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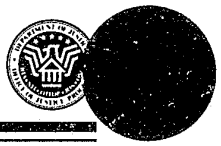

National Institute of Justice / *Issues and Practices*

Assessment of Pretrial Urine Testing in the District of Columbia

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James K. Stewart

Director

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U.S. Department of Justice
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Assessment of Pretrial Urine Testing in the District of Columbia

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Foreword

Early in 1984, the National Institute of Justice devised a research plan to determine the effect of required drug testing on the behavior of drug-using defendants granted pretrial release in the community. Earlier research had shown that offenders committed crimes at much higher rates during periods when they were actively using drugs than during times when they were drug free. We hypothesized that the risk of pretrial misconduct could be reduced if defendants who used drugs could be identified at arrest, their release conditioned on the requirement to remain drug free, and their compliance with that condition monitored by mandatory drug testing during the pretrial release period. Working in cooperation with the Superior Court and the Pretrial Services Agency of the District of Columbia, the Institute sponsored the operation and evaluation of such a program, thus building a bridge between criminal justice research and policy formulation.

As the authors of this study report, systematic pretrial drug testing can decrease the risk of defendants' pretrial misconduct. Defendants who participated in the program had rearrest rates similar to those of non-drug users, while defendants who violated conditions and dropped out were rearrested at a rate fully *twice* that of those who participated and of nonusers.

The District of Columbia assumed full funding for continued operation of the program after the study period. The Bureau of Justice Assistance is currently funding replications in six jurisdictions across the country; three of these are being evaluated by the National Institute of Justice. Indeed, these efforts provide the foundation for elements of the President's National Drug Control Strategy, which calls for the adoption of drug testing programs throughout the criminal justice system, including testing at arrest and during pretrial release. Thus, information on the experience and operation of pretrial testing programs is important as State and local governments wrestle with the problems of drug abuse and drug-related crime. The National Institute of Justice is proud to have sponsored the initial research on this topic and hopes the findings will be useful to both public officials and justice professionals throughout the country.

James K. Stewart
Director

Acknowledgments

A study of this scope required the assistance of a great many persons. We would especially like to thank James K. Stewart, Director of the National Institute of Justice (NIJ), for his keen and abiding interest in pretrial urine testing and its potential usefulness to the criminal justice system. We would also like to thank other individuals at NIJ for their help during the course of the project—in particular, Paul Cascarano of the Office of Communications and Research Utilization (OCRU), which had oversight of this project, Virginia Baldau and Jonathan Budd of the Research Applications and Training Division, and John Spevacek of the Adjudication and Corrections Division. Also, Bernard A. Gropper of the Center for Crime Control Research provided helpful, substantive suggestions throughout the study.

The project would not have been possible without the support of the D.C. Superior Court, particularly Chief Judge Fred B. Ugast and former Chief Judge H. Carl Moultrie. Other judges and hearing commissioners also contributed significantly. We especially appreciated their willingness to discuss their views with us during the research project, which helped the study reflect these practitioners' perspectives on events as well as the results of data analyses.

In addition, the cooperation of the entire staff of the D.C. Pretrial Services Agency (PSA) was necessary for the successful implementation not only of the urine-testing program but also of our research and evaluation. Although thanks are owed to the entire staff, we would especially like to thank John A. Carver, Director; Kathy Reade-Boyer, Director of Administrative Services; Johnny Jordan, Director of the Drug Detection Unit; and Edmond Pears, former Director of the Drug Detection Unit, for working with us to develop operational procedures compatible with the research study. Also, Marcello Macherelli, Matthew McCauley, and J. Daniel Welsh assisted us in compiling the data base for analysis.

We also appreciate the assistance of Eric Wish, who conducted a research project involving urine testing of arrestees in New York City. Dr. Wish was generous in sharing interim findings from his study with us.

We would like to thank Carmela Quintos and Hormoz Hekmatpanah, research assistants on the project, for their help with the quantitative analyses of risk classification and signaling discussed in chapters 3 and 4 of this Summary Report. Finally, we would like to thank Faye Logan, administrative assistant to the project, for her help with the many administrative and secretarial tasks that this project entailed.

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Introduction

Concern about drug abuse permeates American society. For example, a recent national poll found that 96 percent of American voters would like to see effective programs to fight the drug problem. This item ranked highest of any item on a list of actions that might be undertaken by the new President. In fact, 72 percent of the voters surveyed thought that programs to combat drug abuse would begin during the next 4 years.[1]

Although the widespread concern about drug abuse has many aspects, the relationship between drug use and crime is of particular importance in many communities. Interest in the topic has increased in recent years since cocaine use—often in the form of "crack"—has spread throughout the Nation and compounded preexisting drug problems stemming from the illicit use of heroin, phencyclidine (PCP), amphetamines, and other substances. As a result, there is great interest in finding effective programs to deal with the drugs-and-crime problem. This summary report presents the results of such a program, one aimed at drug use by defendants arrested on criminal charges in the District of Columbia.

Beginning in March 1984, the D.C. Pretrial Services Agency (PSA), an independent agency of the D.C. government, inaugurated a comprehensive pretrial urine-testing program for the criminal justice system of the District of Columbia, initially with funds awarded by the National Institute of Justice (NIJ), and subsequently with funds provided by the D.C. government. PSA is charged by law with (1) interviewing all arrestees to determine their eligibility for pretrial release; (2) making recommendations to the court on appropriate terms for pretrial release in all criminal cases; and (3) monitoring compliance with pretrial release conditions for all defendants, except those released on surety bond.

PSA and its predecessor, the D.C. Bail Agency, have performed these functions for more than two decades. It has been publicly recognized for its innovative approaches to pretrial release. In 1982, NIJ designated PSA an "Exemplary Project."[2]

In Washington, D.C., virtually all arrestees are brought to the D.C. Superior Court lockup; the exceptions are defendants charged with Federal offenses or relatively minor crimes. At the time of arrest, PSA attempts to test all adult arrestees for the presence of specific drugs in their urine. These drugs are opiates (primarily heroin), cocaine, PCP, amphetamines, and methadone. After the arrestees have provided urine samples, PSA staff members take the samples from the court lockup directly to PSA's laboratory (located in the same building), where they are analyzed using the enzyme multiplied immunoassay technique (EMIT).

With test results available that same day, PSA's incourt representatives, who are present at the bail-setting hearing, make pretrial release recommendations to the court. A pretrial release hearing in the District of Columbia is an adversarial proceeding between the defendant and defense attorney on one hand and the prosecutor on the other. After listening to both sides and reviewing PSA's report, the hearing commissioner makes a release decision. A release hearing usually takes only a few minutes in Superior Court.

Under D.C. law, a defendant may be released on personal recognizance; on nonfinancial conditions (i.e., subject to certain restrictions on travel, association, behavior, etc.); on financial conditions (i.e., cash, surety, or deposit bond); or into the custody of a third party. He or she may also be preventively detained if no condition or combination of conditions will adequately protect against the defendant's fleeing or endangering the community.

Most arrestees (about 85 percent) in the District of Columbia are released pending trial, rather than detained. Of the released defendants, more than 80 percent are released on some form of nonfinancial pretrial release.[3] PSA monitors compliance with any nonfinancial conditions of release imposed on defendants; this monitoring continues until a case reaches disposition.

Before PSA's urine-testing program began, the only release option specific to the needs of drug users had been referral to treatment. With the advent of the drug-testing program, however, a new release alternative became available for drug-using defendants, namely, placement in PSA's program of periodic urine testing before trial. The court considers continued drug use by a defendant, as shown by the urine-test results, a violation of pretrial release conditions. When PSA reports the violation to the court, it may impose sanctions. Because of the increased likelihood that sanctions would be imposed for a violation of release conditions, PSA considered placement in this program likely to encourage defendants to forego drug use during the pretrial period. If drug use and crime are often related, as research indicates, lower drug use could reduce defendants' pretrial criminality.[4] Finally, defendants who succeeded in the urine testing program could be expected to be better risks for release than those who failed the program.

Under a parallel NIJ grant, distinct from PSA's grant for program operations, Toborg Associates, Inc., evaluated PSA's urine-testing program. The evaluation focused on an 8-month period (June 1984 to January 1985) early in PSA's pretrial urine-testing program. For analyses of failure to appear and pretrial rearrest, cases initiated during this 8-month period were followed to final disposition. The study's findings are the subject of a series of five monographs, as follows:

• *Background and Description of the Urine-Testing Program* presents background information on drug-and-crime relationships generally and, in particular, in the District of Columbia; on the workings of the D.C. criminal justice system; and on the overall organization and mission of PSA. It also describes in detail the operations of PSA's urine-testing program, the program components, and the ways they were implemented.[5]

• *The Views of Judicial Officers* presents the findings from interviews with 25 D.C. Superior Court hearing commissioners and trial judges who had recently heard criminal cases, conducted approximately 1 year after the start of PSA's urine-testing program. Topics covered include judges' use of PSA's urine-testing information, their comparison of the current drug- testing program with the situation before PSA's program began, their opinion about the program's impact, and their assessment of the drug-crime problems in the District of Columbia.[6]

• *Analysis of Drug Use Among Arrestees* presents major findings from PSA's urine testing of arrestees in the D.C. Superior Court lockup. The monograph discusses the rates and types of drug use found; the characteristics of drug users as compared with nonusers; the results of urine tests compared with defendants' self-reports of drug use; and the pretrial release rates of drug users.[7]

• *The Efficacy of Using Urine-Test Results in Risk Classification of Arrestees* considers the extent to which the initial urine-test results from the lockup testing can predict differences in expected pretrial misconduct (i.e., pretrial rearrest and/or failure to appear for court).[8] The statistical analysis of this issue, presented in the monograph, takes into account the "selection bias" that arises because (1) some arrestees were not tested; and (2) some arrestees were not released before trial.

• *Periodic Urine-Testing as a Signaling Device for Pretrial Release Risk* presents a statistical analysis of the relation and possible correlation between the behavior of defendants ordered by the court into PSA's pretrial urine-testing program and subsequent pretrial misconduct, that is, pretrial rearrest and/or failure to appear for court. In particular, the monograph considers whether the urine-testing program can be viewed as a "signaling device" in which defendants, released to await trial, pose either high or low pretrial release risks.[9]

This summary report presents the major findings and conclusions from four of these monographs; it parallels the more detailed discussions in the individual monographs summarized above.[10] Chapter 1 describes PSA's pretrial urine-testing program; chapter 2 considers the results of the initial lockup testing; chapter 3 discusses the efficacy of using urine-test results in risk classification of arrestees; and chapter 4 assesses periodic urine testing as a signaling device for pretrial release risk. Chapter 5 provides a brief discussion of the outlook for the future, both in the District of Columbia and elsewhere. This report provides no separate summary of the monograph, *The Views of Judicial Officers*; instead, it integrates salient comments by the judges and hearing commissioners into the various chapters.

