U.S. Department of Justice
Office of Justice Programs
National Institute of Justice

National Institute of Justice

Issues and Practices

The Drug Use Forecasting Program: Measuring Drug Use in a "Hidden" Population

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The Drug Use Forecasting Program: Measuring Drug Use in a "Hidden" Population

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Foreword

Measuring the extent and nature of illicit drug use in the United States is essential to finding out how severe the drug problem is and more effectively tailoring action and resources to combat it. The broad question of prevalence[1] implies a host of others, such as which drugs are being used, what segments of the population are using them, how often they are used, and in what amounts. Among the most important questions in estimating prevalence is how drug use is changing over time. Trend data can furnish valuable evidence of whether or not the current drug epidemic may be subsiding.

Answers to such questions require a range of accurate measurement tools. Today, there are many systems for estimating drug use at the national, State, and local levels. A number of these data sets are collected under Federal sponsorship. Each one focuses on specific subsets of the population, and each has a different purpose.[2] The array of measurement systems reflects the multitude of issues that arise with the question of drug prevalence. By adding to the body of knowledge about drug abuse, each system helps to create as accurate a picture as possible of drug use in this country.

The Drug Use Forecasting (DUF) program is a measurement system established by the National Institute of Justice to test booked arrestees[3] for illicit drug use. On a quarterly basis, voluntary interviews and urinalysis are conducted among people who have been arrested and brought to the central booking facility of the various DUF sites. The resultant data are analyzed to furnish estimates of recent drug use in this high-risk subgroup. Along with the other major indicators, DUF plays a key role in helping policymakers, law enforcement professionals, and citizens better understand the Nation's drug problem. This report explains the

rationale for DUF, how it operates, and the ways in which the findings can be used, particularly by the sites participating in the program.

The first section presents the context within which the program developed and explains the rationale for drug testing among people charged with serious crime. The second section presents the DUF method, focusing on sampling strategy, the specific procedures used, and the means to ensure quality control. The third section explains how DUF findings can be used to track changing patterns of drug use and how particular sites have used these findings to address the drug problem in their communities. The final section presents evidence of the persistence of the drug problem among the population measured by DUF.

Michael J. Russell
Acting Director
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I — DUF's Role in Measuring Drug Use

A population at risk

One of the leading indicators of drug use — the Federal Government's National Household Survey on Drug Abuse — reveals that in the overall population illicit drug use has generally been declining since it peaked at the end of the 1970's.[4] This news is welcome and encouraging, but it is only part of the story of drug use in America. Not included in this survey is a "hidden" or hard-to-reach population that is at high risk for criminal behavior, including illicit use of drugs. This population consists of people who have been charged with serious offenses.

To measure drug use in this hidden population, the National Institute of Justice set up the Drug Use Forecasting (DUF) program some 5 years ago. During that period DUF has advanced our understanding of drug use by people who are arrested and brought to booking facilities in many of the country's major urban areas. DUF is distinctive in several ways. It is the only measure of drug use for this high-risk group that tests in sites throughout the country. It uses an objective measure — urinalysis — to provide empirical evidence in a population that has been shown to underreport drug use when asked in interviews. The DUF program furnishes trend data that enable each participating site to track changes over time in drug use, monitoring increases or decreases in use, identifying changes in drugs of choice, and tracing patterns of use by different subgroups of the arrestee population.

DUF's focus on booked arrestees is predicated in part on the association of drugs with crime. Research has shown that the frequency of criminal behavior can increase when drugs are involved. Moreover, this drug-abusing population has a greater impact on the quality of life of more people than does any other

group that uses drugs. DUF has consistently shown high levels of illicit drug use among arrestees, including those charged with crimes unrelated to drug use. The percentage of arrestees using drugs is far higher than in the general population. In fact, since arrestees constitute a relatively small percentage of the population, the number who use drugs is vastly disproportionate to their representation in the overall population.

DUF findings underscore the belief that addressing the crime problem requires addressing the drug problem. In the communities that operate DUF programs, the information generated can help to shape public policy and law enforcement strategies as well as to plan and develop programs for preventing and treating drug use. Equally important, measuring drug use in the population that passes through the criminal justice system is a way that these communities can estimate treatment needs, assess the success of drug control efforts, or target treatment programs.

Patterns of drug use and changing attitudes[5]

The strong association of drugs with crime that DUF helped to identify and continues to document may seem obvious today, but only recently has this association been fully recognized. In the United States from about 1910 to 1977, "drug abuse" as a major social problem concerning law enforcement and treatment professionals was equated almost exclusively with heroin addiction. In the mid-1950's, large numbers of young people in the inner-city neighborhoods of New York and Los Angeles became addicted, and by the early years of the next decade use of heroin had become a phenomenon of the underclass of the Nation's largest cities. However, heroin use seemed an isolated problem, its severity measured by counts of the number of deaths due to overdose more than by the crime that often accompanies drug use.

Toward the middle and late 1960's, drug use ceased to be solely an inner-city phenomenon. The baby boom generation was coming of

age and some were beginning to use hallucinogens, marijuana, and other drugs for "recreational" purposes. The attitude toward drugs began to soften. In the mid-1970's this atmosphere of relative toleration reached its height and was perhaps most notably embodied in efforts to legalize "pot" possession. Even cocaine was viewed as a relatively harmless diversion for the affluent, although it was becoming popular in the inner cities as well at this time.

The atmosphere changed dramatically in the early 1980's, with zero tolerance toward even the casual user, and was followed by the introduction of the concept of drug testing in the military and the workplace. The change was also due in part to the rise in the use of cocaine, and particularly the beginning of the crack epidemic in 1986–87. Crack came to dominate the drug markets of most inner-city neighborhoods and contributed to the explosion of crime and violence that plagues these communities today.

Recognizing the drug-crime link

The relationship of drugs to crime is more complex than simple or straightforward cause and effect. As one prominent researcher put it, "There is no clear progression from drug use to crime, or from crime to drug use."[6] Many people who use illicit drugs commit no other crimes, and many people who do commit crime do not use illicit drugs. For this reason, the link is more accurately described as one in which crime and drugs are "powerfully associated with a deviant lifestyle in which each is common."[7]

If the link of drugs to crime is not inexorable, it nevertheless became more evident as the gravity of the drug problem began to be realized. Drug use and sales increase criminality for several reasons, among the more obvious ones that young people predisposed to criminal activity early tend also to initiate drug use while they are young, and that certain drugs (heroin, cocaine, and crack) can rapidly lead to dependence and the need to commit cash-generating crime to support the habit.[8]

The body of evidence documenting the drug-crime link had been growing for some time. Research sponsored by the National Institute of Justice showed drug abuse to be a key indicator of criminal careers involving serious crime — a majority of the most serious offenders among inmates in prisons and jails of three States were found to have histories of heroin abuse, often in combination with other drugs. A survey of State prison inmates conducted in 1989 by the Bureau of Justice Statistics revealed that about two out of three had used drugs as frequently as once a week or more for a period of at least a month at some time in their life.[9] Other research revealed that the intensity of criminal behavior tends to be directly related to heavy drug use, or to put it another way, drug use increases crime. For example, addicts committed four to six times more crime during periods of heavy drug use than when they were relatively drug free. This study also indicated that for some offenders criminal activity could be slowed by reducing the level of drug use.[10] Washington, D.C., provided a test of this notion.

