.
1117 One unit of base yields an equal unit of cocaine HCl.

1118 As shown in Table 14, this cultivation and manufacturing
1119 process resulted in an estimated 708 to 810 metric tons of pure
1120 cocaine that were available for shipment to world markets in
1121 1991.⁵⁷ But, as described below, not all of this cocaine is
1122 shipped to the principal consumer countries.

1123 The transportation pipeline

1124 Cocaine is shipped from manufacturing countries (such as
1125 Colombia) to the primary consumer countries (principally the
1126 United States) in two ways. Some cocaine is shipped directly to
1127 these countries. To avoid detection, however, some of it is
1128 transshipped through other countries such as the Caribbean
1129 nations, South and Central American countries, Canada, and
1130 Mexico.⁵⁸ Figure 4 illustrates the principal routes probably
1131 taken by coca leaves grown in Bolivia as they are transformed
1132 into cocaine, which is then shipped to world markets (the number
1133 of countries through which cocaine is shipped on its way to the
1134 main consumer countries is larger than shown here). Some cocaine
1135 losses occur during these shipments.

1136
1137 Some of the cocaine is consumed in the transshipment
1138 countries, but it is difficult to determine how much for a number
1139 of reasons. For example, drug use surveys from these countries
1140 are usually limited in scope and the methodology changes from
1141 year to year. Accordingly, we have made no adjustments in our
1142 model for these losses.

1143 ⁵⁶ The chemicals include acetone, ether, and hydrochloric acid.

1144 ⁵⁷ The range reflects different assumptions about consumption of coca leaf in Bolivia and Peru.

1145 ⁵⁸ According to the United Nations, 70 percent of all cocaine destined for the United States is trans-
1146 shipped through Mexico. United Nations, International Narcotics Control Board (INCB), Report of the
1147 International Control Board for 1991 (Vienna, 1990), 36. Figure 4 illustrates the principal routes probably
1148 taken by coca leaves grown in Bolivia as they are transformed into cocaine, which is then shipped to world
1149 markets. The number of countries through which cocaine is shipped on its way to the main consumer countries
1150 is larger than shown here.

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1152
1153
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1155

TABLE 14

Estimates of Cocaine HCl Available in the United States in 1991
(in metric tons)

	<u>Low</u>	<u>High</u>
1156		
1157	HCl Available After Discounting For	
1158	Consumption Estimates in Bolivia and Peru¹	
1159	Minimum Consumption Estimate of 33,000 Metric Tons	810
1160	Maximum Consumption Estimate of 66,000 Metric Tons	708
1161	Foreign Seizures²	-199 -199
1162	HCl Available after Discounting	
1163	for Foreign Seizures (Including HCl Seized	
1164	in Producer Countries)	
	509	611
1165	HCl Available after Discounting for	
1166	Shipments to Countries Other Than the U.S.	
1167	90% of HCl Shipped to the United States	550
1168	75% of HCl Shipped to the United States	382
1169	Federal Seizures³	-108 -108
1170	HCl Available in the United States after	
1171	Discounting for Domestic Seizures	
1172	274	442

1173 ¹Estimates of HCl come from the computer model of the cocaine production
1174 process using two levels of consumption estimates in Bolivia and Peru. Mini-
1175 mum and maximum estimates of consumption come from Carter et al. (see foot-
1176 note 55).

1177 ²INCSR, 1992 and Royal Canadian Mounted Police, National Drug Intelligence
1178 Estimate, 1990.

1179 ³Drug Enforcement Administration, Federal-wide Drug Seizure System, 1989-
1180 1991.

1182 The amount of cocaine available in consumer countries is
1183 further reduced by foreign seizures. According to the INCSR,
1184 authorities in producer, transshipment, and other consumer
1185 countries seized about 200 metric tons of cocaine in 1991 (Table
1186 14).⁵⁹

1187 Of the remaining amount, about 10 to 25 percent is diverted
1188 to consumer countries other than the United States. (This
1189 estimate lacks firm grounding, but is probably wide enough to
1190 capture the actual proportion consumed outside the United
1191 States.) Based on these assumptions, we estimate that about 382

1192 ⁵⁹ INCSR, 1992; and United Nations, INCB, Narcotic Drugs, Estimated World Requirements for 1992.
1193 Statistics for 1990.

1194 to 550 metric tons of cocaine were shipped to the United States
1195 in 1991 (Table 14).

1196 The U.S. cocaine market

1197 Of the amount of cocaine shipped to the United States,
1198 Federal authorities seized about 108 metric tons, leaving 274 to
1199 442 metric tons of pure cocaine for domestic consumption during
1200 1991 (Table 14). This is an increase over 1990 estimates of 254
1201 to 418 metric tons, but comparable to 1989 figures of 278 to 445
1202 metric tons.

1203 Using the midpoints of the estimates of price per pure gram
1204 from Table 5, the total retail value of 274 to 442 metric tons is
1205 between \$42 and \$68 billion in 1991.⁶⁰ (This compares with
1206 ranges of \$45 to \$74 billion in 1990 and \$38 to \$60 billion in
1207 1989.⁶¹ Again, we consider this estimate to be high because we
1208 could not fully account for the many reductions in the supply
1209 noted above.

1210 Moreover, the \$42 billion to \$68 billion range is
1211 necessarily wide. As emphasized throughout this section, the
1212 data upon which these estimates are based are not sufficiently
1213 precise to support a narrower range of estimates. Given our
1214 knowledge of cocaine use and price, it is unlikely that the
1215 retail sales expenditure on cocaine approaches \$68 billion
1216 dollars.⁶² When drug expenditures as income in kind are
1217 considered, however, the lower end of this range is consistent
1218 with estimates based on our analysis of drug consumption (Table
1219 13).

1220 Based on the midpoints of our cocaine supply-based estimates
1221 for 1989 and 1991, we estimate that leaf crops and the maximum

1222 ⁶⁰ Not all of the available supply of cocaine imported to the United States may be consumed in a given
1223 year: it may go into inventory or stockpiles in an effort to maintain or increase prices.

1224 ⁶¹ We could not develop an estimate for 1988 because reliable seizure data are unavailable. Federal
1225 interdiction efforts succeed in capturing some of the cocaine headed for U.S. markets. Determining the precise
1226 amount seized before 1989 is difficult because the passing of seized drugs from one agency to another (for
1227 example, from the Coast Guard or customs to the Drug Enforcement Administration) resulted in some double- and
1228 even triple-counting and/or undercounting. In 1989, the Federal-wide Drug Seizure System (FDSS) was begun, so
1229 that a single number is registered and passed with the captured drugs to end double-counting. During that year,
1230 Federal agencies seized 99 metric tons of cocaine. FDSS statistics for 1991 indicate that about 108 metric tons
1231 of cocaine, destined for the United States, were seized in 1991. State and local law enforcement officers also
1232 seize cocaine, but no Federal system exists for counting and reporting such seizures.

1233 ⁶² A figure of \$200 billion was reported by the Latin American Weekly report, with little substantiation.
1234 A similar figure has been cited by Webster and McCampbell, attributed to Holmes, but the source of this estimate
1235 is obscure (Latin American Weekly Report, WR-91-12, March 28, 1991; B. Webster and M. McCampbell, International
1236 Money Laundering: Research and Investigation Join Forces, NIJ Research in Brief, September 1992; C. Holmes,
1237 Combating Money Laundering: An Arizona-Based Approach, Police Executive Research Forum, March 1991). Such
1238 estimates seem impossibly large. If all \$200 billion was attributable to cocaine, and if 2.2 million heavy
1239 cocaine users consume 79 percent of the available cocaine, then each user must be required to spend \$72,000 per
1240 year on cocaine. In contrast, a heroin addict has been estimated to spend \$261 per week on his or her habit
1241 - less than \$20,000 per year. Even if only \$100 billion is attributable to the cocaine market, a heavy user
1242 of cocaine would spend almost \$700 on cocaine per week. This far exceeds the \$420 per week assumed as the upper
1243 limit that can be consumed by the most compulsive user of cocaine. Thus, \$200 billion is certainly an
1244 excessively high estimate.

amount of cocaine produced from those crops have increased by about 11 percent. Perhaps production was increased partly to offset increases in foreign country seizures (Table 15). Because of the increases in foreign seizures, shipments to the United States increased only by about five metric tons. The amount of cocaine U.S. authorities seized increased by 8 percent. The net effect of these increases has been about a 1 percent decrease in the amount of cocaine available for consumption in the United States between 1989 and 1991.

TABLE 15

Trends in Cocaine Supply, 1989-1991
(in metric tons unless otherwise noted)

	<u>1989</u>	<u>1990</u>	<u>1991</u>
Coca Leaf Crop ¹	295,072	305,893	331,140
Maximum Potential Cocaine HCl Produced ²	826	858	930
Seized in Foreign Countries ³	70	152	199
Shipped to the United States	377-544	361-525	382-550
Seized by Federal Authorities ⁴	99	107	108
Available for Consumption in United States	278-445	254-418	274-442
Retail Value in the United States (\$ in billions)	\$38-\$60	\$45-\$74	\$42-\$68

¹INCSR, 1992, 28. There is an error in the coca leaf estimate for 1989 in Bolivia; refer to Bolivia Statistical Table (p. 97) for the correct number.

²This is the amount of cocaine HCl (or pure cocaine) that could have been produced had there been no seizures, consumption, or losses at any stage of production.

³INCSR, 1992; United Nations, INCB, Narcotic Drugs, Statistics for 1990; and the Royal Canadian Mounted Police, National Drug Intelligence Estimate 1990.

⁴Drug Enforcement Administration, Federal-wide Drug Seizure System, 1989-1991.

1283 HEROIN

1284 Poppy plants, from which opium is extracted, are grown in
1285 Southeast Asia, Southwest Asia, and in the Western Hemisphere
1286 (Mexico, Guatemala and Columbia). Opium is converted into heroin
1287 in laboratories in the countries where it is cultivated and in
1288 other countries and then consumed locally or shipped to consumer
1289 countries.

1290 There are two reasons why we cannot develop a supply flow
1291 model for Southwest and Southeast Asia heroin. First, it is
1292 difficult to estimate the total harvest in these areas. For
1293 example, estimates of areas under cultivation in Iran have been
1294 unavailable since the Islamic Republic broke off ties with the
1295 United States. The second problem is that Europe and North
1296 Africa are the primary export markets for heroin from these
1297 regions. This makes it difficult to determine the amount of
1298 heroin shipped to the United States.

1299 In contrast, the United States is the only major market for
1300 Mexican, Guatemalan, and probably Colombian heroin.⁶³
1301 Therefore, we can integrate the heroin production process in the
1302 Western Hemisphere into a computer model similar to the cocaine
1303 model. Using information from the 1992 INCSR on the amount of
1304 land under cultivation and opium yields, we estimated the amount
1305 of heroin available for export to the United States from these
1306 countries. We then used these estimates as the basis for
1307 determining the entire U.S. heroin market. Further, using DEA's
1308 Heroin Signature Program (HSP)⁶⁴ and Domestic Monitor Program
1309 (DMP),⁶⁵ we calculated the U.S. share of the worldwide market

1310 ⁶³ The Royal Canadian Mounted Police report that Mexican and Central American heroin in Canada is
1311 negligible (RCMP, National Drug Intelligence Estimate 1990, 22). According to data on origins of seizures in
1312 Europe, no couriers originated in Mexico (International Criminal Police Organization, The Heroin Situation in
1313 Europe in 1989 (Lyons, France, February 1990).

1314 ⁶⁴ The Heroin Signature Program (HSP), using a random sample from all seizures and purchases registered
1315 in STRIDE, tries to quantify the U.S. market shares of each of the three major heroin producing regions. The
1316 HSP analyzes 300 to 500 exhibits annually from a random sample of purchases and seizures made by Federal agents.
1317 This analysis probably does not reflect the U.S. heroin market as a whole. See Worldwide Heroin Situation 1990.
1318 3. Moreover, the DEA reports, "Chemical analysis of heroin samples purported to have originated in Colombia
1319 have resulted in identification of the drugs as having been processed using techniques indigenous to Southwest
1320 Asia and Mexico" (page 4). This could result in miscalculations in the analysis which follows, because
1321 increases assumed to be from sources other than the Western Hemisphere may in fact be from Colombia.

1322 ⁶⁵ The Domestic Monitor Program (DMP), a retail-level heroin purchase program, monitors the source of
1323 heroin in about 20 metropolitan areas. The DMP sample is less accurate than the HSP sample because the sampling
1324 procedure is not random but, rather, targets cities with large heroin markets. To improve the DMP's
1325 representation of the U.S. heroin market, the percentages of Mexican heroin in the DMP cities have been weighted
1326 by the DAWN data on emergency room mentions for heroin use. Assuming that heroin use, as indicated in DAWN,
1327 is related to quantities supplied to markets, the greater the number of individuals admitted to a city's
1328 emergency rooms for heroin, the greater the supply of heroin to that city.

1329 based on the percentage of Western Hemisphere heroin in the
1330 market.⁶⁶

1331 We estimate that from 21.9 to 32.7 metric tons of heroin
1332 were available in the United States in 1991. We derived these
1333 figures by using the INCSR's estimate of 6.86 metric tons of
1334 heroin from the Western Hemisphere in 1991, and by assuming that
1335 21 percent (based on the HSP) to 31% (based on the DMP) of the
1336 U.S. market comes from the Western Hemisphere. Discounting for
1337 the 1.38 metric tons Federal authorities seized in 1991, we
1338 estimate the total U.S. heroin market to be 20.5 metric tons to
1339 31.3 metric tons in 1991. Using the midpoints of the estimates
1340 of price per pure gram from Table 5, we estimate the total retail
1341 value of this heroin to be between \$26.5 billion and \$40.5
1342 billion .

1343 These estimates are well above what we would reasonably
1344 expect. The largest credible estimate of the number of heroin
1345 addicts is about 1 million, and this estimate is considered to
1346 exceed the actual number.⁶⁷ We reasoned earlier that heroin
1347 addicts are unlikely to spend more than \$420 a week, and few are
1348 likely to spend this much. We also reasoned that about 86
1349 percent of expenditures on heroin could be attributed to
1350 addicts⁶⁸. However, even if we make all these extreme assump-
1351 tions, heroin expenditures cannot exceed approximately \$25
1352 billion.⁶⁹

1353 Therefore, we conclude that the supply-based model for
1354 heroin is not credible. We continue to improve this model and
1355 expect that we will develop credible supply-based heroin
1356 estimates in the future.

1357 MARIJUANA

1358 It is difficult to develop an estimate of the size of the
1359 U.S. retail market for marijuana from estimates of available
1360 supply. First, the amount of marijuana that Americans cultivate
1361 for personal use is impossible to estimate. Second, even though
1362 a large amount of the domestic marijuana market is grown in the

1363 ⁶⁶ For example, suppose X is the amount of heroin from Western Hemisphere sources, and suppose that Y
1364 percent of the U.S. market is met by those Western Hemisphere sources. Then the worldwide supply of heroin sent
1365 to the United States must equal X/Y.

1366 ⁶⁷ D. Hamill and P. Cooley. "National Estimates of Heroin Prevalence 1980-1987: Results from Analysis
1367 of DAWN Emergency Room Data." RTI Technical Report, Research Triangle Institute, 1990.

1368 ⁶⁸ This percentage would certainly be larger if we assumed that 1 million addicts spent \$420 per week
1369 on heroin.

1370 ⁶⁹ Multiply 1 million addicts by \$420 per week by 52 weeks and divide by 0.86.

1371 United States,⁷⁰ countries in South and Central America, the
1372 Caribbean, Asia, North Africa, and the Middle East also supply
1373 cannabis to the domestic market.

1374 Using available production data, conservative assumptions
1375 lead to estimates that Americans spend \$261 billion to \$281
1376 billion a year on marijuana.⁷¹ However, Table 13 reported
1377 retail expenditures on marijuana as less than \$10 billion.
1378 Either the estimates of worldwide cultivation and production are
1379 wildly inflated, or seizures, losses, and consumption within
1380 producer countries have been underestimated by an equal amount,
1381 or the United States' share of the worldwide marijuana consumer
1382 market is much smaller than suggested here. Unfortunately, the
1383 data needed to develop better estimates of these factors are not
1384 available, and without the independent ability to assess the
1385 reliability of the marijuana cultivation estimates, we cannot
1386 develop a plausible supply-based estimate of the retail value of
1387 the marijuana market in the United States.

1388 ⁷⁰ The DEA estimates that approximately 5,000 to 6,000 metric tons of cannabis were cultivated during
1389 1990 (reported in the National Narcotics Intelligence Consumers Committee (NNICC), The NNICC Report, 1990: The
1390 Supply of Illicit Drugs to the United States (Washington, D.C.: National Narcotics Intelligence Consumers
1391 Committee, June 1991), 33).

1392 ⁷¹ Assume that none of the domestically grown marijuana is exported, that 77 percent of all imports into
1393 the United States are Mexican marijuana, and that all marijuana produced elsewhere is exported to other
1394 countries. Then if the DEA/NNICC estimates are reasonably accurate, approximately 26,100 to 28,100 metric tons
1395 would have been available during 1990. At an average cost of \$10 per gram, the retail value of this amount of
1396 marijuana would have been \$261 to \$281 billion dollars. If the average price were closer to \$5 per gram, the
1397 retail value would have been half that large (The NNICC Report, 1990).

1398

III. SUMMARY

1399 Because of the quality of available data, there is
1400 considerable imprecision in estimates of the number of heavy and
1401 casual users of drugs, the amount of drugs they consume, and the
1402 retail sales value of those drugs. The best estimates (all for
1403 1991) follow:

1404 • About 2.1 million Americans are heavy cocaine users;
1405 590,000 are heavy heroin users; 5.7 million use
1406 marijuana at least one day a week; and an unknown
1407 number are weekly users of other illicit drugs and
1408 legal drugs used illicitly.

1409 • About 5.4 million Americans are casual users of
1410 cocaine; about 380,000 are casual users of heroin;
1411 about 13.6 million use marijuana less than once a
1412 week; and millions more use other drugs less than
1413 once a week.

1414 • Trends are difficult to discern. Nevertheless, it
1415 appears that the number of heavy cocaine and heroin
1416 users has changed little over the last four years,
1417 except for a decrease in 1990 that could be
1418 attributed to an increase in the price of cocaine.
1419 In contrast, the number of weekly marijuana users
1420 has declined.

1421 • Casual use of cocaine and heroin has declined. However,
1422 small sample sizes make the heroin data unreliable. No
1423 decline in the casual use of marijuana was apparent.

1424 Deriving estimates of the total expenditure on illicit drugs
1425 and licit drugs consumed illegally is more difficult and
1426 uncertain because those estimates require even more data about
1427 prices paid. Nevertheless, the best estimates indicate the
1428 following:

1429 • Americans spent about \$30 billion on cocaine, \$9
1430 billion on heroin, \$8 billion on marijuana, and \$2
1431 billion on other substances. Income in kind earned
1432 by drug dealers and others probably adds about \$2 to
1433 \$3 billion to the cocaine figure and another \$3
1434 billion for heroin.

1435 • Again, estimating trends is risky, but it does not
1436 appear that expenditures on cocaine and heroin have
1437 changed much over the last four years. In contrast,
1438 expenditures on marijuana and on other drugs seem to
1439 have declined.

1440 Estimates of the total amount of cocaine consumed are lower
1441 than but broadly consistent with estimates of the total amount of
1442 cocaine available for consumption:

- 1443 • From the supply-side perspective, 274 to 442
1444 metric tons of cocaine were available for
1445 consumption in the United States.
- 1446 • From the consumption perspective, Americans consumed
1447 roughly 180 to 250 metric tons of cocaine.

1448 Although the estimates from the supply-side perspective are
1449 higher than those from the consumption perspective, the supply-
1450 side estimates are surely overstated. First, they do not exclude
1451 some losses that occur within the source countries but that
1452 cannot be readily estimated; and second, they do not account for
1453 domestic seizures by State and local officials. Although the
1454 supply-side and the consumption estimates are remarkably close,
1455 they cannot be completely reconciled.

1456 The sizable price increase seen during 1990 is not
1457 reflected in a comparable decrease in the supply of cocaine
1458 available during 1990. This may have occurred because the supply
1459 of cocaine on the street lags behind the supply of cocaine
1460 entering the country, which lags behind the harvest of coca
1461 leaves, so the supply-based and consumption-based estimates
1462 should not be in lock step. Still, how the supply of cocaine
1463 could have remained relatively constant across time while the
1464 price of cocaine increased (and apparently the consumption of
1465 cocaine decreased) during 1990 is a perplexing question.

1466 Although these estimates paint a picture of drug consumption
1467 with an extremely broad brush, and although not all estimates can
1468 be reconciled, the approach we use provides an important
1469 perspective on what is not known about drug production and
1470 consumption and what needs to be known to better understand the
1471 policy choices available to the Nation.

1472 We make no pretense here that the model and estimates we
1473 present in this report are fully adequate to the larger task of
1474 informing public policy decisions. They are at best a start, but
1475 offer important possibilities of integrating what are otherwise
1476 often seen as disparate pieces of information about the
1477 consumption and supply of drugs.

1478 We expect incremental improvements to the estimates and
1479 methods offered here, particularly as better data become
1480 available. We also expect improvement in the model, which will
1481 include systematic and analytic links between government policy
1482 and drug use. Thus, it is probably best to consider this an
1483 interim report. The estimates we present might be seen as an im-
1484 provement over those reported in 1991 and as a prelude to
1485 improved estimates for 1993.

1486 Moreover, the estimates by themselves have only modest
1487 importance - they tell us nothing more than that the drug trade
1488 is large, a conclusion that requires no special study. The real
1489 utility of these numbers is the development of a systematic
1490 methodology for integrating the various indicators - crops in
1491 foreign countries, drugs seized at the borders, arrests made in
1492 American cities, etc. - that can help policymakers to better
1493 understand the dynamics of the drug trade and to better fashion
1494 appropriate policy responses.

ESTIMATING TYPICAL EXPENDITURES ON DRUG CONSUMPTION

1497 This appendix discusses the methodology used to develop
1498 estimates of weekly expenditures on cocaine and heroin by
1499 arrestees who used either or both of these drugs on more than 10
1500 days during the month before their arrest. The estimates
1501 reported here are based on self-reports by arrestees in 22
1502 cities. These self-reports, which are for 1989 and 1990, are
1503 from the Drug Use Forecasting (DUF) program.¹

1504 The Data

1505 DUF respondents reported how much they spent on all drugs
1506 combined (during a typical week) but not how much they spent on
1507 each individual drug. They also reported the number of days they
1508 used any of 22 kinds of drugs during the month before their
1509 interview. We used regression analysis to infer expenditure
1510 patterns for cocaine and heroin based on these data.

1511 The greatest obstacle to accurate reporting is a
1512 respondents' denial of drug use.² Therefore, drug use is
1513 underreported. Once a respondent admits drug use, however, he or
1514 she would seem to have less incentive to underreport or
1515 overreport consumption. To be included in this analysis, the
1516 respondent had to have admitted some illicit drug use during the
1517 last 30 days and had to have admitted some drug expenditure
1518 during the typical week. (These different time periods were
1519 required because of the wording of the DUF questions.) A total
1520 of 9,364 respondents were selected for analysis from the 1990 DUF
1521 data and 5,151 were selected from the 1989 DUF data. We
1522 estimated expenditure patterns for these two years separately.

1523 The dependent variable (EXPEND) was the weekly expenditures
1524 on all drugs. This variable was skewed (a few individuals
1525 reported very high amounts). Consequently, weekly expenditure
1526 was converted to a logarithm before estimating the regression.
1527 We then converted the predictions back to the original dollar
1528 scale.

1529 The number of days that a respondent consumed each of four
1530 categories of drugs were the independent variables. We collapsed

1531 ¹No question was asked about the amount of expenditures on drugs in the 1988 DUF data, so no analysis was performed for
1532 that year.

1533 ² Drug users also have difficulty recalling how often they used a drug, how much they used, and how much they paid for
1534 it. However, this inaccuracy, unlike intentional denial or deception, probably averages out when the data are aggregated.

drugs into four general categories: COCAINE (powdered and crack), HEROIN (black tar and other), MARIJ (marijuana and hashish — combined in the DUF interview), and OTHER. Cocaine, heroin, and marijuana were the only drugs consumed by a large percentage of the arrestee population. OTHER comprised a large number of infrequently consumed substances. Except for MARIJ, each variable comprised at least two drugs.

The category variable represents the maximum number of days any one of those drugs was consumed. For example, if powdered cocaine had been consumed on 15 days and crack cocaine had been consumed on 20 days, then COCAINE was coded as "20 days."

We expected the relationship between expenditures and days of consumption to be nonlinear, but the logarithmic translation may not have been adequate to capture that nonlinearity. Consequently, each of the above category variables was raised to the second power, thus creating additional independent variables: COCAINE2, HEROIN2, MARIJ2, and OTHER2.

Cocaine, heroin, and other drugs are frequently consumed in combination. For example, heroin users often use cocaine, a stimulant, to moderate the effect of heroin, a depressant. However, someone who uses a combination of heroin and cocaine on a daily basis is unlikely to consume the same amount of heroin and cocaine that is consumed by two people who are daily users and exclusive in their drug use.

Consequently, two interaction terms were added to the regression. COKEHER equals COCAINE x HEROIN. COKEHER2 = COKEHER²/300. The division by 300 facilitates the computing algorithm, but otherwise has no substantive importance for the analysis. The consumption of other drugs was relatively infrequent, so we did not add an interaction term to the regression for this variable.

During 1990, DUF respondents were asked whether they had consumed any drugs in addition to those listed in the interview. A variable OTHERDRG denotes that some other drug had been consumed (1=yes, 0=no). This question was not asked during 1989.

Estimation

We used ordinary least squares to estimate the regressions. Results are presented in Table A1.

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Table A1

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**Statistical Results for Regression Analysis
of Drug Expenditures, 1989-1990**

Descriptive Analysis

Variable	1989		1990	
	Mean	Standard Deviation	Mean	Standard Deviation
EXPEND	4.5	1.6	4.4	1.6
COCAINE	11.0	12.1	9.3	11.5
COCAINE2	267.7	369.5	218.4	344.5
HEROIN	3.9	9.5	4.0	9.7
HEROIN2	105.8	279.3	109.6	283.6
MARIJ	6.5	9.4	5.8	9.0
MARIJ2	131.8	272.4	115.1	257.8
OTHER	2.4	6.9	2.5	7.0
OTHER2	52.5	192.7	55.8	196.8
COKEHER	63.2	209.8	55.1	195.2
COKEHER2	160.0	605.6	137.1	558.6
OTHERDRG			0.8	

1594

Regression Results

Variable	1989		1990	
	Parameter	T-Score	Parameter	T-Score
CONSTANT	3.1325	87.64	3.1438	90.41
COCAINE	0.1516	22.58	0.1503	30.27
COCAINE2	-0.0023	-10.42	-0.0022	-13.36
HEROIN	0.1462	10.23	0.145	14.38
HEROIN2	-0.0021	-4.36	-0.0021	-6.27
MARIJ	-0.0207	-3.14	-0.0035	-6.96
MARIJ2	0.0012	5.17	0.0017	9.87
OTHER	0.0565	5.25	0.0788	10.62
OTHER2	-0.001	-2.8	-0.0018	-6.78
COKEHER	-0.0061	-10.07	-0.0053	-12.33
COKEHER2	0.0013	6.77	0.001	7.42
OTHERDRG			0.0483	1.61

R-Square	0.46	0.48
Number of Cases	5,151	9,364

Source: DUF, 1989 and 1990

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1613
1614

The model's explanatory power ($R^2=0.46$ for 1989 and 0.48 for 1990) appears remarkable given the presumed measurement error in these data. Residuals were plotted against the number of days that the respondent reported using cocaine, heroin, marijuana, other drugs, and the interaction term. These plots indicate that the logarithmic transformation does a sufficient job of inducing normality among the residuals and that the model specification does not systematically distort the relationship between days of use and amount of money spent.

Interpretation

We converted predictions based on the regression reported in Table A1 from logarithms to natural units using two approaches. When $\text{Ln}(\$)$ is the predicted value of the original regression, then the median value in the original units is $\text{Median}(\$) = \text{Exponential}(\text{Ln}(\$))$, and the mean value in the original units is $\text{Mean}(\$) = \text{Exponential}(\text{LN}(\$)+\sigma^2/2)$.

When cocaine is the only drug consumed, estimating expenditures on cocaine is straightforward. First, substitute zeros for all independent variables other than COCAINE and COCAINE2. Second, use the regression results to make predictions when COCAINE = 1, COCAINE = 2, ... COCAINE = 30. Similar calculations yield estimates for expenditures on heroin when heroin is the only drug consumed. See Figures A1 and A2, which also report expenditures for other drugs consumed alone.

For example, Figure A1 indicates that when cocaine is consumed 10 days a month, the median weekly expenditure is somewhat more than \$80. It is about \$200 a week when cocaine is consumed on 20 days a month, and it is about \$300 a week when cocaine is consumed on 30 days a month.