Notes

1. These results were reported in *The Washington Post*, "Bush Will Increase Taxes, Most People in Survey Believe; Work on Drugs, Arms, Environment, Deficit Most Uniformly Supported," November 12, 1988, A10.

2. Giannina P. Rikoski and Debra Whitcomb, *An Exemplary Project: The D.C. Pretrial Services Agency*, Washington, D.C. (Washington, DC: National Institute of Justice, U.S. Department of Justice, May 1982).

3. Mary A. Toborg et al., *Pretrial Release Assessment of Danger and Flight*, Appendix G (report to the D.C. Pretrial Services Agency, June 1984) and D.C. Pretrial Services Agency, 1985 Annual Report, as well as Annual Reports for later years (Government of the District of Columbia).

4. Major findings from these studies are reviewed in several articles, including Robert P. Gandossy et al., *Drugs and Crime: A Survey and Analysis of the Literature* (Washington, DC: U.S. Government Printing Office, May 1980); Bernard A. Gropper, *Probing the Links Between Drugs and Crime* (Washington, DC: National Institute of Justice Research in Brief, February 1985); William H. McGlothlin, "Drugs and Crime," in *Handbook on Drug Abuse*, ed. Robert L. Dupont et al. (Rockville, MD: National Institute on Drug Abuse, 1979); Maxine L. Stitzer and Mary E. McCaul, "Criminal Justice Interventions With Drug and Alcohol Abusers: The Role of Compulsory Treatment," in *Behavioral Approaches to Crime and Delinquency*, ed. Edward K. Morris and Curtis J. Braukmann, eds., (New

York: Plenum Press, in press); Jared R. Tinklenberg, "Drugs and Crime," in *Drug Use in America: Problem in Perspective*, Appendix, Vol. I, National Commission on Marihuana and Drug Abuse (Washington, DC: U.S. Government Printing Office, 1973); James C. Weissman, "Understanding the Drugs and Crime Connection: A Systematic Examination of Drugs and Crime Relationships," *Journal of Psychedelic Drugs 10* (1979): 171-192; and Eric D. Wish and Bruce D. Johnson, "The Impact of Substance Abuse Upon Criminal Careers," in *Criminal Careers and "Career Criminals,"* Volume II, ed. Alfred Blumstein et al. (Washington, DC: National Academy Press, 1986).

5. Mary A. Toborg and John P. Bellassai, *Background and Description of the Urine-Testing Program* (monograph prepared under a grant from the National Institute of Justice, U.S. Department of Justice, as part of the study entitled, *Assessment of Pretrial Urine Testing in the District of Columbia*, March 1988).

6. Mary A. Toborg and John P. Bellassai, *The Views of Judicial Officers* (monograph prepared under a grant from the National Institute of Justice, U.S. Department of Justice, as part of the study entitled, *Assessment of Pretrial Urine Testing in the District of Columbia*, March 1988).

7. Mary A. Toborg, Anthony M.J. Yezer, and John P. Bellassai, *Analysis of Drug Use Among Arrestees* (monograph prepared under a grant from the National Institute of Justice, U.S. Department of Justice, as part of the study entitled, *Assessment of Pretrial Urine Testing in the District of Columbia*, March 1988).

8. Anthony M.J. Yezer, Robert P. Trost, and Mary A. Toborg, *The Efficacy of Using Urine-Test Results in Risk Classification of Arrestees* (monograph prepared under a grant from the National Institute of Justice, U.S. Department of Justice, as part of the study entitled, *Assessment of Pretrial Urine Testing in the District of Columbia*, March 1988.

9. Anthony M.J. Yezer et al., *Periodic Urine Testing as a Signaling Device for Pretrial Release Risk* (monograph prepared under a grant from the National Institute of Justice, U.S. Department of Justice, as part of the study entitled, *Assessment of Pretrial Urine Testing in the District of Columbia*, May 1988).

10. These monographs are available from the National Criminal Justice Reference Service, P.O. Box 6000, Rockville, MD 20850.

Chapter 1
Description of PSA's Urine-Testing Program[1]

Program Goals

Washington, D.C., unlike many other urban jurisdictions with a substantial crime problem, has always had a high rate of pretrial release. Moreover, nonfinancial pretrial release—release on personal recognizance or release with nonfinancial conditions—has been ordered for the majority of defendants in recent years.[2] High rates of nonfinancial pretrial release result, in large part, from PSA gathering and verifying background information on defendants for the bail-setting judges to use; setting reasonable release conditions for bail under D.C. law (to insure return for trial and avoidance of criminal activity while released); effectively monitoring conditions of release in individual cases; and reporting violations to the court.

PSA's purpose for its pretrial drug testing program was twofold: (1) to provide a more reliable method (via lockup urine testing) for the bail-setting judges to determine whether a defendant had recently used drugs; and (2) to offer the court a reasonable and reliable new condition of pretrial release—periodic urine testing, monitored by PSA—that will reduce the risk of failure to appear *and* the risk of pretrial rearrest, while providing a signaling mechanism for pretrial release risk.

Initial Urine Testing in the Lockup

The initial determination of drug use is made, in most cases, while arrestees are held in the Superior Court lockup awaiting pretrial release determination.[3] Starting at 7:00 a.m., PSA staff interview defendants. They ask about residence, employment, health, criminal history, drug and alcohol use, and any pending court cases. Since the establishment of the drug detection program, urinalysis data have supplemented this information by showing whether samples of the defendants' urine, taken in the lockup, contain traces of illegal drugs.

PSA staff working in the cellblock, as part of pretrial interviewing, request that defendants provide urine; and staff then collect the specimens. Urinalysis results are then used to set the conditions for pretrial release. Although compliance is voluntary at this stage, relatively few defendants refuse to provide urine specimens.[4]

Technicians collect the first batch of urine samples, then hand-carry the specimens from the lockup area to PSA's laboratory, where they are tested. Strict chain-of-custody procedures are maintained at all times.

Any sample that tests positive for a drug is retested, again using EMIT, to verify the finding. Test results on the first batch of lockup samples are ready for presentation to the court by 10:30 a.m., when the day's first pretrial release hearings are held.

Periodic Urine Testing as a Condition of Pretrial Release

Defendants who test positive for one or more drugs at the initial (lockup) screening may be ordered by the court into a weekly urine-testing program. Each day, the PSA drug unit's intake workers process and track defendants who are scheduled for urine testing. In addition, intake workers provide defendants with a written appointment sheet indicating the date of the next scheduled urine test, and explain the sanctions they could face for noncompliance.

When defendants appear for their appointments, intake workers obtain urine samples and, using the lockup testing procedures, enter the results in PSA's computerized information system. They also record if defendants fail to appear for scheduled urine-testing appointments during the pretrial release period. Defendants are in violation of the program's rules after (a) two consecutive positive drug tests; or (b) one positive test and one failure to appear in 2 consecutive weeks; or (c) three positive tests, or failures to appear, within a 3-month period.

Under the procedures in effect when PSA conducted this study, defendants who failed the regular urine testing program were given a choice of entering a drug abuse treatment program or entering a PSA program of intensive urine testing. Defendants who entered the intensive urine-testing program had to report twice a week for urinalysis. If they failed to report or if they were found drug-positive twice, they failed the intensive urine-testing program. At that point, PSA would report to the court that the defendant had violated the conditions of pretrial release. PSA's urine-testing program had—and still has—two stages of sanctions. PSA initially imposes **internal administrative sanctions** by

requiring the defendant to enter treatment or to report for more frequent urine testing. If the defendant fails to comply with the enhanced program requirements, PSA sends an **official violation notice** to the court, along with a recommendation that a hearing determine whether the defendant is in contempt of court.

Judges have reacted in various ways to PSA's notices that defendants have violated their release conditions. Many judges have held "show cause" hearings, with many defendants sentenced for contempt. Some judges will sentence the defendant to 30 or 60 days in jail for contempt of court but will suspend all but 2 or 3 days of the sentence. According to judges who use this approach, it provides an additional hold over defendants when they are subsequently released, because they know the balance of the suspended contempt sentence may be imposed if they continue to violate their release conditions. Another approach is to sentence a defendant to 1 day of incarceration for contempt of court—a sentence that can be served in the court's lockup, and therefore does not require that the defendant be booked in and out of the crowded D.C. jail.[5]

Special Court-Ordered Urinalyses of Pretrial Releasees

On occasion, the court may request a "one test" urinalysis when a defendant returns to court as scheduled for pretrial motions, plea entry, sentencing, etc. In these cases, PSA collects and processes samples using procedures employed in initial screening. The test result is taken directly to the requesting judge, usually within an hour of the request. If the test is positive for drugs, the judge may order the defendant into PSA's urine testing program.

Management of Drug-Testing Information

PSA conducts thousands of urine tests each month and, hence, faces a major management information task. The Agency must ensure that all test results are recorded accurately and can be retrieved for any given defendant on short notice. PSA can manage the drug-testing information effectively by using the automated management information system (MIS) in place before the initiation of the drug-testing program in March 1984.

Within hours of arrest, PSA's MIS will contain comprehensive information for each defendant on present offense; concurrent probation, parole, or pretrial release status in other criminal cases; prior criminal history; community ties; employment status; and other personal history information. PSA obtains these data from interviews with all D.C. criminal defendants and from telephone verification with outside sources. With the advent of the drug-testing program, PSA expanded the MIS to include the results of the initial lockup test, subsequent tests during the pretrial release period, scheduled testing dates, and whether the defendant appeared.

PSA's enabling legislation[6] stipulates that information from defendants to set conditions of release may not be used against the defendant in any subsequent proceeding. PSA interprets this broad restriction to cover urine-test results during the pretrial period. Consequently, urine-test results cannot be used to determine guilt or innocence on the underlying charge, nor can positive test results be used against defendants who are arrested while on parole or probation on condition they remain drug free.[7]

Consistent with its statutory authorization, PSA places strict limits on access to test results, compliance information, and drug program participation. PSA provides such information only on a need-to-know basis and with the defendant's consent, and only to the court, defense attorneys, and prosecuting attorneys for pretrial release representations and decisions. PSA does not provide urine-test results to families of defendants, victims, witnesses, the police, or the media.

The limits that PSA has placed on who can be tested and on access to test results are keys to the program's success and its acceptance within the local criminal justice system. PSA has worked closely with individual Superior Court judges, the prosecutor's office, and the police department, as well as with probation and parole personnel. PSA has gained acceptance for its interpretation of confidentiality in its governing statute, and use of urine-test results in the criminal justice system.