Monitoring defendants' behavior before trial

The problem Washington, D.C., was facing was how to manage a growing number of drug cases and how to cope with the danger to public safety posed by drug-abusing defendants who were released before trial. The city's Pretrial Services Agency (PSA), in operation since the 1970's, interviewed all defendants after arrest as one step in developing pretrial release recommendations for the court. In part of the interview they were asked about drug use.

NIJ worked with PSA in 1984 to set up an experimental drug testing program, using a new, highly accurate urinalysis technology in addition to the traditional self-reports from arrestees. The working hypothesis was that close monitoring of a defendant's drug use, coupled with quickly applied sanctions for violations, could be effective in deterring drug use and reducing criminal activity.[11]

While that study was under way, an analysis of interviews conducted by PSA between 1979 and 1981 revealed the urgency of the problem: the number of defendants who reported using drugs had doubled in this period.[12]

Using the data from this 3-year period, the researchers also uncovered some striking relationships between drug use and the probability of pretrial misconduct. Among the most dramatic were that drug abusers released before trial were more than twice as likely as nonusers to be arrested again before they were required to appear for trial, and drug users were more likely than nonusers to fail to appear.[13]

A subsequent, NIJ-sponsored independent evaluation of the PSA program judged it successful in demonstrating the feasibility and effectiveness of assessing pretrial risk. The Washington, D.C., model then served as the basis for demonstration programs set up in several State and local criminal court sites with funds from the Bureau of Justice Assistance and NIJ. The programs provided empirical and practical information about the utility of pretrial drug testing.[14]

Arrestee drug use: New York City and Washington

At about the same time the Washington research program was under way, another project involving pretrial drug testing, also sponsored by NIJ, was in progress in Manhattan. In the New York project voluntary interviews and urine testing were conducted, largely among men recently arrested for nondrug felonies. The aim was to track those released before trial and compare the rate of pretrial misconduct among those found drug positive at arrest to those found drug free.

Together the Manhattan and Washington, D.C., projects tested 14,000 arrestees in 1984 alone.[15] The most significant early outcome of both research projects had less to do with rates of pretrial misconduct than with the level of drug use detected by the

new method of urinalysis. In Washington, D.C., defendants' self-report data from the 3-year period 1979–81 had revealed that only 17 percent were using drugs.[16] Data collected in 1984 through urinalysis demonstrated that more than half the defendants tested used drugs.[17] Similar results were reported in Manhattan, where in 1984, 56 percent of the arrestees tested were found to be positive for one or more of four specific drugs.[18] This was a level far higher than indicated at the time by other estimates. Moreover, drug positives were highly independent of charge — not solely for those arrested for drug-related offenses.

Both projects initially shared the need to deal with practical issues, such as whether interviews could be conducted in the difficult and often chaotic physical conditions of large city jails and lockups, and whether arrestees would agree to participate. Affirmative answers to these questions indicated the feasibility of conducting drug testing among this type of population and in this kind of setting.

The Washington data furnished incontrovertible evidence that arrestees tend to underreport drug use, possibly because of perceived legal consequences, and suggested the value of an objective testing tool. That tool, used in 1984 in both New York and Washington, was enzyme immunoassay. Marketed under the trade name EMIT™ (enzyme multiplied immunoassay technology),[19] this method of urinalysis could produce highly accurate results in a short time — 1 to 2 hours — with almost no false positives and about 20 percent false negatives. By contrast, thin-layer chromatography (TLC), the method that had been most widely used, was generally less sensitive, underdetecting some drugs by as much as two-thirds.[20]

The differences between the new urinalysis method and self-reports were striking: In Washington more than half (52 percent) of the arrestees who tested positive by EMIT had failed in the interviews to report drug use.[21] The results effectively challenged the validity

and reliability of information self-reported by arrestees and confirmed the utility of the new method.

A followup study in Manhattan in 1986, sponsored by NIJ, revealed even more dramatic findings about the type and level of drug use among arrestees. The results of urine testing at Manhattan's central booking facility produced empirical evidence that cocaine was the drug detected most often and its use was rising rapidly: twice as many arrestees tested positive for this drug in September 1986 as in 1984.[22]

Had self-reports been relied on exclusively, the increase might never have come to light, because the proportion who admitted to ever having used cocaine was about the same in both years.[23] The Pretrial Services Agency reported similar findings: In Washington cocaine use was also on the rise.[24] The findings in both sites were perhaps even more significant in illuminating the differences between drug use trends in the general population and the offender population. While national surveys were detecting some moderation of drug use in the overall population in this period, there was now hard evidence that among arrestees the use of cocaine was escalating.

These two projects uncovered a "hidden" population of heavy drug users — defendants charged with serious crime. This segment of the population, not covered in national surveys, had gone largely unmeasured, and estimates of the magnitude of drug use among them had fallen far short of the mark.

II — How DUF Works and What It Does

The high levels of cocaine use detected in Manhattan and the steep increase there and in Washington, D.C., between 1984 and 1986 raised the question of whether the trend might be an anomaly of these two large east coast cities or whether arrestee drug use in other cities was also significantly higher than previous estimates. At the time, there were other indications that cocaine use was rising. For example, it was showing up in higher numbers of cocaine-related emergency cases. Moreover, crack cocaine was emerging, adding to the impetus for developing an indicator of drug abuse among the segment of the population most prone to deviant behavior.

Focus on urban areas

To gauge drug use trends in urban areas, NIJ established the Drug Use Forecasting program in 1987. Initially, the Nation's largest cities were targeted, but this goal was constrained by the need to select locations that were able to cooperate with and support the program. From a practical standpoint, data collection would be easier and less costly in cities than in suburban or rural areas. This is because the cities process many more arrestees in the same amount of time as do less populated areas. The sites selected had to be large enough to process a sufficient number of arrestees during the 2-week testing period.

The original 12 sites have expanded to 24. All of them are major urban areas, and all but Fort Lauderdale have populations of 250,000 or more. (A list of the sites is presented in exhibit 1.) The inclusion of this city and other relatively smaller sites (Birmingham and Omaha, for example) has helped provide evidence that the drug epidemic has spread beyond the country's largest metropolitan areas and has furnished insights into patterns of arrestee drug use

outside them. The sites participating in 1992 included most U.S. cities with a population of more than a million and smaller cities representing the four regions of the country — Northeast, Midwest, South, and West.[25]

As DUF developed, the Department of Justice's Bureau of Justice Assistance, which provides Federal assistance to State and local governments to improve their criminal justice systems, recognized the value of the program in helping to meet its own objectives. BJA's subsequent contributions to DUF funding have been an important component of the program's success.