Note from Figure A1 that, when broken down by daily expenditure, spending on heroin and cocaine is about the same. However, this does not mean that when cocaine and heroin are consumed in combination, expenditures on each are equally divided. More likely, one of the drugs is the drug of preference, and the other is used frequently but at a lower dosage.

When cocaine and heroin were consumed in combination, we attributed greater expenditure to what appeared to be the dominant drug. Let \$ represent the predicted dollar expenditure on drugs by individuals who consume cocaine and heroin but no other drugs.

Let N_c represent the number of days a month that an individual consumed cocaine, and let N_h represent the number of days a month that individual consumed heroin. Expenditures on cocaine and heroin are estimated as:

$$\$c = \$ \left[\frac{N_c}{N_c + ADJ \cdot N_h} \right] \quad \$h = \$ - \$c$$

where $ADJ = 0.5$ when $N_c > N_h$ and $ADJ = 2.0$ otherwise. According to this formulation, when cocaine is consumed on more days than heroin, at least two-thirds of the drug expenditure is attributed to the purchase of cocaine. When heroin is consumed on more days (or the same number of days) as cocaine, then at least two-thirds of the drug expenditure is attributed to heroin. As a practical matter, this rule dictates that respondents who say that they use both heroin and cocaine daily spend two-thirds of the money on heroin and one-third on cocaine. This division seems appropriate given evidence that such individuals typically are long-established heroin users who add a small amount of cocaine to their consumption.³

Typical Expenditures

Using results from the above regression, coupled with assumptions about how joint expenditures on heroin and cocaine should be apportioned, we estimated the median and mean expenditures for cocaine and heroin for every respondent who used either drug heavily. We averaged those estimates over all respondents who admitted using cocaine or heroin on more than 10 days during the month before their arrest. Results are reported in Table A2.

Typical expenditures appear to have remained stable during 1989 and 1990. The chief problem in interpreting these numbers is that the medians are so different from the means. Which should be used as "typical" expenditures? Evidence presented later seems to indicate that the median is preferable. Before turning to this evidence, the matter of earnings from income in kind must be considered.

³ D. Hunt, Abt Associates Inc., "Tracking the Prevalence of Heroin Use," paper prepared for ONDCP, July 1992.

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1690

TABLE A2

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Mean and Median Expenditures on Cocaine and Heroin, 1989-1990

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1693

19891990

1694

Expenditures on cocaine by those
who use cocaine heavily

1695

1696

(Mean)

\$434

\$430

1697

(Median)

\$211

\$217

1698

Expenditures on heroin by those
who use heroin heavily

1699

1700

(Mean)

\$513

\$519

1701

(Median)

\$250

\$261

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1703

Source: DUF, 1989 and 1990.

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Accounting for Income in Kind

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Heavy drug users support their drug use through legitimate sources and through crime, especially drug dealing. Returns from dealing are often in the form of drugs as a payment for services rendered, or "income in kind." How does income in kind affect our estimates?

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It is sometimes asserted that most heavy users pay for their drug use by dealing or assisting others who deal in illicit substances. For example, Johnson and colleagues⁴ report that in their sample of New York City heroin users, daily users spent an average of \$7,601 a year on heroin but consumed about \$13,189 worth of heroin a year. Regular users (defined in this study as those who use heroin between three and six times a week) spent \$4,019 a year on heroin but consumed about \$6,431 worth of the drug a year. The difference between expenditures and consumption represents in-kind earnings in the form of drugs. If this were a typical pattern, then the expenditures on drugs computed from DUF should be inflated by $(\$13,189/\$7,601)$ or 1.73 for daily users, and $(\$6,431/\$4,019)$ or 1.6 for regular users. For reasons reported here, such multipliers seem much too large.

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First, consider a hypothetical illustration of a drug market. Suppose that mid-level dealers have 100,000 units of drug X to sell and, at \$1 a unit, demand \$100,000 for their drugs. Suppose initially that there are 100 heavy users but no

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⁴ B. Johnson et al., *Taking Care of Business: The Economics of Crime by Heroin Abusers* (Lexington, Massachusetts: Lexington Books, 1985).

1731 other users. Then each heavy user must generate \$1,000 of income
1732 for the mid-level dealers.

1733 The 100 heavy users could support their use partly from
1734 dealing, but clearly they cannot support their use entirely from
1735 dealing. Selling exclusively to each other would not raise the
1736 \$100,000 expected by mid-level dealers. The \$100,000 must come
1737 from some other source.

1738 Now these 100 users could support one-third of their
1739 consumption by selling 66,666 units for \$1.50 a unit to each
1740 other. This is a Pyrrhic marketing success, of course, but it
1741 would be effective if alternative income sources sometimes
1742 provided sufficient funds to make purchases and sometimes did
1743 not. The total revenue generated is \$100,000, enough to satisfy
1744 the middlemen. This division of drugs would approximate what was
1745 observed by Johnson and colleagues in New York.

1746 This solution requires that the street price of drug X be 50
1747 percent higher than the price to mid-level dealers. In reality,
1748 retail prices for cocaine and heroin are about one-third higher
1749 than wholesale prices,⁵ so income in kind would seem more likely
1750 to add about 33 percent to our estimates of drug consumption
1751 based on transactions in which money was exchanged.

1752 Moreover, many sellers do not themselves consume drugs (at
1753 least not at heavy use rates). To extend the above illustration,
1754 suppose that one-half the 100,000 units of drug X are sold by
1755 entrepreneurs who do not themselves consume drugs. Then the 100
1756 heavy users could support only about 17 percent of their own drug
1757 use by selling drug X at \$1.5 a unit to other users. *The market*
1758 *opportunities for heavy users to support their own consumption*
1759 *with income in kind is limited by sales by nonusers.* Sales by
1760 nondrug users may be sizable.

1761 Reuter and colleagues report that only 11 percent of the
1762 dealers they interviewed retained one-half or more of the drugs
1763 for personal consumption; 30 percent retained less than one-half,
1764 "usually only 'a little of it.'"⁶ If "a little of it" means 15
1765 percent, then these figures suggest that about 10 percent of the
1766 drugs that were available to these dealers were retained for
1767 personal consumption. If Reuter's dealers are typical of those
1768 who sell drugs, then the expenditure figures based on dollar
1769 transactions should be increased by 0.1/0.9, or about 11 percent
1770 to account for in-kind income.

1771 ⁵ W. Rhodes and R. Hyatt, Abt Associates Inc., "The Price of Illicit Drugs, 1981-1991," paper prepared for ONDCP, May
1772 15, 1991.

1773 ⁶ P. Reuter et al., *Money from Crime: A Study of the Economics of Drug Dealing in Washington, D.C.* (Santa Monica,
1774 California: Rand Corporation, 1990) RAND publication R-3894-RF, p. 61.

1775 In his field study conducted in 1982 and 1983 of 15 street-
1776 level heroin dealers in Detroit, Mieczkowski⁷ reports that
1777 dealers are typically not heavy users: "...although runners
1778 appear by and large to be recreational drug users, they are not
1779 addicted to heroin." Mieczkowski's findings suggest that income
1780 in kind represents a smaller percentage of drug consumption than
1781 was reported by Johnson.

1782 Altschuler and Brounstein⁸ interviewed 387 ninth and tenth
1783 grade, minority, inner-city boys from Washington, D.C. during
1784 1988. Of the 387, 7 percent used drugs but did not sell them, 9
1785 percent sold drugs but did not use them, and 4 percent both sold
1786 and used drugs. These findings suggest that many drug sales are
1787 made by dealers who are not heavy users.

1788 Williams tracked the drug (cocaine and crack) dealing of
1789 eight New York juveniles who belonged to a teenage drug ring
1790 called the Cocaine Kids, or the Kids. Williams reports that
1791 "...virtually all cocaine suppliers expect retail dealers to
1792 return with cash amounting to about 60 to 75 percent of potential
1793 retail sales of their consignment."⁹ If this profit margin is
1794 typical for cocaine and crack retailers, and if all this profit
1795 is income in kind spent on the retailer's consumption, then
1796 estimates based on dollar transactions might be multiplied by
1797 0.66 to 0.33. However, the dealers interviewed by Williams did
1798 not take their profits primarily in the form of crack: "All the
1799 Kids snort cocaine regularly. This is accepted, but the use of
1800 crack is generally frowned upon: those who snort are thought to
1801 have more control and discipline than those who smoke crack or
1802 freebase. Most dealers see crack smokers as obsessive consumers
1803 who cannot take care of business; crack users, they say, tend to
1804 become agitated, quickly lose control and concentration, and take
1805 one dose after another at the expense of everything else."¹⁰

1806 Skolnick,¹¹ who examined crack sales by gang members in
1807 California during 1988, reports two types of dealers: one who
1808 sells for profit and one who sells to buy drugs. Interestingly,
1809 Skolnick also reports that 75 percent of street sales will be
1810 returned to the middleman, a figure consistent with that reported
1811 by Williams in New York.

1812 ⁷ T. Mieczkowski, "Geeking Up and Throwing Down: Heroin Street Life in Detroit," *Criminology* 24, no.4. (1986): 645-665.

1813 ⁸ D. Altschuler and P. Brounstein, "Patterns of Drug Use, Drug Trafficking, and Other Delinquency among Inner-City
1814 Adolescents in Washington, D.C.," paper presented at the Annual Meeting of the American Society of Criminology, Reno,
1815 Nevada, 1989, 9 and Table 3.

1816 ⁹ T. Williams, *The Cocaine Kids: The Inside Story of a Teenage Drug Ring* (Reading, Massachusetts: Addison-Wesley
1817 Publishing, 1989), 36.

1818 ¹⁰ Williams, *The Cocaine Kids*, 47.

1819 ¹¹ J. Skolnick, *The Social Structure of Street Drug Dealing* (BCS FORUM, Office of the Attorney General, State of California,
1820 undated).

1821 Waldorf and Lauderback interviewed 568 members of 86
1822 different ethnic gangs in San Francisco.¹² They reported that
1823 only 16 percent of the crack sellers used crack during the month
1824 before the interview, although about one-half of the cocaine
1825 sellers and about three-fourths of the heroin sellers used those
1826 drugs during the month before the interview. The gang members
1827 explained that intoxicated sellers did not make reliable dealers
1828 and that drug dependence impaired the gang member's ability to
1829 defend the gang. Waldorf and Lauderback reached similar
1830 conclusions to Chin¹³ (Chinese gang members who sold heroin did
1831 not use it) and Vigil.¹⁴

1832 Mieczkowski, on the other hand, reports that crack sellers
1833 in his Detroit sample "appear to conform closely to the 'classic'
1834 or 'hustler' view of the drug user."¹⁵ Nearly two-thirds of the
1835 respondents said that they sold crack to get money for their own
1836 crack consumption.

1837 The important point is that many of the drugs consumed by
1838 heavy users are sold by individuals who do not use drugs heavily.
1839 The ability of heavy users to support their own use through
1840 dealing is necessarily limited. Consequently, the amount of
1841 drugs that heavy users receive as income in kind cannot account
1842 for much of the cocaine and heroin consumed.

1843 Data are not sufficient to support precise estimates. It
1844 seems that a street dealer might be able to retain about one-
1845 fourth of the drugs that he markets and that profit dealers
1846 (those taking their profit in cash rather than in kind) are more
1847 numerous among cocaine dealers than among heroin dealers. We
1848 assume that two-thirds of the cocaine dealers and one-third of
1849 the heroin dealers are profit dealers.

1850 Assume that a cocaine retailer must return \$3 for every \$4
1851 of crack or powdered cocaine that he sells. Also assume that
1852 two-thirds of all retail dealers are profit dealers and one-third
1853 are users. This means that every \$1 spent on crack and cocaine
1854 would result in $\$1 \times 0.33 \times 0.33 = \$0.11$ in income in kind,
1855 suggesting that the estimates should be inflated by 0.11. This
1856 inflation figure equals the 11 percent income in-kind figure
1857 derived from Reuter and colleagues' study.

1858 ¹² D. Waldorf and D. Lauderback, "Don't Be Your Own Best Customer — Drug Use of San Francisco Ethnic Gang Drug
1859 Sellers," *Crime, Law and Social Change — An International Journal*, 19 (1993): 1-15. The published article was based on a
1860 population of 300; however, an updated version surveyed 568 gang members.

1861 ¹³ K. Chin, "Chinese Triad Societies, Tongs, Organized Crime and Street Gangs in Asia and the United States," unpublished
1862 Ph.D. dissertation, University of Pennsylvania, Philadelphia, Pennsylvania, 1986.

1863 ¹⁴ J. Vigil, *Barrio Gangs: Street Life and Identity in Southern California* (Austin, Texas: University of Texas Press, 1988).

1864 ¹⁵ T. Mieczkowski, "Crack Distribution in Detroit," *Contemporary Drug Problems* (Spring 1990): 23-24.

1865 Second, assume that a heroin retailer must return \$3 for
1866 every \$4 of heroin that he sells. Also assume that one-third of
1867 the retail dealers are profit dealers. This means that every \$1
1868 spent on heroin would result in a maximum of $\$1 \times 0.33 \times 0.66 =$
1869 $\$0.22$, suggesting that the estimate should be inflated by 0.22.
1870 This inflation figure is lower than the in-kind figure derived
1871 from Johnson and colleagues' study but is more consistent with
1872 observations that not all those who sell heroin are heavy users.

1873 We assume a somewhat higher estimate for in-kind income. We
1874 assume that \$0.25 worth of heroin is retained as in-kind income
1875 for every \$1 of heroin sold. For cocaine, we assume one-half
1876 that amount, or \$0.125, for every \$1 sold.

1877 Choosing the Median As the Typical Expenditure

1878 If weekly expenditures on drugs were reported with perfect
1879 accuracy, there would be little justification for using any
1880 number other than the mean. After all, regardless of how the
1881 data are skewed, the mean is the average expenditure, and total
1882 expenditures will equal the average expenditure multiplied by the
1883 number of heavy users.

1884 However, another interpretation seems more reasonable. Sup-
1885 pose that the average expenditure is about the same for everybody
1886 who uses drugs on a specified number of days a month, but that
1887 the amount spent on drugs is reported with great inaccuracy.
1888 From this view, the median is the best measure of the average ex-
1889 penditure.¹⁶ Some other sources suggest that the median
1890 expenditure is more accurate for our analysis.

1891 Other reports of expenditures on drug use

1892 Other studies, primarily of heavy users involved with the
1893 criminal justice system, estimate expenditures on heroin and
1894 cocaine that are broadly consistent with the median reported here
1895 (Table A2).

1896 ¹⁶ An analogy helps make this point. Suppose that a grocery store clerk were to ring 1,000 \$1 candy bars individually on
1897 his register. Suppose that he was inaccurate but unbiased as he occasionally registered too many or too few zeros: 100 bars were
1898 priced at \$0.10, 800 were priced at \$1, and 100 were priced at \$10. The total expenditure on candy bars would be \$1,810, or
1899 an average of \$1.81 per candy bar. Here the clerk's random errors do not balance out.

1900 Johnson and colleagues¹⁷ interviewed 201 subjects who were
1901 street-level heroin users in East and Central Harlem; all were
1902 involved in some form of criminality and spent most of their time
1903 on the streets. Subjects were interviewed for five consecutive
1904 days and then were interviewed weekly for the following four
1905 weeks. About 132 of these subjects were interviewed four more
1906 times at three- to six-month intervals. The average user spent
1907 \$4,203 a year on heroin. These users often sold drugs, and when
1908 they did, payment was usually in the form of drugs as income in
1909 kind. When income in kind was taken into account, these users
1910 spent about \$6,986 a year on heroin. Daily users directly
1911 purchased \$7,601 worth of heroin a year, but when income in kind
1912 is taken into account, they spent about \$13,189. Regular users
1913 (those who used at least weekly but less than daily) made cash
1914 payments of \$4,019 for heroin over the course of a year, but with
1915 income in kind payments, their annual expenditures were \$6,431.
1916 These estimates are comparable with those based on the median
1917 responses in the DUF data, which suggest that heavy users of
1918 heroin spend about \$12,000 a year on heroin.

1919 Johnson and Wish¹⁸ recruited 105 male New York "hard-drug
1920 abusers" who had committed one or more relatively serious non-
1921 drug crimes (such as robbery, burglary, grand larceny, or
1922 assault) in the past 24 hours. Those who had committed recent
1923 robberies spent an average of \$52 a day on illicit drugs. Those
1924 who had committed other crimes spent an average of \$32 a day.
1925 Thus, for those who had just committed crimes, the expenditure on
1926 drugs was \$224 to \$364 a week.

1927 For those who bought both heroin and cocaine, daily
1928 expenditures totaled \$259 to \$357 a week. Those who bought only
1929 cocaine spent \$175 to \$231 a week on cocaine. Those who bought
1930 only heroin spent \$154 to \$252 a week on heroin. It is notable
1931 that 86 percent of these subjects reported using some illicit
1932 substance on 28 of the past 30 days, so the majority could be
1933 considered heavy drug users. These figures seem to be high
1934 estimates of consumption, however. Because all these users had
1935 recently committed serious crimes, they had money available for
1936 drugs from illegal sources. Nevertheless, the average
1937 expenditures were about the same as those based on the median
1938 values from the DUF data.

1939 Reuter and colleagues report results based on interviews
1940 with 186 males on probation in Washington, D.C. who had sold
1941 drugs during the mid-1980s. About one-half reported purchasing
1942 drugs for their own use. This half had a median expenditure of
1943 \$400 a month; the mean was \$1,596. However, about 40 percent of

1944 ¹⁷ B. Johnson et al., *Taking Care of Business: The Economics of Crime by Heroin Abusers* (Lexington, Massachusetts:
1945 Lexington Books, 1985).

1946 ¹⁸ B. Johnson and E. Wish, "The Robbery-Hard Drug Connection: Do Robbers and Robberies Influence Criminal Returns
1947 and Cocaine-Heroin Purchases," paper presented at the Criminology Section of the American Sociological Association, August
1948 17, 1987.

1949 the respondents consumed some of the drugs that they acquired for
1950 dealing, representing income in kind spent on drugs; about 10
1951 percent reported that they consumed one-half the drugs that they
1952 acquired by dealing. The median and mean are much smaller than
1953 their counterparts in DUF, but the Reuter subjects are not
1954 necessarily heavy users.¹⁹

1955 Mieczkowski²⁰ asked 190 "chronic users of crack cocaine" in
1956 Detroit about their crack consumption by appending questions to
1957 the DUF interview. About one-fourth of these users consumed four
1958 or fewer rocks²¹ a week (\$40 or less a week); most of the others
1959 clustered at 10 to 20 rocks a week (\$100 to \$200 a week) and 40
1960 to 50 rocks a week (\$400 to \$500 a week). Only 5 percent used
1961 over 100 rocks a week. Mieczkowski speculated that the upper
1962 range included dealers who could not distinguish between their
1963 own consumption and what they sold, as well as individuals who
1964 were sharing with friends.

1965 This additional evidence is consistent with the conclusion
1966 that the median values based on DUF data typify spending patterns
1967 for those arrestees who admitted using cocaine or heroin on at
1968 least 11 days during the past month. However, some of the
1969 studies described below report larger expenditure patterns.

1970 Mieczkowski²² reports on interviews with "100 self-reported
1971 dealers and user/dealers of crack cocaine" who were in
1972 residential treatment facilities in Detroit. All can be
1973 considered to be heavy users. The amounts reported on weekly
1974 drug usage were highly skewed. The estimates were: \$937 mean;
1975 \$877 trimmed mean; \$600 median; \$544 M-estimator. These
1976 estimates are considerably higher than those we report, although
1977 they are not inconsistent with estimates for the very heaviest
1978 users. One explanation of this variation may be that these users
1979 had especially high use patterns, as evidenced by their seeking
1980 treatment.

1981 ¹⁹ P. Reuter et al., *Money from Crime: A Study of the Economics of Drug Dealing in Washington, D.C.* (Santa Monica,
1982 California: Rand Corporation, 1990) Rand Publication R-3894-RF, p.61.

1983 ²⁰ T. Mieczkowski, "Crack Distribution in Detroit," *Contemporary Drug Problems* (Spring 1990): 18-20.

1984 ²¹ Crack is made by heating powdered cocaine until it crystallizes. "Rocks" are then broken off the chunk of crack produced.
1985 Crack is often bought by the rock. Although this purchase unit varies in weight and size, rocks tend to be fairly small and
1986 inexpensive.

1987 ²² T. Mieczkowski, "The Economic Dimensions of Crack Use and Distribution: Some Preliminary Data," paper presented to
1988 the American Society of Criminology Annual Meetings, Reno, Nevada, November 1989.

1989 Other studies of treatment populations indicate that
1990 expenditures can be much higher for the typical heavy user than
1991 is assumed here. Schnoll and colleagues²³ report on
1992 expenditures by 172 men and women who received treatment for
1993 cocaine abuse in Chicago primarily during 1982 and 1983. Average
1994 expenditures were reported as \$800 a week.

1995 Gawin and Kleber²⁴ describe heroin use in a sample of 30
1996 consecutive admissions to a cocaine treatment program in New
1997 Haven. Thirteen intravenous drug users used an average of 5.6
1998 grams a week, six smokers used an average of 9.1 grams, and 11
1999 who snorted used an average of 5.3 grams a week. If these users
2000 paid \$100 a gram, they must have spent \$500 to \$900 a week for
2001 cocaine prior to entering treatment.

2002 Although the latter studies, all of which are based on a
2003 population in treatment, indicate that heavy users spend more on
2004 cocaine than is assumed in this study, users in treatment
2005 probably have use patterns that are atypical of heavy users in
2006 general. As Waldorf and colleagues²⁵ report, most heavy cocaine
2007 users are able to control their consumption, avoiding the ruinous
2008 expenditure patterns that often drive other users — those who
2009 have the least control — into treatment.

2010 Evidence from the NHSDA

2011 Additional evidence comes from the 1991 NHSDA. Sixty-three
2012 individuals admitted using cocaine on 11 or more days during the
2013 month before the interview and reported how much they had spent
2014 on cocaine. Average expenditures were \$140 a week. Although
2015 estimates based on the NHSDA are much lower than those based on
2016 DUF, analysis of both data sets shows that heavy users in the
2017 NHSDA data are different from heavy users in the DUF data.²⁶

2018 Estimates based on amount consumed

2019 Another way to validate the median as a measure of expendi-
2020 tures is to infer how much hard-core cocaine and heroin users
2021 could spend given their consumption patterns.

2022 ²³ S. Schnoll et al., "Characteristics of Cocaine Abusers Presenting for Treatment," in *Cocaine Use in America:*
2023 *Epidemiological and Chemical Perspectives*, ed. N. Kozel and E. Adams (Rockville, Maryland: National Institute on Drug Abuse,
2024 1985), NIDA Research Monograph 61, 171-181.

2025 ²⁴ F. Gawin and H. Kleber. "Cocaine Use in a Treatment Population: Patterns and Diagnostic Distinctions," in *Cocaine Use*
2026 *in America: Epidemiological and Chemical Perspectives*, ed. N. Kozel and E. Adams, 182-192.

2027 ²⁵ D. Waldorf et al., *Cocaine Changes: The Experiences of Using and Quitting* (Philadelphia: Temple University Press, 1991).

2028 ²⁶ D. Hunt and W. Rhodes, Abt Associates Inc., "Characteristics of Heavy Cocaine Users, Including Polydrug Use, Criminal
2029 Activity, and Health Risks," paper prepared for ONDCP, December 14, 1992.

2030 It is difficult to shoot heroin more frequently than four
2031 times a day, and many DUF respondents used heroin less often than
2032 daily.²⁷ According to Division of Substance Abuse Services
2033 (DSAS) street units in New York City, a heavy user might use one
2034 to two bags of heroin a session, and each bag would cost \$10.
2035 These approximations suggest that a heavy user could not spend
2036 much more than \$420 a week.

2037 Although \$420 is close to the mean expenditure estimated
2038 based on the DUF data, even those heroin users who are heavy
2039 consumers cannot shoot heroin every day, four times a day.
2040 Clearly, \$420 a week should be considered more as an upper limit
2041 than an average for weekly expenditure on heroin.

2042 Cocaine is different. While heroin seems to be self-
2043 limiting (the user's craving can be satisfied much as a diner is
2044 satiated after a full meal), cocaine is notable because it
2045 immediately engenders a desire for more cocaine. As discussed
2046 earlier, there are reports of very heavy consumption patterns
2047 just prior to seeking treatment.

2048 Nevertheless, cocaine consumption has two limitations. The
2049 first is physiological. Binge use exhausts the body, so rest is
2050 necessary before binge use can recur. The second is that heavy
2051 cocaine use can quickly exhaust financial resources. One way to
2052 check estimates of drug spending patterns for cocaine is to
2053 assess the user's income from legal and illegal sources.

2054 Estimates based on financial resources

2055 One way to assess the practical upper limit for cocaine use
2056 (excluding the minority of users who drain personal resources
2057 prior to entering treatment) is to estimate the amount of money
2058 that heavy users have available to spend on cocaine.

2059 According to DUF, most heavy users who are arrested and
2060 questioned have limited legal incomes. Much of their earnings
2061 comes from crime. How much do such individuals earn from
2062 combined sources?

2063 As would be expected, it is no easier to estimate the amount
2064 of money earned from crime than it is to estimate the amount of
2065 money spent on drugs. There are, however, a few studies of
2066 earnings from property crime. Johnson and colleagues, in a study
2067 described above, report that daily heroin users earn an average
2068 of \$8,825 a year from non-drug criminal activity, and regular

2069 ²⁷ Kahn reports an average of three fixes a day for 453 clients before their participation in a methadone maintenance program.
2070 Only 16 percent of his clients reported more than four fixes daily. Anglin reports that during the 12 months before entering
2071 criminal justice supervision, 279 heroin addicts (who had been identified through a methadone maintenance program in the early
2072 1970s) had injected heroin an average of 2.7 times a day. R. Kahn, "The Frequency of Narcotic Use Before and After Admission
2073 to a Methadone Maintenance Program," *International Journal of the Addictions* 14 (8): 1157. M. Anglin et al., "Effects of Legal
2074 Supervision on Narcotics Use and Criminal Behavior over the Addiction Career," *Criminology*, submitted.

users earn \$6,283 a year. Total criminal income, including drug income in kind, is \$18,820 for daily users and \$11,203 for regular users. After living expenses are subtracted from these incomes, the amount available for heroin expenditures could not be much greater than is assumed in this report.²⁸

Anglin and colleagues²⁹ describe the income of 279 male heroin addicts who were selected from those who had first entered a methadone program between 1971 and 1973. The period of time described is the 12 months prior to their first period of legal supervision. Chicano respondents averaged \$6,708 in illegal income a year (not counting \$924 a year from drug dealing), and whites averaged \$8,580 a year (not counting \$1,320 a year from drug dealing). Legal incomes were \$1,984 to \$2,672 a year. Even when inflation is taken into account, these incomes could not support drug use habits far in excess of what is assumed in this paper.

Reuter and colleagues report results based on interviews with 186 males on probation in Washington, D.C. who had sold drugs during the mid-1980s. They report an average income of \$2,863 a month, all but \$849 from illegal activity, mostly drug sales. However, most of this income was spent on expenses other than drugs — drug expenditures averaged \$883 a month.³⁰

Conclusions

The evidence is not compelling, but it seems best to assume that the median expenditures on cocaine and heroin — as measured from DUF data — provides the best basis for computing dollar expenditures on cocaine and heroin. The uncertainty surrounding this assumption is best handled through sensitivity analysis, which we execute in the main report.

The evidence in support of the percentage of drugs earned as income in kind is also meager. We assume that for every dollar spent on cocaine another \$0.125 of cocaine is consumed as income in kind. We assume that for every dollar spent on heroin another \$0.25 of heroin is consumed as income in kind.

²⁸ B. Johnson et al., *Taking Care of Business: The Economics of Crime by Heroin Abusers*, (Lexington, Massachusetts: Lexington Books, 1985).

²⁹ M.D. Anglin et al., "Effects of Legal Supervision on Narcotics Use and Criminal Behavior Over the Addiction Career," Los Angeles, California: UCLA Drug Abuse Research Group, December 1988, Table 3.

³⁰ P. Reuter et al., *Money from Crime: A Study of the Economics of Drug Dealing in Washington, D.C.* (Santa Monica, California: Rand Corporation, 1990), Rand Publication R-3894-RF, p. 61.

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**TRACKING THE INCIDENCE OF HEROIN USE:
IS THERE A POSSIBLE EPIDEMIC?**

Dana Eser Hunt

Abt Associates Inc.

December 30, 1992

Introduction

Beginning in early 1990, there have been reports that heroin use in the United States may be increasing in response to increased heroin production worldwide and the entry of Columbian growers and distributors into the heroin trade.¹ Underlying these reports is a fear that we may be facing a new heroin epidemic of the magnitude of the explosion of cocaine use during the 1980s or similar to the heroin epidemics of 1968, 1974 and 1978.²

This report considers the following critical questions:

- o Is more heroin currently available in the United States?
- o Is more being distributed here?
- o Is the price lower and the purity higher?
- o Is there an increase in the number of heroin users?
- o Are new users or long-term users accounting for the increased consumption of heroin?