The next chapter presents key findings on drug use among arrestees in the District of Columbia, as determined by PSA's urine-testing program. It also details how the objective data on defendants' drug use changed commonly held views on the extent of drug use among arrestees and on the types of drugs used.

Notes

1. This discussion applies to procedures in effect during the period of the research study, which ended January 31, 1985; some procedures were changed subsequently. See also John A. Carver, "Drugs and Crime: Controlling Use and Reducing Risk Through Testing," National Institute of Justice *Research in Action* series, September/October 1986; and James K. Stewart, "Quid Pro Quo: Stay Drug Free and Stay on Release," *George Washington Law Review* 57, no. 1 (November 1988): 68-76.

2. See Introduction, note 3.

3. Formerly, defendants charged with misdemeanors and released on citations from police stationhouses were not tested for drug use. However, after the first year of operation, the Superior Court's hearing commissioners began to request with increasing frequency that citation releasees be tested for drug use at their first scheduled court appearance.

4. A hearing commissioner or judge will sometimes order a defendant who refused to provide PSA with a urine sample in the lockup to report to PSA for a urine test as a condition of release.

5. Toborg and Bellassai, *The Views of Judicial Officers*, 5-6.

6. D.C. Code, Chapter 13, Pretrial Services and Pretrial Detention, Sec. 23-1301, et seq.

7. Some judges reported that defendants' performance in the urine-testing program, either before trial or after conviction but pending sentencing, affected sentencing decisions for those defendants who were convicted. Successful urine-test results prior to sentencing were viewed as good indicators that probation outcomes were likely to be successful as well. On the other hand, continued drug use before trial or pending sentencing was considered a strong indicator that drug use would likely continue, if the user was placed on probation. Because of the perceived relationship between drug use and crime, several judges reported a reluctance to place persons who cannot abstain from drug use on probation. Toborg and Bellassai, *The Views of Judicial Officers, op. cit.*, pp. 9-10.

Chapter 2
Results of Lockup Testing

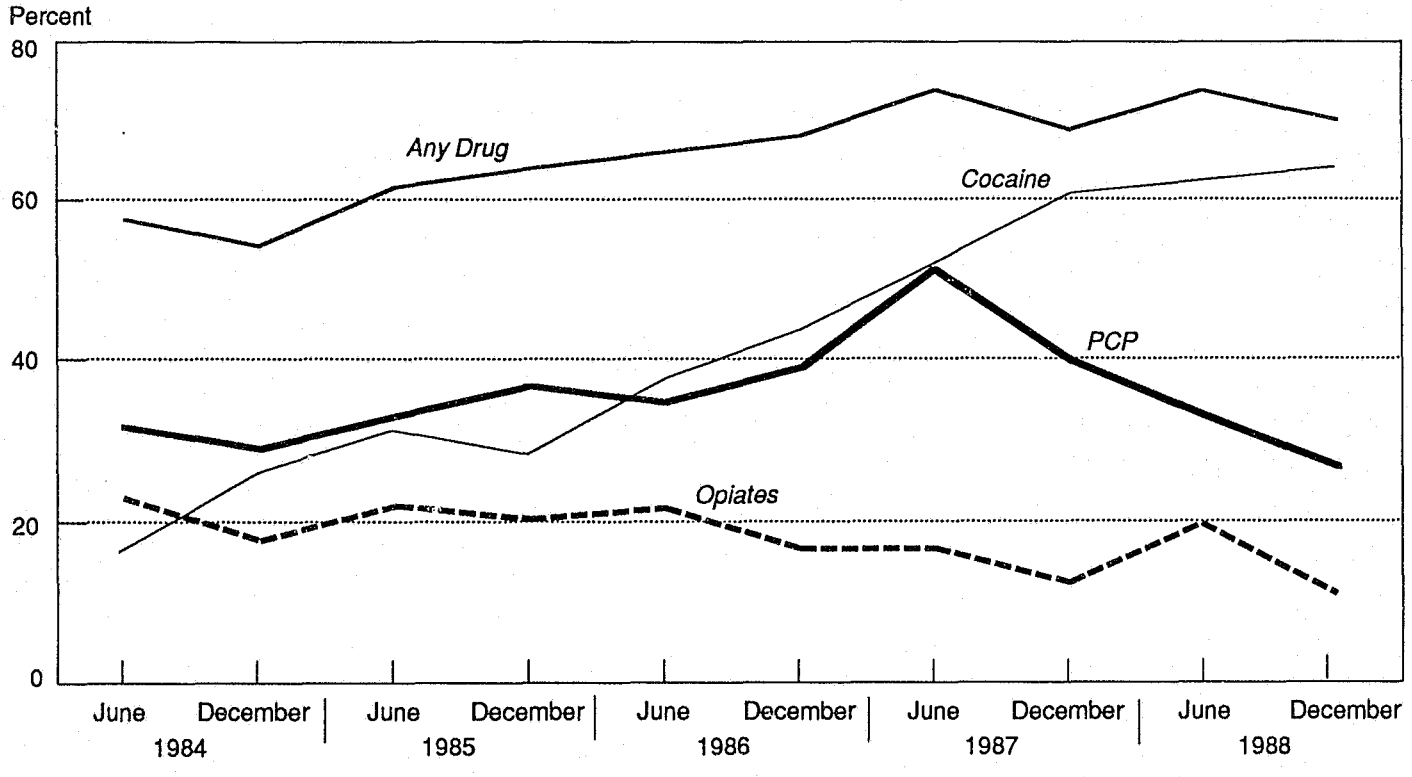
As discussed in the last chapter, PSA's urine-testing program has two major components: (1) lockup testing of defendants shortly after arrest; and (2) periodic testing of selected defendants who are awaiting trial. This chapter presents major findings from the lockup testing, including the rates of drug use and the kinds of drugs used, and provides a comparison of urine-test results with defendants' self-reports of drug use.

Rates of Drug Use Among Arrestees

With the initiation of PSA's urine-testing program in March 1984, objective data became available about the extent of drug use among arrestees in the District of Columbia. These data showed a much higher rate of drug use than expected: **more than half the tested arrestees used one or more of the five drugs for which the tests were conducted**–opiates, cocaine, PCP, amphetamines, and methadone. Before the urine-testing program, local criminal justice officials had thought that about one-fourth of arrestees would test positive. The extent of drug use among arrestees, as determined by urine tests, was approximately double this level. Moreover, because urinalysis detects drugs in the urine for a limited time (approximately 2 to 8 days, depending on the drug) and because the urine tests are conducted only for selected drugs, it is likely that the extent of drug use among arrestees is higher than the urine tests indicate.

Drug use among arrestees has not declined since PSA's urine-testing program began. As shown in figure 1, rates of drug use have increased since that time. In December 1988, for example, almost three-fourths of the arrestees tested drug-positive.

Figure 1
Drug Test Results for Selected Drugs
(Based on 70,489 tests of arrestees, Mar. 1984–Dec. 1988)



When PSA's urine-testing program first began, the rate of drug use was highest for PCP (used by about one-third of the tested arrestees), followed by opiates (used by about one-fifth of those tested), and cocaine (used by about one-sixth of those tested). Use of amphetamines or methadone was comparatively rare (less than 5 percent of the tested arrestees used each of these drugs). The high rate of PCP use surprised many people in the jurisdiction. As a result of this, and the subsequent media attention it received, new efforts were initiated to expand the treatment facilities for PCP users in the District of Columbia.

Over time, PCP use increased and then declined, while opiate use remained fairly stable for more than 2 years and then declined slightly. Cocaine use increased dramatically over the same time period. **By December 1988, fully 64 percent of the tested arrestees were positive for cocaine**; this is four times higher than the rate of cocaine use when PSA's urine-testing program began in March 1984.

Many drug-positive defendants used more than one drug; indeed, **approximately one-third of the drug-positive defendants used several drugs.** The most common drug-use combinations were (1) opiates and cocaine and (2) cocaine and PCP.

Comparison of Urine-Test Results With Defendants' Self-Reports

Because PSA asks defendants about their drug use in its lockup interview, the defendants' self-reported drug use can be compared with the urine-test results. As shown in table 1, during the 8-month period (June 1984-January 1985) studied by the Toborg Associates' research project,[1] less than one-half of the drug users identified by urine tests told PSA they were using drugs.

PCP users were especially unlikely to report that they were using drugs—only about one-third did so. Heroin users were the most likely to report drug use, perhaps because the signs of intravenous heroin use are frequently difficult to disguise. Even so, more than one-third of the heroin users did not report any drug use.

Table 1
Comparison of Urine-Test Results With Arrestees' Self-Reported Drug Use in Washington, D.C. (June 1984-Jan. 1985)

Type of drug use identified by urine test	Total number of drug users identified by urine test	Arrestees who self-reported their drug use	
		Number	Percent of total users
Any drug	3,282	1,457	44.4%
One drug only	2,172	819	37.7
Two or more drugs	1,110	638	57.5
Cocaine only	376	130	34.6
Opiates only	446	277	62.1
PCP only	1,264	386	30.5
Opiates and cocaine only	439	325	74.0
Cocaine and PCP only	302	108	35.8
Opiates and PCP only	140	65	46.4
Cocaine, opiates, and PCP	104	59	56.7
Any use of cocaine	1,221	622	50.9
Any use of opiates	1,129	726	64.3
Any use of PCP	1,810	618	34.1

These findings strongly suggest that reliance on arrestees' self-reports of drug use will significantly underestimate its extent. Moreover, recent research in New York City had similar findings: 50 percent of the drug users identified by urine tests had reported in a confidential research interview that they used drugs; 67 percent of the opiate users, 48 percent of the cocaine users, and 25 percent of the PCP users reported their use of these drugs.[2] These findings also confirm those of an earlier (1976) study of six cities, which concluded that there was low correspondence between interview data and urinalysis results for all drugs except heroin.[3]

Drug Use by Charge

A substantial percentage of defendants in all charge categories tested positive for drug use, as shown in table 2. For example, more than half the tested defendants charged with robbery, two-fifths of the tested defendants charged with burglary, and about one-third of the tested defendants charged with assault were drug-positive.

These findings are inconsistent with the argument that selective urine screening for defendants facing certain charges would be more efficient than mass urine screening of all arrestees. Based on the experience in the District of Columbia, such an approach would miss substantial numbers of drug users. For example, a program that tested only arrestees charged with drug possession or sale would miss one-half of all arrestees who used drugs in the District of Columbia. If urine tests were also conducted for arrestees charged with robbery, burglary, larceny, fraud, or forgery, approximately one-third would still be missed. Hence, comprehensive identification of drug-using arrestees would seem to require urine testing of all arrestees. Screening by selected charges is likely to miss a substantial portion of drug-using arrestees.