The focus on cities, and their locations in all parts of the country, are among DUF's major strengths. This is because the program's goals include providing information useful at the community level. With trend data for a particular city, drug use patterns at the sites can be tracked over time and the requisite response made. Differences in drug-abuse patterns by region can also be traced and compared.

Focus on serious offenders[26]

DUF's emphasis is on identifying the extent of drug use among people charged with serious crimes. Thus, arrests for petty offenses, such as vagrancy and traffic violations, are generally not included. This emphasis also dictates that the interviews and urinalysis be conducted among people arrested during the evening shift, because daytime arrests are largely for less serious offenses.

At first, the program tested only adult men. As DUF progressed, other types of offenders were included, with some sites adding women arrestees and juvenile detainees/arrestees. Of the 24 sites, 21 now test women and 12 test male juveniles (juvenile female detainees are included in 10 of these 12 sites). About 200 men are tested at each site. Because the number of women and juveniles is relatively small, all those brought to the booking or detention center

Exhibit 1

The DUF Sites

Site	1990 Population
Atlanta	394,000
Birmingham*	266,000
Chicago	2,784,000
Cleveland*	506,000
Dallas	1,007,000
Denver*	468,000
Detroit	1,028,000
Fort Lauderdale	149,000
Houston	1,631,000
Indianapolis (Marion County)*	731,000
Kansas City (MO)	436,000
Manhattan	1,488,000
Los Angeles*	3,485,000
Miami	359,000
New Orleans (Orleans Parish)	497,000
Omaha	336,000
Philadelphia	1,586,000
Phoenix (Maricopa County)*	983,000
Portland (Multnomah County)*	437,000
St. Louis*	397,000
San Antonio*	936,000
San Diego (San Diego County)*	1,111,000
San Jose*	782,000
Washington, DC*	607,000

Population data source: U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States 1991 (111th edition)*, Washington, D.C., 1991: 34–35.

Note: Original sites are in bold. Chicago, Miami, and Omaha do not test women.

*Tests juveniles.

during the data collection period are interviewed, regardless of charge. And because the criteria for selecting women are different from those used to select men, the findings for the two groups cannot be combined.

Sampling strategy

In the often frenetic environment of a booking facility it is difficult to take random samples. The size of the DUF sample for male arrestees was initially set at 200 on the basis of research conducted with data from the Manhattan project. Samples of varying sizes were randomly selected from a larger population to determine the smallest number that would be representative of those booked in the facility. The research demonstrated that from a sample of 200 the results of as many as 4,000 urine tests could be accurately predicted. In most sites 225 male arrestees are now interviewed. Where women are part of the sample, the goal is to interview at least 100, and where there are juvenile detainees, the goal is to include 50 to 100.

The universe of adult arrestees brought to the facilities where the DUF samples are drawn differs somewhat from site to site. For example, some sites will have only men recently arrested for felony crimes in an inner-city area, while at others there will be men and women from all locations in a county, some of whom have been arrested for minor violations of city ordinances, and some for serious crimes.[27]

The DUF sampling strategy is site-specific and conducive to tracing trends over time in a given location. The participants are not statistically representative of all arrestees and cannot be projected to a larger population. NIJ will be exploring ways to determine whether the DUF data can be aggregated to create a measure of drug use in the arrestee population nationwide.

A drug-use baseline is created

The first DUF findings confirmed that the data from the New York and Manhattan research sites were not anomalies. Between June and November 1987, 2,000 male arrestees were tested in 12 cities and similarly high levels of drug use were found. Depending on the particular site, between 53 percent and 79 percent of the men tested were found to be positive for at least 1 of 10 drugs. These levels were two to nine times higher than those in the general population, where drug use appeared to be leveling off.[28]

Among the more specific findings were that use of cocaine ranged from a low of 43 percent to a high of 63 percent, depending on the city, and heroin use was significant in New York, Washington, San Diego, and Portland. With these initial findings, the program now had baseline data for tracking changes in drug-use patterns at the sites.

The DUF procedure[29]

Once every 3 months, for about 14 consecutive evenings, trained local staff at each site interview and obtain urine samples from people who have been arrested in the previous 48 hours and are being held at the central booking facility. The arrestees participate voluntarily and remain anonymous. The response rate is high, with almost 90 percent of those interviewed agreeing to provide a urine specimen.[30]

Specific procedures for conducting the interviews, obtaining the specimens, and conducting all other tasks related to data collection were developed by the staff of the DUF project at NIJ. Their aim was to ensure uniformity throughout the sites as well as rigorous quality control. At each site a project coordinator is responsible for making sure that the procedures are followed and for supervising data collection.[31]

The coordinator reviews arrest or booking slips to select the individuals who will be interviewed. For male arrestees the selections are made according to a priority order that places serious, nondrug-related charges at the top.

Self-report information — the interview. The interview questionnaire elicits information about drug-use behavior as well as demographic and related data.[32] Some of the information that cannot be obtained from urinalysis comes from this portion of the DUF protocol (as well as from the arrest record). Response rates have been high, with over 90 percent of arrestees agreeing to the interview, which takes 15 to 20 minutes to administer.

Drug-use behavior. Participants who admit to drug use are asked questions about previous use, whether or not they consider themselves dependent on specific drugs, and at what age they first used drugs. A series of questions elicits information from cocaine users about the type of cocaine used and the mode of administration. Some questions focus on treatment — whether the person has ever received treatment, is currently in a treatment program, or perceives a need for treatment.

Demographic data. Arrestees are asked about their education level, marital status, employment status, and income, among other variables. Like the information on drug-use behavior, this can be used at the local level by the sites to develop programs or by researchers to advance understanding of the drug problem. For example, many of the arrestees have not completed high school, a finding which suggests that education level be taken into account when treatment programs are developed. Demographic information from the interview and from the arrest record, which includes such items as age, race, sex, and ethnicity, can be correlated with information on drug behavior to better target treatment programs. In a project that used DUF data from Manhattan, researchers examined birth dates, race/ethnicity, and income source in an attempt to explain opiate use.[33]

Enhancing the interview. The DUF interview has evolved, with new areas of inquiry added as need dictates. The AIDS epidemic was the impetus for expanding the section on modes of drug administration, with a particular focus on needle sharing. Recent reports from various Federal agencies warned of the possible outbreak of a heroin epidemic. Some evidence came from the DAWN system (Drug Abuse Warning Network), a program of the National Institute on Drug Abuse, which showed an increase in heroin-involved emergency room episodes. These reports prompted inclusion in the DUF interview of a "heroin addendum" at all sites. It consists of a series of additional questions related to heroin use and is intended to provide fuller information about how heroin is being used among DUF participants.[34] In Detroit in 1988, concern over crack use prompted the DUF project director at this site to add a series of questions about levels of consumption, amount of money spent on the drug, and other issues.[35]