According to information derived from heroin seizure data, intelligence estimates, and law enforcement surveillance, worldwide heroin production has increased in recent years, more is being imported into the United States, heroin prices are falling, and purity is increasing. Because dealers are not inclined to "stockpile" heroin, these trends imply:

- (1) an increase in the number of heroin users, or
- (2) an increase in the quantity consumed by established heroin users.

While either scenario could account for consumption of the increased supply, only the first would imply a new epidemic.

Earlier heroin epidemics produced large numbers of new users or initiates, many of whom ultimately became addicted, producing an unprecedented demand for drug treatment in the late 1970s and early 1980s. Many of these addicts persist in public health statistics. The addicts of the 1968 epidemic, most of whom began heroin use in their late teens and early twenties, are now in their early

¹ J.B. Treaster, "Cocaine Users Adding Heroin to Their Menus," New York Times, 21 Jul 1990; "To Avoid AIDS, Users of Heroin Shift From Injecting to Inhaling It," New York Times, 17 Nov 91, p. A1; "Columbia's Drug Lords Add New Line: Heroin For the U.S.," New York Times, 14 Jan 92, p. A1.

² J. Inciardi, The War on Drugs (Palo Alto, CA: Mayfield Press, 1989).

forties; those from the late 1970s surge are in their thirties. Some have died, some have "matured out" of drug use, and some have successfully completed treatment and are drug free. But many others may still be using heroin.

In today's market, there is the added dimension of new methods of ingestion. Until recently, heroin was almost exclusively injected, either intramuscularly (skin-popping) or intravenously. Snorting or smoking heroin was both exotic and rare. Currently, with the higher purity levels available in some areas, heroin users can choose to smoke or snort the drug, perhaps removing the fear of AIDS and some of the stigma of heroin use.

Determining who is using the new supply of heroin is critical to detecting an emerging epidemic. Is the additional supply being used by established addicts or is the expanded supply being used by a new generation of Americans who could become a future addict population? Or, as is argued in this paper, are consumption patterns more complex?

In considering issues surrounding a potential resurgence of heroin use, this study draws on several data sources:

- o the System to Retrieve Information from Drug Evidence (STRIDE),
- o the National Household Survey on Drug Abuse (NHSDA),
- o the Drug Use Forecasting system (DUF),
- o the Drug Abuse Warning Network (DAWN),
- o data from the National AIDS Demonstration Research (NADR) projects,
- o data from the New York State Division of Substance Abuse Services treatment system,
- o a series of telephone conversations with ethnographers, treatment providers, and law enforcement.

This report addresses the question of the possibility of a heroin epidemic through a three-part analysis of the problem:

- o Section I examines whether there is more high-purity, low-priced heroin available nationally and/or regionally.
- o Section II addresses whether the overall number of heroin users has increased.
- o Section III examines the breakdown between new and established users.

Section I: Heroin Availability During the 1980s and Early 1990s

The cultivation of opium, the raw material for the production of heroin, has increased drastically in recent years. The major opium producing countries -- Burma, Afghanistan, and Iran -- have been incapable or unwilling to take active measures to limit the production of either opium. The U.S. State Department's Bureau of International Narcotics Matters reports that the U.S. Government and other governments committed to reducing drug trafficking have "little or no influence" in the major heroin producing countries.³ The lack of ability to reduce opium cultivation has resulted in an increase in the heroin supply available to the worldwide and U.S. heroin markets.

According to the United Nation's International Narcotics Control Board, Southeast Asian opium cultivation has doubled over the last five years and remains high.⁴ This high level of production has resulted in the trafficking of more heroin from Southeast Asia to Western countries, including the United States. The Drug Enforcement Administration (DEA) reports that there has been a substantial increase in the proportion of Southeast Asian heroin available in the U.S. market.⁵ In addition, there have been indications from seizures that heroin is now being cultivated and processed in South America.⁶ In short, the amount of heroin available for consumption in the world and in the United States has risen dramatically in the last five years.

In an effort to gauge the impact of this increase in heroin availability on the U.S. heroin market, Abt Associates analyzed data from STRIDE to estimate variation in the price and purity of heroin from 1981 through the third quarter of 1992.⁷ STRIDE data comprise reports of the amounts of money paid by DEA agents in clandestine heroin buys across the country. Because these buys vary as to the weight and purity of the heroin seized, analysis of

³ Bureau of International Narcotics Matters, International Narcotics Control Strategy Report (Washington, D.C.: Department of State Publications, March 1992), 7.

⁴ United Nations, International Narcotics Control Board, Report of the International Narcotics Control Board for 1991 (Vienna, 1990), 22.

⁵ United States Department of Justice, Drug Enforcement Administration, Office of Intelligence, Worldwide Heroin Situation 1990 (Washington, D.C.) 1.

⁶ J.B. Treaster, "Columbia's Drug Lords Add New Line: Heroin for the U.S." New York Times, 14 Feb 1992.

⁷ W. Rhodes and R. Hyatt, "The Price of Illicit Drugs, 1981-1991," report to the Office of National Drug Control Policy (Cambridge, MA: Abt Associates Inc., September 1992).

trends is calculated in terms of price per pure gram of the drug for transactions of a given size.

The 11 years of STRIDE data examined indicate a clear trend toward lower unit prices and higher purity for heroin. The price of heroin fell throughout the 1980s, bottoming out in 1989. The heroin market experienced a slight price increase in 1990, but prices fell again during the first half of 1992.

To detect changes in the market for street level transactions, Abt Associates examined purchases in the one-half gram to five gram range (Table 1). Larger buys are generally out of the range of most user/dealers or street level dealers. A drop in price and a rise in purity is evident at purchase levels as small as one-half gram (or less) and at larger purchase levels of five grams. Between 1981 and 1991, heroin purity levels rose five-fold at the one-half gram level; 1988/89 marked the period of lowest prices. Relatively higher purity, lower prices, and greater availability now characterize the street level heroin market.

Tables 2 and 3 indicate the price/purity data for 1981 through the third quarter of 1992, by region of the country, for purchases of up to one-half gram and one gram respectively. As these data show, in 1987 the Northeast experienced significant price drops and purity increases for heroin, a pattern which has continued unabated through the present. Other regions, including the Southeast, Midwest, and Southwest experienced more delayed and less marked changes in their heroin markets. While purity levels in these markets never achieved the purity levels of the Northeast market, with the possible exception of the Deep South where purity has remained low,⁸ all areas of the country have now been affected by this rise in purity.

These STRIDE findings showing both a rise in the purity of heroin available on the street and certain regional variations are substantiated by telephone interviews with selected urban ethnographers routinely conducted during 1992 as part of another Abt project. When asked about the price and purity of heroin over the past two years, all the ethnographers reported that heroin is more available and that the purity is higher, though availability and purity of the product varies considerably from region to region.

Ethnographers in some areas like El Paso, Texas reported that the mainstay of that community's heroin trade, Mexican black tar and brown heroin, has not changed a great deal, but recently white heroin has become more available. Because white heroin is imported principally from Southeast and Southwest Asia or Columbia,

⁸ As the tables show, data for the Deep South region are also limited or missing for many time periods.

TABLE 1

**AVERAGE PRICE AND PURITY OF HEROIN IN THE UNITED STATES,
1981-1992**

												1992	
Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Q1	Q2
Purchases of 5 grams or less													
Price per pure gram	3374.40	3317.75	3325.33	3071.85	2652.71	2668.86	2270.85	1832.04	1459.33	1935.32	2036.43	1741.89	1964.35
Purity	6.73	9.08	11.36	13.68	14.16	16.43	21.84	30.17	30.33	24.24	26.64	31.88	35.32
Purchases of 1 gram or less													
Price per pure gram	3474.70	3367.18	3422.96	2930.45	2565.75	2661.63	1984.10	1802.74	1472.93	1855.12	1937.56	1626.65	1945.57
Purity	8.06	11.18	12.95	15.36	15.70	17.10	24.41	33.34	34.36	26.65	29.11	34.84	38.20
Purchases of 1/2 gram or less													
Price per pure gram	3852.36	3485.00	3612.22	2811.99	2579.26	2804.98	1898.66	1794.92	1437.29	1774.44	1874.43	1574.88	1874.17
Purity	7.35	10.31	11.44	14.57	13.70	14.54	25.35	35.77	36.81	28.97	33.12	39.15	42.77

TABLE 2

AVERAGE PRICE AND PURITY OF HEROIN IN DAWN AND DUF CITIES BY REGION,

1981-1992

(Purchases of 1/2 gram or less)

												1992	
Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Q1	Q2
Southeast													
Price per pure gram	6925.73	5558.87	7024.08	3496.64	6357.74	NA	NA	2150.25	3679.35	4376.54	2344.35	1310.81	1449.54
Purity	4.03	5.51	4.90	6.18	4.98	NA	NA	22.34	13.28	11.20	29.63	39.27	36.58
Northeast													
Price per pure gram	4524.20	3143.91	2321.52	3066.24	2648.98	1412.23	1972.46	1431.91	958.89	1083.94	1036.84	965.08	843.85
Purity	16.35	22.66	22.25	31.96	24.61	40.63	55.90	51.94	51.24	44.22	55.37	52.48	70.01
Midwest													
Price per pure gram	4284.08	3775.36	3393.16	3674.69	4664.52	2033.33	4117.64	2876.08	1620.62	2245.44	1921.25	2277.12	1370.35
Purity	36.52	12.77	33.07	12.11	13.24	27.23	34.55	25.00	40.02	27.03	18.12	31.67	17.35
Southwest													
Price per pure gram	4082.30	3177.56	2582.34	2232.04	1545.01	1646.74	1331.85	1837.19	1450.21	1714.91	1936.24	1499.31	1464.05
Purity	9.27	20.97	16.91	23.22	38.88	39.51	26.01	38.27	46.65	21.87	21.93	36.21	52.10
Mountain (Denver)													
Price per pure gram	NA	NA	NA	---	---	NA	---	NA	---	NA	3077.87	NA	NA
Purity	NA	NA	NA	---	---	NA	---	NA	---	NA	23.10	NA	NA
Deep South													
Price per pure gram	---	3174.96	---	NA	6208.83	---	NA	3565.34	NA	---	4852.83	5540.07	3727.18
Purity	---	19.76	---	NA	19.08	---	NA	16.28	NA	---	14.99	12.54	15.23
Northwest													
Price per pure gram	8124.55	4316.21	2758.86	1276.87	3097.25	6422.05	987.02	2080.08	NA	1475.88	3510.20	2182.39	1983.90
Purity	16.60	76.63	52.57	49.94	25.23	33.59	34.45	23.90	NA	17.77	15.25	23.34	34.49
Mid-Atlantic													
Price per pure gram	3802.14	2715.04	3870.92	3002.27	1561.97	3826.58	3236.82	2002.65	2501.04	2643.84	1941.87	876.33	2016.87
Purity	21.36	6.80	9.11	35.10	25.53	11.88	19.42	41.19	29.62	17.38	26.95	33.90	18.14

... No observations for this period.

NA Insufficient data to calculate statistics.

Source: System To Retrieve Information from Drug Evidence, 1981-1992.

TABLE 3
AVERAGE PRICE AND PURITY OF HEROIN IN DAWN AND DUF CITIES BY REGION,
1981-1992
(Purchases of 1 gram or less)

												1992	
Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Q1	Q2
Southeast													
Price per pure gram	5576.71	4837.03	5377.96	4868.66	6165.57	NA	3304.15	3204.26	3159.58	4248.25	2560.58	2111.13	1706.16
Purity	2.78	5.71	6.78	4.08	3.69	NA	5.53	10.03	14.82	9.60	26.76	22.90	34.90
Northeast													
Price per pure gram	3507.26	3343.08	2317.36	3293.13	2662.18	1675.63	1762.32	1475.80	957.98	1157.52	1049.32	950.05	814.75
Purity	17.63	17.46	21.60	26.47	21.33	38.35	47.96	49.07	49.99	43.85	54.54	51.85	68.22
Midwest													
Price per pure gram	4417.71	3203.25	3569.28	4555.45	3846.50	2996.30	4101.27	2679.08	1529.92	2039.37	2171.79	2094.07	1803.13
Purity	27.29	16.25	32.17	10.06	19.67	17.26	21.04	20.93	27.06	22.45	16.83	26.00	17.17
Southwest													
Price per pure gram	4027.02	3263.63	2551.15	2221.23	1538.48	1572.00	1369.26	1595.39	1436.07	1336.53	1862.99	1387.06	1635.30
Purity	11.21	16.32	18.53	24.69	37.29	37.49	25.85	35.40	43.35	21.04	21.13	32.84	39.72
Mountain (Denver)													
Price per pure gram	NA	NA	NA	---	---	12708.94	---	NA	---	1482.02	2874.71	1919.27	2456.11
Purity	NA	NA	NA	---	---	55.81	---	NA	---	40.53	21.94	25.69	36.13
Deep South													
Price per pure gram	---	3174.96	---	NA	5247.45	---	NA	3051.77	1835.38	---	4569.62	4952.18	3693.62
Purity	---	19.76	---	NA	17.85	---	NA	21.05	22.01	---	12.94	10.64	13.72
Northwest													
Price per pure gram	6565.51	2350.37	1966.59	1555.94	1933.13	1369.69	1201.67	2080.08	NA	3045.64	2756.66	1426.93	1879.34
Purity	17.31	42.23	51.02	42.69	35.80	40.50	27.21	23.90	NA	11.99	13.20	24.38	31.83
Mid-Atlantic													
Price per pure gram	2788.49	2456.94	3410.78	3282.38	1935.29	3707.28	3414.84	1899.17	2874.07	2794.52	1676.16	1681.15	1759.67
Purity	29.76	7.39	12.26	26.29	26.12	12.26	16.86	24.29	20.22	13.95	25.09	31.09	21.66

--- No observations for this period.

NA Insufficient data to calculate statistics.

Source: System To Retrieve Information from Drug Evidence, 1981-1992.

ethnographic reports of the increased availability of white heroin in new areas are consistent with DEA reports of increased worldwide production and expanded marketing.

Reports from Florida have shown some changes since April 1992. In the spring of 1992, heroin was neither widely available nor widely used. Following Hurricane Andrew, both heroin and cocaine dealers moved into the disrupted areas of south Florida and began selling large quantities of both substances to cleanup workers and displaced persons. The south Florida ethnographer interviewed reports that even seasoned heroin users were "getting a nod" (becoming stuporous from their typical dosage unit), indicating that a higher purity product is now generally available.

For the same period, the Northeast and Chicago areas report the same ready availability of heroin and high purity reflected in the STRIDE data. While unit pricing remains the same (\$10 and \$20 "bags"), the quality of these standard purchase units is reportedly much higher. In New York City for example, street samples of \$10 units from all over the city test 12-35 percent pure, far higher than the 2-5 percent "Harlem bag" that has long characterized the trade in that area. The higher purity product first appeared among New York's Lower East Side traders, but can now be found both citywide and in New Jersey and Connecticut as well.

Epidemiologists reporting to the National Institute on Drug Abuse's Community Epidemiological Work Group (CEWG) indicate in their 1992 report that heroin prices are level or down in most areas, while purity is level or up.⁹ The CEWG notes that New York remains the most significant heroin importation and distribution center, with an increased number of independent dealers, increased competitiveness, and more aggressive marketing strategies.

The trend toward increased purity and availability is evident from earlier CEWG reporting cycles. As early as December 1987, the CEWG reported a sharp increase in the purity levels of Southeast Asian heroin in New York and cited reports by local law enforcement officials of the recent appearance of high-quality heroin in Philadelphia.¹⁰ The June 1988 report of the CEWG reported the availability of a wide range of heroin purity levels in northern and western cities with increased purity levels in cities in the

⁹ Community Epidemiological Work Group, Epidemiologic Trends in Drug Abuse: June 1992 (Rockville, MD: National Institute on Drug Abuse, 1992). The Community Epidemiological Work Group (CEWG) is a network of researchers from major metropolitan areas of the United States and selected foreign countries that meets semiannually to discuss the current epidemiology of drug abuse.

¹⁰ Community Epidemiology Work Group, Epidemiologic Trends in Drug Abuse: December 1987 (Rockville, MD: National Institute on Drug Abuse, 1988).

central region.¹¹ At that time, generally low purity levels were still found in southern cities. The increased purity trend was captured by the December 1988 report of the CEWG, which found increased purity and trafficking of Southwest and Southeast Asian heroin in several northeastern cities and increased purity levels in New Orleans.¹²

The data presented above confirm that heroin is more available currently than in previous years. While the Northeast has experienced the most significant drop in price and rise in purity, other regions, including the Southeast, Midwest and Southwest have seen increases in the available supply of higher purity, lower priced heroin as well.

Whether the recent change in the availability of higher purity heroin has meant an increase in the actual number of heroin users is the natural complement to questions about the availability of heroin. The sections which follow address whether consumption of the new supply is due to an increase in the number of users, use in greater quantities by current heroin users, or some combination of the two.

Section II: Is There an Increase in the Number of Heroin Users?

None of the data sources examined for this study indicate any appreciable recent increase in the overall number of heroin users. However, there have been some substantive changes in the user population. This section of the report reviews evidence regarding trends in the prevalence of heroin use. The composition of the heroin user population is described in Section III.

The results of the 1991 National Household Survey on Drug Abuse (NHSDA) indicate that for the years 1988, 1990, and 1991, the number of heroin users in the population was virtually unchanged: from 0.3 percent (1988 and 1991) to 0.2 percent (1990) of household

¹¹ Community Epidemiology Work Group, Epidemiology of Drug Abuse in the United States and Europe: June 1988 (Rockville, MD: National Institute on Drug Abuse, 1988). Cities in the central region include Chicago, Dallas, Detroit, Minneapolis, New Orleans, and St. Louis.

¹² Community Epidemiology Work Group, Epidemiologic Trends in Drug Abuse: December 1988, (Rockville, MD: National Institute on Drug Abuse, 1988).

members report heroin use in the past year (Figure 1).¹³ Similar findings are reflected in the High School Senior Survey (HSSS).

Although these two surveys have often been criticized for failing to accurately represent the population of heroin users,¹⁴ they should nevertheless be expected to reflect any significant increases in heroin use among new users. First-time use of marijuana, cocaine, and most other illicit substances typically occurs during teenage years, and past epidemics of heroin use indicate initial use by youths and by young adults. While experimentation -- the harbinger of a heroin epidemic -- should be reflected in both surveys, neither survey suggest that an epidemic of heroin use is underway.

The Drug Use Forecasting System (DUF), designed to provide advanced warning of drug epidemics, is a nationwide urine testing program to detect drug use among arrestees. The program, which began in 12 cities in the late 1980s, was expanded to 23 in 1991. Throughout the late 1980s, data from urine testing in the District of Columbia and other original DUF sites reflected the remarkable upsurge in cocaine use which characterized that period. In contrast, since the appearance of higher purity/lower priced heroin, DUF has not indicated dramatic changes in the percentage of users testing positive for opiates (Table 4). Across all sites, 10-11 percent tested positive for opiates in each year. Only Chicago reports a significant increase in the percentage testing positive for opiates over these years. All other sites report stable or declining numbers. Even areas of high concentration of heroin users like New York or Washington, D.C. show little change over time.

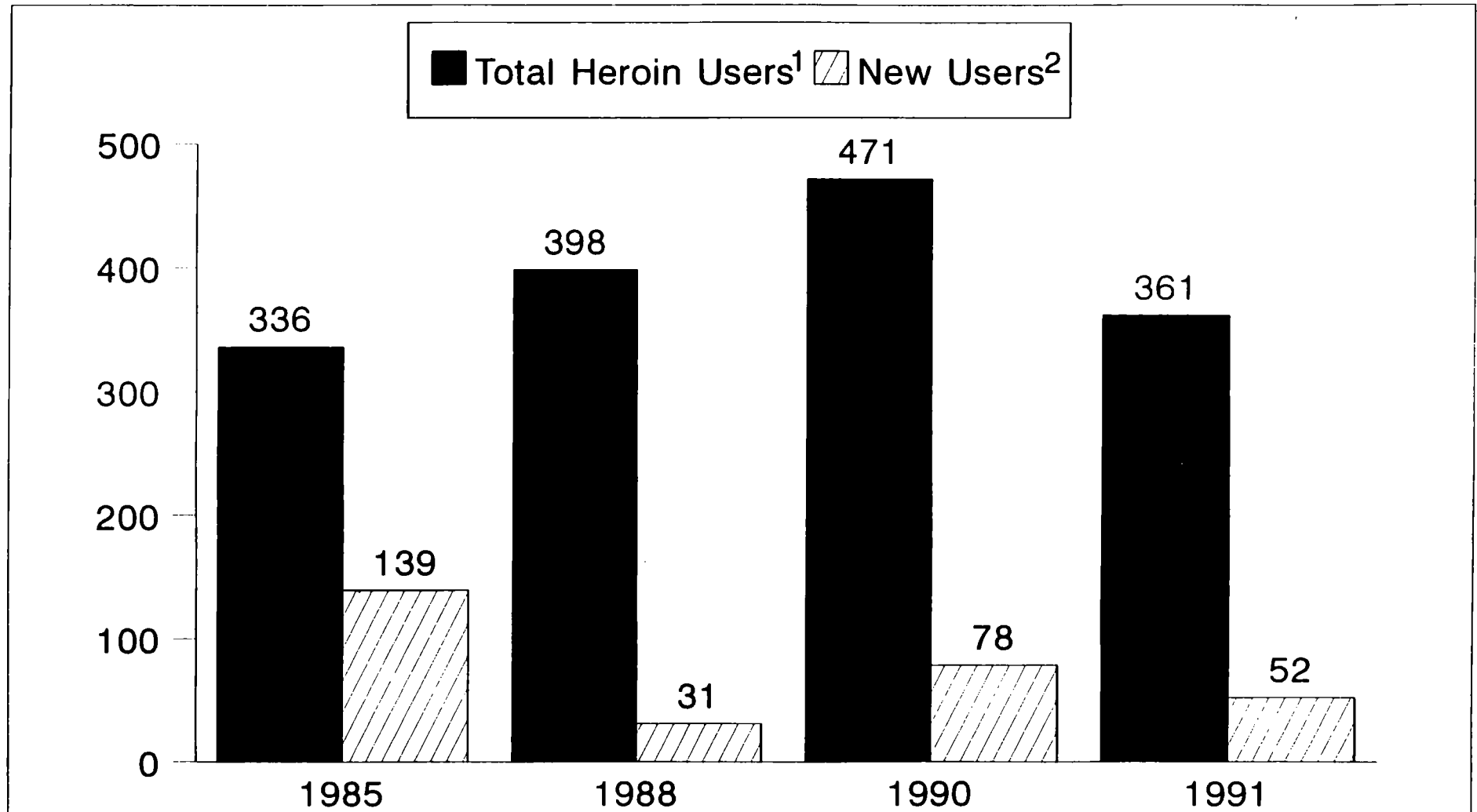
To confirm findings from analysis of the DUF data, data from the Drug Abuse Warning Network (DAWN) are examined. The DAWN system provides national estimates of the number of emergency room (ER) episodes in which illicit drug use was cited as a reason for seeking treatment. DAWN generates a quarterly report of use of a wide range of legal and illegal drugs and alcohol that may have contributed toward seeking medical treatment through ERs.

¹³ Any discussion of heroin use reflected in the NHSDA should be prefaced with a **cautionary** word about the small numbers represented by these samples. Though **sampling weights** make the final numbers much higher, the actual number of respondents reporting heroin use represented in each of the survey years is often too small to make tests of significance of changes from survey to survey reliable.

¹⁴ Once heroin use has reached addictive levels, many users are not likely to retain stable residences nor remain in school and thus drop out of the potential sampling frame of the NHSDA and the HSSS.

Figure 1

Annual Heroin Use by Total and New Users,^a 1985-1991 (In thousands)



^a Two users have been excluded from the analysis--one 71 and another 81 years old--because of the rarity of these cases and the effect they have on the final numbers when weighted.

¹ Any use within the last 12 months.

² First use within the last 12 months.

Source: National Household Survey on Drug Abuse, 1985-1991.

Table 4

Percentage of Arrestees Testing Positive for Opiates in 21 Cities, 1988-1990

City	1988	1989	1990
Birmingham	7%	%	%
Chicago	18	27	27
Dallas	7	7	7
Ft. Lauderdale	5 ^a		
Houston	4	5	6
Los Angeles	16	15	14
Miami	1 ^a		
New York	25	18	19
Philadelphia	12	11	9
Phoenix	8	10	8
Portland	16	18	14
San Antonio	19	17	18
San Diego	21	22	20
San Jose		8	9
St. Louis	6	7	6
Washington, D.C. ^b		15	15

^a N = less than 200

^b Not in 1988 sample

Source: Drug Use Forecasting System, 1988, 1989, 1990.

Overall, the total number of drug-related emergencies for use of any illicit drug increased from 1988 to 1989 (from 416,961 to 425,904) before declining to 371,208 in 1990. There was another increase from 1990 to 1991 (from 371,208 to 398,349), though this number is still lower than the number of episodes reported in 1988 (Table 5).

Heroin is always a fairly small part (less than 10 percent) of the total drug related episodes. While there have been quarterly fluctuations in the number of heroin mentions, no consistent trend of increasing heroin mentions appears in this four-year series of DAWN data. However there are some interesting city specific variations in these data. In New York, where high purity, low cost heroin has been available since 1987, heroin related ER mentions declined in 1990 to 70 percent of what they were in 1988. Not far away in Newark and Philadelphia, however, ER mentions for opiates increased in the three-year period. Of the 21 cities reporting, 13 report heroin mentions decreasing or remaining essentially the same from 1988 through 1990, and eight report increases during that time period. The greatest increases occur on the West Coast (San Diego and San Francisco) and in Philadelphia.

Medical examiner (ME) data, (reflecting deaths attributable to particular drugs), for the first quarter of 1989 through the fourth quarter of 1991 show a similar pattern of variation in the number of heroin mentions. The data show a high of 700 mentions during the fourth quarter of 1989 and a low of 438 during the fourth quarter of 1990. Generally, the ME data reveal the lowest number of mentions for the three-quarter period from the third quarter of 1990 through the first quarter of 1991 (474 to 488) followed by a rise in the number of mentions during the second quarter of 1991 to 627. Cities reporting noticeable increases in heroin-related deaths over this time period include Baltimore, Newark, San Diego, and Philadelphia.¹⁵

The June 1992 CEWG report reflects a similar overall picture with regional variation. Heroin ER mentions are stable in 13 cities, with increases reported in Miami, Atlanta, Detroit, Newark, New York, and St. Louis. There are some increases in the number of inhalers, but injection is the primary mode of use in all CEWG cities. Heroin-related deaths declined in six cities, were up in five, and stable in three cities. Primary treatment admissions for heroin were up in several cities, though only in New York, New Jersey, and San Francisco do they represent more than one-third of total admissions to drug treatment. Average age of both treatment admissions and ER mentions is consistently over 35 across reporting

¹⁵ While Philadelphia's ME report for the fourth quarter of 1991 shows an almost identical number of heroin related deaths as reported in the first quarter of 1989, the city reported unusually high numbers of deaths in the first three quarters of 1991.

Table 5

All Drug, Heroin- and Cocaine-Related Emergency Room Episodes, 1988-1991

	1988	1989	1990	1991
Drug Episodes ¹	416,961	425,904	371,208	398,249
Drug Mentions ²	690,360	713,392	635,460	681,737
Heroin	39,026	41,656	33,884	37,185
Cocaine	104,731	110,013	80,355	103,890

¹ A drug episode is an occasion on which a patient presents to the emergency room with a drug-related problem or in which evidence of drugs are found in lab testing.

² A drug mention can occur for each drug reported by the emergency room patient or be detected in the lab test. There can be as many as five drug mentions in each drug episode.

Source: Drug Abuse Warning Network, 1988, 1989, 1990, 1991.

cities. Methods of use now include inhalation, though the extent varies considerably. In New Jersey, for example, over 40 percent of patients admitted for treatment were inhaling heroin, while inhalation is almost nonexistent in the Southwest.

Based on analysis of these relevant national data, there is no detectable change in the number of new users, be they initiates to use or returning users. While some of the data do indicate that many in the United States continue to experiment with heroin, there are no grounds for concluding that the country is on the verge of an epidemic of heroin use.

Part III: Today's Heroin User

At any point in time, the factors relevant to determining how much heroin will be consumed by an individual user are its price, its availability (and the availability of appropriate substitute drugs), the level of drug tolerance of the user, and the mode of ingestion. Each of these variables directly affects the types of users reflected in the national and regional data on heroin. In this section we discuss four types of heroin users:

- o traditional heroin addicts
- o established cocaine users who supplement their cocaine use with heroin
- o relapsed users
- o new users

These user types are based on drug research literature and logical assumptions about patterns of drug use.¹⁶ Potentially, each user type could be a contributing factor in the overall increase in the consumption of heroin.