Table 2
Drug Use by Charge, Washington, D.C.
(June 1984-Jan. 1985)

Offense charged	Number Tested for drugs	Percent positive for drugs
Drug possession or sale	2,292	71.8
Receiving stolen property	161	54.0
Robbery	359	52.6
Flight or escape	141	48.2
Auto theft	318	47.8
Larceny	423	47.0
Weapons	224	43.8
Burglary	368	41.6
Prostitution	436	39.2
Destruction of property	186	34.4
Assault	670	33.3
Other offenses	335	43.0
Total	**5,913**	**54.0**

Rates of Drug Use by Age and Gender

Patterns of drug use vary considerably by age and gender, as shown in table 3. Rates of PCP use are highest for the youngest arrestees (ages 18-21) and are sharply higher for men than women. In general, rates of opiate or cocaine use increase for both men and women until ages 31-35 and then decline.

Women, who constituted 18 percent of all arrestees during the period studied, had the same overall rate of drug use (52 percent) as men. However, when comparing age groups, PSA found that women arrestees were more likely to use opiates or cocaine and less likely to use PCP.

Once again, the findings from the research in New York City were similar: PCP use was concentrated among the young; use of opiates or cocaine increased until ages 31-35 and then declined; and women used opiates and cocaine at earlier ages and at higher rates than did men.[4]

The strikingly high rates of drug use found among younger arrestees in the District of Columbia provided impetus for establishing a program of urine testing for juveniles facing criminal charges. As one judge, interviewed about the adult urine-testing program, said, "We may be losing the battle at the juvenile level. The adult courts see drug users at age 18, but you know they didn't just start using drugs then." Similarly: "If you can get young kids identified as drug users at 14 or 15, you can really deal with the problem. You have a much higher chance of success than with older drug users. Juvenile drug testing should be our number one priority now."[5] It was partly as a result of these widely expressed concerns about drug use among juveniles that the National Institute of Justice funded a demonstration project in the District of Columbia to conduct urine testing of juvenile respondents and probationers. This program, also run by PSA, began operation in October 1986 and is being evaluated by Toborg Associates.

Table 3
Drug-Test Results by Age, Gender, and Drug

Item	Age group 18-21	22-25	26-30	31-35	36-40	41-up	Total
Percent positive for any drug							
Males	56%	58%	55%	53%	46%	32%	52%
Females	43	53	59	60	56	27	52
Percent positive for cocaine							
Males	10	17	22	22	19	15	18
Females	16	23	28	31	25	6	23
Percent positive for opiates							
Males	3	10	24	27	24	19	17
Females	7	18	29	37	31	14	22
Percent positive for PCP							
Males	52	46	29	17	12	5	31
Females	30	23	17	9	16	3	19
Percent positive for more than one drug							
Males	10	15	21	20	15	13	16
Females	13	18	27	32	34	13	22
Number tested							
Males	934	988	1,089	822	397	465	4,695
Females	215	289	272	138	68	63	1,045

Rates and Types of Pretrial Release

Table 4 shows the pretrial release rates for nonusers of drugs compared with users of only one drug and with users of two or more drugs (defendants are categorized as drug users or nonusers based only on the urine-test results). Also shown are the pretrial release rates for users of specific drugs. By number of drugs used, release rates were highest for nonusers of drugs (82.2 percent), followed by users of only one drug (72 percent); pretrial release rates were lowest for users of two or more drugs (74.1 percent). By type of drug used, release rates were highest for users of PCP only (84 percent) and lowest for users of opiates and cocaine (69.5 percent).[6]

Before PSA's urine-testing program began, there had been some concern that rates of pretrial detention might increase, and rates of nonfinancial release might decrease, if judicial officers possessed accurate information on the extent of drug use by arrestees. No such changes in release practices occurred. Indeed, rates of nonfinancial release rose slightly after initiation of the program: from 67 percent in 1983 to 70

Table 4
Pretrial Release Rates by Number and Types of Drugs Used, Washington, D.C. (June 1984-Jan. 1985)

Drug use	Pretrial release rate	Number released
No drugs	82.2%	2,367
One drug only	80.2	1,741
Two or more drugs	74.1	822
Cocaine only	79.0	297
Opiates only	70.2	313
PCP only	84.0	1,062
Opiates and cocaine only	69.5	305
Cocaine and PCP only	79.5	240
Opiates and PCP only	77.9	109
Cocaine, opiates, and PCP	73.1	76

percent in 1984 and 71 percent in 1985.[7] When interviewed, judges and hearing commissioners explained that they were now willing to "take a chance" on releasing drug-using defendants who might previously have been detained on high bond if the judge had suspected drug use (e.g., due to a drug-related charge or history of drug abuse). Now, judicial officers were willing to consider release **on condition of participation** in PSA's pretrial urine-testing program.[8]

Most of the judges interviewed thought that drug use was a good indicator that a defendant might fail to appear for court or be rearrested before trial. The next chapter presents the results of empirical analysis of this point.

Notes

1. The numbers presented in table 1 and all subsequent tables in this chapter are based on a 60-percent random sample of the full data set.

2. Eric D. Wish, Elizabeth Brady, and Mary Cuadrado, "Drug Use in Arrestees: Findings From Manhattan," paper presented at the NIJ conference "Drugs and Crime: Detecting Use and Reducing Risk," Washington, D.C., June 5, 1986).

3. William C. Eckerman et al., "Insights Into the Relationship Between Drug Usage and Crime Derived From a Study of Arrestees," in *Appendix to Drug Use and Crime: Report of the Panel on Drug Use and Criminal Behavior*, National Institute on Drug Abuse and Research Triangle Institute, (September 1976).

4. Wish, Brady, and Cuadrado.

5. Toborg and Bellassai, *The Views of Judicial Officers*, 14-15.

6. Release rates are somewhat understated, due to incomplete data on (1) whether defendants who had bonds set as their release conditions eventually posted those bonds; and (2) whether defendants initially detained on 3- or 5-day holds were subsequently released. However, these release/detention options are imposed on only a minority of D.C. defendants; the vast majority of D.C. defendants—about three-fourths—are released on some type of personal recognizance.

7. Data provided by John A. Carver, Director, D.C. Pretrial Services Agency.

8. Toborg and Bellassai, *The Views of Judicial Officers*, 11-12.

Chapter 3
The Efficacy of Using Urine-Test Results in Risk Classification of Arrestees

Systematic urine testing for all arrestees raised the possibility that urine-test results could improve pretrial risk classification of defendants in the District of Columbia.[1] Whether urine tests improve pretrial risk classification depends on the test results' contribution over and above the factors already used for risk classification (e.g., community ties and prior record).

Pretrial risk classification is difficult because defendants are selected for different types of pretrial release based on the court's judgment that they pose different levels of pretrial release risk. Hence, some defendants are released unconditionally before trial; others are released on compliance with certain restrictions during the pretrial period (e.g., curfew, or posting a money bond); and others are detained until trial. Because of these differences in release conditions, it is difficult to develop statistical estimates of pretrial release risk posed by all arrestees.

For example, only those defendants who are actually released before trial could be rearrested before trial or fail to appear for court. Hence, direct observation of those outcomes is limited to released defendants. However, released defendants are only part of the total population of arrestees. Moreover, released defendants are, presumably, better release risks than detained defendants. Released defendants—the only defendants who could be rearrested before trial or fail to appear for court—constitute a biased sample of all arrestees. To be useful, though, risk classification for pretrial rearrest and/or failure-to-appear risk

Table 5
Results of Multivariate Analyses To Identify Major Factors Affecting Pretrial Outcomes

Independent variable	Pretrial rearrest	Failure to appear	Pretrial misconduct
Constant	0	0	0
Employed	-	-	-
Probation, parole, or pending case	+	0	0
Prior conviction(s)	+	+	+
Lockup drug test results			
Cocaine only	0	+	+
Opiates only	0	+	+
PCP only	+	-	0
Opiates and cocaine	0	+	0
Opiates and PCP	0	0	0
PCP and cocaine	0	0	0
Three or more drugs	+	0	0

Note:

"+" indicates that, at the time of arrest, a positive urine-test result for the drug(s) shown had a positive and statistically significant association with subsequent failure to appear, pretrial rearrest, or pretrial misconduct.
"-" indicates a negative and statistically significant association.
"0" indicates no statistically significant association.

must apply to all arrestees—those detained after arrest as well as those released.

The Toborg Associates' analysis of risk classification used multivariate statistical techniques (trivariate probit) that are designed to deal with the problem of selection bias.[2] Specifically, these techniques provide unconditional statistical estimates of arrestees' release risks, rather than estimates conditional on the type of pretrial release they received. Stated differently, these statistical techniques provide estimates of release risks for all defendants, not just those released before trial. Moreover, the analysis estimates the incremental contribution of urine-test results to risk classification for all arrestees. Finally, the classification analysis does not require resolution of the debate on whether drug usage and criminality are causally related or simply highly correlated behaviors (perhaps stemming from joint causation by other factors).

The analyses demonstrate that **urine-test results make a consistent, significant, incremental contribution to pretrial risk classification for arrestees in the District of Columbia.** Analysis by type of drug also shows that specific drugs and combinations of drugs relate in different ways to the risk of pretrial rearrest, failure to appear, or overall pretrial misconduct (a composite measure, consisting of failure to appear, pretrial rearrest, or both). This point is illustrated in table 5, which simplifies the results of a typical set of multivariate analyses, based on data for a sample of 7,883 arrestees (see appendix A for the detailed results). As shown in table 5, the use of PCP only or the use of three or more drugs (determined by the lockup urine test conducted shortly after arrest) had a positive, significant association with pretrial rearrest. The use of cocaine only, opiates only, or the combination of opiates and cocaine had a positive, significant association with failure to appear, while the use of PCP only had a negative, significant association with that outcome. For overall pretrial misconduct, the use of cocaine only or opiates only showed positive, significant associations.

Note that use of PCP only is positively related to pretrial rearrest and negatively related to failure to appear. When both outcomes are combined in the single variable pretrial misconduct, the individual effects offset each other. This finding indicates that **classification systems designed to deal only with failure to appear should assess urine-test results substantially differently from systems for the prevention of pretrial rearrest or the prevention of both failure to appear and pretrial rearrest.** In this regard, PSA's dual recommendation system, with separate risk assessments for failure to appear and rearrest, seems particularly appropriate.