Automating the interview process. "AutoDUF," a computerized interviewing procedure, was recently developed and has been pilot-tested at several DUF sites. Based on the use of laptop computers, AutoDUF is designed to detect errors and inconsistencies in responses, prepare reports, organize responses to open-ended questions, and link together data obtained daily and quarterly. For example, the program will signal the interviewer if contradictory answers are entered, indicating on the screen the precise nature of the discrepancy between answers and requesting clarification. Computerization also eliminates the separate task of data entry and once implemented by all the sites, could make the findings available in less time. Manhattan and Atlanta recently adopted AutoDUF.[36]

Obtaining empirical evidence through urinalysis. Arrestees are known to underreport drug use. For this reason, DUF uses an objective measure, urinalysis, in addition to self-reports obtained through interviews. It is the only one of the leading indicators of

drug use to do so. The highly accurate EMIT™ method is used to test for 10 drugs: cocaine, opiates (which include heroin), marijuana, phencyclidine (PCP), methadone, benzodiazepines (Valium, for example), methaqualone, propoxyphene (Darvon), barbiturates, and amphetamines (including "speed"). All positive results for amphetamines are also analyzed by gas chromatography, a method commonly used to confirm other tests because it is very accurate in detecting the amount (sensitivity) and type (specificity) of a drug. The confirmation test is performed to eliminate positives that might be caused by over-the-counter "look-alike" medications. For the other drugs, no confirmation is necessary because the odds are overwhelming that the results will be accurate and because these drugs have no licit look-alikes that might cause the user to test positive.

For most of the 10 drugs tested, urinalysis can detect recent use only — in the past 2 to 3 days. The exceptions are marijuana and PCP, which can sometimes stay in the body several weeks after use. While urinalysis can establish recent drug use, it cannot distinguish between the casual user and the chronic user. Even if the test is negative, there may be drug dependence, for the results may indicate only that the person has been drug free for the past 2 or 3 days. Should hair testing be adopted in the future it would offer a means to widen the window of detectability because hair retains evidence of drug use for a much longer period. NIJ is considering use of hair testing as an epidemiological tool in the DUF program.

Data analysis and reporting. DUF findings are based on the combined results of the urinalysis and the interview. The specimens are shipped to a central, NIDA-certified laboratory for analysis. The completed questionnaires are edited for accuracy and sent to the DUF Data Center where they are reviewed and the data analyzed. Data from both sources are merged and uploaded via an electronic bulletin board system to NIJ and the DUF sites where

they are available within a short time after data collection. Collection every 3 months makes the findings available on a schedule that facilitates creation of trend data for use by the local sites. NIJ publishes the findings on a quarterly and annual basis.

Quality control

Advisory Board. From the start, the DUF program has been monitored by a Research Advisory Board comprising representatives of other Federal agencies that work in drug enforcement, treatment, or research; and selected practitioners, researchers, and representatives of professional organizations in the field. (A list of current Board members and their organizational affiliations is presented in exhibit 2.)

The function of the Board is to provide expert counsel on how to improve the program. It makes suggestions for enhancement of operations and more effective use of the data and findings. A major responsibility is to ensure the methodological rigor of the DUF program. In this capacity, it advises on refinements in the system, particularly the sampling technique. This function is carried out by a Methodology Committee, made up of 9 of the Board's 15 members. The Committee also suggests areas of possible research to ensure the robustness and representativeness of the data.

At a recent meeting, the Board proposed that all sites be equipped with the AutoDUF computerized interview program and that laptop computers be made available to support it. In addition, the Board proposed expansion of data analysis and inclusion of the findings in the DUF publications.[37]

NIJ management. Training in the DUF procedure is provided by NIJ at all the sites, both initially, once a site becomes part of the program, and on an as-needed basis. All local staff who will be involved in data collection are trained by the NIJ field training coordinator in such matters as conducting the interviews and

Exhibit 2
The DUF Advisory Board

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dealing with aggressive or recalcitrant arrestees. The amount of training depends on the need, with retraining visits scheduled when problems arise. NIJ also makes initial visits to the booking facilities to make certain that the proper arrangements have been made and to identify local agencies that may be interested in the test results. NIJ maintains ongoing contact with the project coordinators to keep them abreast of new developments in the program. During each collection period the project coordinators in turn work with the local staff to ensure smooth operations of data collection and testing.

The day-to-day operations of the DUF program are reviewed in the annual meeting of the project coordinators. Together with NIJ staff, they discuss such matters as data collection, editing, and budget. At the same time, meetings with the staff from individual DUF sites permit exploration of site-specific issues.

Independent evaluation. At the recommendation of the Advisory Board, the DUF sampling strategy was examined in a major study of the program's procedures, commissioned in 1990. Focusing on adult arrestees, the researchers examined such questions as which arrestees are represented in the sample, what response rates are obtained for the interview and for providing a urine specimen, and how trends in data at a given site can be interpreted.

Among the major conclusions were that in each site, the DUF sample of adult arrestees is representative of the arrestees who are booked in the particular locations where the program operates and produces valid estimates of confirmed drug-use levels among that group. However, these booked arrestees are not, nor were they intended to be, representative of *all* people arrested in the jurisdiction. For one reason, in many jurisdictions not all arrestees are brought to a central booking facility. In addition, the booking facilities differ considerably in the "catchment area" they serve, with some processing all arrestees apprehended by all law enforcement agencies in a given county, and others processing arrestees apprehended only by certain units.

The researchers also concluded that although comparison of DUF data from site to site is difficult, comparison of data within a given site over time is useful. This is because the type of arrestees selected differs from site to site, primarily as a result of the variations in the populations present in the booking facilities from which they are drawn. Also varying from site to site are the offenses that are well represented in each local DUF sample.

In documenting the DUF procedures, the researchers made suggestions for a number of changes in sampling procedures, data analysis, and recording. In general they felt that the universe of the sample should be more clearly designed and that the selection of arrestees should more closely approximate a probability sample. Clarification of the population from which the DUF sample is obtained would enable analysts to better understand and interpret the DUF data.[38]

Recently, the General Accounting Office conducted a review of the DUF methodology and that of two other leading indicators of drug prevalence (the National Household Survey on Drug Abuse and the High School Senior Survey). The National Institute of Justice has reviewed the final report, released in June 1993. On the basis of suggestions and directions from the DUF Methodology Committee, changes guided by the GAO report will be forthcoming.

III — The Utility of DUF Data

DUF was established partly on the basis of evidence that new drug epidemics are "forecast" in trends in urinalysis results from arrestees months before the drugs show up in other indicators of drug use in the community at large. As illicit drugs become available in the community, it seems plausible that the people who engage in deviant behavior (including criminal activity) would be among the first to use them.