¹⁶ D. Nurco, I. Cisin and M. Balter, "Addict Careers. I. A New Typology," The International Journal of the Addictions 16, no. 8 (1981):1305-1325; D. Hunt, D. Lipton, D. Goldsmith and D. Strug, "Problems in Methadone Treatment: The Influence of Reference Groups," in J. Grabowski, M. Stitzer, and J. Henningfield (eds.) Behavioral Intervention Techniques in Drug Abuse Treatment, NIDA Monograph No.46 (Rockville, MD: National Institute on Drug Abuse, 1984), 8-22. B. Johnson, P. Goldstein, E. Preble et al., Taking Care of Business: The Economics of Crime by Heroin Users (Lexington, MA: Lexington Books 1985); L. Robins, "Addict Careers," in R. Dupont, A. Goldstein and J. O'Donnell (eds.) Handbook on Drug Abuse (Rockville, MD: National Institute on Drug Abuse, 1979). pp.325-336.

A. The Traditional Heroin Addict

In a surplus heroin market two trends could occur. The number of established users could grow to include more new users, and old addicts could increase the amount of the drug they use. During periods in which the heroin market is tight, established addicts may enter treatment or substitute other opiates such as Dilaudid, Demoral, codeine, or nonprescription methadone for heroin. When the market opens up, these users typically return to heroin, their drug of choice. In an epidemic, the number of established users grows, as many new initiates to heroin become regular users.

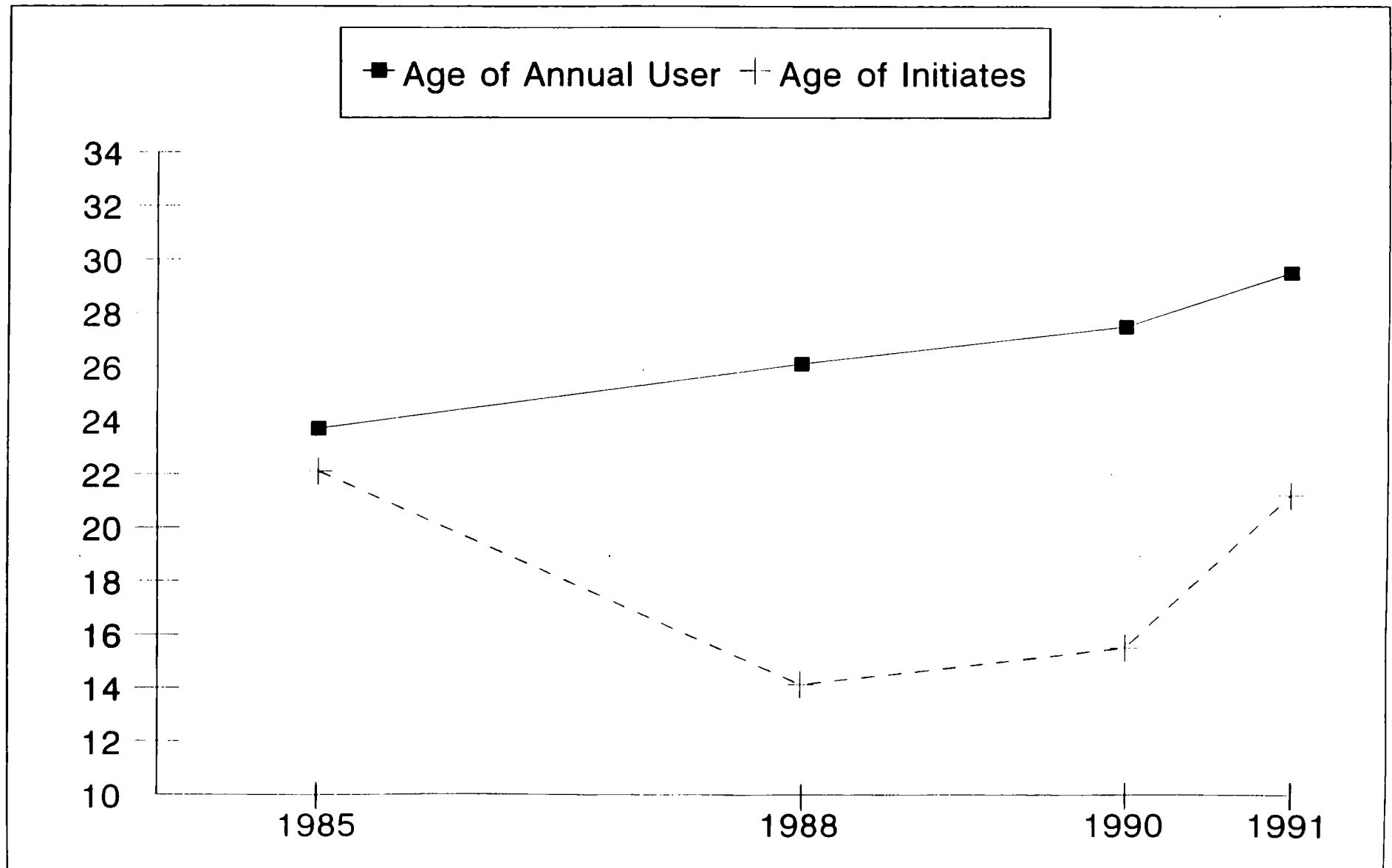
The discussion of today's heroin user begins with a sketch of traditional user, because of the prominent role they play in the current picture of heroin use. Established heroin users make up an aging population whose characteristics have been reflected with little variation in data sets for the last 30 years. The numbers and geographic distribution of this cohort remain much the same, even though AIDS has taken a toll. Estimates of the size of this population vary, but most studies indicate that there are roughly between 500,000 and 1 million long-term, heavy users of heroin in the United States today.¹⁷

A review of the major data sources reveals an aging population of users with little evidence that many of today's heroin users are young initiates. Data from the NHSDA survey reveals that the user population as a whole is older; the average age of current heroin users found in the NHSDA was 24 years old in 1985 and over 28 years old in 1991. These data imply that members of earlier cohorts of heroin users are continuing to use and few young recruits are being added. There is also a slight increase in the average age of initiates, suggesting that somewhat older users are appearing in 1991 (see Figure 2).

Data from the National Institute on Drug Abuse (NIDA) National AIDS Demonstration Research (NADR) Projects can also be used to examine heroin use. NADR, which operated in over 60 sites from 1987 to 1991, targeted outreach efforts to drug users not currently in treatment and to their sexual partners, and accumulated

¹⁷ W. Rhodes, "Synthetic Estimation Applied to the Prevalence of Drug Use." Journal of Drug Issues (in press).

Figure 2
Average Age of All Heroin Users and Initiates



Source: National Household Survey on Drug Abuse, 1985, 1988, 1990, 1991.

descriptive information on over 50,000 persons.¹⁸ Of that number, more than 30,000 were current heroin users.¹⁹

The patterns of use in the NADR sample indicate a population of consistent heavy users of heroin. In each year of the project, 80 percent or more of the sample of heroin users report taking heroin at least once a week or more and nearly 60 percent are daily users.²⁰ They are not new users. The average age of the current heroin user in the NADR data set is 35. They have been injecting heroin for an average of 13 years, and cocaine for an average of 11 years. Over 60 percent of the sample in each of the years examined had been injecting heroin for 10 or more years; 19-27 percent in each year had been injecting 21 or more years.

The NADR data do not comprise a panel of projects across each year. Each year, new programs were added, some of which may serve different populations than were represented in the earlier years and/or may be located in communities with different drug use problems. To address this shortcoming in the NADR data for this report, data are examined from a single area (New York/New Jersey) over the four-year time frame to see if the type of user, methods of use, or amount of use changed during the period of higher purity, lower priced heroin. As was discussed earlier, New York/New Jersey is the area reporting the highest purity and lowest prices in the country during this time period.²¹

As with the total NADR sample, in the New York/New Jersey sample, heroin injectors in each year are, on average, 3 years older than non-injectors (see Table 6). The proportion of users

¹⁸For the purposes of this research, data from the NADR sample were separated according to the year in which the interview took place. Data used represent all interviews conducted in 1988, 1989, 1990, and during the first quarter of 1991. In some analyses the 1991 data have been combined with the 1990 data.

¹⁹ These data were supplied by Nova Research Corporation, the national contractor for the NADR projects for NIDA. They represent all cases interviewed as of March 1991.

²⁰Since the early samples in 1987-1988, the proportion of daily users has decreased (from 63 percent of heroin users to 44 percent of users) and the proportion of occasional users (who use heroin four or fewer times per month) has increased (from 9 percent of users to 15 percent). This is still, however, a sample representative of the core group of heavy users mentioned earlier.

²¹ This analysis is based on data from six sites in the New York/New Jersey area. These sites produced data on a total of 7488 drug users and their sexual partners. Of that number 90 percent are heroin users. The data cover the time period from February 1988 to February 1991.

Table 6

**Average Age of Injectors and Non-Injection Heroin Users
in New York and New Jersey NADR Samples, 1988-1991**

Year	Non-Injected Use	Injected Use	Total
1988	30.5	32.9	32.9
n	(11)	(575)	(586)
% of population	(2%)	(98%)	(100%)
1989	31.95	35.7	35.6
n	(109)	(2,575)	(2,684)
% of population	(4%)	(96%)	(100%)
1990	32.2	34.5	34.4
n	(167)	(3,087)	(3,254)
% of population	(5%)	(95%)	(100%)
1991*	30.1	32.6	32.4
n	(19)	(206)	(225)
% of population	(8%)	(92%)	(100%)

* Represents 6 months of data only.

Source: National AIDS Demonstration Research project, 1988-1991.

under 20 is extremely small while the proportion of users over 30 is consistently more than 60 percent. Even among non-injectors, a group in which one might expect younger users to appear, almost half are 30-39 years of age. Most importantly, across the years in this regional sample the age of both injectors and non-injectors rises, implying an aging population.

Like the NHSDA, the NADR New York/New Jersey sample is not a group with a large number of new users. For each year, less than 8 percent are initiates,²² while over three-fourths have been using for five or more years. Figure 3 indicates the percentage of heroin users in the New York/New Jersey sites who report some inhalation or smoking of heroin in the prior six-month time period. Given that this sample was intended to gather data from intravenous drug users, it is interesting to note the dramatic increase in the number of persons who also inhale each year. In 1988 less than half of the New York/New Jersey heroin users reported any inhalation or smoking of heroin, a number which jumped to almost three-fourths of the sample in 1990 and the first half of 1991. It is important to remember, however, that these users are also injecting heroin: the percentage of heroin users who are injecting never drops below 90 percent in any year. This increase in inhalers may result from the higher purity heroin that has been available for some time in that region and fear of AIDS.

Data provided by the DAWN system reflects drug toxicity associated with overdoses, contaminated adulterants, and dangerous drug combinations. While young initiates, not yet sophisticated in the use of the drug, are particularly prone to many of these ills and might be expected to appear in the DAWN system, these data indicate that there is not a great increase in the number of young users appearing in the ERs for heroin-related problems (Table 7). There has been little change in the number of persons in each age category reported by DAWN over the years 1988-1991, with over three-quarters of heroin users falling in the 35-plus group. In fact, there has been a decline in mentions among those aged 12-25, from about 5,500 heroin-related episodes reported in 1989 to approximately 4,800 in 1990.

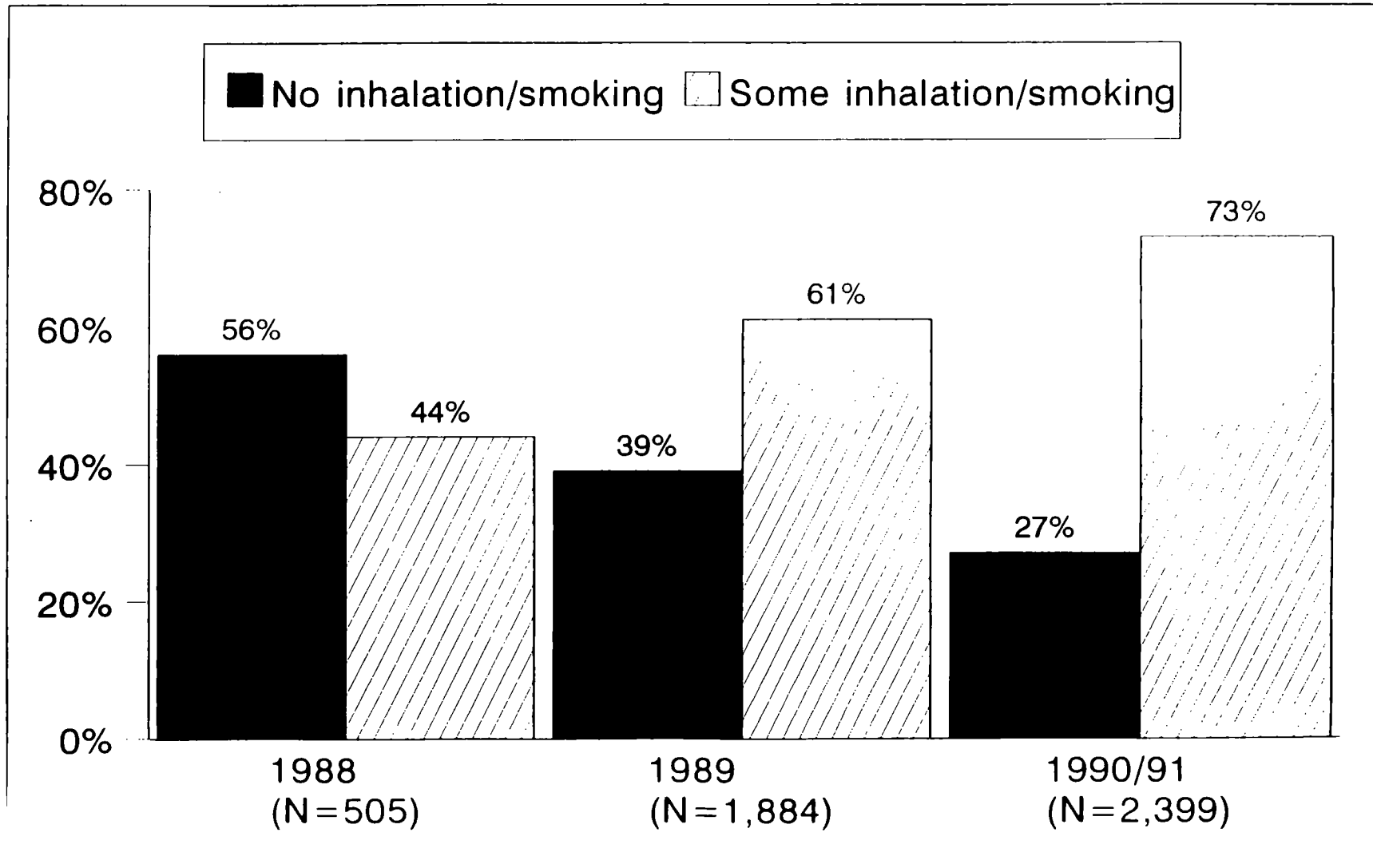
As in the other data sources, the majority of users appearing in the DAWN system are in their thirties or older, a pattern which has not changed significantly since 1988. This may suggest that the increased purity of heroin may, in fact, be causing medical problems for some older users -- established heroin users and new users who are over 30.

Persons entering drug treatment represent a more established population of drug users, whose use has become problematic and who

²²Data from 1990 and the first half of 1991 are combined in these calculations.

Figure 3

Percentage of Heroin Users Who Inhaled Heroin
in the Prior Six Months in N.Y./N.J. NADR Sites,
1988-1991



Source: National AIDS Demonstration Research Project, 1988, 1989, 1990, 1991.

Table 7

DAWN Emergency Room Mentions by Age for 1988-1991*

	1988	1989	1990	1991*
Total Heroin Episodes	39,026	41,656	33,884	28,261
Total Drug Episodes	416,961	425,904	371,349	301,266
12-17	141 (*)	168 (*)	182 (1%)	154 (1%)
18-25	5,370 (14%)	5,094 (12%)	4,654 (14%)	3,631 (13%)
26-34	17,547 (45%)	17,251 (41%)	13,127 (39%)	10,947 (39%)
35+	15,817 (41%)	18,949 (46%)	15,850 (47%)	13,394 (47%)
Unknown	152 (*)	188 (*)	66 (*)	136 (*)

* Represents Q₁-Q₃ 1991

* Value is less than 1 percent.

Source: Drug Abuse Warning Network, 1988 through the third quarter of 1991.

have been somehow motivated to seek treatment. Table 8 indicates the number of persons entering treatment in New York State in 1989, 1990, and 1991 with heroin as the primary drug of abuse. As this table shows, there has been a slight increase in heroin entrants in New York, though these figures are well below the numbers of entrants with other drug problems. The New York data also show that there has been an increase in "non-injector" heroin users entering treatment (from 33 percent of all heroin users in 1989 to 39 percent in 1991).

Table 8 also indicates the secondary drug of abuse of treatment entrants whose primary drug problem is heroin. As this table shows, heroin users most commonly choose cocaine to supplement their heroin habit, and there appears to be two types of users or use patterns reflected. Heroin injectors are more likely to inject cocaine than to inhale or smoke it as crack; heroin inhalers are more likely to inhale or smoke cocaine, rather than to inject it. There are some shifts in this pattern in 1991, where there is evidence of more smoking/inhaling of both heroin and crack.

As these data indicate, while the number of heroin users who inhale the drug and who appear to be combining it with crack is increasing, the injector is still the primary heroin consumer. That user is also an older addict, perhaps part of the earlier cohort of users established in the late 1970s and early 1980s.

Overall, the evidence from these major data files indicates that the majority of heroin users are part of an aging group of heavy users who initiated their heroin use during earlier epidemics. Recent initiates to heroin use are a decided minority in this population.

B. Established Cocaine Users Who Supplement Their Cocaine Use With Heroin

Heroin use by the heavy cocaine user is a potentially important part of the heroin puzzle. As the scenario has been played out in the media, heroin may be a new and secondary drug of abuse for the heavy cocaine or crack user. Since there are a large number of heavy cocaine users in the United States, this group could, in fact, be the basis for a new heroin epidemic.

Prior to the recent drop in price and rise in purity of heroin available on the street, heroin may not have been an option for this user population, and he or she would cope with the agitation cocaine engenders through the use of other narcotics or alcohol, other depressants, tranquilizers, sedatives, and marijuana. With the appearance and new marketing of heroin (perhaps through cocaine distributors rather than traditional heroin dealers), heroin, a particularly effective depressant, may have become a viable option

Table 8

**Entrants to New York State Drug Treatment with Heroin as Primary Drug of Abuse
by Secondary Drug of Abuse, 1989-1991**

Heroin as Primary Drug of Abuse						
Secondary Drug	1989		1990		1991	
	Injected	Inhaled	Injected	Inhaled	Injected	Inhaled
Alcohol	629 (6%)	258 (5%)	695 (6%)	346 (7%)	763 (8%)	492 (8%)
Crack ¹	457 (4%)	518 (9%)	443 (4%)	495 (10%)	617 (7%)	917 (16%)
Cocaine Inhaled ²	758 (7%)	1,472 (27%)	664 (6%)	1,536 (31%)	483 (5%)	1,684 (28%)
Cocaine Injected	5,629 (50%)	180 (3%)	5,371 (50%)	132 (3%)	4,445 (47%)	57 *
Marijuana	308 (3%)	619 (11%)	278 (3%)	318 (6%)	261 (3%)	436 (7%)
Other or None Cited	3,929 (35%)	2,413 (44%)	3,379 (31%)	2,827 (57%)	2,895 (31%)	2,342 (40%)
	11,253	5,460	10,830	4,969	9,464	5,928
Total	16,713		15,799		15,392	
All treatment entrants total	49,899		50,366		51,143	

¹ Crack smoked, cocaine smoked, crack other

² Cocaine oral, cocaine inhaled, cocaine other

* Value is less than 1 percent.

Source: New York State Division of Substance Abuse Services

for thousands of users who would otherwise not have considered it.²³ Those who supplement cocaine and crack use with heroin are likely to be inhalers of the drug. For most drug users there remains sufficient resistance to injection drug use that most crack smokers and cocaine inhalers may be reluctant to start injecting heroin.

A relationship between heroin and cocaine use suggested by the National Household Survey on Drug Abuse (NHSDA) data is helpful in understanding the dynamics of heavy drug use. It is not surprising that of current heroin users in the NHSDA, the majority also report cocaine use. Heroin and cocaine have long been companion drugs among heavy users. However, heavy users most often begin taking many other drugs including cocaine before "graduating" to heroin use. As indicated in Figure 4, although in 1985, 1988, and 1990 only 28-41 percent had tried heroin first or had tried heroin and cocaine in the same year, in 1991 58 percent had tried heroin first or in the same year they tried cocaine. Although it could be a fluke caused by the small numbers of heavy users in the sample, the new trend bears watching. It may indicate earlier establishment of heroin abuse and/or more exclusive early use of heroin. It may also call into question the idea that many current heroin users are actually cocaine users turning to or adding heroin.

Reports of the CEWG from 1988 may have captured the growing problem of the heavy cocaine or crack consumer's use of heroin. The report of the June 1988 proceedings of the CEWG described increases in both intranasal heroin use and an increase in the speedballing of heroin (injecting heroin and cocaine together).²⁴ The December 1988 report of the CEWG noted reports of increased smoking of heroin combined with crack in New York and Philadelphia, two cities in which an increase in higher purity heroin was first detected.²⁵

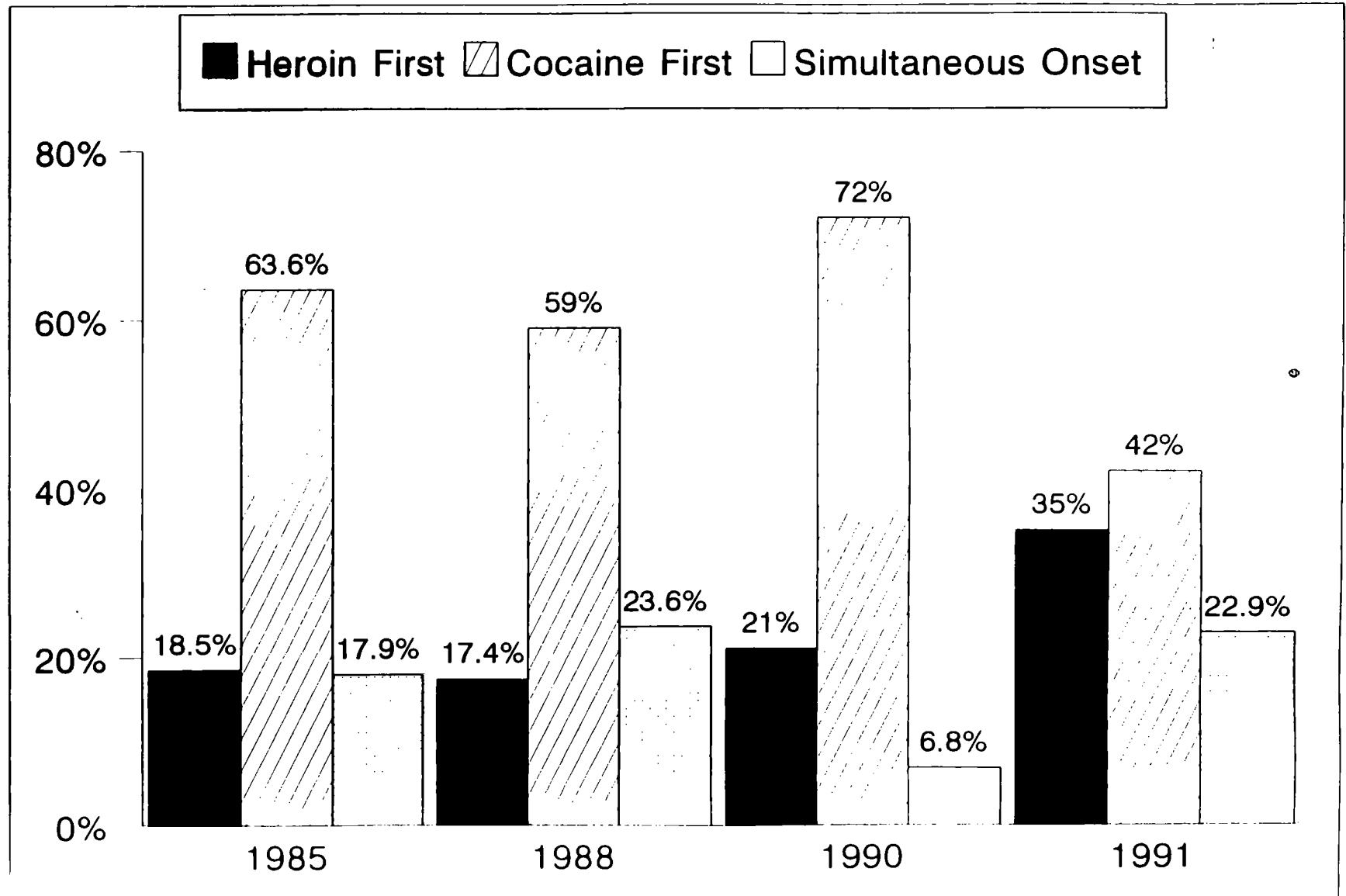
Using DUF, we find that heroin users also tend to use cocaine (Table 9). As the table shows, in both 1989 and 1990 large numbers of arrestees tested positive for both substances. However, these data cannot determine the sequence or relationship of use nor can they explain the declining percentage of heroin users who tested

²³ The DEA reports that Colombian organizations have begun distributing heroin in the United States; they derive this heroin both from trading cocaine for heroin in Asia and Europe and from cultivating poppies in Colombia (Source: Community Epidemiology Work Group, "Epidemiologic Trends in Drug Abuse," December 1991 (Rockville, MD: National Institute on Drug Abuse, 1992), p. 23).

²⁴ Community Epidemiology Work Group: June 1988, "Epidemiology of Drug Abuse in the United States and Europe," (Rockville, MD: National Institute on Drug Abuse, 1988).

Community Epidemiology Work Group, "Epidemiologic Trends in Drug Abuse: December 1988" (Rockville, MD: National Institute on Drug Abuse, 1988).

Figure 4
Sequence of Heroin/Cocaine Use



Source. National Household Survey on Drug Abuse, 1985, 1988, 1990, 1991.

Table 9

Profile of Heroin Users Among Arrestees

	1988 N=13,815	1989 N=21,991	1990 N=28,502
Test positive for opiates	13 %	11 %	10 %
Self-reported use of heroin in past 30 days	*	48 %	42 %
Characteristics of those who tested positive for heroin	N=1,791	N=2,319	N=2,751
Test positive for cocaine	76 %	78 %	69 %
Current (30 day) crack use	*	64 %	53 %
Current injectors	*	61 %	58 %
Average age	31 %	31 %	32 %
Average years of heroin use	12 %	12 %	13 %
% who are initiates	3 %	4 %	4 %
Average age of initiates	26 %	26 %	27 %

*Information unreliable due to change in questionnaire in the second quarter.

Source: Drug Use Forecasting System, 1988-1990.

positive for cocaine; in 1989, 78 percent tested positive compared with 69 percent in 1990.²⁶ It appears from DUF that both heroin and cocaine use are declining in this population.

A cohort of heavy cocaine users who also use heroin is very difficult to detect in traditional data sources primarily because its members may not be using enough heroin to produce problems related specifically to heroin use. The new heroin user whose primary drug of abuse is cocaine or crack will not appear for treatment for heroin use for some time, if at all. If users add only a small amount of heroin to their drug consumption each day, they may never become addicted and may never appear in statistics for treatment for heroin use. However, if there are enough users of this type, their \$10-20 purchases each day could affect the market, increasing demand and driving up prices.²⁷ These users should however, appear in treatment data sources for cocaine use problems with heroin indicated as a secondary drug.