Although table 5 shows only the **direction** of the relationship, it is important to stress that the **magnitude** of the effects shown is sometimes quite large. For example, a positive urine test for cocaine only resulted in an increase in the marginal probability of failure to appear of about 15 percentage points. Given that the mean probability of failure to appear is approximately 20 percentage points, a marginal probability effect of 15 points is 75 percent of the mean. Clearly, this is a huge probability increase for failure to appear associated with positive urine tests for cocaine only.

The results shown in table 5, as stated previously, are based on multivariate analyses assessing the incremental contribution of urine-test results to risk classification. Thus, the analysis first scanned for other factors that might affect failure to appear, pretrial rearrest, or pretrial misconduct, and then considered the additional effect of urine-test results. As shown in table 5, there were only a few variables besides urine-test results that were significant in these pretrial outcomes. Those variables were employment, which was negatively related to all three outcomes studied; prior conviction(s), which was positively related to all three outcomes; and probation, parole, or pending case when arrested, which were positively related to pretrial rearrest (though not to failure to appear or overall pretrial misconduct).

Visher and Linster analyzed the District of Columbia urine-testing data and applied a hazard (or survival) model of pretrial rearrest risk to the data for a sample of 2,662 male defendants released on their own recognizance prior to trial. The authors concluded that "the most striking result in these analyses is the size of the risk multiplier associated with a positive drug test result. For subjects testing positive for a single drug other than PCP, the rearrest risk in the early weeks after release is three to four times as great as their drug-negative counterparts; and if two drugs are involved, it is nearly five times as great."[3] The hazard model is not appropriate for failure to appear, but these rearrest results are consistent with those obtained using probit techniques. In addition, Smith, Wish, and Jarjoura analyzed urine-test results for a sample of 2,606 New York City arrestees to assess whether urine-test data improved pretrial risk classification.[4] The authors considered two pretrial risk outcomes: failure to appear for court and pretrial rearrest. For each of these outcomes, analyses using censored probit models found that drug-positive urine-test results were significantly associated with release risk, over and above the other information typically available to judges making release decisions.

Specifically, after scanning for other factors that might affect those outcomes, the study found that the number of drugs for

which an arrestee tested positive was significantly related to the subsequent probability of failure to appear and of pretrial rearrest. The drug(s) used affected the release risk; persons testing positive for heroin or cocaine had a higher probability of failure to appear, while those testing positive for PCP were significantly more likely to be rearrested.[5]

Thus, the New York City analysis had findings similar overall to those of the District of Columbia study. In particular, the results of urine tests conducted shortly after arrest were important, statistically significant predictors of pretrial release risk. The urine-test results made an incremental contribution to pretrial risk assessment, over and above the explanatory power provided by other factors used for risk classification, such as prior record and community ties. This suggests that use of urine-test results in an operational context, such as the District of Columbia, can indeed improve risk classification of arrestees.

Notes

1. For recent studies of pretrial risk classification, see John S. Goldkamp, Michael R. Gottfredson, and Susan Mitchell-Herzfeld, *Bail Decisionmaking: A Study in Policy Guidelines* (report to the National Institute of Justice, U.S. Department of Justice, 1981); Samuel Myers, "The Economics of Bail Jumping," *Journal of Legal Studies 10* (June 1981): 381-396; William Rhodes et al., *Pretrial Release and Misconduct in Federal District Courts* (Special Report to the Bureau of Justice Statistics, U.S. Department of Justice, December 1984); Liese Sherwood-Fabre, *An Experiment in Bail Reform: Evaluating Pretrial Release Services Agencies in Federal District Courts* (report to the National Institute of Justice, U.S. Department of Justice, 1984); and Mary A. Toborg et al., *Classification Systems for the Accused: An Empirical Analysis of Washington, DC.* (Final Report to the National Institute of Justice, U.S. Department of Justice, 1986).

2. See Lung-Fei Lee, "Sequential Discrete Choice Econometric Models With Selectivity" (mimeograph, University of Minnesota, 1984); and Mary A. Toborg et al., *Classification Systems for the Accused: An Empirical Analysis of Washington, DC.* Final Report to the National Institute of Justice, U.S. Department of Justice, 1986). See also Robert P. Trost and Anthony M.J. Yezer, "Sequential Selection and Selectivity in a Model of the Market for Bail Bond," Business and Economics Section, *Proceedings of the American Statistical Association* (1985). Additionally, see the work based on the bivariate probit model by John M. Abowd and Henry S. Farber, "Job Queues and the Union Status of Workers," *Industrial and Labor Relations Review* 35 (1982) 354-367; Henry S. Farber, "Worker Preference for Union Representation," *Research in Labor Economics* 2, Supplement (1983): 171-205; Raymond H.P. Fishe, Robert P. Trost, and Philip Lurie, "Labor Force Earnings and College Choice Among Young Women: An Examination of Selectivity Bias and Comparative Advantage," *Economics of Education Review* (1981): 169-191; Chung-Lo Meng and Peter Schmidt, "On the Cost of Partial Observability in the Bivariate Probit Model," *International Economic Review* 26, no. 1 (February 1985): 71-85; and Dale J. Poirier, "Partial Observability in the Bivariate Probit Model," *Journal of Econometrics* 44 (February 1980): 210-217.

3. Christy Visher and Richard Linster, "A Survival Model of Pretrial Failure" (draft discussion paper presented at the 1988 annual meeting of the American Society of Criminology), 23.

4. Douglas A. Smith, Eric D. Wish, and G. Roger Jarjoura, "Drug Use and Pretrial Misconduct in New York City," *Journal of Quantitative Criminology* 5 (June 1989): 101-126.

5. Ibid.

Chapter 4
Periodic Urine Testing as a Signaling Device for Pretrial Release Risk

Background

One component of PSA's pretrial urine-testing program is periodic analysis of urine specimens from selected drug-using defendants who are on release awaiting trial. This chapter presents the results of statistical analyses of the relationship between participation in this program and pretrial rearrest, failure to appear, or overall pretrial misconduct (defined as pretrial rearrest and/or failure to appear).

The analysis covers defendants arrested during an 8-month period (June 1984-January 1985) shortly after PSA's urine-testing program began. During that time drug-using defendants released to await trial were randomly assigned to three groups. One group was placed in the periodic urine testing before trial program; a second was referred for treatment to the citywide drug abuse treatment agency (an established practice predating the PSA urine-testing program); and the third was a control group, released with neither urine testing nor referral to treatment. Altogether, approximately 2,000 defendants were placed in these three groups during the 8-month experiment.

During the design phase of the experiment, PSA concentrated on developing criteria for failure in the urine-testing program and determining an appropriate response. PSA staff, other local criminal justice practitioners, and the Toborg Associates research team discussed the issues extensively; their resolution required that tradeoffs be made between program needs and research needs. The final solution divided the urine-testing program into two phases. Defendants were first placed in regular urine testing, which provided once-a-week urinalysis. Those who failed this phase of the program—by testing positive for drugs, or by failing to appear for a drug test, either twice in a row or three times over 3 months—entered a second phase. They were given the option of either entering intensive urine testing, which provided for twice-a-week urinalysis, or being referred to treatment. A violation was reported to the court only for failure in intensive urine testing or treatment, not for failure in the first phase (regular urine testing) of the program. (See appendix B for more information about the experiment.)

This approach was taken for two reasons. First, PSA had a history of offering defendants a second chance before reporting release condition violations, and it did not want to change this policy. Second, there was some concern by PSA that its reports of urine-testing violations would lack credibility with the court if those defendants who were reported to have failed had never been offered the option of treatment.

The following analysis is limited to those defendants who were part of this experiment; it does not apply to all arrested defendants or even to all released defendants during that time. Rather, it deals with defendants who (1) tested positive—at the lockup test, shortly after arrest—for drugs and/or who admitted drug use, (2) were not already in treatment and did not request referral to treatment, and (3) were released pretrial on nonfinancial conditions.

While participants in the experiment were selected because they were drug users, the object of the experiment was to evaluate the potential role of urine testing as a pretrial release condition, rather than to test relationships between drug use and crime. For a variety of reasons, any urine test is an imperfect indicator of drug use. Most important is the problem of detecting drug use, particularly opiates and cocaine, which are eliminated from the body relatively quickly (within about 48 hours after use). Also, false positives and false negatives can be important, and these vary by type of drug. PSA made no attempt to adjust the urine-test results for problems such as differential detectability, because the hypotheses predicted the effects of urine tests, not the effects of drug use.

The analyses examined two fundamental questions:

1. Did the relative success of the defendants in PSA's urine-testing program correlate statistically with rates of pretrial rearrest, failure to appear, or overall pretrial misconduct?

2. Did an initial urine-testing program assignment—rather than a treatment referral or a referral to a control group—result in a lower than expected rate of pretrial rearrest, failure to appear, or overall pretrial misconduct?

These questions stem from the role of urine tests (and other pretrial release conditions) in changing defendants' incentives and, hence, their behavior. Two types of defendant responses are of particular interest. A **direct incentive effect** occurs when defendants placed in urine-testing programs lower their drug use and/or their level of pretrial misconduct because they fear the consequences of failure in the pretrial urine-testing program. The direct incentive effect operates by reducing the chances for the defendant to engage in pretrial misconduct without being detected (the "detection" effect) and/or by increasing the penalties facing the defendant if misconduct is discovered (the "punishment" effect). The second fundamental research question listed above concerns the size of the direct incentive effect generated by the urine-testing condition of pretrial release.[1]

Besides the direct incentive effect, a urine-testing condition of pretrial release may provide information through "**signaling.**" Defendants may show—or "signal"—that they are good release risks by complying with the pretrial urine-testing condition. This is the basis of the first fundamental question listed above.[2]

The effectiveness of a signaling device depends on its ability to separate defendants who are less likely to engage in pretrial misconduct from those who are more likely to do so. Consequently, a successful signal must be based on behavior that is comparatively more difficult to achieve for individuals whose greatest tendency is to engage in misconduct. For example, a requirement to call in periodically during the pretrial release period would probably not serve as an effective signal of law-abiding behavior because defendants engaged in illegal activities could produce the signal (i.e., report daily by telephone) as well as anyone else without lowering the benefits of engaging in crime. A good signaling mechanism must also permit reliable screening at acceptable cost.

Periodic urine testing appears to meet the criterion for an effective postarrest signal for pretrial releasees. Modern technology makes screening for drug use through urinalysis both relatively precise and relatively inexpensive. It is also likely that defendants who engage in pretrial misconduct will have greater difficulty eliminating or substantially reducing drug use than those who do not. This hypothesis seems reasonable because the same discipline that promotes the elimination of illegal drug use should lower pretrial misconduct, and because the greater the drug dependence of the defendants, the more likely the association with crime.