Preliminary research using DUF data has laid the groundwork for the evolution of the program into a viable forecasting system. In a study based in Washington, D.C., researchers traced arrestee drug-use patterns in the period 1984 to 1990 to determine whether they affected other indicators of the drug problem. The goal was to extend the use of arrestee urinalysis results to community planning in order to better meet the need for service. The indicators the researchers examined included subsequent changes in the number of drug-related emergency room admissions, deaths by drug overdose, child maltreatment cases, and crime rates. Analysis revealed no consistent relationship between them and the drug-use data, however.[39]

Nor has the recent evidence of increased heroin use, noted above, been predicted by DUF. Some indicators of such an increase have been observed, among them a rise in the number of heroin-related emergency room episodes, which are believed to be due to stepped-up production, increased purity, and lower price. The observations have given rise to concern over a possible new heroin epidemic just when the crack epidemic may be abating. The DUF data, by contrast, show that opiate use in the period 1987 to 1992 was stable and relatively low, especially when compared to cocaine (see exhibit 3, p. 23). This was also shown to be true in a study of Manhattan (traditionally a site with a significant level of heroin

use), despite evidence that more heroin was being sold in New York City in 1991 and 1992 than previously.[40]

Even in the DUF sites that had documented the highest opiate use (Chicago, Manhattan, and San Diego), use has been generally declining. The decline may, however, be related to enforcement strategies. That is, with so much emphasis on crack, fewer heroin sellers and users may be targeted for arrest and this may cause a decrease in the detected proportion of heroin users. The decline may also be explained in part by the number of heroin users in prison or in treatment programs, or who have died of an overdose.[41] The DUF program will continue to monitor trends in the use of this drug.

Identifying emerging trends and patterns

As the DUF program evolves, renewed efforts will be made to develop its forecasting potential. Currently, the data serve as a useful tool for tracking and documenting trends in drug use.[42] This function is predicated on the belief that professionals working in treatment, law enforcement, planning, and policymaking will be able to use the DUF findings to get ahead of the curve in addressing drug-related problems.

Quarterly reporting strengthens the value of DUF in tracking trends. When the DUF program began, the decision to test arrestees quarterly was made to ensure obtaining data often enough to detect trends efficiently and permit timely response. With a 5-year baseline now established for many of the DUF sites (see exhibit 4, p. 24), this is now possible because drug use can be traced over time, patterns identified, and the requisite response made when the data reveal substantial changes in the percentage of users of a given substance.

Exhibit 3

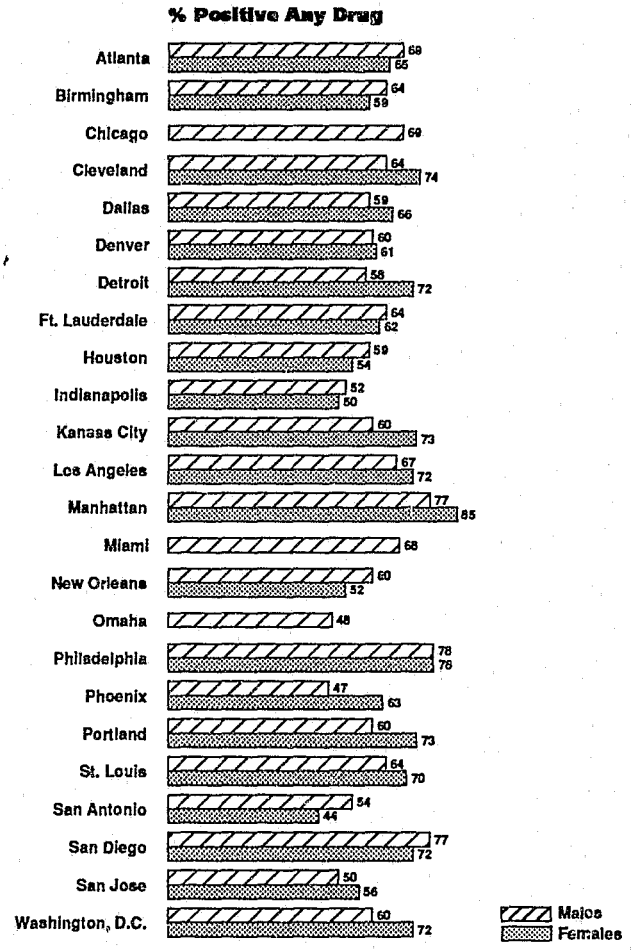
Annual Trends in Cocaine Use

Male Booked Arrestees

	% Positive					
	1987	1988	1989	1990	1991	1992
Atlanta	–	–	–	59	57	58
Birmingham	–	51	53	30	52	49
Chicago	49	58	59	54	61	56
Cleveland	–	52	56	45	48	53
Dallas	–	49	51	43	43	41
Denver	–	–	–	24	30	38
Detroit	53	51	50	38	41	37
Ft. Lauderdale	46	42	50	46	44	46
Houston	40	49	52	43	56	41
Indianapolis	–	15	26	18	22	23
Kansas City	–	41	44	30	37	41
Los Angeles	46	60	52	45	44	52
Manhattan	66	74	72	65	62	62
Miami	–	64	65	–	61	56
New Orleans	41	51	60	51	50	49
Omaha	–	21	–	10	14	16
Philadelphia	–	72	74	65	62	63
Phoenix	20	30	32	29	20	26
Portland	31	40	37	22	30	35
St. Louis	–	38	50	42	48	50
San Antonio	–	27	26	26	31	32
San Diego	35	43	41	45	45	45
San Jose	–	–	32	26	33	28
Washington, D.C.	–	–	59	48	49	44

Note: Positive by urinalysis. For each year, data were aggregated for each quarter that they were available.

Exhibit 4
Drug Use by Male and Female Booked Arrestees



Note: Positive by urinalysis, January through December 1992. Drugs tested for include cocaine, opiates, PCP, marijuana, amphetamines, methadone, methaqualone, benzodiazepines, barbiturates, and propoxyphene.

Early evidence. The value of the data as a time series to track local shifts in drug use became evident during the early DUF research projects in Manhattan and Washington, when in only a 2-year period (1984 to 1986) a steep rise in cocaine use was recorded. In Washington, D.C., trend data also helped to document the city's PCP problem. The results of urinalysis tests conducted as part of the NIJ-sponsored pretrial drug testing project confirmed police reports of a great deal of PCP on the streets. The findings prompted the expansion of local treatment resources targeted at PCP users. DUF subsequently recorded a 31-percent rate of PCP use in Washington, D.C., while at most other sites it was less than 5 percent.