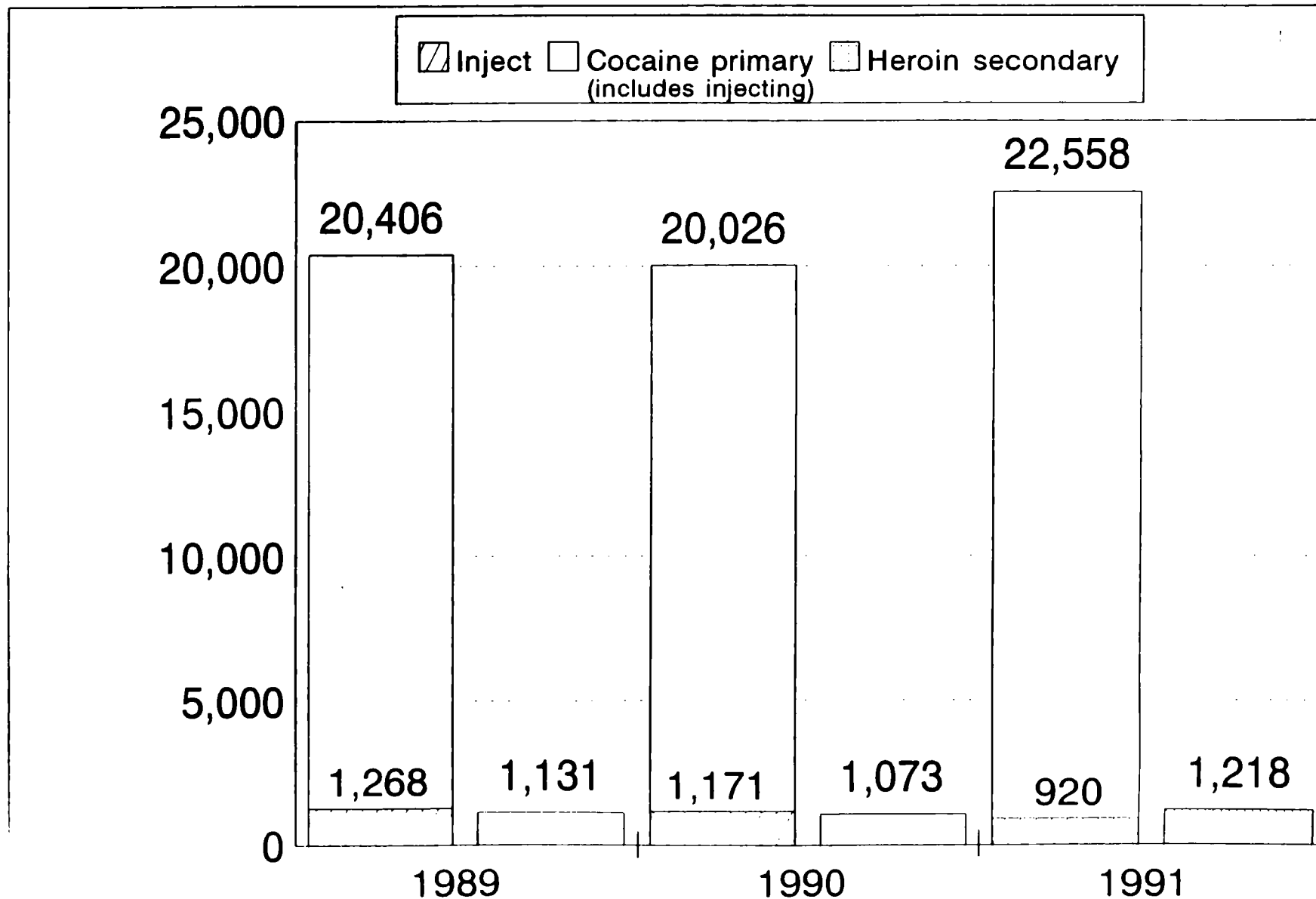
If cocaine users are turning to heroin due to increased availability and reduced price, they should appear in increasing numbers in Figure 5, persons in New York State who on admission to treatment report cocaine as the primary abuse problem and heroin as a secondary problem. As this figure shows, only a fraction of primary cocaine abusers use heroin, and that figure has not changed appreciably over time. Indeed, the number of cocaine injectors seems to match fairly well with heroin injectors, implying a stable body of heavy intravenous users of both drugs.

To summarize, when heroin is the primary drug of abuse of the patient entering treatment in New York, cocaine is the secondary drug about half the time (Figure 6), and both drugs are typically injected. When cocaine is the primary drug of abuse at entry, however, heroin is the secondary drug in only 5 percent of the cases, and heroin is injected by no more than 6 percent in any year. The heavy cocaine user and the heavy heroin user are most often from different populations.

²⁶ This may be explained by the relatively high price of cocaine in 1990. See W. Rhodes and R. Hyatt, "The Price of Illicit Drugs, 1981-1991," report to the Office of National Drug Control Policy (Cambridge, MA: Abt Associates, September 1992).

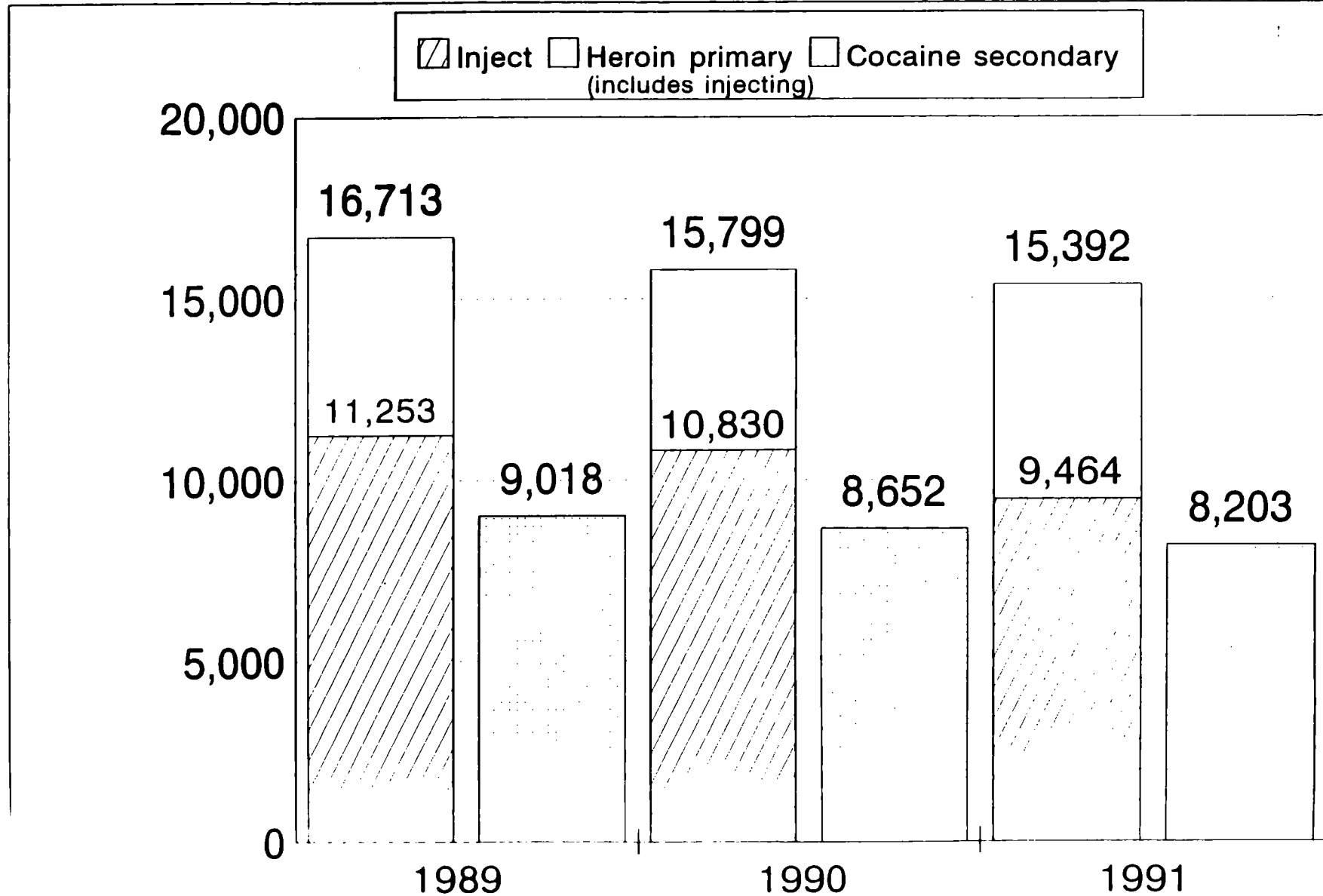
²⁷ It has been estimated that 1.5 to 2.5 million individuals currently use cocaine on a weekly basis in the United States (Source: W. Rhodes, "Synthetic Estimation Applied to the Prevalence of Drug Use."

Figure 5
Cocaine as Primary Drug Used



Source: New York State Division of Substance Abuse Services, 1989-1991

Figure 6
Heroin as Primary Drug Used



Source: New York State Division of Substance Abuse Services, 1989-1991

C. Relapsed Users

The former heroin user returning to use is not a "new user" but will appear as a new user in some data sets if he or she has not used heroin in recent years. Recovered heroin addicts or current methadone treatment clients may have returned to heroin because of its higher purity and lower price. Former heroin users may also be drawn back into heroin use through a contemporary heavy use of cocaine (see previous discussion).

These relapsed users can be distinguished from other new users in that they are typically older and have a history of drug use and prior treatment for their addictions. Relapsed users may also use the drug differently than someone who has never used heroin before; that is, they may be either injecting or inhaling heroin, but because of prior experience with the drug, may display less resistance than initiates to injecting it.

Given the size of the cohort that experimented with or initiated heroin use during earlier eras, there may be a substantial number of recovered addicts in the population presently at-risk of reinitiating heroin use. While their propensity to return to heroin use is unknown, if a large enough number of former users are relapsing, this group may account for an increased demand for the drug.

None of the data sets currently available allow clear differentiation of the relapsed user from the established user.²⁸ While data from each source describe current users as older, with old heroin habits and often with long treatment histories, they do not indicate whether these are relapsed heroin users. However, telephone conversations with treatment providers conducted by Abt Associates in April and September of 1992 produced some indication that there are returning or long abstinent addicts now entering treatment.

D. New Users

The final category of heroin users is that of the initiates to use or "virgin users." For the current situation to be a true epidemic, data should show a large number of these virgin users.

²⁸ Questions in DUF, NHSDA, and NADR include age of onset of heroin use and recency of use (prior 30 days, six months, one year, etc.), but do not cover whether use was continuous from onset to recent use.

An initiate to heroin is someone who has only recently begun to use heroin.²⁹ These users may appear in the Drug Abuse Warning Network (DAWN): as poor judges of correct dosage or purity they may take too much of the drug, precipitating a need for medical attention. They are not likely, however, to appear in treatment data for several months or even years after initial use.³⁰ New users may also not appear in the DUF data as early stages of use may not reach a level of life-style or financial involvement which results in criminal activity.

While the number of heroin users in the NHSDA is very small, a substantial resurgence of use by new users should be reflected in an increase in the number of NHSDA respondents reporting first heroin use in the years since prices have dropped and the availability and quality have risen. As reported earlier, Figure 1 shows the number of persons reporting that they used heroin at least once in the prior 12-month period in the 1985, 1988, 1990, and 1991 NHSDA and the proportion of users who initiated use in the prior year.

Figure 2 shows the average age of all annual heroin users and the average age of initiates. The majority of users are older, long time users in their thirties. Initiates comprise less than 10 percent and are a new, younger cohort of users. The proportion of new users in each year is small, most likely reflecting continuous replacement of the older cohort of users rather than an epidemic of new users. The majority of these new initiates are young experimenters: 67 percent are under 30 years of age. Of these new users, 77 percent have used heroin a total of less than five times over the course of their lives. However, some of the 1991 survey data reveals a departure from the initiate described in earlier NADR data. In 1991, there appears a group of initiates over 30 years of age (19 percent), who do not appear in any of the prior years' data. This may suggest a new group of older initiates.

Given the typically early age of heroin initiation, new initiates to heroin use might also be expected to emerge in the Monitoring the Future study conducted by researchers at the University of Michigan (HSS). This series of surveys covers national probability samples of high school students in the 12th grade. Trends from this sample indicate a decline in the use of all illegal drugs, including heroin. In 1991, lifetime prevalence for heroin was 1.2 percent for eighth and tenth graders and 0.9

²⁹ For the purposes of this report, recent heroin use is defined as initiation within the last year. However, initiates to heroin use may be users of other drugs. An annual user is defined as any use in the prior 12-month period.

³⁰ Establishment of physiological addiction takes time, often not occurring until one to two years after initial experimentation.

percent for seniors.³¹ This figure has been steadily declining among seniors surveyed since 1975, when 2.2 percent reported ever having used heroin. In contrast only 0.4 percent of the seniors surveyed in 1991 reported any use in the prior year period and only 0.2 percent reported any use in the prior 30 day period.

Worth noting, however, are the HSS researchers' findings that the perceived availability of heroin has risen steadily over the last few years--consistent with the evidence presented earlier. In 1986 twenty-two percent of the high school seniors surveyed reported that heroin would be "fairly easy" or "very easy" to obtain. Beginning in 1989, over 30 percent of those surveyed reported heroin as easy to obtain.

DAWN data from 1988-1991 indicate that teenagers and young adults (12-25), the age typically associated with drug initiation, have not appeared in ERs in greater numbers since 1988 for medical problems related to heroin use. This age group has been consistently 13-14 percent of the total heroin ER mentions (see Table 7). Again, the majority of heroin-related ER episodes occur among older users who are less likely to be initiates. Confirmation of this assumption is not available from these data because the DAWN questionnaire does not ask for the age of drug use onset.

According to the National AIDS Demonstration Research (NADR) Project data, the percentage of users who are initiates (individuals who injected heroin for the first time within the last year) was about 8 percent in 1988-1989 and 10 percent in 1990-1991. In the DUF data, heroin initiates are, on average, five to six years younger than established heroin users, but, otherwise have much the same profile. They are concurrent users of cocaine (76 percent in 1990) and likely to be injecting rather than using intranasally or smoking (57 percent in 1990).

Initiates are potentially the largest group of new users, since the boundaries of the class are unlimited. However, other factors mitigate against expanded use that might otherwise follow increased availability. Heroin, primarily a drug taken by injection, has long had a poor reputation -- damaged further by the onset of the AIDS epidemic. It is likely, therefore, that to attract new users, the reputation of the drug would have to have changed somewhat, perhaps through introduction of a new method of ingestion, and perhaps because the need to use it (for example, to counter the effects of heavy cocaine use) overrides heroin's bad

³¹ The researchers explain the higher prevalence among younger samples as the effect of dropouts. The students who report use in the early years are more likely to have dropped out by senior year.

reputation. In San Francisco, one ethnographer³² conjectured that a combination of the decrease in cocaine's purity and reputation (both from representations in public education campaigns as well as the life-style surrounding heavy crack users) and the increase in heroin quality in that area may be helping to convert heavy cocaine users to heroin use.

In the recent past, heroin has been almost exclusively injected, either intramuscularly (skin-popping) or intravenously. The intranasal use or smoking of heroin was both exotic and rare. Today, with higher purity levels available in some areas, heroin users can smoke or snort the drug, perhaps removing the fear of AIDS and some of the stigma associated with injection of the drug. Nevertheless, available data do not indicate a large influx of new users, regardless of mode of ingestion.³³

Conclusion

This study demonstrates a consistent increase over recent years in the supply of high-purity, low-priced heroin. The trend, first noted in the Northeast in the late 1980s, has since spread across the country, apparently resulting in increased consumption of heroin by older established users and some increase in inhalation of the higher purity substance by both initiates and returning users.

The bulk of this increased supply of heroin appears to be consumed by older established heroin addicts who primarily inject the drug, often mixing it with cocaine. This user is most often male, but the data indicate that the heavy user cohort contains a growing numbers of females.

The price and overall quantity of the basic units of purchase -- "dime" (\$10) or "twenty" (\$20) bags -- has not changed, but the product is typically of better quality than that found in earlier periods. This increase in purity occurred over a period of about three to five years, depending on the geographic region in question. This gradual increase may have allowed the established user to build up a greater tolerance to higher purity levels, keeping emergency room admission rates lower than one might anticipate. Older users may find that they at times "nod" on the higher quality product, but in general they have developed a

³² Sheila Murphy, Institute for Scientific Analysis, San Francisco, California, interview with Abt Associates, September 1992.

³³ According to the NADR data, among heroin users who primarily or exclusively inhale the drug the average age is two to four years younger than it is for those who primarily or exclusively inject it, but both groups are on average over 30 years of age.

tolerance level which allows, or even dictates, consumption of a greater quantity of the drug.

In addition, the higher purity product accommodates both old and new intranasal users of heroin. Those who are injecting may also be inhaling the drug. Those who are exclusively inhaling may remain inhalers, though several treatment and ethnographic sources noted that this is most often a first stage use pattern. As one ethnographer reports, "They may start snorting it, but they always end up with the needle. It's too wasteful to keep snorting it, and the rush is not the same."³⁴ Whether this tendency will hold true for the initiates in these data sets should be the subject of future research.

The dominant user in these samples is the traditional heroin user described in the literature, most of whom initiated use 10 to even 20 years ago. There are also some new users, both replacements to the older cohort with similar use patterns, and some new users initiating heroin use after heavy cocaine use. However, the path to heroin through heavy cocaine use still does not appear to be very common. The majority of cocaine or crack users in treatment samples are not heroin abusers, even though the reverse pattern (heavy heroin users also abusing cocaine) is common. In today's drug market, however, this user -- reflected also in the DUF, DAWN, and NADR samples -- is most likely using more of both drugs in a continuation of a long-standing drug use career.

³⁴ "Quarterly Pulse Check," report to Office of National Drug Control Policy, (Cambridge, MA: Abt Associates, October 1992).

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CHARACTERISTICS OF HEAVY COCAINE USERS,
INCLUDING POLYDRUG USE, CRIMINAL ACTIVITY, AND HEALTH RISKS

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February 12, 1993

Introduction

Cocaine use exploded in America during the 1970s and early 1980s -- increasing from five million Americans who reported ever using cocaine in 1974 to 22 million just eight years later.¹ This unprecedented increase was further fueled in the 1980s by the appearance of a highly potent, inexpensive, smokable form of cocaine -- crack.

Since the Nation intensified its war on drugs in the mid-1980s, Americans have hardened their attitudes against illicit drug use, and the appeal of cocaine to most users has diminished. In fact, since 1988, there are almost 2 million fewer cocaine users.²

Still, a core of heavy cocaine users remains.³ For these people, cocaine use is a compulsion costing them thousands of dollars a year and producing a myriad of complications, including disrupted family life, reduced earnings power, degraded health, and trouble with the law. Their use also creates costs to society because they clog the criminal justice system, sometimes overwhelm local drug treatment programs, and force the public health and welfare systems to cope with the unfortunate consequences of drug use.

Who Are the Heavy Cocaine Users?

Four data sources were used in this report: the National Household Survey on Drug Abuse (NHSDA), National AIDS Demonstration Research (NADR) Project, the Drug Use Forecasting (DUF) Program, and the Drug Abuse Warning Network (DAWN). A discussion of these sources, including their limitations, can be found at Appendix A.

¹ These data are derived from *Cocaine Use in America: Epidemiologic and Clinical Perspectives*, ed. N. Kozel and E. Adams, NIDA Research Monograph 61 (Rockville: Department of Health and Human Services, 1985).

² According to the National Household Survey on Drug Abuse (NHSDA), *Main Findings 1988*, Table 2.1, 8.2 million Americans used cocaine at some time during 1988. According to tabulations of the 1991 NHSDA, performed by Abt Associates, 6.1 million Americans used cocaine at some time during 1991.

³ Heavy users are those who consistently used cocaine at least once a week in the prior 12 month period. Excluded from this group are those who are recent initiates, more sporadic users, and those who have experimented with but have since stopped using cocaine. Because of the consistent consumption pattern implied by this definition, heavy users would be vulnerable to cocaine's psychological and physiological attractions and, unless the quantities consumed each time were very small, to its financial demands.

Because using cocaine is illegal, users are generally evasive when asked about their drug-using behavior. Thus, any profile of heavy users drawn from national survey data is imperfect. However, when national survey data are combined with data based upon criminal justice and health care system encounters, a fairly reliable profile of heavy cocaine users emerges.

The lure of cocaine

Cocaine use is highly reinforcing. It is a drug that, given unlimited access, laboratory animals will select over food -- nearly to the point of starvation.⁴ Because of cocaine's powerfully reinforcing capabilities, users are prone to binges, consuming large quantities over short periods of time. The binge is characteristically followed by a "crash," or depression, which encourages further use of cocaine or other drugs to alleviate discomfort.

Heavy cocaine use is also expensive. Heavy users among arrestees claimed to spend \$100 to \$300 a week on cocaine.⁵ Heavy users who answered the 1991 NHSDA claimed to spend just under \$100 per week on cocaine. Escalating use may lead users to divert income from other needs, including family expenses and health maintenance. Intensified use may also increasingly disrupt a conventional life-style, compounding the difficulty of recovery from compulsive use. For those with limited resources, crime may ultimately become a means to afford drugs.

Number of Heavy Cocaine Users

The NHSDA excludes those who are not homeless but whose residential ties are too unstable for them to be counted as part of a household, and those who, if part of a household, are unlikely to answer surveys. However, this population is well represented in data collected by the DUF program. Although it is true that not all heavy drug users are arrested at some time in their drug-using careers, a large percentage is, so the criminal

⁴ T.G. Aigner and R.L. Balster, "Choice Behavior in Rhesus Monkeys: Cocaine versus Food." *Science*, 201 (1978):534-535. For further discussion of cocaine studies in animals see Chris Johanson, "Assessment of the Dependence Potential of Cocaine in Animals," in *Cocaine: Pharmacology, Effects and Treatment of Abuse*, ed. J. Grabowski, NIDA Research Monograph 50, (Rockville: Department of Health and Human Services, 1984).

⁵ Based on the 1990 DUF data, \$100 is the median response from respondents who admitted using cocaine on 11 to 20 days per month during which they did not also use heroin on 10 or more days; \$300 is the median response for those who used cocaine on 21 or more days.

justice system provides valuable supplemental data when counting heavy drug users.⁶

Converting the DUF data into estimates of heavy drug users throughout the criminal justice system required adopting assumptions about how the arrest process works and then applying mathematical models and statistical analysis. Methods for making that conversion have been described elsewhere.⁷

After applying those conversion methods, we derived a composite estimate of the number of cocaine users by adding estimates from the Household Survey to estimates from DUF, and then subtracting the overlap. We estimated that in 1991 there were over 2.1 million heavy cocaine users and 5.4 million casual cocaine users. Over the last four years, the number of heavy users has changed little, but the numbers of casual users has declined (see Table 1).

TABLE 1
Estimated Number of Heavy and Casual Users of
Cocaine 1988-1991

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
NHSDA				
Cocaine				
Heavy	884,148	776,765	668,328	625,000
Casual ⁸	7,347,000	6,466,000	5,585,000	5,440,000
DUF				
Cocaine				
Heavy	1,587,052	1,884,778	1,561,351	1,790,946
COMPOSITE				
Cocaine				
Heavy	2,082,321	2,334,509	1,965,544	2,142,597
Casual	7,347,000	6,466,000	5,585,000	5,440,000

Sources: NHSDA 1988, 1990, 1991; DUF 1988, 1989, 1990; Uniform Crime Reports 1988, 1989, 1990

⁶ See the discussion of criminal justice involvement, pg 12.

⁷ The methodology is described in W. Rhodes, "Synthetic Estimation Applied to the Prevalence of Drug Use," *Journal of Drug Issues* (in press).

⁸ Casual users are those who used less frequently than once a week during the prior 12 month period.

The demographics of heavy users

As discussed above, the NHSDA identifies few heavy cocaine users, and those who are identified differ in some respects from those found in the populations sampled for DUF, NADR, and DAWN (see Table 2).⁹ In the DUF data, the heavy cocaine users are arrestees; in NADR, they are likely to be heavy drug users who are not in treatment and who are injecting drugs; in the DAWN data, the heavy cocaine users have sought emergency medical treatment. Nevertheless, the profiles of heavy cocaine users based on each of these data sources are similar, although the degree to which characteristics are exhibited is less pronounced in the NHSDA.

As Table 2 indicates, heavy cocaine users are twice as likely to be men as they are to be women. Blacks and Hispanics are overrepresented among heavy users. Further, fewer than one-fourth live with a spouse or other partner, and about 75 percent of the heavy users identified in the NHSDA live in urban areas with populations in excess of 250,000. The NADR, DUF, and DAWN samples are also drawn from urban populations.

Although all heavy users identified in these data sets have similar characteristics, those in the non-NHSDA samples show larger concentrations of Blacks and many more unemployed persons. Only 25 percent of the NHSDA sample of heavy users are unemployed, compared with 71 percent and 57 percent in the DUF and NADR samples respectively.¹⁰ Only 31 percent of the NADR population hold full- or part-time jobs. Heavy cocaine users in the non-NHSDA samples¹¹ are also older and less educated, on average, than the NHSDA population of heavy users.

⁹ These four samples are not equivalent. They are not demographically matched nor have they been derived using the same level of precision. They are presented here for descriptive purposes only.

¹⁰ Respondents are outside of the labor force if they are unemployed, retired, rely on welfare, or engage in illegal activities as their primary means of support.

¹¹ The DUF population is restricted to adults, as juveniles have separate booking facilities.

TABLE 2
CHARACTERISTICS OF CASUAL AND HEAVY COCAINE USERS

	<u>CASUAL</u> ¹	<u>NHSDA</u> ¹	<u>DUF</u> ²	<u>NADR</u> ³	<u>DAWN</u> ⁴
RACE					
Black	13 %	33 %	67 %	56 %	58 %
White	75	42	20	18	33
Hispanic	9	21	12	24	(⁵)
Other	3	3	(⁶)	2	9
(Subtotal)	(100%)	(100%)	(100%)	(100%)	(100%)
EMPLOYMENT STATUS					
FT or PT Employment	64 %	58 %	24 %	31 %	
Out of the Labor Force ⁷	21	25	71	57	
In School, Homemaker, Disabled, Retired, Other	15	17	5	12	
(Subtotal)	(100%)	(100%)	(100%)	(100%)	
INCOME LESS THAN \$9,000	42 %	50 %	83 %	---	---
LIVE IN URBAN AREA (>250,000)	70 %	75 %	---	---	---
AGE					
12-17	5 %	7 %	(⁶)	(⁶) %	6 %
18-25	36	36	27	15	(⁸)
26-34	31	40	48	46	
35+	28	17	25	39	
(Subtotal)	(100%)	(100%)	(100%)	(100%)	
EDUCATION					
12-17 Years Olds	5 %	7 %			
< High School Diploma	22	44	75 %	56 %	
≥ High School Diploma	73	49	25	44	
(Subtotal)	(100%)	(100%)	(100%)	(100%)	
MARRIED OR COMMON LAW	33 %	20 %	22 %	---	
SEX					
Male	66 %	56 %	63 %	71 %	66 %
Female	34	44	37	29	34
(Subtotal)	(100%)	(100%)	(100%)	(100%)	
Total Heavy Cocaine Users in Sample					
		N=625,000 ⁹	N=3,621	N=34,000	N=80,355

Note: Detail may not add to total due to rounding.

¹ National Household Survey on Drug Abuse, 1991.

² Drug Use Forecasting program, 1990.

³ National Institute on Drug Abuse/National AIDS Demonstration Research, 1988-1991.

⁴ Drug Abuse Warning Network, 1990.

⁵ "Other" includes Hispanic and other racial groups.

⁶ Less than 1 percent.

⁷ This figure for DUF also includes 28 percent of the sample who report illegal sources of income as their primary income.

⁸ Other ages in DAWN reported with noncomparable age breaks.

⁹ This is the number of heavy cocaine users projected to the total U.S. population from weighted responses.

Although a large percentage of heavy cocaine users are unemployed and exist on marginal incomes, heavy cocaine users are found at higher socioeconomic levels as well. Data from the NHSDA show that 5 percent of the heavy users are college graduates, 20 percent live in a household where the primary wage earner holds a professional or managerial position, and 5 percent earn over \$30,000 per year. More than half are full-time or part-time workers, and 17 percent are either homemakers or adults enrolled in school.

These middle-class users are much less likely to appear in the other three data files, because they are unlikely to be homeless, are better able to avoid contact with the law, and are more likely to seek medical attention through private physicians than through emergency rooms.¹²

In short, all four data sets provide a glimpse of specific segments of the larger population of heavy cocaine users. The characteristics and behaviors of heavy drug users may not be reflected accurately in the NHSDA because heavy users often do not live in permanent housing; nonetheless, the NHSDA captures that segment of heavy users who live in households. The heavy cocaine users who are reached by the NHSDA have characteristics that are similar to but less pronounced than those of heavy users described using DUF, NADR, and DAWN.

Heavy cocaine users consume a variety of other drugs

Drug users are often characterized by their drug of preference (*heroin addicts, cocaine users*). However, few heavy users consume only one drug, even when drug preference is strongly driven by physiological dependence. Generally, heavy users of cocaine frequently use alcohol, marijuana, heroin and sedatives, or other drugs to offset the rush associated with heavy cocaine use and to ease the aftermath or "crashing" phenomenon (see Table 3).¹³

Cocaine may also not be the primary drug even among those who use it regularly. Many daily heroin users add a substantial amount of cocaine in what one heroin addict referred to as a

¹² Middle-income and low-income drug users are probably equally likely to seek emergency room treatment for acute reactions. Nevertheless, in 1990, about half of all emergency room contacts were due to "chronic effects," "withdrawal," or "seeking detoxification" (DAWN 1990, Table 2.14). It might be assumed that middle-class users would be more likely to seek medical care from private physicians and from clinics for these nonacute health problems.

¹³ D. Strug et al., "Patterns of Cocaine Use among Methadone Clients," *International Journal of the Addictions*, Vol. 20, No. 8 (1985):1171.

"bonus,"¹⁴ in an injected combination known as a "speedball." Sixty-nine percent of the NADR sample of heavy cocaine users also use heroin and 41 percent use it daily. Twenty-six percent of the heavy cocaine users in the DUF sample are current heroin users, and 16 percent of them use heroin daily.