One of the interesting features of pretrial urine testing as a signaling mechanism is that it is a postarrest signal; i.e., defendants signal their level of pretrial release risk by actions they take after pretrial release. The signaling mechanism does not depend—as many risk classification systems do—on prearrest variables, such as residence, employment, or prior record. Although prearrest signaling mechanisms (or classification systems) have been widely used to separate high- from low-release-risk defendants, few postarrest signaling mechanisms now exist at the pretrial stage.

Note that the argument that the continued use of drugs (or nonuse) serves as a postarrest signal of risk does not require resolution of the controversy over whether drug use is a cause or a correlate of crime. Rather, the efficiency of drug testing as a signaling device rests on the hypothesis that, among arrested defendants who test positive for drugs, those who are less likely to engage in pretrial misconduct are also those who will find it easier to reduce drug use. It may be that drug use, once reduced, will also lower the need or desire for pretrial misconduct, but it is not necessary to prove this to show that urine testing is a good signaling device.

Major Findings

With regard to the first question, our study statistically analyzed pretrial arrest, failure to appear, and overall pretrial misconduct by estimating equations that incorporated personal characteristics, criminal history, current charge(s), and lockup urine-test results for the defendants during the 8-month study.[3] Defendants were "successful participants" in the program if they appeared as scheduled for three or more urine tests beyond the initial lockup test. They were considered "nonparticipants" otherwise (i.e., if they failed to report for urine testing at all or if they dropped out before the third test beyond the lockup test).[4] These analyses showed that the defendants' decisions to participate or not participate in urine testing separated them into two groups with differences in expected pretrial rearrest rates, failure-to-appear rates, and overall pretrial misconduct rates. These differences were large and statistically significant, indicating that successful participation in the pretrial urine-testing program signaled defendants' pretrial release risks. (Detailed results of the analyses appear in appendix C.)

Table 6 shows that, for all three outcome measures, **the defendants who participated in the PSA urine-testing program—defined as appearing for four or more total tests (the lockup test plus three subsequent tests)—performed better than other defendants, while those who dropped out did notably worse.** Rates of pretrial rearrest, failure to appear, and overall pretrial misconduct for defendants who participated in urine testing were about one-half the rates for defendants who dropped out of the urine-testing program. This large difference may reflect an unwillingness to appear for urine testing by the heaviest drug users, who know that their test results would certainly be

positive. Furthermore, heavy drug users may have personal characteristics that are difficult to measure but that are systematically associated with higher rates of pretrial rearrest and failure to appear. This, of course, is precisely the manner in which a successful signal works. In this case, urine testing allows defendants with the best release risks to demonstrate their reliability.

Altogether, approximately two-thirds of all defendants referred to the urine-testing program participated in it—again, participation defined as appearing for at least four total tests. Defendants who participated in the urine-testing program also performed better than persons referred to treatment or those placed in the control group.

Table 6
Pretrial Rearrest, Failure-To-Appear, and Misconduct Rates by Urine-Testing Status

Urine-testing status	Pretrial rearrest rate	Failure-to-appear rate	Pretrial misconduct rate
Participated in urine testing	16.4%	16.9%	29.0%
Dropped out of urine testing	33.1	33.4	52.6
Referred to treatment	20.4	19.7	35.7
Placed in control group	20.7	18.6	34.7

The differences in percentage rates of pretrial misconduct between defendants who participated and those who did not participate in urine testing were very large and very significant statistically. This is the type of separation associated with signaling. By continuing to appear for urine testing, defendants signal that they pose low risks of pretrial misconduct. Screening is easily achieved because the simple criterion of appearing for four tests is sufficient to establish a separation. In 1988, Visher conducted another analysis of the Washington, D.C., urine-testing data. Visher used different analytic techniques, was limited to male defendants, and considered only pretrial rearrest. She found that the pretrial rearrest rate of the defendants who participated in the pretrial urine-testing program was about one-third lower than the pretrial rearrest rate for defendants who dropped out of the program.[5] The analysis also shows that the pretrial urine-testing program signals that program participants have lower rates of pretrial rearrest than nonparticipants.

With regard to the direct incentive effect of assignment to urine testing, probabilities of pretrial misconduct did not vary significantly by the initial assignment to the urine testing, treatment referral, or control groups. Given the structure of the experiment, which permitted defendants initially assigned to the urine-testing group to seek treatment subsequently, this result is understandable.

Moreover, after PSA's assignments of defendants to the three groups for the experiment, some judges ordered defendants from the treatment referral and control groups into urine-testing. This was possible because the pretrial period in Washington, D.C., often spans many months, with defendants making many court appearances prior to final case adjudication. As knowledge of the urine-testing program spread, judges began ordering defendants into it—after the initial release decision but before the final disposition of the case. Ironically, although the judges' actions showed their high regard for the urine-testing program—an outcome measure for the program as a whole—these actions degraded the comparability of the three groups (attained by random assignment) for the balance of the pretrial period. The experiment therefore could not test the effect of urine testing versus (1) referral to treatment or (2) no intervention on pretrial rearrest and/or failure to appear.

In addition, no clear-cut findings could emerge from the analysis of the direct incentive effect because data are incomplete on which sanctions the court imposed on defendants who violated the urine-testing conditions of their pretrial release. According to the data provided by PSA, failure in urine testing did not significantly result in adverse actions by the court, as the number of "show cause" hearings attest, as well as the actions taken at those hearings.

However, D.C. Superior Court judges reportedly often handled violations of pretrial urine-testing conditions as "add-ons" to regularly scheduled hearings on other matters in the case, rather than as specially scheduled show-cause hearings. PSA representatives were usually not present at such ad hoc hearings (though they usually were present at show-cause hearings on urine-testing condition violations), and no routine reporting procedures informed PSA of sanctions imposed on defendants for violations of pretrial urine-testing requirements. Hence, the data base used for the

present analysis does not reflect all the sanctions that were imposed on defendants. Unfortunately, there is no way to estimate the effect of sanctions not reflected in the data base.

Conclusions and Policy Implications

In conclusion, the results of the analysis of PSA's pretrial urine-testing program for released defendants suggest that the program operates as an **effective signaling mechanism**. Defendants, because many of them are active drug users, can nevertheless often be safely released before trial. If such release is conditioned on periodic reporting for urinalysis, the Washington, D.C., experience indicates that they will soon sort themselves into two subgroups: (1) those who comply with the release conditions by appearing for urine testing, and (2) those who do not comply, either by failing to appear or by dropping out after only a few tests. Moreover, those defendants who do comply with the urine-testing requirements have sharply lower rates of pretrial rearrest, failure to appear, and overall pretrial misconduct (i.e., pretrial rearrest and/or failure to appear) than those who fail to comply. Participation in the urine-testing program signals that the defendant's behavior poses a lower risk of pretrial misconduct.

Other implications for public policy stem from these findings. One is the **need to develop additional risk-signaling devices** based on pretrial defendants' postrelease behavior. Selected programs that may serve as pilots are underway in various communities. For example, in Washington, D.C., certain defendants unable to make bail are granted conditional nonfinancial release—first to a residential halfway house, and later to the community under restrictive conditions of supervision, including urine testing. In this case, good behavior in the halfway house signals that the defendant is a good candidate for supervised pretrial release in the community.

Release conditions that include reporting requirements or electronic monitoring can provide an opportunity for defendants to differentiate their individual degree of risk for rearrest or failure to appear from the risk profile of other defendants with a similar criminal record. It may be useful to perform tests similar to those conducted for pretrial release to determine whether other signals exist.

Such approaches may eventually identify a number of postarrest signals that can be used to separate high- from low-risk defendants. Under these circumstances, pretrial release policies and practices could monitor the signals provided by defendants so that probable high risks could be placed under more restrictive release conditions. Such action would create a direct incentive effect by responding to the signaling behavior of defendants. At the same time that high-risk defendants were placed under more restrictive conditions of release, those whose behavior after release identified them as low risks could remain under current supervision levels or reduced levels. In this way a better tailoring of risk level to pretrial supervision could occur—one based on defendants' demonstrated actions after release, rather than on risk predictions made at the time of arrest.

Notes

1. The analysis of direct incentive effects follows the "economics of crime" literature, including Gary S. Becker, "Crime and Punishment: An Economic Approach," in *Essays in the Economics of Crime and Punishment*, ed. Gary S. Becker and William Landes (New York: Columbia University Press, 1974); and Michael K. Block and John M. Heineke, "A Labor Theoretic Analysis of Criminal Choice," *American Economic Review* 65 (September 1975): 314-325. The economics of crime model assumes that criminal behavior arises from rational self-interest on the part of the criminal who seeks to maximize utility. Criminal activity increases when the individual has few alternative sources of earnings; rewards of crime are large; the probability of punishment is small; and/or the magnitude of expected punishment is small. A few papers deal with this topic, including work by William M. Landes, "The Bail System: An Economic Approach," in *Essays in the Economics of Crime and Punishment*, ed. Becker and Landes; Charles F. Manski, "Prospects for Inference on Deterrence Through Empirical Analysis of Individual Behavior," in *Economic Models of Criminal Behavior*, ed. by John M. Heineke (New York: North-Holland Publishing, 1978); Samuel L. Myers, Jr., "The Economics of Bail Jumping," *Journal of Legal Studies*, Vol. 10 (June 1981): 381-396; and Ann Dryden Witte, "Estimating the Economic Model of Crime With Individual Data," *Quarterly Journal of Economics* 48 (February 1983): 167-175. Of these works, only those by Landes and Myers deal with the pretrial release period. These works provide general support for the direct incentive effects of release conditions hypothesized here, although the issue of urine-testing conditions has not been studied in the economics of crime literature.

2. First developed in the classic work by Michael A. Spence, *Market Signaling: Information Transfer in Hiring and Related Screening Processes* (Cambridge, MA: Harvard University Press, 1974), market signaling has been shown to characterize decisions about individuals based on behavioral traits that cannot be directly observed. In the process of hiring, for example, individuals are screened based on indicators of their future performance because work habits and productivity cannot be directly observed. Such decisions

are based on records of past educational achievement and work history, which are assembled with some care by the applicant, who submits these to the prospective employer to signal future performance. Obviously, education has some direct effect on productivity, but signaling models predict that education is also used by individuals to signal their potential and intent to be good employees. Tests of the extent to which higher education serves as a "filter" have been made by James W. Albrecht, "A Procedure for Testing the Signalling Hypothesis," *Journal of Public Economics* (February 1981): 123-132; Kenneth Arrow, "Higher Education as a Filter," *Journal of Public Economics* (February 1981): 193-216; and John Riley, "Testing the Educational Screening Hypothesis," *Journal of Political Economy* (1979): S227-S252. The results of these works suggest that employers behave as if education provides extra information in applications for positions where it is difficult to objectively measure productivity.