Tracking specific drugs. DUF trend data helped assess whether "ice" (smokable methamphetamine) was emerging as a new drug of choice in San Diego and other DUF sites. Heavy use of amphetamines had been recorded among arrestees there and in other west coast cities. Since ice had been initially noted in Hawaii, there was speculation that the drug would soon move east. Also, media reports in the fall of 1989 suggested that ice would be the drug of the 1990's. When questions about ice were added to the DUF interview, responses indicated considerable familiarity with the drug (largely through the media), but little use of it. DUF had established a baseline for tracking amphetamines in San Diego and elsewhere, and showed that their use (which includes ice) was stable or falling at all the sites.[43]

Perhaps the most striking trend DUF has identified involves cocaine. Since 1988 it has remained the most prevalent drug among booked arrestees.[44] DUF also documented the decline in marijuana use, a trend also detected in the general population. This decline occurred at most sites in 1990 and 1991, although data for 1992 indicate a rise in use.

Site- and region-specific variations. DUF data are most useful in tracking what is happening in individual sites and regions, where

wide variation has been documented in patterns and types of drug use. For example, in 1988, DUF showed that the highest rate of drug use was in the Northeast and that in this region more arrestees tested positive for multiple drugs than anywhere else. DUF has also shown that high-rate use of some drugs is concentrated in certain cities and regions. Cocaine was found to be most widespread in the Northeast, for example. As noted above, amphetamines were found to be confined to the West (Los Angeles, Phoenix, Portland, San Diego, and San Jose, for example). PCP use tends to be concentrated at only a few DUF sites.

The site and regional variations can often be so great as to suggest there are as many different drug problems as there are cities. They also suggest the usefulness of creating site-specific profiles of drug behavior that can serve as the basis for programs tailored by the participating jurisdictions to local needs.

Demographic data. The demographic data gathered by the DUF sites permit analysis by such variables as sex and age. They have revealed some dramatic findings, notably the high rate of drug use by women arrestees. At half of the DUF sites, 50 percent or more of the women tested in 1992 were found positive for cocaine. In that year use of cocaine by women ranged as high as 72 percent and for any drug as high as 85 percent. Use of opiates, generally low, was as high as 24 percent among women in 1992. In the DUF sites that test juvenile detainees, analysis of drug use among young people revealed marijuana as the drug of choice: In 11 of the 12 sites that test juveniles, it was the most prevalent drug in this group in 1992.

Drug-use behavior. The DUF program gathers information not only about drug use and related demographics, but also about the behavior associated with drug use. Sometimes this information is obtained when a specific site adds questions to the interview protocol. For example, the AIDS epidemic prompted inclusion of

questions about needle use and needle sharing. The responses obtained in 1988 indicated that a substantial number of drug users — as high as 47 percent — injected drugs at least once. Many needle sharers indicated they changed their behavior as a result of the AIDS epidemic, but as many as 44 percent of the men interviewed at that time said they share needles. The findings highlight the need for outreach and AIDS prevention education among IV (intravenous) drug users.

Use of the data by the DUF sites[45]

DUF data are used primarily in two ways. They identify the drugs the arrestee population is using and track trends over time, and in so doing help participating jurisdictions to allocate criminal justice resources more effectively. They also provide an objective documentation of the scope of drug use among the most dangerous segment of the population, and in this way create public awareness of and support for law enforcement, prevention, and treatment programs.

When DUF findings in New Orleans signalled a serious PCP problem among young arrestees, the city responded by launching a drug prevention program. At the initiative of the sheriff's office, the DARE (Drug Abuse Resistance Education) program was introduced into area schools in 1990. This initiative may be expanded to include drug testing of juveniles on arrest. At the State level, the DUF findings were the impetus for enactment of laws that address drug use by arrestees, among them mandating pretrial drug testing for anyone charged with a felony and the inclusion of drug possession as a factor in setting bail.[46]

As noted above, concern over crack use prompted Detroit to add questions about use of this substance to the DUF interview in 1988. The answers provided a good picture of crack usage in the arrestee population and shed light on the subculture of crack use in the city.

The researchers uncovered information on frequency of use, amount consumed or shared (number of "rocks" per week), median expenditure on the drug, and location of purchase ("dope house" or elsewhere). Some of the arrestees discussed in detail the process they used to prepare crack from granular cocaine, and from the interviews a lexicon of more than 100 street terms for crack was compiled. Such information would be useful to police in conducting intelligence operations through wiretaps or other means.[47]

In four sites DUF is administered through a program funded in part by the Bureau of Justice Assistance to identify drug-dependent offenders and have them obtain treatment. In these sites (Birmingham, Chicago, Phoenix, and Portland) DUF data have been used to inform law enforcement officials and the medical community of a segment of the population about whose level of drug use little was known until DUF began: women arrestees. DUF data on this population obtained in 1988 and 1989 have proved valuable to law enforcement and the medical community in their attempts to contain AIDS.[48] The data have been useful in enabling program administrators to provide treatment alternatives that take into account the particular needs of drug-abusing women. The medical establishment is being alerted to the need to target this segment of the population for messages on the dangers of needle sharing and other risky behavior associated with drug use.

DUF findings in the cities of Chicago and Portland have provided the impetus for the States of Illinois and Oregon to establish DUF-like replications in suburban and rural counties. Illinois is supporting replications in seven suburban and rural counties, and Oregon in two rural counties, to measure drug use and monitor trends. In Illinois, DUF findings have also led to support for appropriations and legislative action to address the drug problem and to advance treatment resources throughout the State.

IV — The Need for Complementary Measurement Tools

Drug use remains high among booked arrestees — much higher than in the general population. At almost all the DUF sites, at least half the men and women tested in 1992 were found to be positive for at least one drug.[49] By contrast, in the same year only 5.5 percent of adults nationwide admitted recent use of any illicit drug.[50] At many DUF sites, the percentage of arrestees testing positive for any drug in 1992 was much higher than 50 percent. Among women, use of any drug that year ranged as high as 85 percent and among men as high as 78 percent.

For cocaine, the differential between arrestees and the population overall is even greater. A very small percentage of the general population (less than 1 percent) reported recent use of cocaine, while at the DUF sites as many as 63 percent of male arrestees and 72 percent of female arrestees tested positive for use of this substance in 1992.[51] The differential for drug preference is also striking. As has been the case since 1988, cocaine remained the drug of choice among arrestees in 1992, while among the population overall, marijuana has been the most prevalent drug for the past 20 years.[52]

As noted earlier, drug use in the general population (including high school and college students), as measured by other Federal indicators, has been declining for several years. In fact, by at least one measure the drop has been almost precipitous. Figures for 1985 indicated that 23 million people used drugs in the month before they were surveyed, while in 1992, the year of the most recent household survey, the figure was 11.4 million.[53] In other words, the percentage reporting recent drug use fell by more than half in only 7 years.

Some observers believe that the dramatic downward trend can be explained in part by the recent atmosphere of intolerance toward drugs, which could prompt an unwillingness to admit use.[54] This atmosphere, coupled with the decline in use, may have unintended implications for policymaking. If we focus only on what is happening in the general population we may wrongly conclude that the drug epidemic is subsiding. Worse still, diminishing tolerance toward drugs may cause us to lose sight of the real locus of the problem — the hard-core users who are frequently involved with the criminal justice system.[55] As drug use declines in the general population, it is possible that these hard-core users may become targeted for retribution or become a group neglected by society.[56] Yet as DUF has amply demonstrated, it is in this group that the drug problem is most acute.