Alcohol is the most often used companion drug for heavy cocaine users. For example, one-third of the heavy cocaine users in the NHSDA sample, almost half in the DUF, and over half in the NADR used alcohol on at least 12 days during the month prior to the interview. Although not shown in Table 3, cocaine users consume more alcohol than those who abstain from using cocaine. Fifteen percent of the heavy cocaine users in the NHSDA drank five or more drinks on at least 10 of the prior 30 days, compared with 16 percent of the moderate users and only 2 percent of the cocaine abstainers.

Heavy cocaine users are frequently involved with the criminal justice system

Research shows no inexorable link between drug use and criminal activity (beyond illicit drug use).¹⁵ Many drug users commit no other crimes and many criminals do not consume drugs. However, studies have found that criminal activity escalates during periods of intensified drug use and declines during periods when drug users are in treatment. These associations are particularly prominent for heavy users of heroin and cocaine.¹⁶ DUF data, for example, point to a strong association between criminal activity and the use of cocaine: roughly 30 percent of arrestees have urine tests that are positive for cocaine.¹⁷

Heavy cocaine users are more involved in crime than those who abstain because of economic motivations (they commit crime to obtain the resources to buy expensive drugs), the effects of the drug itself (they become disinhibited and commit crimes), or because of a life-style choice (they participate in both drug use and criminal activity). As to the latter, drug dealing is a natural outgrowth of heavy use because most heavy users will at some point stumble onto the opportunity to distribute a larger amount of drugs than they consume. Selling drugs helps them to maintain their own supply of drugs and provides supplementary income.

¹⁴ D. Hunt et al., "The Costly Bonus: Cocaine Related Crime among Methadone Treatment Clients," *Advances in Alcohol and Substance Abuse*, Vol. 16, No. 2 (1987):107-122.

¹⁵ B.A. Gropper, *Probing the Links Between Drugs and Crime*, NIJ Research in Brief, February 1985; M.R. Chaiken and B.D. Johnson, *Characteristics of Different Types of Drug-Involved Offenders*, NIJ Issues and Practices Report (NCJ 108560), February 1988.

¹⁶ See M. Tonry and J. Wilson (eds.), *Drugs and Crime*, (Chicago: University of Chicago Press, 1989) for a review of the research in this area.

¹⁷ This is a national estimate based on DUF data from 22 cities. For details on how the percentage was derived, see W. Rhodes, "Synthetic Estimation Applied to the Prevalence of Drug Use," *Journal of Drug Issues* (in press).

TABLE 3
PERCENTAGE OF HEAVY COCAINE USERS
WHO CONSUME SELECTED OTHER DRUGS

	<u>NHSDA</u> ¹	<u>DUF</u> ²	<u>NADR</u> ³
HEROIN			
Any Past Month Use	6%	26%	69%
≥ Weekly ⁴	(⁵)	20	58
Daily	(⁵)	16	41
SEDATIVES/TRANQUILIZERS			
Any Past Month Use	7	10	27
≥ Weekly	(⁶)	3	13
Daily	(⁶)	1	5
STIMULANTS/AMPHETAMINES			
Any Past Month Use	6	5	15
≥ Weekly	(⁶)	1	7
Daily	(⁶)	(⁵)	2
PCP			
Any Past Month Use	1	3	7
≥ Weekly	(⁶)	1	2
Daily	(⁶)	(⁵)	(⁵)
HALLUCINOGENS			
Any Past Month Use	7	1	8
≥ Weekly	1	(⁵)	2
Daily	(⁵)	(⁵)	(⁵)
MARIJUANA			
Any Past Month Use	54	43	69
≥ Weekly	18	12	44
Daily	9	6	19
ALCOHOL			
Any Past Month Use	78	75	86
1-11 Times/Month	44	33	28
12-29 Times/Month	23	17	20
Daily	10	26	38
Total Heavy Cocaine Users			
in Sample	N=625,000⁷	N=3,621	N=34,138

¹ National Household Survey on Drug Abuse, 1991. Questions on frequency of use are phrased as the number of times the drug was consumed in the past 12 months. However, in the NHSDA, for some drugs, this is phrased only as any (versus some) use in the past 30 days. Total weighted N=201 million for NHSDA sample.

² Drug Use Forecasting program, 1990. Questions on frequency of use in DUF are phrased as the number of days in the past 30 on which the drug was consumed. Total N for DUF = 28,502.

³ National Institute on Drug Abuse, National AIDS Demonstration Project, 1988-1991. Questions on frequency of use in NADR are asked as the typical pattern of use in the past six months, i.e., none, less than four times a month, about one time a week, two-six times a week, about one time a week, about one time a day, two-three times a day (almost every day), four or more times a day (almost every day). Total N for NADR = 49,293.

⁴ Defined as more than 10 days in the past 30 days in NHSDA and DUF and as two-six times a week or more (8-12 times a month) in NADR.

⁵ Less than 1 percent.

⁶ Information not collected at this level of specificity.

⁷ This is the number of heavy cocaine users projected to the total U.S. population from weighted responses.

The 1991 NHSDA asked respondents if they had ever been arrested and booked for a crime and, if they had, how many times they had been arrested and booked during the 12 months before the interview.¹⁸ Half of the heavy users reported having been arrested or booked; only 8 percent of those who abstained from cocaine use had been arrested. Furthermore, 23 percent of the heavy users, compared with only 1 percent of those who abstained, reported being booked during the year before the interview.

NADR respondents are also heavily involved in criminal activity. Eighty-one percent of the heavy users have been incarcerated at some point in their lives, and 30 percent have been in jail in the last six months. No data are available concerning the specific crimes this group committed.

In the DUF sample, 52 percent of all robbery arrestees and 52 percent of all burglary arrestees test positive for cocaine, indicating recent use.¹⁹

Heavy cocaine use is associated with serious health problems

Drug use both precipitates and exacerbates health problems among heavy users. Some problems, such as cardiac irregularities, are triggered by the drug itself. For others, it is more difficult to show that cocaine is the causal agent, given the other drugs used (alcohol, heroin, tranquilizers) and the often careless life-style and poor access to health care that accompanies heavy use.

The method of drug administration can also cause health problems ranging from deviated nasal septa from snorting, respiratory damage from crack smoking, or AIDS from sharing injection equipment or unprotected sexual activity while intoxicated or in exchange for drugs. In short, heavy cocaine users have many medical needs and make significant demands on the health care system.

¹⁸ Respondents are told that being booked means that "you were taken into custody and processed by the police or by someone connected with the courts, even if you were then released." Respondents were told to ignore minor traffic violations.

¹⁹ Urinalysis detects cocaine for up to two or three days after use. Not all of those who test positive for cocaine are heavy users, but 58 percent of arrestees who admit cocaine use report that they use cocaine on more than 10 days per month.

Self-reported health status

Both the NHSDA and the NADR surveys include questions regarding the respondent's health status. In both surveys cocaine use was associated with a poorer (self-reported) health status. NHSDA data indicate that 26 percent of heavy users reported their health as "fair" or "poor," compared with 13 percent of more moderate users and 12 percent of those who abstained. Furthermore, heavy users in this sample were twice as likely as abstainers to have had motor vehicle accidents. Heavy cocaine users were also more likely to have been absent from work due to illness in the previous month (39 percent) than were abstainers (32 percent), and six percent of the heavy users lost seven or more days of work in the prior 30 days compared with 2 percent of the abstainers.

In the NADR sample, only 16 percent of heavy users reported their health to be "excellent." Furthermore, 20 percent reported having had hepatitis; 4 percent, tuberculosis; and 10 percent, syphilis. Similar health data are not available for the DUF and NHSDA samples.

Fetal exposure

Almost a third of the heavy users are women of childbearing age. Estimates of the number of fetal cocaine exposures vary. In the NADR sample, 8 percent of the women who were using cocaine weekly or more report being pregnant at the time of the interview. In the National Maternal and Infant Health Survey (NMIHS), an estimated 46,700 pregnant women stopped using cocaine after recognizing that they were pregnant; however, 22,400 women continued to use cocaine after knowing that they were pregnant.²⁰ Other estimates of pregnant cocaine users range from 91,500 to over 250,000.²¹

²⁰ Tabulations of the NMIHS performed by M. Gross and V. Leiter of Abt Associates Inc. Because the NMIHS is a mail survey, it undoubtedly suffers from the same problem as the NHSDA: heavy drug users, who often are homeless or transient, are likely to be underrepresented in the survey, and those who answer the survey may decline to admit their drug use. Estimates based on the NMIHS should be considered to be lower limits.

²¹ General Accounting Office, *Drug Exposed Infants: A Generation at Risk*, (Washington D.C.: General Accounting Office, 1990).

Fetal cocaine exposure has been associated with low birth weight and premature birth. A recent study conducted at Harlem Hospital²² indicates that hospital costs at discharge for cocaine-exposed infants were over \$5,000 more than for unexposed infants.²³ These additional costs result partly from longer stays in the hospital awaiting social service evaluation or foster care placement services.

Risk of HIV infection

As with other drugs, heavy cocaine users who inject drugs are at risk for HIV infection. Of the heavy users in the NHSDA, 17 percent reported they had injected cocaine during the 12 months before the survey.²⁴ In the DUF sample, 23 percent reported injection as the preferred method.²⁵ Among the heavy cocaine users in the NADR sample, 81 percent had injected cocaine in the prior six months.²⁶ In the DAWN data, injection was identified as the route of administration between 22 percent and 32 percent of all mentions of cocaine.²⁷

Death

Medical examiners report drug-related deaths to DAWN. During 1991, 3,081 deaths could be attributed to cocaine alone or in combination with other drugs.²⁸

²² C. Phibbs et al., "The Neonatal Costs of Maternal Cocaine Use," *Journal of the American Medical Association*, Vol. 226, No. 11 (September 18, 1991):1521-1526.

²³ Discharge costs for infants exposed to crack and to cocaine in combination with other substances were even higher.

²⁴ Seventy-one percent snorted it and 54 percent smoked it.

²⁵ Seven percent preferred snorting it; 54 percent preferred smoking it as crack, and the rest preferred to freebase.

²⁶ The high frequency of injection by those in the NADR sample can be explained by the focus of the NADR project, HIV prevention and education.

²⁷ The route of administration was unknown for 32 percent of the emergency room mentions of cocaine. The lower limit is the reported percentage; the upper limit is the reported percentage divided by 0.68.

²⁸ National Institute on Drug Abuse, "Release of Third and Fourth Quarter 1991 DAWN Medical Examiner Data," memo from Mark Barnes, Counsel to the Secretary for Drug Abuse Policy, August 18, 1992.

TABLE 4
SOCIAL/EMOTIONAL PROBLEMS ASSOCIATED WITH
HEAVY COCAINE USE
(in percentage of heavy users)

47%	Argued with family or friends
51%	Had difficulty thinking clearly
45%	Felt irritable or upset
44%	Became depressed or lost interest in things
40%	Felt nervous or anxious
34%	Felt alone or isolated
33%	Found problems harder to handle
34%	Felt distrustful or suspicious
32%	Got less work done at school or on the job
18%	Had health problems
7%	Had to get emergency medical help

Source: National Household Survey on Drug Abuse, 1991. Percentages were adjusted by dividing by 1 minus the percentage of cases where the answer was missing.

Other problems result from heavy cocaine use

Based on the NHSDA, we know that heavy cocaine use engenders other social and economic problems that affect the user, his or her family, friends, and employer. Table 4 reports a list of problems that weekly cocaine users attributed to drug use. Although these problems (for example, "argued with family or friends") are not experienced exclusively by heavy drug users, it is notable that the respondents attributed these problems to their own drug use.

Conclusions

Heavy cocaine users are more likely to be members of minority groups, unemployed, in poorer health, and involved with criminal activities than more moderate users and abstainers. They are also likely to consume other illicit drugs in addition to cocaine, and those drugs are more likely to be marijuana and alcohol than heroin.²⁹ These users live in large metropolitan areas, report poorer health than the more moderate user or the abstainer, has more traffic accidents, and is absent from the workplace more often when employed.

²⁹However, heavy cocaine users in the NADR sample are more likely to augment their drug use with heroin than marijuana.

Effectiveness of public responses

It is regrettable that so little is definitively known about the effectiveness of either punishment or treatment on heavy cocaine use. Those heavy users who are identified in the criminal justice system seem to appear repeatedly; best estimates indicate that arrestees who test positive for cocaine use will be arrested an average of 1.5 times per year when they are not confined.³⁰ And while many users benefit from treatment, compulsive use is most frequently a chronic condition.³¹ The Treatment Outcome Prospectives Study (TOPS) showed that for every 10 clients who used cocaine regularly during the year prior to treatment, six clients had returned to heavy use one year after treatment, and eight clients had relapsed into heavy use within three to five years after treatment.³² These statistics do not accurately reflect the success of treatment outcomes. (The TOPS study is the most recent large-scale study of treatment outcomes. Many smaller scale treatment studies show results with better long-term outcomes.)³³ Nevertheless, the TOPS data suggest that treated cocaine users are more likely than not to return to drug use.

Limits to the effectiveness of both treatment and law enforcement when dealing with heavy cocaine users are reflected in the trends reported earlier. It is encouraging that Americans increasingly regard even occasional cocaine use as harmful and increasingly report that they had not used cocaine during the year before the survey. After what appeared earlier to have been encouraging news that heavy cocaine use was also abating, more recent statistics point toward an intractableness among heavy users. Because of the psychological and physiological cravings that cocaine engenders in established users, the Nation faces a continuing battle to deal with this problem.

³⁰ Frequency of rearrest are from an analysis of rearrest rates based on data reported in eleven studies. Details of these calculations are reported in Rhodes, "Synthetic Estimation Applied to the Prevalence of Drug Use," *Journal of Drug Issues* (in press).

³¹ D. Gerstein and H. Harwood (eds.), *Treating Drug Problems* (Washington, D.C.: National Academy Press, 1990).

³² Hubbard et al., *Drug Treatment: A National Study of Effectiveness* (Chapel Hill: University of North Carolina Press, 1989), Table A-2. Hubbard reports the percentage of all treatment clients who reported regular cocaine use one year prior to treatment, the percentage who reported regular cocaine use one year after treatment, and the percentage who reported regular use three to five years after treatment. The statistics reported in the text were computed by dividing the second percentage by the first and the third percentage by the first. Because Hubbard reports rates by treatment mode, the rates were weighted by the number of clients in each mode of treatment. Those who were treated for less than three months and more than three months were weighted equally.

³³ Gerstein and Harwood, *Treating Drug Problems*.

Appendix A

Data Sources Used to Describe the Heavy User Population

No one data set accurately describes the heavy cocaine using population. To develop an accurate composite, we must examine several different data sets.

The household population

The National Household Survey on Drug Abuse (NHSDA), conducted by the National Institute on Drug Abuse (NIDA), is a survey of drug and alcohol use reported by a nationwide probability sample of residents of U.S. households aged 12 and older. The responses for these individuals are statistically weighted to represent the total U.S. household population. However, caution should be exercised in using these data to develop estimates, since they often represent few actual respondents. In this instance, the number of persons reporting or imputed to report heavy cocaine use is 217.³⁴

The NHSDA does not reach drug users who live outside households, and this group may include many heavy drug users. Some evidence of this comes from tabulations of the 1991 NHSDA, which reveal that respondents from unstable households³⁵ are twice as likely to use drugs as those from stable households,³⁶ suggesting an association between drug use and transience and homelessness. Descriptions of the activities of this homeless and transient population are only available in studies that use snowball and opportunistic sampling or both among heavy users, or that conduct ethnographic research in the areas many heavy users frequent. For example, data from a NIDA demonstration research project, National AIDS Demonstration Research (NADR), indicate that nearly 50 percent of heavy users in that sample would have

³⁴ Consistent with NIDA's definition, weekly use means that the respondent replied that he or she used cocaine on at least one or two days per week every week during the year prior to the survey. Of the 217 affirmative responses, 59 were imputed based on other data in the survey. A 95 percent confidence interval places the range of household members who admit weekly use of cocaine at roughly 482,000 to 768,000. The range is approximate because the high level of imputation in these data affect the mean and standard error in unknown ways.

³⁵ In this analysis, instability is defined as five or more changes of residence within five years and living with three or more unrelated individuals in the household.

³⁶ Stability is defined as fewer than five residential changes within five years and living with relatives only.

been excluded from the NHSDA.³⁷ Consequently, data from the NHSDA are augmented to obtain a reliable profile of heavy drug users.

Population at risk for HIV infection

The NADR data are derived from a 63-site project involving outreach to and intervention with injecting drug users and their sexual partners on issues relating to HIV infection. Because these groups are not drawn from a representative sample, the results cannot be generalized to the entire population of heavy users. Nonetheless, the data base is useful for describing heavy cocaine users who inject the drug. The data base contains information on over 34,000 heavy cocaine users.

Arrestee population

The Drug Use Forecasting (DUF) program measures the rate of drug use among those arrested for serious crimes in central booking facilities in 24 large cities. Arrestees are questioned about their recent and long-term drug use, and their urine is tested for the presence of 10 drugs. DUF is not a probability sample, so sample statistics may not represent the general population of all arrestees. For example, only arrestees in large cities are voluntarily surveyed and tested. Further, DUF respondents are self-selecting; that is they must consent to the survey and urinalysis. Finally, because data collection procedures may vary from city to city, it is difficult to make meaningful comparisons between cities. Nevertheless, DUF provides a unique view of the prevalence of drug use among individuals who are involved with the criminal justice system.

Medical emergencies and deaths

The Drug Abuse Warning Network (DAWN) provides another perspective on the characteristics of heavy cocaine users. DAWN records the characteristics of individuals whose emergency room admission is associated with drug use. Not all those who seek emergency medical treatment for cocaine-related problems are heavy cocaine users, but 72 percent are described as having a "dependence" on cocaine. Thus, DAWN data reflects the characteristics of heavy users who seek emergency medical treatment.³⁸

³⁷ This percentage is a rough estimate based on the observation that about half of the heavy cocaine users in the NADR data reported that they were either homeless (living on the streets or in shelters) or had lived in someone else's home for six months or less.

³⁸ This estimate was derived from *NIDA Statistical Series: Annual Emergency Room Data 1990*, Series I, Number 10-A, Table 2.13. Motive for drug use was not reported for 11.6 percent of the emergency room visits involving cocaine. Thus, the 63.3 percent of visits in which the motive for using cocaine was described as dependence was divided by 0.884 to account for unknown motives. This adjustment, which assumes that the response of "unknown" is distributed uniformly across those who are and those who are not dependent, results in an estimate that 72 percent are dependent.

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Divider Title: _____

**PRIMARY AND SECONDARY APPROACHES TO SUBSTANCE
ABUSE PREVENTION: WHAT WORKS AND WHY?**

**Christine Smith
Stacia Langenbahn
with
Patricia Cole
Joan Kaufman
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Abt Associates, Inc.

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EXECUTIVE SUMMARY

Substance abuse prevention efforts have changed during the last decades to include a shift from large-scale broad-based media and public education campaigns to prevention programs that are tailored to specific target groups, take place in a community context, and utilize a combination of intervention strategies.

Many of the exemplary programs described here utilize multiple intervention strategies and deliver diverse services to meet an array of participant needs. Most are community based or community oriented, seeking the input of people from a variety of fields and agencies (including business, teachers, parents, students, human services, and local government).

This collaboration and partnership building has been valuable in accurately assessing the nature of the problem of substance use in a given community and in identifying available resources to combat it. The strategic alliances of community members enable coordination of prevention endeavors while challenging community norms that tolerate substance abuse. Rather than the traditional emphasis on individuals, programs today attempt to identify multiple causes of substance use and target multiple mechanisms for change including the family, schools, and the community at large.

Overview of Prevention Field

Media Approaches

- disseminate information to educate public on dangers of substance use
- through broad-based media, as in the "just say no" campaign

Affective Skills Approaches

- build life, social and decision-making skills
- through trainings in the classroom with individual and group activities

Positive Alternatives Approaches

- provide fun alternatives to substance use
- through youth recreation centers, drug-free events, or outdoor adventure programming

Peer-based Approaches

- teach resistance skills, empower youth to create substance-free norms
- through peer-led trainings in realistic settings

Family-based Approaches

- train family members in behavior management, communication and conflict resolution skills
- through multifamily meetings with lessons for parents and children

Community-based Approaches

- mobilize entire community to overturn norms that tolerate substance use
- through collaborative partnerships of all main sectors of the community

Promising Features of Exemplary Programs

The field of substance abuse prevention has been described as being in its infancy. As such, no strategy or approach has yet been proven through rigorous scientific study to be effective in reducing substance use. However, in the absence of conclusive evaluative findings, there appears to be a consensus of experts in the field as to which prevention programs appear to be the most promising. Based on nominations of experts appearing in various reports, 19 exemplary programs are identified and described in this report. These programs share three important characteristics: they are comprehensive in approach, positive in focus, and carefully tailored to a clearly defined target population.

The comprehensiveness of the exemplary programs can be seen in the way each addresses the individual within his or her social environment -- be it among peers, within the family, cultural group, or in the broadest context of the community at large. By maintaining a positive focus on health promotion, prevention providers attempt to intervene in the broadest range of potentially negative outcomes, from school failure and teen pregnancy to violence and community deterioration, while maintaining a basic orientation on substance use. Model prevention programs empower participants to choose healthy lifestyles by training them in specific skills using techniques that are designed to appeal to them, both in terms of the age of participants and their cultural backgrounds. Program activities effectively engage participants, in part, because they are designed to embrace the cultural context of the people they serve.

Comprehensive in Approach

- addresses individual in context of environment (family, peers, culture, or community)
- provides variety of services that address the multiple domains of participants' lives
- targets multiple social problems

Positive in Focus

- fosters healthy life-styles
- avoids stigmatizing "high-risk" participants
- empowers participants through peer- or parent-led skill-building trainings
- offers services that are active, experiential, and participatory

Tailored to Target Group

- provides age appropriate services
- designs culturally sensitive interventions
- maintains flexibility in programming to meet the needs of those served

INTRODUCTION

Prevention methods and intervention strategies have undergone continual development and modification throughout the last two decades. In the 1970s, programs based on the public health model, such as broad-based media campaigns, the provision of positive alternatives to drug use, and lessons in interpersonal skills were used as singular approaches to the prevention of alcohol and drug abuse. When used in isolation, these individual strategies did not effect significant changes in behavior.¹ Thus, programs developed during the 1980s and 1990s have attempted to integrate these approaches into more comprehensive programming by utilizing traditional approaches coupled with more recently developed strategies.

Today, substance abuse prevention programs build on these traditional approaches, but incorporate more recently developed strategies such as peer education, resistance skills training, and education programming that target families rather than individuals. Thus far, these techniques appear to have produced some short-term positive effects; however, further rigorous evaluation is needed to determine whether these effects endure over time.

Perhaps the most promising recent development in the prevention field is the movement towards community-based programming which consolidates the efforts of diverse community groups interested in addressing substance abuse. Community leaders, business representatives, philanthropic organizations, human service professionals, and citizens convene to analyze a given community's needs for prevention programming and develop a coordinated plan to accomplish their shared goals.

This report briefly describes the public health model as it has influenced the development of prevention programs over time; outlines traditional approaches as well as developments which have emerged over the last decade; summarizes the designs of model or exemplary prevention programs; and identifies features that promising prevention programs share in common. The report is based on a review of the prevention literature, informal discussions with prevention practitioners and other researchers, and site visits conducted by Abt Associates staff.

THE PUBLIC HEALTH MODEL OF PREVENTION

Substance abuse prevention programs can be categorized according to the risk level of the audience to which they are targeted. The public health model assesses levels of risk or use as primary, secondary, and tertiary categories.

Primary Prevention Approaches

Primary prevention services for substance abuse are targeted towards individuals who are not perceived to be at immediate risk of using substances. Elementary school children are typically targeted; however, primary prevention services can and often do target the entire population, including both adults and youth, through the use of broadcast media. Examples include the "Just Say No" campaign, brochures on signs of drug use in children mailed to all households in the United States, and classroom programs that educate elementary school children about the dangers of drug use.

Secondary Prevention Approaches

Secondary prevention is aimed at people who are thought to be at risk for alcohol and drug use (their eventual alcohol or drug use is considered to be highly probable) or who may have already initiated use but have not become habitual users. This approach to prevention can encompass any number of strategies, depending on the characteristics of the population being targeted and the degree of perceived risk. If the target group is elementary school students identified as "high risk" based on early antisocial behavior, the strategy may be to teach basic life and interpersonal skills followed by basic information on drugs. If the target group is junior high school students who are judged to be at high risk by a school guidance counselor or other professional, the approach may be to model resistance skills useful in confronting drug-using or -selling peers.

Tertiary Prevention and the Link to Treatment

Tertiary prevention is directed towards those individuals who have initiated use and for whom habitual use is likely or has already become established. Tertiary approaches include drug and alcohol treatment and detoxification programs. Substance abuse prevention programs usually include mechanisms for referral to drug treatment services. For example, if a student is caught using drugs in the

Brattleboro, Vermont area, a member of the Leadership Project prevention program (a component of the Brattleboro school system) meets with the student and makes a referral to a local community mental health center where the student is evaluated to determine the most appropriate service or treatment. If treatment is deemed necessary, the student enters a program, and the school and Leadership Project later provides follow-up and aftercare. (See Appendix I for a more detailed description of this program.) While most prevention programs do not provide treatment services on-site, the majority of the exemplary programs identified in this report have established referral systems, should the need for residential treatment or detoxification arise.²

The approaches that have emerged in the past 20 years are often a blend of both primary and secondary prevention. Further, a wide variety of approaches have emerged that encompass a range of programs, services, and intervention methods. By way of an overview of effective prevention programming, a typology of programs has been developed (Table 1).

RECENT RESEARCH ON PREVENTION

For the most part, the prevention strategies developed in recent years have yet to be formally evaluated. At present, we cannot say with certainty "what works" in this emerging field. Instead of scientific studies that might tell us with authority which programs are most effective at preventing substance use, we must rely on the opinions of experts in the field. In fact, some experts have said that we know more about what doesn't work in prevention than what does.³

Available research seems to show that the more traditional prevention strategies have not proven to be effective in the long term. Researchers have concluded that, in order to better address the problem of substance abuse, the basic approaches need to be modified. These approaches need to either address other risk factors, such as family or environmental influences, or they need to be strengthened by adding periodic "booster" sessions.

In response to these conclusions, substance abuse prevention efforts have changed during the last decades. They have shifted from large-scale, broad-based media and public education campaigns to prevention programs that more finely target their audience, treat participants as part of a social group, and utilize a combination of

Table 1
Overview of Alcohol and Other Drug Abuse Prevention Approaches

Strategy Used	Presumed Cause Targeted	Sample Activities	When Most Effective	Limitations
Media Campaigns	Lack of knowledge about dangers of drug use	Advertising campaigns, factual information through posters, pamphlets	When used with peer, school, or family approaches	Knowledge does not always change behavior; PSA messages often too short and not shown often enough
Affective Education	Low self-esteem, poor social skills	Setting goals, defining personal values, and learning social skills	When used with family or peer approaches	Skills not specific to drug use
Alternatives Activities	Boredom and lack of activities to fill time, alienation	Youth centers, drug-free dances and celebrations, sports programs, physical adventure programs	When used with peer or family approaches	Choice of activities that are linked with alcohol or drug use
Peer Resistance Skills Training	Peer pressure	Demonstrating and practicing how to "say no" to drugs, with suggestions and comments on each practice session	When led by older peers and training moved outside classroom to "real-life" setting	May be more effective for girls than for boys
Family Training	Family management problems, social bonding	Training in communication, conflict resolution, and behavior management	With motivated families	Requires more resources to serve entire families
Community Orientation	Lack of community support for prevention efforts, community tolerance of substance use	Many services, many organizations involved	With grassroots involvement of a wide variety of community members	Requires focused coordination and resources

intervention strategies. Many of the model programs described here utilize several intervention strategies and deliver many services to their participants. (The strategies outlined in this report are summarized in Table 1 for reference.)

Traditional Approaches to Prevention

In the 1970s, prevention programs used a wide range of techniques. They produced media campaigns, sponsored alcohol- and drug-free events as positive alternatives to substance use, and worked to build the social and life skills of participants. As with resistance skills training, evaluations of these programs showed that they were not effective when only one or two strategies were used alone.⁴ However, researchers have found that many of these strategies are beneficial when they focus on specific skills for resisting drug use and when they are combined with more recent strategies.⁵

Media campaigns. In the past, traditional media campaigns often used "scare" tactics to present the negative consequences of drug and alcohol use. Such approaches appear to be ineffective. More recent campaigns present models of abstinent behavior and promote positive alternatives to drug use. Even so, any prevention program based solely on providing information does not appear to reduce or prevent substance abuse. Experts in the field agree that media campaigns should be part of more comprehensive prevention programs in order to be most effective in preventing substance abuse.⁶

Affective education. Affective education techniques include development of self-esteem, social and decision-making skills, and clarification of values. The underlying assumption of affective education techniques has been that substance abusers have a deficiency in personal and social skills and that fostering the personal development of adolescents will enrich students' lives so as to reduce their likelihood of drug use.