Signaling, or screening, is used in the criminal justice system as well. For example, information on good behavior in prison is used to make decisions on parole. This postincarceration signal is transmitted by the convicted and confined individual. Indeed, experiences in prison may be structured to provide opportunities for inmates to signal their fitness for release by participating in work and other responsible behavior in prison.

3. Some variables, which have been used in other studies to predict criminal behavior, were not systematically available in the data. These variables include marital status, education, and the time pattern of prior convictions.

4. Of the 455 defendants placed in the urine-testing program who were analyzed, 299—or about two-thirds—met the definition of "successful participants." The possibility that appearance failure in urine testing was due to completion of the case was eliminated by considering only cases that took more than 30 days to reach disposition. The possibility that appearance failure in urine testing could be triggered by rearrest was eliminated by counting subsequent lockup tests performed at rearrest as appearances for urine testing. This adjustment tends to produce a false-positive association between urine-testing and pretrial rearrest.

5. Christy A. Visher, "Assessment of Pretrial Urine Testing in the District of Columbia: A Reanalysis" (unpublished paper, 1988), 9-11.

Chapter 5
Outlook for the Future

Today, PSA's urine-testing program for adult arrestees and defendants awaiting trial is a well-accepted component of the criminal justice system in the District of Columbia. Since the end of the NIJ grant, which provided the initial funding, the program has been supported each year by the D.C. government. Reasons for the program's high degree of local acceptance—which seems likely to continue—include the following:

• **High-level criminal justice officials support PSA's program.** Before the program started, they were already familiar with the ways in which urine-test results could be used, because screening of arrestees through urinalysis has been common in the District of Columbia, off and on, since 1971. However, no previous program was as systematic, comprehensive, or responsive to the needs of the court as is PSA's.

• PSA's program was **carefully planned and implemented.** Considerable attention was given to such issues as developing rigorous chain-of-custody procedures and determining the proper uses of urine-test results—while acting to preclude other uses of them and training and educating PSA staff and other criminal justice practitioners about the program.

• Arrestees' urine-test results are used at the time of arrest solely **to determine conditions of pretrial release**; they cannot be used to determine guilt or innocence on the current charge or as evidence of probation or parole violation in another case. Similarly, urine-test results for defendants who are tested periodically as a condition of pretrial release are used **to monitor compliance with release conditions**, not for other purposes. The **carefully constrained uses of the urine-test results** from PSA's program has bolstered the widespread acceptance of the program.

• The urinalysis technology used—the EMIT (enzyme multiplied immunoassay technique)—has been objectively rated as having a **high level of accuracy**; moreover, the equipment does not require a toxicologist to operate it. As a result, PSA staff quickly learn to use the equipment and consistently provide the court with reliable test results.

• **There are a series of sanctions of increasing severity that can be imposed on defendants who fail to comply with the urine-testing condition of pretrial release.** These sanctions range from warnings and administrative sanctions, such as requiring more frequent urine testing, to sentences for contempt of court. The most severe sanctions are imposed only after a defendant has repeatedly failed to appear for testing or has repeatedly tested positive for drug use.

Based on the results of the Washington, D.C., urine-testing program, the Bureau of Justice Assistance (BJA) has funded replications in other communities as part of its mandate under the Anti-Drug Abuse Act of 1986. To date, BJA has funded pretrial urine-testing programs in six jurisdictions: Pima County, Arizona; Multnomah County, Oregon; New Castle County, Delaware; Prince George's County, Maryland; Maricopa County, Arizona; and Milwaukee County, Wisconsin.[1]

Moreover, in the District of Columbia a preadjudication urine-testing program for juveniles has now been implemented by PSA. Initially funded by NIJ, this program—like the adult urine-testing program—has subsequently been supported entirely by the D.C. government. The juvenile urine-testing program is currently being evaluated by Toborg Associates, under a separate grant from NIJ.

The juvenile urine-testing program originated with the adult lockup test results, which disclosed very high rates of drug use among young adults. These findings sparked interest in earlier interventions—before juveniles entered the adult criminal justice system.

The lockup testing of adult arrestees also showed—from the inception of the program—that rates of drug use were much higher than estimated previously and, additionally, that PCP use was a much more significant problem than anticipated. As time passed, the lockup test results also documented the sharp increase in cocaine use among adult arrestees. These findings led to increased local efforts to provide more resources for drug abuse treatment, especially for PCP and cocaine users. Even so, most criminal justice officials in the District of Columbia still view treatment resources as far from adequate.

This lack of adequate treatment resources is of particular importance, given the findings of this project that show that criminal justice practitioners and the public at large have

good reason to be concerned about drug use among defendants. Defendants who have been drug users, as shown by the results of the lockup urine tests, pose higher pretrial release risks—for both pretrial rearrest and failure to appear—than nonusers, after screening for other factors that might affect pretrial release risk (e.g., background characteristics and prior record).

Moreover, defendants who participated in PSA's pretrial urine-testing program—defined as appearing for four or more tests (the lockup test plus three subsequent tests)—performed significantly better than other released defendants, while those who dropped out did notably worse. Indeed, rates of pretrial rearrest and failure to appear for defendants who participated in the program—about two-thirds of all persons ordered into the program—were about one-half the rates of the defendants who did not participate. Thus, not only does the initial lockup urine test help classify defendants for pretrial release risk, but the defendants' participation or nonparticipation in the pretrial urine-testing program after release also helps to identify high versus low risks for continued pretrial release.

The replication sites funded by BJA should provide important insights into the extent to which similar findings emerge in other jurisdictions and about the significance of the relationships. In the meantime, the findings from the District of Columbia strongly suggest that pretrial urine testing can be an important component of a community's response to the drugs-and-crime problem.

Notes

1. See *The Pretrial Reporter* 12, no. 5 (October 1988) and no. 6 (December 1988) for more information on these programs (Washington, D.C.: Pretrial Services Resource Center, 1988).

Appendix A
Detailed Results of RiskClassification Analyses

Table A–1 presents the results of trivariate probit estimates of pretrial rearrest, failure to appear, and pretrial misconduct (i.e., the combination of pretrial rearrest and/or failure to appear). The trivariate probit estimator[1] allows for the estimation of parameters of three-stage models of pretrial misconduct, such as the one shown in figure A–1. Note that there are really two complete trivariate processes shown in figure A–1. One consists of the system where there is a urine-test result, $Y_{1i}=Y_{2i}=1$, and pretrial misconduct behavior in outcomes (2) and (3) is observed, $Y_{3i}=0,1$. The other is based on pretrial misconduct of persons released with no urine-test result, outcomes (4) and (5) $Y_{1i}=1$ and $Y_{2i}=0$, in figure A–1. In the subsequent discussion, these will be termed path A and path B, respectively. Estimates performed on path A indicate the determinants of pretrial misconduct among accused individuals who were released on recognizance with urine-test results.

In contrast, estimates on path B allow the prediction of pretrial misconduct associated with individuals released with no urine-test results. Of course, it is not possible to estimate the effects of drug use as indicated by urine-test results on pretrial misconduct on path B because no urine-test data are available.

The system in figure A–1 may be illustrated using the equations shown below. The actual outcomes in figure A–1 are structured so that, if the defendant is released on recognizance, $Y_{1i}=1$; and $Y_{1i}=0$ if the defendant is given a financial condition or held.

$$Y_{1i}^* = G_1 + Z_{1i}g_1 + e_{1i}$$
$$Y_{2i}^* = G_2 + Z_{2i}g_2 + e_{2i}$$
$$Y_{3i}^* = G_3 + Z_{3i}g_3 + e_{3i}$$

where G_j is a constant term, Z_{ji} is a matrix of observed values of independent variables, g_j is a vector of parameters to be estimated, and e_{ji} is an identically and independently distributed random variable. If test results are observed $Y_{2i}=1$, and release without test results is indicated if $Y_{2i}=0$. Finally, $Y_{3i}=1$ for the cases in which misconduct occurs, and it is equal to 0 in the absence of misconduct. This system has two levels of selectivity and three possibilities for correlation between the error terms.

For the pretrial misconduct problem described in figure A–1 and in the equations presented above, individuals who are held or have financial conditions set should be the worst risks. It follows that the correlation between e_{1i} and e_{3i}, r_{13}, will be negative: any accused with a large positive value of e_{3i} tends to be perceived as a poor risk for release and hence likely to be held or have a financial condition set. It is also likely that defendants released on personal recognizance without urine testing are persons perceived as the lowest risks. Thus Y_{2i} and e_{2i} are like Y_{3i} and e in that the observation of the dependent variable equal to unit is more likely for the highest risk individuals. This means that the correlation between e_{2i} and e_{3i}, r_{23}, should be positive also and that the correlation between e_{1i} and e_{2i}, r_{12}, should be negative. Thus, there is reason to believe, a priori, that $r_{12}<0$, $r_{13}<0$ and $r_{23}>0$ for the pretrial misconduct system presented here.

Put another way, omitted variables which enter e_{2i} and e_{3i} so that they vary directly with the implicit probability of pretrial misconduct are likely to vary inversely with the implicit probability of release on personal recognizance in the first equation and with the omitted variables which enter e_{1i}. If the defendants with the highest risk for pretrial misconduct are selected out of the sample because they are given financial release conditions and/or held, then single-equation estimates of pretrial misconduct determinants on either path A or path B will tend to understate the likely amount of pretrial misconduct if all defendants were released. Specifically, estimates of G_3 would be biased downward and some of the parameters in the vector g_3 would also be biased, depending on the correlation between e_{1i} and the independent variables. Estimates of path A will also be influenced by the selection process in which many of the best risks are sent along path B with $r_{23}>0$. This will generate an upward bias in G_3 which, to some extent, will compensate for the downward bias due to selection at the first stage. Thus, the overall selection bias that appears in single-equation estimates of pretrial misconduct using the sample selected to run through path A only will be the result of two compensating forces due to the negative r_{13} and positive r_{23}.

The results presented in table A–1 address the issue of whether urine-test results, available shortly after arrest, make an incremental contribution to the explanation of pretrial rearrest, failure to appear, or pretrial misconduct. The statistical test for such incremental contribution is simple. Urine-test results on released defendants, along with other variables usually included in classification schemes, are related statistically to the subsequent observation of pretrial misconduct. The usefulness of urine-test results is affirmed

if the estimated coefficients for the variables reflecting urine-test results are statistically significant.