Given the disproportionality and severity of drug use among arrestees, this population can scarcely be neglected. This will not happen as long as the differences in drug use between arrestees and the general population are recognized as proof that there is more than one drug problem. Because there is, more than one measure of drug use behavior helps to effectively address the issue. Since the strength of one measurement system may compensate for the limitations of another, the data sets can complement and mutually confirm each other. They also could be combined to produce as accurate a picture as possible of drug use in this country.

HOW TO RECEIVE DUF PUBLICATIONS

To receive the DUF quarterly and annual reports and other DUF publications, call NIJ's National Criminal Justice Reference Service at 1–800–851–3420 or write to: DUF Program, National Institute of Justice, 633 Indiana Avenue NW., Washington, DC 20531.

Because the drug use problem of arrestees is so severe, DUF trend data will continue to help provide direction for treatment programs, law enforcement, and other public policy responses. At the same time the program will continue to monitor the extent of the problem in this segment of the population where drug use is the most entrenched. The uses of the data to support public policy and the program's determination that the needs of the "hidden population" will not be neglected explain why DUF remains as much a call to action today as when it began.

Notable Findings From DUF

- Provided empirical evidence that drug use among offenders is almost double the levels previously estimated on the basis of self-reports.
- Documented high levels of cocaine use at a time when treatment programs were still focused on the heroin problem.
- Determined that in contrast to self-reported trends in the general population, cocaine use among arrestees has declined only moderately since the years when it peaked.
- Confirmed major differences by city and by region in drug of choice.
- Furnished data with which to identify drug treatment needs.
- Collects demographic information about arrestees that can be correlated with drug-use behavior to better target treatment efforts.
- Demonstrated that drug use among women arrestees is often very high.
- Provided evidence that a significant number of arrestees, although aware of health risks, still inject drugs and share needles.

NOTES

1. "Prevalence" means the number of people who use drugs during a specific time period.

2. A list and discussion of sources for drug use data is presented in Collins, James J. and Marianne W. Zawitz, "Federal Drug Data for National Policy," U.S. Department of Justice, Bureau of Justice Statistics, April 1990.

3. Throughout this paper, references to arrestees tested in the DUF program mean arrestees brought to the booking facility at the DUF sites.

4. *Preliminary Estimates from the 1992 National Survey on Drug Abuse*, U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, June 1993:2. The decline is also evident among high school and college students. See National Institute on Drug Abuse, *Smoking, Drinking, and Illicit Drug Use among American Secondary School Students, College Students, and Young Adults, 1975–1991*, Volume 1: *Secondary School Students*, U.S. Department of Health and Human Services, 1992:7–11; Volume 2: *College Students and Young Adults*, U.S. Department of Health and Human Services, 1992: 5–10.

5. The information on historical patterns of drug use was drawn from DuPont, Robert L., and Eric Wish, "Operation Tripwire Revisited," *Annals of the American Academy of Political and Social Science*, 521 (May 1992):91–111; Wish, Eric D. "U.S. Drug Policy in the 1990s: Insights from New Data from Arrestees," *The International Journal of the Addictions*, 25(3A), 1990–1991:377–409; Johnson, Bruce D., Terry Williams, Kojo A. Dei, and Harry Sanabria, "Drug Abuse in the Inner City," *Drugs and Crime* (vol. 13, Crime and Justice), eds. Michael Tonry and James Q. Wilson, Chicago: University of Chicago Press, 1990:9–67; and chapter 12 of David F. Musto's *The American Disease: Origins of Narcotic*

Control (expanded edition), New York: Oxford University Press, 1987.

6. Tonry, Michael, "Research on Drugs and Crime," in *Drugs and Crime* (vol. 13, Crime and Justice):4.

7. *Ibid.*

8. Johnson, Bruce D., Terry Williams, Kojo A. Dei, and Harry Sanabria, "Drug Abuse in the Inner City," in *Drugs and Crime*: 41–42.

9. *Drugs, Crime, and the Justice System: A National Report from the Bureau of Justice Statistics*, U.S. Department of Justice, Bureau of Justice Statistics, December 1992:3.

10. Summary reports of research on the drug-crime link are in Gropper, Bernard A., "Probing the Links between Drugs and Crime," National Institute of Justice *Research in Brief*, February 1985; and Graham, Mary G., "Controlling Drug Abuse and Crime: A Research Update," National Institute of Justice, *NIJ Reports*, 202 (March/April 1987):2–7. Other relevant studies are Tonry, Michael, and James Q. Wilson, eds., *Drugs and Crime*; Gandossy, R.P., J.R. Williams, J. Cohen, and H.J. Harwood, *Drugs and Crime: A Survey and Analysis of the Literature*, Washington, D.C.: U.S. Government Printing Office, 1980; Nurco, D.N. "Etiological Aspects of Drug Abuse," in DuPont, R.I., A. Goldstein, and J.O'Donnel, eds., *Handbook on Drug Abuse*. Washington, D.C.: National Institute on Drug Abuse, 1979; Wish, E.D., and B.D. Johnson, "The Impact of Substance Abuse on Criminal Careers," in Blumstein, A., J. Cohen, J.A. Roth, and C.A. Visher, eds., *Criminal Careers and Career Criminals*. Washington, D.C.: National Academy Press, 1986:52–88; Inciardi, J.A. *The War on Drugs*, Palo Alto: Mayfield Publishing Company, 1986. For evidence that people arrested or incarcerated have high levels of drug use, see the studies by Chaiken, Jan, and Marcia Chaiken,

Varieties of Criminal Behavior, Santa Monica, California: RAND Corporation, 1982; Chaiken, Marcia R., and Bruce D. Johnson, *Characteristics of Different Types of Drug-Involved Offenders*, Washington, D.C.: National Institute of Justice, 1988; Ball, J.C., L. Rosen, J.A. Flueck, and D.N. Nurco, "The Criminality of Heroin Addicts When Addicted and When off Opiates," in Inciardi, J.A., ed., *The Drugs-Crime Connection*, Beverly Hills, California: Sage Press, 1981; and Anglin, M. Douglas, and George Speckart, "Narcotics Use and Crime: A Multi-sample, Multi-method Analysis," *Criminology* 26:197–233. See also Bureau of Justice Statistics, *Drugs, Crime, and the Justice System: A National Report*, December 1992. Many of the items in this list were drawn from Eric D. Wish's "U.S. Drug Policy in the 1990s: Insights from New Data from Arrestees."

11. Carver, "Drugs and Crime: Controlling Use and Reducing Risk through Testing," *NIJ Reports*, 199 (September–October 1986):2–7.

12. Toborg, Mary A., and Michael P. Kirby, "Drug Use and Pretrial Crime in the District of Columbia," National Institute of Justice *Research in Brief*, October 1984:2.