Although affective education can modify their participants' knowledge and attitudes towards alcohol and other drugs, it has not been proven effective in reducing actual substance use.⁷ What appears to be needed for traditional affective education to work is an added focus on specific skills that help participants abstain from substance use. More recent approaches to affective education combine previous strategies with demonstrations of techniques for resisting

peer pressure to use drugs or alcohol and opportunities to practice them.

Alternatives programming. The goal of these programs is to provide young people with healthy alternatives to substance use. The assumption behind the alternatives approach is that if young people were provided with alternatives to drug taking that were equally appealing, they would take advantage of them. To do this, both schools and community centers usually sponsor drug- and alcohol-free social and recreational activities.⁸ A potential danger in this approach occurs when prevention programmers unintentionally choose activities that may actually be linked with drinking or drug taking. For example, while sports events can provide a fun, active alternative to parties, drinking may be part of the tradition surrounding these events.

Alternatives programs are meant to counter boredom, alienation, and lack of structured time and supervision. However, the causes of substance abuse are more complex. Alternative activities, while helping create an adolescent culture which does not encourage drug and alcohol use, may need to be combined with other strategies to be effective in preventing substance abuse.

More Recent Approaches

Programs developed during the 1980s and 1990s have modified traditional approaches by adding new strategies. These include *resistance skills training*, where children are shown how to "say no" to drugs and alcohol (often by older adolescents); *family training*, to aid parents and their families to create organized households and improve communication and establish appropriate roles for the parent and the child; and *community collaboration*, where a variety of community groups collaborate and coordinate their efforts to stop alcohol and other drug abuse in their community. A program that incorporates a combination of prevention strategies and approaches is more likely to successfully address the combination of environmental, psychosocial, cultural, and familial factors that contribute to alcohol and drug abuse.

Peer resistance skills training. This approach to prevention aims at combatting a long-recognized risk factor for adolescent substance use: peer pressure. Experts generally agree that children whose friends have used drugs or who approve of drug use are more likely to use drugs themselves.⁹ One traditional approach to

training children to resist peer pressure has been conducted in schools for several years now. DARE is an example of this type of program. Formal evaluations have shown that these standard training programs have enjoyed only "limited" success in preventing alcohol and marijuana use.¹⁰ Researchers have found that the influence these programs have on their participants is short-lived. In the few studies that have examined the effects of these programs two years after completion, participants appeared to be equally as likely to have experimented with cigarettes, alcohol, or marijuana as other children who had not participated in the programs.¹¹

More recent peer resistance programs have been modified in an effort to increase their effectiveness. Trainers continue to demonstrate ways to handle the situations and confrontations that are likely to occur around drug use, as well as to use role play to allow participants to act out scenarios in which they might be pressured to use drugs or alcohol, and so develop and hone their refusal skills. These programs are beginning to use peers as trainers; rather than school counselors, law enforcement officials, or teachers. Prevention providers have come to believe that youth are generally more open to receiving information and training (especially regarding alcohol and drug use) from their peers than from authority figures. So an emerging part of peer resistance skills programs is the training of peer leaders who can then teach these same skills to younger children.¹²

Family training. Although peer groups influence young people, families remain the strongest force in children's lives. Family training programs aim to educate parents on their role as "the primary prevention agents for their own children."¹³ Specific family problems, such as lack of cohesion in the family, lack of structure provided to children, and poor or negative communication patterns among family members, can also be associated with adolescent substance use. Prevention programs that are family based are therefore designed to encourage positive role modelling, family cohesion, and healthy parent-child interactions.

Traditionally, family-based programs have focused on training parents in behavior management and communication skills. Parents learned the signs and causes of drug and gang involvement as well as basic child development. They have also offered techniques for resolving conflicts and for allowing children to experience the logical consequences of their misbehavior.

More recent family programs also incorporate family therapy principles that help to define family boundaries, establish routine and order within the family, and clarify family roles (for example, empowering parents to be authority figures while freeing children from excessive responsibility). These programs support healthy family relationships by building the self-esteem of both parents and children.

Evaluations of these family training programs show they have improved family cohesion and children's behavior -- two factors contributing to adolescent substance use.¹⁴ Also, one evaluation of a preschool program demonstrated long-term improvement in other areas; such as juvenile delinquency, teen pregnancy, and high school dropout rates.¹⁵ Long-term studies to establish a direct effect on substance use have begun, but the results will not be available for some time.

Community orientation. One of the best ways to deal with the many factors that contribute to drug use is to involve members from throughout the community in drug prevention efforts. The most successful substance abuse prevention programs seek the input of people from a variety of fields and agencies (including community leaders, business executives, human service professionals, local government officials, teachers, parents, and students). Such groups can gauge the unique needs of their community, agree on a plan to meet those needs, and identify resources to combat the problem. The very existence of a strategic alliance of leaders devoted to solving the drug problem in their community challenges local attitudes that tolerate substance abuse.

In minority communities, successful prevention programs also deal specifically with the dynamics of drug use in their culture. These multicultural programs also promote cultural understanding and pride in one's heritage. In addition, many urban programs work to organize the community and to develop economic opportunities.

Promising Features of Model Prevention Programs¹⁶

Although not all of the model programs are community based, each addresses individuals within their social environment. This comprehensive approach to prevention enables programs to confront many interrelated social problems -- from school failure and teen pregnancy to violence and community deterioration -- in addition to alcohol and other drug use.

Another way model programs attack multiple social problems is by maintaining a positive focus. By emphasizing healthy life-styles rather than the negative consequences of unhealthy behavior, prevention programs check the development of many social ills. Part of this positive approach includes focusing on learning skills rather than fixing people with problems. This encourages more even-handed treatment of both high- and low-risk participants in the program.

By allowing clients to participate actively in learning skills rather than passively receiving information, prevention programs can empower their clients. An example of this can be found in the peer resistance programs discussed earlier when they encourage participants to recognize and share the skills they have mastered with other children.

As one researcher noted, there is no single cure for preventing alcohol and drug use that works for all kinds of people.¹⁷ Therefore, in order to best serve their clients, model programs carefully tailor their interventions to the participant's age and cultural background.

Profiles of Model Prevention Programs

Identification of Model Programs. The model programs profiled here were selected based on the recommendations of several sources. The most recent edition of the OSAP (Office of Substance Abuse Prevention) report that annually commends 10 alcohol and other drug prevention programs was the main source consulted.¹⁸ Two additional sources were a published report by the Government Accounting Office (GAO) on "promising" adolescent drug use prevention programs¹⁹ and an unpublished report on youth self-sufficiency programs funded by the Administration of Children and Families.²⁰ Recommendations of experts in the field were also solicited in telephone interviews, and a few model programs were identified through a literature review.

Researchers from Abt Associates Inc. visited 19 of these model programs to directly observe program operations.²¹ These programs were chosen to represent a diversity of rural and urban locations, racial and ethnic populations, and types of services provided.²²

In the discussion that follows, the model programs are organized according to the social group the program targets; such as schools, peer groups, families, cultural groups, and communities.

School-based programs. In the past, schools have typically attempted to prevent substance use simply by teaching students about the harmful effects of drug use. Studies that evaluated these programs found that they were ineffective in preventing substance use.²³ In fact, there is some evidence that teaching students about how drugs can make them feel might inadvertently "advertise" the use of drugs, and actually increase students' drug use.²⁴ Based on these findings, prevention providers have redesigned their programs to teach students specific lessons on how to resist drug use as well as valuable life skills.

Prevention providers often work with school personnel to identify children in need of services. A student with certain behavior problems in the classroom or social problems with other students may have a family member with a substance abuse problem. By working with the schools, prevention programs can intervene at the first signs of trouble, before a student becomes involved with drugs or alcohol. Table 2 describes several features of two school-based programs including how the programs are organized, staffed, and funded. The table also summarizes the range of services provided as well as how the prevention programs are linked to other organizations (especially drug treatment agencies) in their communities.

The first model program presented in Table 2 is Early Drug Abuse Prevention (EDAP) of Montpelier, Vermont.²⁵ EDAP provides support groups to fifth through eighth grade children. The support groups are composed of both high- and low-risk youth. It is hoped that healthy adolescents can influence peers who are more at risk through the bonds formed in structured support groups. The goals of the groups are to improve self-esteem and to learn basic life and interpersonal skills including problem solving, self-expression, and stress management.

Stress management is the principal aim of the Preschool Stress Relief Project²⁶ in Atlanta, Georgia as well. This program serves children in preschool in the belief that substance use can best be prevented by targeting precursors to alcohol and other drug use as early as possible. This approach is based on studies that have shown that elementary school children who lack the normal sense of attachment to schools and family, or who have shown signs of antisocial behavior or unusual levels of stress are more likely to use substances during their adolescence. The program seeks to reduce the risk of later substance use by teaching Head Start students, parents, and teachers to recognize the effects of stress and to

Table 2

Model School-Based Prevention Programs

SITE	Early Drug Abuse Prevention (EDAP), Montpelier, Vermont¹	Preschool Stress Relief Project (PSRP), Atlanta, Georgia¹
CENTRAL FEATURES/ CHARACTERISTICS	Community-based program that provides youth with support groups and life and social skills building that will empower them to make healthy choices about alcohol and drug use.	A primary prevention training and consultation program for high-risk students, teachers, and parents on stress management, PSRP aims to promote healthy life-style choices through education, recognition and reduction of stress, and self-esteem and coping skills building.
STRATEGIES EMPLOYED	Life and social skills training, self-esteem building, and communication skills	Self-esteem building, coping skills training, training on the effects of stress
TARGET GROUP	Program targets both low- and high-risk youth and families.	Metropolitan Atlanta's Head Start students and their teachers.
ORGANIZATION	EDAP is part of the Washington County Youth Service Bureau.	PSRP shares a board of directors with its new sponsor, the Holistic Stress Control Institute (it was formerly sponsored by the National Council of Negro Women, Inc.).
STAFF/FUNDING	Funding: State & Federal monies through the Department of Education.	Staff: four, including a parent trainer. Funding: program funded solely by OSAP.
RANGE OF SERVICES	Educational in-school support groups for youth are led by school staff, trained high school students, or trained facilitators from the outside. Support groups last for 12 weeks and include skill building, support, and informing youth of available community resources.	Trainings, workshops, and the dissemination of culturally sensitive education materials to teachers, high-risk youth, and parents on stress management and the relationship between stress and substance abuse

Table 2

Model School-Based Prevention Programs

SITE	Early Drug Abuse Prevention (EDAP), Montpelier, Vermont¹	Preschool Stress Relief Project (PSRP), Atlanta, Georgia¹
LINKAGE TO TREATMENT, OTHER ORGANIZATIONS	Referrals and resource system in place	PSRP has a referral and resource guide for parents or teachers; PSRP maintains linkages with programs in and outside the city.
EVALUATION ACTIVITIES	Pre- and post-program comparisons showed that participants significantly improved their self-esteem and classroom conduct.	PSRP was evaluated during 1987 through 1989; a process and outcome evaluation was begun last year.

¹ Source: OSAP, "Communities Creating Change: Exemplary Alcohol and Other Drug Prevention Programs," 1990.

manage stress through relaxation techniques. The program has been so successful that Head Start plans to expand the program into its Family Service Centers across the country.

Although there are many advantages to focussing prevention efforts in the schools, there are limitations to this setting. While school-based programs can provide a captive audience for drug prevention, they may not reach the students most at risk because these students may be absent or truant more often than others. In addition, students rarely encounter pressure to use drugs within the classroom. Young people need to practice resistance skills in a setting that is more similar to the ones in which they actually face peer pressure to use drugs. The best school-based programs offer students that opportunity by conducting practice sessions outside the classroom.

Peer-based programs. As children reach adolescence, they look more and more to their peers as they decide what is permissible and desirable, including decisions about drug and alcohol use. Peer-based programs use the power of peer groups to help adolescents comprehend the consequences of alcohol and drug use. Peer support groups foster frank discussions of the pressures facing adolescents and suggest healthy ways to deal with them. Finally, these groups promote peer support of abstinence, creating an alternative peer culture which does not condone substance use. Many programs foster this positive peer culture even more by enabling adolescents to train other children in how to resist pressures to use alcohol and drugs. By encouraging participants to become leaders among their peers, these programs also enhance the self-esteem of their young trainers. (Table 3 describes nine model peer-based programs discussed below.)

Four of the model programs listed here employ peer-led education in their prevention strategies. Alternatives for Teens joins adults and teens together to plan alternative events. The Substance Abuse Prevention Project trains students to implement drug prevention projects in their schools. The Madison Square Boys and Girls Club and the Peer Counseling Project teach participants how to conduct prevention programs in a community the teens select.

The Alternatives for Teens²⁷ program sponsors support groups that meet in Vermont schools to discuss alcohol and drug use issues. In addition, the program provides positive alternatives to alcohol and other drug use. The Alternatives for Teens program has a strong peer leadership component: youths devise their own agendas for the

Table 3

Model Peer-Based Prevention Programs

SITE	Alternatives for Teens (AFT), Middlebury, Vermont¹	Substance Abuse Prevention Project, Caribou, Maine¹	Madison Square Boys and Girls Club, New York New York²
CENTRAL FEATURES/ CHARACTERISTICS	Provides peer-driven groups to discuss issues and build skills in a safe environment with an outside facilitator not connected with the school or criminal justice system, also provide youth with positive alternatives to alcohol and drug use	Program based on the belief that vast representation of a community that includes businesses, schools, grass roots organizations, and human service providers is needed to combat substance abuse	Through five clubhouses located in the Bronx, Brooklyn, and Manhattan, this program centers on youth empowerment and group leadership development.
STRATEGIES EMPLOYED	Listening and empathy skills, communication building, social and life skills training	Refusal skills training, self-esteem building, communication skills, peer-to-peer education, and alternative events	Social, life, and communication skills training; self-esteem enhancement
TARGET GROUP	Area youth between ages of 12-18 in Addison County	Youth aged 5-19 and their families in two communities in Caribou, Maine	New York City youths aged 13-17
ORGANIZATION	Sponsored by the Addison County Parent/Child Center, shares board of directors with Center	Prevention Project has advisory committee and is sponsored by the Aroostock Mental Health Center; other community organizations co-sponsor events and programming.	Part of the national Boys and Girls Clubs network, the Madison Square Club encourages participants to enjoy other club activities, including academic services, job development, physical activities, and counseling
STAFF/FUNDING	Staff: one counselor/facilitator as primary staff person, supervision provided by Parent/Child Center Funding: no State or Federal money presently; area schools, businesses, organizations	Program has been scaled down considerably since 1990 due to funding cuts.	Staff: Each clubhouse maintains its own staff (program overseen by project director) Funding: primarily from United Way, local and State government, and private sources. Annual budget for all five sites is approximately \$175,000.

Table 3

Model Peer-Based Prevention Programs

SITE	Alternatives for Teens (AFT), Middlebury, Vermont ¹	Substance Abuse Prevention Project, Caribou, Maine ¹	Madison Square Boys and Girls Club, New York New York ²
RANGE OF SERVICES	Weekly discussion groups with students from 7th to 12th grade (agenda items are primarily peer-driven); alcohol and drug-free alternatives to graduation parties, sports victories, etc.; physical outdoor adventure programs.	Aroostock Teen Leadership Camp, a peer-led camp instructing ways to end substance abuse; the Buddy System Program, which matches teenagers with elementary students for purposes of role modeling, providing positive relationships among age groups, and building communication skills among teens and children; peer education programs; trainings for youth service providers, families, and parents	Substance abuse programming includes an initial 10-session workshop that emphasizes decision making, values clarification, and the consequences of alcohol and drug use. After completion of the sessions, youth then pick a community, assess its drug problem, and develop a drug-free campaign (such as psa's, presentations, rallies, etc.) for that community.
LINKAGE TO TREATMENT, OTHER ORGANIZATIONS	Linkage with local community mental health center, referrals for treatment, although there is a shortage of treatment resources including beds and counseling, lengthy waiting lists	Program sponsored by a community mental health agency with links to treatment providers, operates under a community partnership model.	No information available.
EVALUATION ACTIVITIES	No evaluation to date, outcome evaluation of 12 case studies performed in-house in 1987. While AFT is committed to conducting a formal evaluation, no plans are underway given budget restrictions.	Information not available.	No information available.

¹ Source: OSAP, "Communities Creating Change: Exemplary Alcohol and Other Drug Prevention Programs," 1990.

² Source: GAO, *Adolescent Drug Use Prevention: Common Features of Promising Community Programs*, 1992.

Table 3

Model Peer-Based Prevention Programs

SITE	Peer Counseling Project (PCP), Washington, D.C. ¹	The Leadership Project (LP), Westminster, Vermont ²	Twelve Together Detroit, Michigan ¹
CENTRAL FEATURES/ CHARACTERISTICS	PCP trains students to become peer leaders who will conduct outreach to other youth on alcohol prevention. PCP believes that it is successful because it is peer-led and youth oriented.	This program stresses adult-youth partnerships through programming that targets both area youth and adults and seeks to change community norms that tolerate alcohol and drug abuse.	As part of the Metropolitan Detroit Youth Foundation, Twelve Together is a peer counseling program whose main goal is to prevent high school students from dropping out of school. However, drug prevention is addressed as one in a combination of factors that cause students to drop out of school.
STRATEGIES EMPLOYED	Peer counseling and crisis intervention	Communication skills, life and social skills training, peer resistance skills training, self-esteem enhancement	Peer counseling groups
TARGET GROUP	Area youth, predominantly Hispanic	Area youth and adults	Target population is area youth in the 9th grade.
ORGANIZATION	The Peer Counseling Project is sponsored by the Latin American Youth Center (LAYC). Youth recruited through PCP often take advantage of other services offered by the sponsoring agency.	LP under auspices of Project Adventure, shares board of directors, has distinct advisory board.	Twelve Together is sponsored by the Metropolitan Detroit Youth Foundation.
STAFF/FUNDING	Staff: One official staff person, approximately six peer counselors	Staff: Coordinator of Prevention Services; LP Teams, consisting of adults and youth; volunteers Funding: OSAP (Community Partnership grant), State area schools, private sources	Staff: Four outreach counselors, and three administrators, plus volunteer group facilitators Funding: HHS and local businesses

Table 3

Model Peer-Based Prevention Programs

SITE	Peer Counseling Project (PCP), Washington, D.C. ¹	The Leadership Project (LP), Westminster, Vermont ²	Twelve Together Detroit, Michigan ¹
RANGE OF SERVICES	Peer leaders are trained in prevention, treatment resources, and other social issues including AIDS, suicidality, family problems, etc. These youth (called "amigos") then train other youth on drug prevention. Latin American Youth Center also provides a host of other services to youth such as counseling, tutoring, job training, and alternative activities.	Weekly discussion groups among students within schools; meetings with youth and police, teachers, parents, and other adults; peer-to-peer training; community-wide awareness activities/events	Peer counseling groups meet weekly for one year and discuss a range of topics including school, families, drug use, suicidality, sexuality, sexual abuse, and communication skills; Twelve Together groups also attend weekend retreats; ancillary services include job development, academic programming, and parent-peer support groups.
LINKAGE TO TREATMENT, OTHER ORGANIZATIONS	Amigos are trained in community treatment options so that they can provide referrals.	Referral system with linkages to treatment facilities and professional counseling services	Schools assist with recruitment; businesses provide financial and in-kind support.
EVALUATION ACTIVITIES	No formal evaluations performed to date. LAYC is interested in having formal studies conducted if funds can be procured for that purpose.	Process and outcome evaluation to date, LP committed to conducting further evaluation at all levels.	An outside evaluator conducted a study looking at graduation rates, increases in academic performance, and improvements in interpersonal skills. The evaluation showed the program had a positive effect on participants.

¹ Source: CSR, "Identification of "Best Practices" of OHSD's Youth-Related Demonstration Projects," 1991.

² Source: OSAP, "Communities Creating Change: Exemplary Alcohol and Other Drug Prevention Programs," 1990.

Table 3

Model Peer-Based Prevention Programs

SITE	SMART Moves, Pittsburgh, Pennsylvania ¹	American Variety Theatre Company (AVTC), Minneapolis, Minnesota ²	Adventure Alternatives Program, Austin, Texas ²
CENTRAL FEATURES/ CHARACTERISTICS	As part of the Boys and Girls Clubs of America, SMART Moves' prevention program targets a number of problems facing youth, including drug use and teen pregnancy, through a standardized curriculum being implemented throughout the country.	The performing arts are the foundation of AVTC. Dramatizations of current social issues, including the dangers of drugs and alcohol, are performed by youth for family and friends. The performances provide youth and their audiences with a forum to discuss difficult issues.	Adventure Alternatives strives to promote positive interactions between youth and adults and to increase youth's ability to express themselves through experiential learning, physical adventure activities, and a variety of services for youth and adults.
STRATEGIES EMPLOYED	Communication skill building, social and life skills development, resistance skills training, information dissemination, alternative activities, programs for parents and other caretakers	Alternative activities, social and life skills training, self-esteem building, communication skills, decision-making skills, peer leadership	Social and life skills, communication skills building, alternative activities, family training
TARGET GROUP	Area high-risk youth, aged 9-15	Area youth, aged 4-21, mostly from the distressed urban neighborhood where AVTC is located	Services provided to area youth (aged 9-17) and adults, both primarily male and white (55 percent white, 29 percent Hispanic, 16 percent African-American)
ORGANIZATION	SMART Moves is sponsored by the Boys and Girls Clubs of America, a nationwide organization; supervision and development is provided by the Boys and Girls Club.	Part of the Minnesota Extension Service of Hennepin County	The sponsor, Austin Wilderness Counseling Services, has a 12-member board of directors.
STAFF/FUNDING	Staff: 14 staff, 70 volunteers Funding: United Way, with additional monies from other private sources	Staff: Six staff Funding: Local government, businesses, performance earnings	Staff: Adventure Alternatives has a staff of 22. Funding: Federal, State and county government, as well as private sources and client fees; budget for 1990-1991 was \$472,000.

Table 3

Model Peer-Based Prevention Programs

SITE	SMART Moves, Pittsburgh, Pennsylvania ¹	American Variety Theatre Company (AVTC), Minneapolis, Minnesota ²	Adventure Alternatives Program, Austin, Texas ²
RANGE OF SERVICES	SMART Moves has a standard curriculum with components for various age groups focusing on drug use and other social issues. Components include a resistance skills program for youth aged 9–12, a social and life skills program incorporating resistance skills and stress reduction techniques for youth aged 13–15, and training curricula for parents, peer leaders, and volunteers.	Peer education: Youth Teaching Youth, a peer-to-peer drug and alcohol awareness/prevention program that older youth teaches to 4th–6th grade students; stage productions on drug and alcohol use and other social issues of concern to the community; role modeling on nondrug-using behaviors. Preparations for the performances teach a variety of life skills and offer participants an overall sense of competency.	School-based programming for children of drug-using parents, educational support groups for parents and youth that strive to improve family communication, counseling for youths, adventure activities that include trips to wilderness areas and outdoor challenges.
LINKAGE TO TREATMENT, OTHER ORGANIZATIONS	Referral system with linkages to treatment providers	Established referral network in place for those suspected of alcohol or drug abuse, collaborate with other youth service organizations	Linkage has been established with treatment resources in community; also, teachers make referrals to AA program if they identify an appropriate student.
EVALUATION ACTIVITIES	Program monitoring is the only current evaluative activity. A formal outcome evaluation has shown that SMART Moves programs were effective in reducing drug dealing and the presence of crack in public housing communities.	No formal evaluation planned.	The University of Texas provides evaluation services.

¹ Source: OSAP, "Communities Creating Change: Exemplary Alcohol and Other Drug Prevention Programs," 1990.

² Source: GAO, *Adolescent Drug Use Prevention: Common Features of Prevention Programs*, 1992.

discussion groups and plan alternative events such as substance-free prom nights and fitness-oriented field trips.

The Substance Abuse Prevention Project in Caribou, Maine²⁸ also uses group outdoor experiences as a way to prevent substance use among the children they serve. For example, Teen Leadership is a week-long summer camp program focusing on drug awareness and leadership training. Participants learn how to avoid using alcohol and drugs and how to lead other children in prevention activities within their own schools. Staff also teach interpersonal and resistance skills in area schools as well as teaching parents how to recognize the signs of substance use, what the negative consequences of substance abuse are, and how to help their children cope with the pressures of growing up.

The Madison Square Boys and Girls Club²⁹ is a peer-based program that serves New York City youth in the Bronx, Brooklyn, and Manhattan. It offers workshops which train participants in decision-making and interpersonal skills, help them develop healthy values, and teach them about the consequences of alcohol and drug use. Participants then select a community, determine where its drug problems lie, and design media campaigns and other presentations to inform the members of that community about substance use. Additional services provided by the club include sports and other alcohol- and drug-free activities, academic tutoring, job development, and psychological counseling.

Similarly, the Peer Counseling Project,³⁰ prepares Hispanic youth in Washington, D.C. to become peer leaders. Participants organize discussion groups around issues of concern to them, such as drug use, AIDS, suicide, and family problems. These teen leaders then conduct prevention programs for younger children. The Latin American Youth Center which sponsors the project provides additional services such as counseling, tutoring, job training, and alternative activities.

Other model programs focus primarily on developing resistance skills. The Leadership Project and Twelve Together teach resistance skills in peer support groups, while the SMART Moves program uses a standard curriculum that will soon be taught in Boys and Girls Clubs across the country.

Under the Leadership Project,³¹ peer support groups meet in Vermont schools to discuss drug and alcohol use. These groups train

youth in resistance skills as well as more general interpersonal skills. The Leadership Project also fosters communication between teens and adults by bringing them together to discuss common issues and conflicts. The Leadership Project also teams up adults with teens to organize alternative activities and other community events.

Twelve Together³² aims to help troubled adolescents stay in school and graduate from Detroit high schools. The program's approach centers on peer support groups composed of a group of up to 12 ninth graders, led by adult volunteers. These support groups address the full range of social and academic challenges faced by students. Included are drug use by family members, the drug culture students may encounter in their neighborhoods, issues of physical and sexual abuse, and other stresses. In addition, Twelve Together provides academic tutoring, job development, and parent support groups.

The SMART Moves program³³ focuses specifically on promoting abstinence from alcohol and drug use and from adolescent sexual involvement, through resistance skills training and health education. In order to target a particularly vulnerable group, the Boys and Girls Clubs have established chapters in public housing developments. A scientific evaluation found that the program helped to reduce alcohol and other drug use, drug trafficking and other drug-related criminal activity, and the presence of crack in the public housing developments they served.³⁴ Boys and Girls Clubs across the country plan to establish SMART Moves programs in the near future.

While resistance skills training is the primary focus of the peer-based programs discussed above, still other programs use the expressive arts or outdoor adventure as vehicles for preventing substance use among young people. The American Variety Theatre Company of Minneapolis³⁵ is an informal school in the performing arts that provides urban youth with positive alternatives to alcohol and other drug use. While performances often touch on the consequences of substance abuse, the focus of the program also encompasses the broader diversity of issues--from running away to gang violence to environmental destruction--that concern today's urban youth. In addition, its Youth Teaching Youth program trains high school students to teach elementary and junior high school students the dangers of alcohol and drug use, refusal skills, and positive alternatives.

The Adventure Alternatives program in Austin, Texas,³⁶ provides a unique mix of therapeutic groups and physically challenging outdoor activities to children from the ages of 9 to 17. Local school teachers and counselors identify children who seem likely to use substances and refer them to the program. In addition to the outdoor activities, Adventure Alternatives provides more traditional individual and group psychotherapy as well as family training. By combining experience-based as well as traditional psychotherapy, the program creates a safe environment that enables participants to express themselves constructively instead of taking drugs.

Family-based programs. Prevention programs that focus their attention on the entire family rather than on the child alone reinforce the key role parents can play in preventing their children from using drugs and alcohol. At the same time, these programs can also bring to light substance abuse by parents, teaching both parents and their children how parental behavior can influence their children's welfare. Specifically, children whose parents abuse substances may be more likely to grow up to abuse substances as well. For example, children of alcoholics may be as much as four to five times more likely to become alcoholic as other children.³⁷ This may also be true for marijuana and other illicit drug use. Strife and disorder within the family may also be related to adolescent substance use, and these factors can also be addressed by family-based programs.³⁸

Families and Schools Together (FAST)³⁹ is a model prevention program that seeks to prevent substance abuse by improving family functioning. During weekly meetings that include all the members of several families, the FAST program offers something to both parents and children. First, parents are given a chance to support each other during "Buddy Time," when the children are cared for in another room. Then the at-risk child is given "Special Play" (based on supportive play therapy techniques), a time when the parent devotes full attention to the child. Someone from the local alcohol and drug abuse agency is on hand at all meetings for informal consultations with family members of all ages. The FAST program's blend of family training, child self-esteem building, and parent support groups has proven so effective and popular that the Wisconsin legislature allocated funds that enabled FAST programs to be established in schools statewide. As of this writing, FAST programs are being conducted in over 70 schools across six States (see Table 4).