13. Ibid:3.

14. See Visher, Christy A., "Pretrial Drug Testing," *Research in Brief*, National Institute of Justice, September 1992.

15. Graham, "Controlling Drug Abuse and Crime: A Research Update":1.

16. Toborg and Kirby, "Drug Use and Pretrial Crime":3.

17. Toborg and Kirby, "Drug Use and Pretrial Crime":2; Carver, "Drugs and Crime": 3.

18. Wish, Eric D., "Drug Use Forecasting: New York 1984 to 1986," National Institute of Justice *Research in Action*, February 1987:1.

19. The EMIT technology is explained in "Testing To Detect Drug Use," National Institute of Justice *Technology Assessment*, June 1986, volume 1, number 3.

20. Wish, Eric D., and Bernard A. Gropper, "Drug Testing by the Criminal Justice System," in *Drugs and Crime* (vol. 13, Crime and Justice), eds. Tonry and Wilson:342.

21. Carver, "Drugs and Crime":2.

22. In September and October 1986, 83 percent of arrestees tested positive for cocaine, compared to 42 percent in 1984. Wish, "Drug Use Forecasting":2.

23. Wish, "Drug Use Forecasting":4.

24. Carver, "Drugs and Crime":5.

25. The regions are defined by the U.S. Bureau of the Census.

26. A full explanation of the sampling process is presented in *Drug Use Forecasting Program Procedures Manual*, National Institute of Justice, February 1990. Copies of the manual are available from NIJ.

27. See Chaiken, Jan M., and Marcia R. Chaiken (with the assistance of E. Robert Poulin), "Understanding the Drug Use Forecasting (DUF) Sample of Adult Arrestees," Lincoln, Massachusetts: LINC, July 1993 (NIJ grant 90–IJ–CX–0051): 3. This report presents the findings of an examination of the DUF sampling strategy.

28. "Attorney General Announces NIJ Drug Use Forecasting System." *NIJ Reports*, No. 208 (March/April 1988):8–9.

29. The complete procedure is presented in *Drug Use Forecasting Program Procedures Manual*, National Institute of Justice, February 1990. The manual also contains instructions for training the interviewers.

30. Chaiken and Chaiken, "Understanding the Drug Use Forecasting (DUF) Sample":3.

31. More than half the coordinators have backgrounds in criminal justice, sociology, or related fields. Typically, they are associated with local universities, but some serve on the staff of criminal justice divisions of the State or local government. Others are associated with TASC (Treatment Alternatives to Street Crimes), a nationwide program, funded in part by the Bureau of Justice Assistance, whose purpose is to reduce the criminality of drug-dependent offenders by maximizing the rehabilitative aspects of treatment and processing through the criminal justice system. Some are on the staff of the police or sheriff's department.

32. The number of variables in the data set was 125 in 1987 and is now 277 (1991).

33. Johnson, Bruce, Andrew Golub, and Hokerrom Hossain, "Trends in Heroin Use among Arrestees," New York: National Development and Research Institutes, Inc., October 1, 1992 (partially funded under NIJ grant #91–IJ–CX–K014):26–33.

34. National Institute of Justice. *Drug Use Forecasting Annual Report 1991*. December 1992:23.

35. Mieczkowski, Tom, "Understanding Life in the Crack Culture: The Investigative Utility of the Drug Use Forecasting System," *NIJ Reports*, 217 (November/December 1989):7–9.

36. Communication from Eric Wish, developer of AutoDUF.

37. "Summary of Proceedings: DUF Advisory Board Meeting, July 30, 1992." Unpublished document, National Institute of Justice, 1992.

38. Chaiken and Chaiken, "Understanding the Drug Use Forecasting (DUF) Sample." Copies of this report are available from NIJ.

39. Harrell, Adele, Keiko Powers, and Yih-Ing Hser, "Anticipating Community Drug Problems," unpublished report submitted to the National Institute of Justice (grant #90–IJ–CX–0039), Washington, D.C.: The Urban Institute, June 1992.

40. National Institute of Justice, *Drug Use Forecasting, Annual Report 1991*, December 1992: 22–23; National Institute of Justice, *Drug Use Forecasting, Annual Report 1992*, October 1993; and Johnson, Golub, and Hossain, "Trends in Heroin Use":1.

41. Johnson, Golub, and Hossain, "Trends in Heroin Use among Arrestees": 23–24.

42. Unless otherwise indicated, the sources used in this section are the DUF annual reports.

43. Pennell, Susan, "'Ice': DUF Interview Results from San Diego," *NIJ Reports*, 221 (summer 1990).

44. National Institute of Justice, *Drug Use Forecasting, Annual Report 1992*, October 1993; National Institute of Justice, *Drug Use Forecasting, Annual Report 1991*:3, 4.

45. Only a few examples are cited here. A full discussion of the use of DUF data by the participating sites will be presented in a future NIJ *Research in Brief*.

46. Foti, Charles C., Jr., "The Effect of Drug Testing in New Orleans," National Institute of Justice *Research in Brief*, January 1993.

47. Mieczkowski, "Understanding Life in the Crack Culture."

48. Bureau of Justice Assistance, *Implications of the Drug Use Forecasting Data for TASC Programs: Female Arrestees*, November 1991.

49. National Institute of Justice. *Drug Use Forecasting, Annual Report 1992*, October 1993.

50. *Preliminary Estimates from the 1992 National Household Survey on Drug Abuse*:6.

51. In 1992 the highest rate of cocaine use among male arrestees was recorded in Philadelphia and the highest rate among women was recorded in Manhattan. The figure on cocaine use among the general population is from *Preliminary Estimates from the 1992 National Household Survey on Drug Abuse,* U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, June 1993:12.

52. Information about trends in marijuana use in the general population is from National Institute on Drug Abuse, *National Household Survey on Drug Abuse: Highlights 1991*, U.S. Department of Health and Human Services, February 1993:21; and *Preliminary Estimates from the 1992 National Survey on Drug Abuse*:11. The information on arrestee use of cocaine is from *Drug Use Forecasting, Annual Report 1992.*

53. *Leading Drug Indicators: An Office of National Drug Control Policy White Paper*, Washington, D.C.: Executive Office of the President, September 1990:9; *Preliminary Estimates from the 1992 National Household Survey on Drug Abuse*:2. The figures refer to use of any illicit drug in the month prior to the interview.

54. *Leading Drug Indicators*:7; Wish and Gropper, "Drug Use and Crime":33. If people are denying drug use, the decline may not be as steep as it appears and the figures may underestimate actual use.

55. Wish, Eric D., "U.S. Drug Policy in the 1990's: Insights from New Data from Arrestees," *The International Journal of the Addictions*, 25 (3A), 1990–1991:378–79.

56. Wish, "U.S. Drug Policy in the 1990's":378–79, 398; Musto, *The American Disease*:xi.

* U.S. G.P.O.1993-301-177:80029