Table 4

Model Family-Based Prevention Program

SITE	Families and Schools Together (FAST), Madison, Wisconsin¹
CENTRAL FEATURES/ CHARACTERISTICS	Through a combination of family and parenting training, parent support groups, and community collaboration, FAST empowers families to face the many stressors in their lives. FAST seeks to foster healthy children and families by addressing the multiple factors that contribute to alcohol and drug use.
STRATEGIES EMPLOYED	Family training, social and life skills training, self-esteem building, family communication skills
TARGET GROUP	At-risk area school children aged 5 to 9 and their families
ORGANIZATION	Statewide replication is overseen by Family Services, Inc., a nonprofit mental health agency, through training, technical assistance, and certification of all sites
STAFF/FUNDING	Staff: Over 70 sites in six States have four staff members each, one from each collaborative partner Funding: State and Federal including the Drug-Free Schools Act and Head Start, as well as private sources such as the United Way.

Table 4

Model Family-Based Prevention Program

SITE	Families and Schools Together (FAST), Madison, Wisconsin¹
RANGE OF SERVICES	Multifamily meetings with the same agenda each week. Free meals, transportation and child care are provided for the entire family. Parents are given "Buddy Time," without the presence of children, designed to decrease isolation by building support among parents. The at-risk child is then given Special Play (based on play therapy techniques), a time when the parent devotes full attention to the child.
LINKAGE TO TREATMENT, OTHER ORGANIZATIONS	Collaboration between schools, parents, mental health, and treatment providers is integral to the program design.
EVALUATION ACTIVITIES	Strong evaluation study shows significant behavioral improvements at home and in the classroom by high-risk children, as well as improvement in family relationships.

¹ Source: OSAP, "Communities Creating Change: Exemplary Alcohol and Other Drug Prevention Programs," 1990.

Community-based programs. Community-based programs try to prevent substance abuse within the broader context of the community. These programs address the tolerant attitudes or difficult conditions in a community that can promote substance abuse. Programs that focus their efforts on changing common attitudes that accept substance use typically target their interventions to a large, geographically defined community. Other programs, those that see substance use as but one of a host of challenges facing their community, usually target their efforts to members of their cultural group or inner city area. Table 5 describes seven unique community-based programs of both types.

Community-based programs that primarily address tolerant attitudes often focus on providing information on the dangers of drug use and teaching communication and resistance skills. They also seek to deliver positive messages and images about drug-free life-styles.

This approach, developed by Mary Ann Pentz and her colleagues, has been successful in several midwestern projects, such as Project STAR (Students Taught Awareness and Resistance) which covers 15 communities in the Kansas City metropolitan area. The Project seeks to involve all key community systems that influence the attitudes and values of youth: family, media, workplace, and schools. All Kansas City school districts participate in the project, and ongoing teacher training works to maintain consistent messages about drug use.

Formal evaluation of Project STAR has indicated its success.⁴⁰ However, one limitation to using Project STAR as a model for other communities is that it has been developed and applied primarily in midwestern communities. The program is currently being established in at least 17 schools in Washington, D.C. Given the very different cultural and geographic make-up of that community, monitoring success in the D.C. area may answer any questions regarding the approach's applicability outside of the Midwest.

The Community Organizing for Prevention⁴¹ is another community-based program of this type. It is even broader in scale, with programs across the state of Nebraska. Beyond the training of community teams, the program has developed distinct training models for youth, parents, and teachers. In addition to their work in mobilizing the community of Lincoln, program staff offer training and technical assistance to other Nebraska communities interested in forming community task forces of their own.

Table 5

Model Community-Based Prevention Programs

SITE	Students Taught Awareness and Resistance, Kansas City, Kansas and Missouri ¹	Community Organizing for Prevention, Lincoln, Nebraska ²	Jackie Robinson Center for Physical Culture, Brooklyn, New York ³
CENTRAL FEATURES/CHARACTERISTICS	STAR seeks to reduce drug and alcohol use through a standardized school-based curricula including homework for families to explore attitudes and behaviors relating to drug use.	Program seeks to develop and support statewide networks of community partnerships, substance-free youth groups, parent educators, and peer leaders throughout the state of Nebraska.	Community-oriented program offering an array of services designed to promote solid decision making and healthy choices around alcohol and drug use, staying in school, and attaining fulfilling careers
STRATEGIES EMPLOYED	Resistance skills, communication skills, and social skills training, role playing, media coverage of the drug problem and the prevention program	Community task forces, alternative activities, training members of other communities through a statewide information and support network	Alternative activities, academic tutoring, discussion groups, community events
TARGET GROUP	Middle and high school youth, their parents, and their community	Communities in rural Nebraska; teachers, parents, students	Programming for area youth, predominantly African-Americans aged 8-18
ORGANIZATION	Project STAR is run by a nonprofit foundation.	Part of the Alcoholism and Drug Abuse Council of Nebraska (ADACN), shares board of directors with ADACN	The Jackie Robinson Center is a large organization that sponsors its own programming; there is a board of directors that includes a congressional representative and members of the business and professional communities.
STAFF/FUNDING	Staff: 10 staff as well as administrative support from the foundation Funding: Federal, foundation, and private donations	Staff: eight full-time Funding: State, Federal (OSAP, Youth Activities Block Grant, Department of Education), private donations, and fees from retreats	Staff: The Center employs approximately 350 full- and part-time staff. Funding: State funding is supplemented by the Ford Foundation. Annual budget for 1990 was \$2.15 million, with 3,658 youths served.

Table 5

Model Community-Based Prevention Programs

SITE	Students Taught Awareness and Resistance, Kansas City, Kansas and Missouri¹	Community Organizing for Prevention, Lincoln, Nebraska²	Jackie Robinson Center for Physical Culture, Brooklyn, New York³
RANGE OF SERVICES	Resistance skills training delivered in all middle and high schools, standardized curricula and training for teachers delivering the prevention program	Teams of youth, parents, and teachers trained through retreats that include educational and team building sessions, information on community resources, and family group sessions; also serves as statewide clearinghouse of resources for other communities throughout Nebraska	Programming ranges for recreational and sporting events to academic support. Educational activities consist of tutoring and classes in basic skills; counseling activities consist of individual counseling, discussion groups, and in-service trainings on a variety of health and social issues.
LINKAGE TO TREATMENT, OTHER ORGANIZATIONS	All school districts have participated with select teachers receiving training in the STAR curriculum; local business support for the program	Maintains statewide clearinghouse which contains information relating to treatment facilities and other available resources, operates under a community partnership model	Referral networks with treatment facilities exist, and crisis intervention is provided on site.
EVALUATION ACTIVITIES	Randomized cross-sectional and longitudinal surveys of students and parents on drug use risk behaviors, drug availability, and community norms for drug use, and interviews with families and community members; initial research showed a decline in program participants beginning alcohol use as compared to nonparticipants.	COP has had process, impact, and outcome evaluations performed on the programs.	No information available.

¹ Source: Literature review

² Source: OSAP, "Communities Creating Change: Exemplary Alcohol and Other Drug Prevention Programs," 1990.

³ Source: GAO, *Adolescent Drug Use Prevention: Common Features of Prevention Programs*, 1992.

Table 5

Model Community-Based Prevention Programs

SITE	Northside Opportunities Project, Youth Emergency Services, St. Louis, Missouri ¹	Fulfilling Our Responsibility Unto Mankind (FORUM), Chicago, Illinois ²	Addison Terrace Learning Center (ATLC), Pittsburgh, Pennsylvania ³
CENTRAL FEATURES/ CHARACTERISTICS	The Northside Opportunities Project (NOP) developed the "I Believe in Me" workshop, targeting African-American youth, as well as other services designed to increase minority participation and relevance to minorities.	FORUM seeks to foster human, community, and economic development in its inner-city target area of South Side Chicago. Community-based prevention and education programs through community training, public awareness events, and prevention programs in the schools and community.	Program uses multicultural model that emphasizes self-enhancement/empowerment through efforts aimed at increasing cultural identity and pride. ATLC believes this will lead to a greater sense of community and more positive and healthy individual choices concerning alcohol and drug use.
STRATEGIES EMPLOYED	Affective social skills training	Life and social skills training; refusal skills training; family training; organizing neighborhood block clubs, community parades, and events	Alternative activities, self-esteem building, affective education techniques, information dissemination, case management
TARGET GROUP	At-risk youth and their families	Low- and moderate-income African-American youth and inner-city families in South Side Chicago area	Area youth, primarily African-American aged 5-21 and their families
ORGANIZATION	Youth Emergency Services is the parent organization for NOP.	12-member board of directors made up of staff and community members	ATLC is run independently and is not governed by any other agency; volunteers are used in several different capacities.
STAFF/FUNDING	Staff: one Project Director, staff from YES available to help run events and workshops Funding: HHS	Staff: eight full-time staff, two administrative assistants, many volunteers Funding: through State and private donations, annual budget \$330,000	Staff: 12 staff members Funding: largely funded by the United Way, with additional monies from Federal, local, and county agencies and private contributions and donations

Table 5

Model Community-Based Prevention Programs

SITE	Northside Opportunities Project, Youth Emergency Services, St. Louis, Missouri¹	Fulfilling Our Responsibility Unto Mankind (FORUM), Chicago, Illinois²	Addison Terrace Learning Center (ATLC), Pittsburgh, Pennsylvania³
RANGE OF SERVICES	A broad range of services are provided, including individual and family counseling, job development and training, a youth shelter, self-esteem building activities, workshops and trainings. One workshop ("I Believe in Me") is used extensively in the community as a means of outreach and self-esteem building for African-American youth.	Don't Hang with Gangs prevention and intervention program provides education on human interpersonal and community relations to combat a variety of social problems including drugs, gangs, and violence. Effective Black Parenting classes offered. Student Assistance Programs promote economic development while providing positive alternatives to substance use.	Wide range of programming, activities, and events: support groups for co-dependent or single-parent women; parenting classes for high school students; youth groups which focus on self-esteem, cultural awareness, and community involvement; counseling, case management, and crisis intervention to individuals and families.
LINKAGE TO TREATMENT, OTHER ORGANIZATIONS	Youth that need other services are referred out; YES maintains links with treatment providers and other resources.	Linkages with several community treatment providers, cooperative relationships with local organizations	Referral system has linkages to treatment. Aftercare and case management ensure consistent care and no overlap services.
EVALUATION ACTIVITIES	YES collects data on youth served; evaluations to date have revolved around the "I Believe in Me" workshops and numbers of youth receiving services.	Beyond routine monitoring, no formal evaluation due to budget restrictions; recently developed programs include evaluation component.	Information not available.

¹ CSR, "Identification of 'Best Practices' of OHSD's Youth-Related Demonstration Programs," 1990.

² Source: GAO, *Adolescent Drug Use Prevention: Common Features of Prevention Programs*, 1992.

³ Abt Associates Inc. site visit.

Table 5

Model Community-Based Prevention Programs

SITE	Golden Eagles, Minneapolis, Minnesota ¹	Asian Youth Substance Abuse Project California ¹
CENTRAL FEATURES/ CHARACTERISTICS	Promotes healthy lifestyles among Native American youth, promotes cultural identity and values in an attempt to address high rates of alcoholism and other social issues in Native American communities	Culturally sensitive services and programming to area Asian youth run by a consortium of five community-based agencies and two service organizations, community-based programming that targets both youth and families
STRATEGIES EMPLOYED	Alternative activities such as after-school and summer day camp programs, family and parent training, information dissemination through seminars on drug abuse, community events, social and life skills training, self-esteem enhancement, academic support	Alternative programs, parenting and family skills training, peer resistance skills training, life and social skills training
TARGET GROUP	Area Native American youth aged 3-20	Area Asian youth, including Japanese, Filipino, Chinese, Korean, and Vietnamese groups
ORGANIZATION	Golden Eagles is part of the Indian Health Board which provides an array of services to the Native American community.	AYSAP is a consortium of organizations serving the Asian community of San Francisco; AYSAP has a board of directors, and member agencies have separate advisory boards.
STAFF/FUNDING	Staff: 21 staff members Funding: both public and private monies	Staff: AYSAP has a staff of 30, most of whom work at consortium centers. Funding: OSAP, also State, county, and private monies

Table 5

Model Community-Based Prevention Programs

SITE	Golden Eagles, Minneapolis, Minnesota ¹	Asian Youth Substance Abuse Project California ¹
RANGE OF SERVICES	Peer leadership (through tutoring younger participants and acting as program representatives in community events), service activities designed to foster pride in heritage and community, support groups, referrals to sponsor agency for on-site health services, academic programs including school readiness for preschoolers and tutoring for students in all grades, culturally specific programming	School programs designed to reduce academic failure; alternative activities to gang and drug involvement, including expressive arts programs, summer day camps, after school clubs and youth centers; peer-to-peer refusal skills training; social and life skills training, including confronting pressures to assimilate and become Americanized.
LINKAGE TO TREATMENT, OTHER ORGANIZATIONS	Treatment is provided on site through sponsoring organization--referrals are easily exchanged, collaboration with area schools and agencies.	AYSAP has link with substance abuse recovery program; treatment center in area provides detox, treatment, aftercare services; two staff of AYSAP are based at treatment center.
EVALUATION ACTIVITIES	Currently, program outcomes are based on standardized psycho-educational assessments administered before and after the program. More in-depth evaluations are planned for exemplary program activities.	Evaluation are underway of the individual bilingual counseling programs that focus on stress management and coping skills and of an eight-week youth group.

¹ Source: GAO, *Adolescent Drug Use Prevention: Common Features of Prevention Programs*, 1992.

The community-based programs which seek to enhance the cultural identity of their participants typically serve a geographic area such as a neighborhood rather than an entire city--a much smaller scale than Project STAR or the community task forces of Nebraska. In inner-city communities where the drug culture seems to have nearly overrun a neighborhood, culturally based community prevention programs offer young people a safe haven from the streets, provide positive alternatives to drug or gang-related activities, and help to support the pursuit of jobs outside of the drug market.

For example, the Jackie Robinson Center of Brooklyn, New York⁴² offers a variety of programming designed to promote healthy decision making including abstinence from drugs and alcohol and staying in school. To do this, the program provides sports and cultural activities, social services, and academic support. Many teachers, coaches, and school principals volunteer as staff members, and the center maintains an active relationship with the schools.

The centerpiece of the Northside Opportunities Project⁴³ of St. Louis is the "I Believe in Me" workshop that promotes self-esteem and cultural awareness among African-American youth. Other services provided by its parent organization include psychological counseling for youth and their families, job training and development, a youth shelter, and volunteer peer counseling.

FORUM (Fulfilling Our Responsibility Unto Mankind)⁴⁴ serves a predominantly African-American community on the South Side of Chicago. FORUM strives to empower young people, families, and the inner-city community it serves through a broad range of programs that are especially tailored to the black community. FORUM sponsors family and parent training programs which aim to strengthen participants' parenting skills and increase the awareness of parents with small children of the consequences of alcohol and other drug use. A showpiece of the FORUM approach is the Don't Hang with Gangs program, in which staff teach fringe gang members (or first-time juvenile offenders) basic life and interpersonal skills and counsel them in how to deal with the many serious social problems these youth face. FORUM seeks to build the characters of these youth so that they can make choices that are healthy for themselves and those around them in the face of the widespread gang violence and drug use in their neighborhoods. In addition to these programs that focus on young people and their families, FORUM also aims to foster community and economic development through the sponsorship of neighborhood precinct councils and business initiatives.

The Addison Terrace Learning Center (ATLC)⁴⁵ is a community-based program which serves a public housing development in Pittsburgh, Pennsylvania. ATLC provides all kinds of prevention services, including school-based support groups, family trainings, and alternative activities. Among the most innovative of ATLC's programs is the Shelter Diversion Project which intervenes in cases of suspected child abuse or neglect. The program helps parents confront their problems (many times stemming from alcohol or drug abuse) and keep their children safe and at home if at all possible. Another program innovation is the Co-Dependent Intervention Support Group, meeting the specific needs of African-American women who live with an alcoholic or drug-abusing family member. Past support group participants have achieved their educational and employment goals, entered drug treatment, and gained independence from public assistance programs.

The two remaining community-based programs that were chosen as commendable, the Golden Eagles/Ginew program and the Asian Youth Substance Abuse Project, both serve specific minority communities. These programs are designed to address pressures such as assimilation, immigration, and discrimination confronting the members of their ethnic communities. By acting to relieve these pressures and to foster positive bonds among its members, these programs seek to reduce the appeal of substance use within the communities they serve.

The Golden Eagles/Ginew⁴⁶ program serves Native American youth of greater Minneapolis. Ginew is housed in an Indian Board of Health center so that alcohol and drug abuse prevention fits within the program's overall goal of health promotion. Peer support groups that specifically target adolescents at risk for drug and alcohol use meet after school and in summer camps. Ginew sponsors alternative activities designed to foster pride in the youths' heritage and community, such as traditional drumming and dancing classes. In addition, Ginew organizes volunteer tutoring services for school-aged children and parent training for preschoolers entering kindergarten.

The Asian Youth Substance Abuse Project (AYSAP)⁴⁷ acts as an umbrella organization for several agencies that serve five distinct Asian ethnic groups of San Francisco. AYSAP tailors each prevention program to the particular Asian community targeted. For example, the Japanese Community Youth Center teaches adolescents to train elementary school-aged children in basic life and interpersonal

skills. In the Filipino and Korean communities where the church has a more visible influence, the project works with clergy who are actively involved with those communities to bolster family support and to provide substance-free social events. In contrast, AYSAP programs serving the Vietnamese and Cambodian communities sponsor drug- and alcohol-free activities that are based on the lunar new year, a popular pagan holiday in Southeast Asia. With these groups, the project confronts the unique stresses that immigrant families face. The program also coaches immigrant parents in discipline, helping them to regain a sense of authority through improved communication. Finally, the Chinatown Youth Center provides alternative activities, including expressive arts programs, to those at risk for or on the fringes of gang and drug involvement.

Conclusions

The experiences of prevention providers as well as some early results from research show that recent innovations in substance abuse prevention hold great promise. One important conclusion is that prevention efforts must be sustained: prevention of substance use cannot be accomplished by a one-time inoculation, but rather must include "booster" sessions throughout the course of a young person's development.

Prevention providers have come to believe that programs which emphasize the individual in the context of their social groups (focusing on schools, families, peer groups, or entire communities) are more successful than those that treat individuals outside their social environment. Interventions that employ active rather than passive learning and use parents or peers as leaders are also considered more successful because they more fully involve participants. Finally, programs are most successful when they respond to the unique needs and cultural makeup of their own particular communities and when they actively engage community leaders in their efforts. While experts agree these approaches are promising, further evaluation studies will help clarify the key elements that make a prevention program a success.⁴⁸

ENDNOTES

1. See Botvin, 1990; Hawkins et al., 1991; and Tobler, 1986 for reviews of evaluations from that era.
2. According to findings from the National Drug and Alcohol Treatment Unit Survey (NDATUS), the reverse is also true: the majority of treatment facilities (60 percent) report that they also engage in prevention activities. National Institute on Drug Abuse, *National Drug and Alcoholism Treatment Unit Survey, Main Findings Report, 1989*, (Washington, D.C.: Department of Health and Human Services, 1990).
3. Carl G. Leukefeld and William J. Bukoski, "Drug Abuse Prevention Evaluation Methodology: A Bright Future," *Journal of Drug Education*, 21 (1991):191-201.
4. See Botvin, "Substance Abuse Prevention Research: Recent Developments and Future Directions;" Hawkins, et al., "Assessing Effectiveness of Drug Abuse Prevention; and Nancy Tobler, "Meta-Analysis of 143 Adolescent Drug Prevention Programs: Quantitative Outcome Results of Program Participants Compared to a Control or Comparison Group," *The Journal of Drug Issues*, 16(1986): 537-567 for reviews of evaluations from that era.
5. Arnold Goldstein, "Refusal Skills: Learning to be Positively Negative," *Journal of Drug Education*, 19(1989):271-283.
6. Botvin, "Substance Abuse Prevention Research: Recent Developments and Future Directions."
7. Botvin, "Substance Abuse Prevention: Theory, Practice and Effectiveness."
8. Tobler, "Meta-Analysis of 143 Adolescent Drug Prevention Programs;" Botvin, "Substance Abuse Prevention: Theory, Practice, and Effectiveness."
9. David Hawkins, Denise Lishner, and Richard Catalano, Jr., "Childhood Predictors and the Prevention of Adolescent Substance Abuse," *Etiology of Drug Abuse: Implications for Prevention*. National Institute on Drug Abuse Research Monograph 56, DHHS Publication Number (ADM)90-1335, (Washington, D.C.: Government Printing Office, 1990).

10. Gilbert Botvin, "Substance Abuse Prevention: Theory, Practice and Effectiveness," in *Drugs and Crime*, edited by Michael Tonry and James Q. Wilson (Chicago: University of Chicago Press, 1990).
11. David Hawkins, Robert Abbott, Richard Catalano and R. Gillmore, "Assessing Effectiveness of Drug Abuse Prevention: Implementation Issues Relevant to Long-Term Effects and Replication," *Drug Abuse Prevention Intervention Research: Methodological Issues*, National Institute on Drug Abuse Research Monograph 107, DHHS Publication Number (ADM)91-1761, (Washington, D.C.: Government Printing Office, 1991).
12. Gilbert Botvin, Eli Baker, Nancy Renik, Anne Filazzola and Elizabeth Botvin, "A Cognitive-Behavioral Approach to Substance Abuse Prevention," *Addictive Behaviors*, 9(1984): 137-147.
13. Lynn McDonald and Family Service, Inc., "Families and Schools Together: Orientation and Training Manual," self-published manual, January 1992, 1-4.
14. Lynn McDonald and Stephen Billingham, "FAST Evaluation: Report to the FAST Statewide Advisory Board," unpublished report, January 31, 1992; and Joseph DeMarsh and Karol Kumpfer, "Family-Oriented Interventions for the Prevention of Chemical Dependency in Children and Adolescents," in *Childhood and Chemical Abuse: Prevention Intervention* edited by Stephanie Griswold-Ezeyoke, Karol Kumpfer and William Bukoski (New York: The Haworth Press, 1986).
15. J.R. Berruetta-Clement, L.J. Schweinhart, W.S. Barnett and D.P. Weikhard, *Changed Lives: The Effects of Perry Preschool Program on Youths through Age 19* (Ypsilanti: High/Scope Press, 1984) as described in Robert L. DuPont et al., *Stopping Alcohol and Other Drug Use before It Starts: The Future of Prevention*, OSAP Prevention Monograph No. 1, DHHS Publication Number (ADM)89-1645 (Rockville, Maryland: OSAP, 1989).
16. What makes a prevention program a "model" is not yet clearly defined by experts in the field. For this report, model programs were identified through the recommendations of experts solicited by Federal agencies. (The reports used to identify model programs are described below.)
17. Stephanie Griswold-Ezeyoke, Karol Kumpfer and William Bukoski, editors, *Childhood and Chemical Abuse: Prevention and Intervention*, (New York: The Haworth Press, 1986).
18. Office for Substance Abuse Prevention, "Communities Creating Change: Exemplary Alcohol and Other Drug Prevention Programs, 1990," 1990; as well as supplemental information

provided by program staff, either in written form or through telephone interviews with Abt Associates staff. OSAP issued a call for nominations was given to State alcohol and other drug agency officials who were allowed to nominate no more than two model prevention programs from their State. Nominations were also solicited by national organizations and experts in the field. Then, 33 experts reviewed all available written program materials, rated all the nominees and, based on these ratings, the 10 best programs were selected. All of these programs are described in this report with one exception: the Absentee Prevention Program was omitted because it solely targets behaviors not directly relevant to alcohol and other drug use.

19. Government Accounting Office, Adolescent Drug Use Prevention: Common Features of Promising Community Programs (Washington, D.C.: GAO, 1992). The GAO identified "promising" programs from a wide range of sources. In addition to OSAP grantees, the GAO gathered lists of programs receiving support from the National Institute on Drug Abuse (NIDA), the Department of Housing and Urban Development (HUD), and the Department of Education (i.e., Drug-Free Schools), as well as model programs named by the U.S. Conference of Mayors, the National League of Cities, the Department of Justice, and a panel of national experts. In this way, 226 programs were identified as models of adolescent drug use prevention, and all 226 were respondents to a mail survey on program characteristics and best practices. From these 226 programs, 10 programs were selected in consultation with knowledgeable staff from funding agencies and other experts to receive site visits from GAO staff and to be showcased as the most promising in the field. All the programs commended by the GAO are described in this report With the exception of two programs: Parents for a Drug Free Youth and the Puerto Rico Department of Anti-Addiction Services were not included because they do not provide direct services to an identifiable target population.
20. Signus Corporation (formerly CSR, Inc.), "Identification of 'Best Practices' of OHDS's Youth-Related Demonstration Projects: Summaries of 26 Effective Youth-Related Demonstration Projects," Volume 2, unpublished report prepared for the Administration for Children and Families, Department of Health and Human Services, 1991. In a study of the best practices and most effective programs among youth-related demonstration projects funded by the Administration for Children and Families, Signus Corporation identified 26 model programs. The 26 model programs were identified through a rating system based on best practices criteria developed in consultation with national experts. Of these, four programs are included in this report because they are the only ones that are directly relevant to drug

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abuse prevention.

21. We especially endeavored to visit those programs that were commended as exemplary by more than one source. Of the eleven programs initially selected, two programs declined to be visited on the grounds that they had already been commended as exemplary and that staff were not available to accommodate visitors.
22. The protocol for Abt's site visits is included in an unpublished report to ONDCP which is available upon request.
23. Botvin, "Substance Abuse Prevention: Theory, Practice, and Effectiveness;" Arnold Goldstein, "Refusal Skills: Learning to Be Positively Negative," Journal of Drug Education 19(1989): 271-283; John O'Connor and Bill Saunders, "Drug Education: An Appraisal of a Popular Perspective," The International Journal of the Addictions 27(1992): 165-185; Gilbert Botvin, "Substance Abuse Prevention Research: Recent Developments and Future Directions," 56(November 1986): 369-374.; Tobler, "Meta-Analysis of 143 Adolescent Drug Prevention Programs;" Hawkins et al., "Childhood Predictors and the Prevention of Adolescent Substance Abuse."
24. M.S. Goodstadt, "Alcohol and Drug Education," Health Education Monographs 6(1978): 263-279; B. Kinder, N. Pape and S. Walfish, "Drug and Alcohol Education Programs: A Review of Outcome Studies," International Journal of the Addictions 51(1980): 1035-1054.
25. OSAP, "Communities Creating Change."
26. OSAP, "Communities Creating Change."
27. OSAP, "Communities Creating Change" and information gathered through a site visit by Abt Associates.
28. OSAP, "Communities Creating Change."
29. GAO, Adolescent Drug Use Prevention.
30. CSR, "Identification of 'Best Practices' of OHDS's Youth-Related Demonstration Projects."
31. OSAP, "Communities Creating Change" and information gathered through a site visit conducted by Abt Associates.
32. CSR, "Identification of 'Best Practices' of OHDS's Youth-Related Demonstration Projects."
33. OSAP, "Communities Creating Change" and information gathered through a site visit by Abt Associates.

34. Steven Schinke, Kristin Cole and Mario Orlandi, "The Effects of Boys and Girls Clubs on Alcohol and Other Drug Use and Related Problems in Public Housing," final report to the Office of Substance Abuse Prevention, 1991.
35. OSAP, "Communities Creating Change" and information gathered through a site visit conducted by Abt Associates.
36. GAO, Adolescent Drug Use Prevention.
37. D.W. Goodwin, "Alcoholism and Genetics: The Sins of Fathers," Archives of General Psychiatry 6(1985): 171-174 as quoted in Karol Kumpfer and Joseph DeMarsh, "Family Environmental and Genetic Influences on Children's Future Chemical Dependency" in Childhood and Chemical Abuse: Prevention and Intervention edited by Stephanie Griswold-Ezekoye, Karol Kumpfer and William Bukoski (New York: The Haworth Press, 1986).
38. Hawkins et al., "Childhood Predictors and the Prevention of Adolescent Substance Abuse."
39. OSAP, "Communities Creating Change" and information gathered through a site visit conducted by Abt Associates.
40. Mary Ann Pentz, James Dwyer, David MacKinnon, et al., "A Multicommunity Trial for Primary Prevention of Adolescent Drug Abuse: Effects on Drug Use Prevalence," Journal of the American Medical Association 261, 22(June 9, 1989): 3259-3266)
41. OSAP, "Communities Creating Change."
42. GAO, Adolescent Drug Use Prevention.
43. CSR, "Identification of 'Best Practices' of OHDS's Youth-Related Demonstration Projects."
44. GAO, Adolescent Drug Use Prevention: Common Features of Prevention Programs, and information gathered through a site visit conducted by Abt Associates.
45. Information gathered through a site visit conducted by Abt Associates.
46. GAO, Adolescent Drug Use Prevention.
47. GAO, Adolescent Drug Use Prevention.
48. For example, research into the origins of drug use indicates that the drugs of choice and the progression pattern which drug users will follow can differ significantly from culture to culture. Further, drug use patterns may differ between subgroups of the same broadly defined ethnic group. For example, the Asian Youth Substance Abuse Project tailors its

interventions, due to cultural differences and variations in the substance abused, to each of five separate Asian communities in San Francisco: Japanese, Chinese, Filipino, Vietnamese, and Korean.