There is a modest literature on pretrial misconduct classification functions.[2] Generally, the most successful variables in such equations are those which indicate the previous criminal record and the current labor market activity of the defendant. These variables are represented in the basic empirical tests performed here by PPP, a variable equal to the sum of the number of pending cases, parole, and probation, and EXCON, the number of prior convictions. Labor market status is captured by EMPLOYED, a dummy variable equal to 1 if the defendant is employed and 0 otherwise. It would be desirable to have information on the timing of prior convictions but that was not available. Also missing were details on type of employment, education, and marital status.

Urine-test results are captured by a series of dummy variables which are represented as: COCAINE, equal to 1 if

Table A–1
Trivariate Probit Estimates of Pretrial Rearrest, Failure To Appear, and Pretrial Misconduct

Variable	Pretrial rearrest	Failure to appear	Pretrial misconduct
CONSTANT	-0.794 (0.922)	-0.322 (0.699)	-0.445 (0.62)
EMPLOYED	-0.127* (0.070)	-0.205* (0.057)	-0.228* (0.066)
PPP	0.317* (0.146)	-0.020 (0.26)	0.160 (0.19)
EX-CON	0.066* (0.021)	0.024* (0.15)	0.055* (0.011)
COCAINE	-0.046 (0.095)	0.379 (0.11)	0.264* (0.11)
OPIATES	0.211 (0.14)	0.173* (0.094)	0.149* (0.081)
PCP	0.184* (0.11)	-0.111* (0.063)	0.031 (0.05)
OPIATES&COCAINE	-0.092 (0.085)	0.257* (0.098)	0.004 (0.073)
OPIATES&PCP	0.092 (0.34)	-0.217 (0.132)	-0.089 (0.099)
PCP&COCAINE	0.037 (0.07)	0.047 (0.09)	0.046 (0.08)
MULTIDRUG	0.316* (0.12)	-0.103 (0.18)	0.232 (0.16)
NOB	7883	7883	7883
F(11,3841)			
r12	-0.439 (0.86)	-0.397 (0.91)	-0.60 (0.77)
r13	-0.661 (0.76)	-0.251 (1.05)	-0.40 (0.83)
r23	0.102 (0.45)	0.472 (0.46)	0.45 (0.43)

*Indicates significance at 10 level; standard errors in ( )

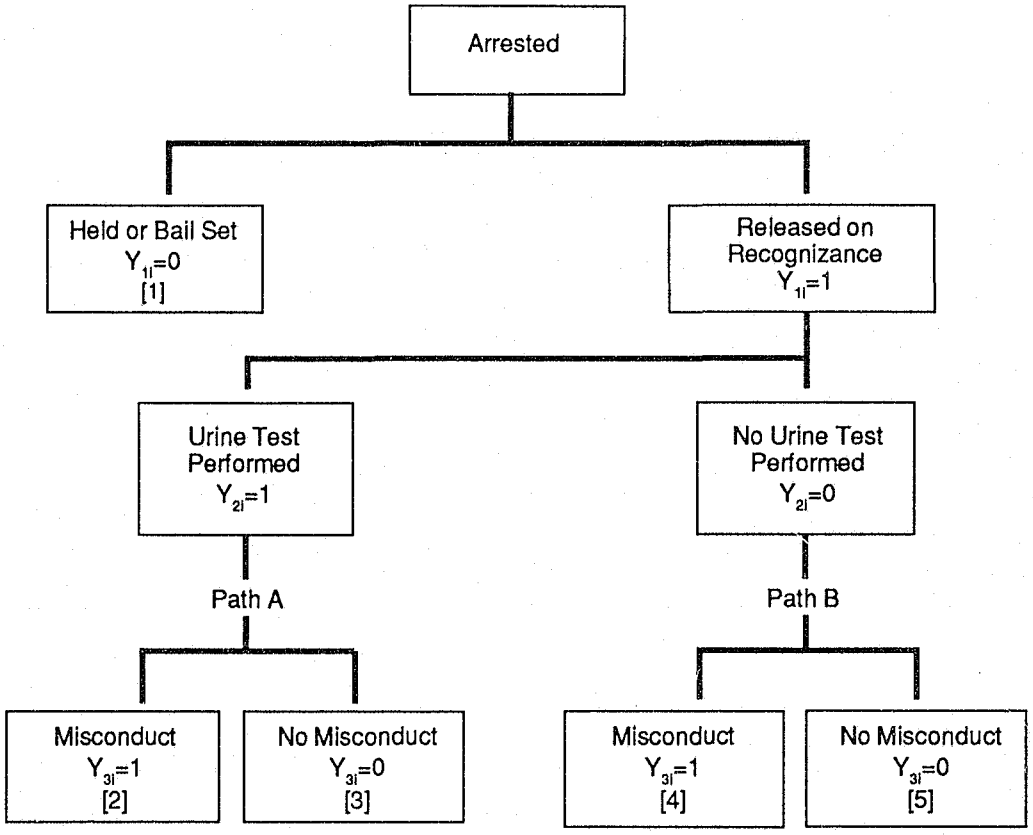
the defendant tested positive for cocaine only; OPIATES, equal to 1 if the accused tested positive for opiates only; PCP, equal to 1 if the defendant tested positive for PCP only; OPIATES&COCAINE, equal to 1 if the defendant tested positive for opiates and PCP only; PCP&COCAINE, equal to 1 if tests for PCP and cocaine only were positive; and MULTIDRUG, which was 1 if the defendant tested positive for three or more drugs.

It is important to remember that the statistical relation is between urine-test results and misconduct, not drug use and misconduct. Drug use is not observable. The urine-test results provide a qualitative indication of drug use during the days before arrest.

The estimation results in table A–1 show that **the type of drug for which a positive result was obtained has important implications for the probability of rearrest.** Specifically, positive tests for "opiates only" or "PCP only" or for "three or more drugs" are directly related to the probability of pretrial rearrest, although the estimated coefficient of opiates is only significant under a one-tailed test. Urine-test results which indicate the presence of cocaine are not associated with higher probability of pretrial rearrest. Surprisingly, the estimated coefficient of OPIATES&PCP, while positive, is nonsignificant in all three estimates. Of course, only a small proportion of all defendants tested positive for OPIATES&PCP and negative for all other drugs but this result is surprising in view of the direct effects of "opiates only" or "PCP only" test results.

The individual urine-test outcomes also have very distinctive effects on the probability of failure to appear. The estimated coefficient of COCAINE is positive, significant, and very large. Indeed, the estimated coefficient of 0.379 implies an increase in the marginal probability of failure to appear of about 15 percentage points associated with a positive urine test. Given that the mean probability of failure to appear is

Figure A–1
Three-Stage Model of Pretrial Misconduct



approximately 20 percentage points, a marginal probability effect of 15 points is 75 percent of the mean—i.e., **this is a huge probability increase associated with positive tests for cocaine.**

The estimated coefficient for OPIATES is positive and significant, as is that for the two-drug combination, OPIATES&COCAINE. The estimated coefficient of OPIATES&COCAINE is 0.257, which is an average of the 0.379 for COCAINE and 0.173 for OPIATES. PCP has a negative and significant estimated coefficient. The interaction terms involving PCP&COCAINE as well as OPIATES&PCP also appear to approximate averages of the individual drug coefficients. Thus, the failure-to-appear effects of combinations of the three major drugs appear to be combinations of the individual drug effects. MULTIDRUG is nonsignificant. This result is surprising, but it may reflect the inclusion of methadone and amphetamines in the MULTIDRUG variable. It may be that positive amphetamine tests are detecting the use of legal medicines. In earlier specifications, an amphetamine test variable often had very counterintuitive values.

For pretrial misconduct, the estimated coefficients of the urine-test result variables are easily summarized. COCAINE and OPIATES have effects on the probability of misconduct which are large, particularly for COCAINE, and statistically significant. None of the urine-test variables reflecting drug combinations is statistically significant at the 10-percent level selected as a standard. However, MULTIDRUG would be significant if a one-tailed t-test were adopted as a standard and its estimated coefficient is large and positive. The failure of drug combination variables which include PCP test results to be significant is understandable in the misconduct equation, given that the effect of PCP on pretrial rearrest is positive and significant but the effect on failure to appear is negative and significant. The estimated coefficients in the misconduct equation appear to reflect a combination of the pretrial rearrest and failure-to-appear results.

Overall, the results presented in table A–1 show that urine-test results do indeed make a consistent, significant, incremental contribution to pretrial risk classification for arrestees in the District of Columbia. Moreover, analysis by type of drug shows that specific drugs and combinations of drugs are related in different ways to the risk of pretrial arrest, failure to appear, or overall pretrial misconduct.

1. See Lung-Fei Lee, "Sequential Discrete Choice Econometric Models With Selectivity (mimeograph, University of Minnesota, 1984); and Mary A. Toborg et al., Classification Systems for the Accused (report to the National Institute of Justice, U.S. Department of Justice, 1986).

2. See, for example, Samuel Myers, Jr., "The Economics of Bail Jumping," *Journal of Legal Studies 10* (June 1981): 381-396; and Toborg et. al., *Classification Systems for the Accused: An Empirical Analysis of Washington, DC.* (Final Report to the National Institute of Justice, U.S. Department of Justice, 1986).

Appendix B
Description of the Experimental Component of the D.C. Pretrial Services Agency's Urine-Testing Program for Defendants Awaiting Trial

In March 1984, the D.C. Pretrial Services Agency (PSA) initiated a comprehensive program of urine testing for defendants awaiting trial in the District of Columbia. One component of this program was an experiment, designed to test the efficacy of periodic urine testing before trial—as compared to (1) referral to treatment and (2) no drug-related intervention—in reducing pretrial rearrest and failure-to-appear rates for defendants released before trial on nonfinancial conditions. As originally designed, the urine-testing program would operate as follows:

- All arrestees processed through the lockup of the D.C. Superior Court would be tested for the presence of five drugs in their urine: opiates, cocaine, phencyclidine (PCP), amphetamines, and methadone.

- Defendants would be eligible for participation in the experiment if they (1) tested positive for any of these drugs or admitted drug abuse when interviewed by PSA staff; (2) were not already in treatment; (3) did not request referral to treatment at the time of the PSA interview; and (4) were released by the court on nonfinancial conditions, subject to reporting to PSA for appropriate assignment of specific drug-related release conditions.

- Eligible defendants would be randomly assigned by PSA to one of three groups: one group would participate in a new program, to be run by PSA, of periodic urine testing before trial; a second group would be referred to drug abuse treatment, usually at the citywide treatment agency; and the third group would be a control group for whom no special release conditions related to drug abuse would be imposed. Overall, approximately 30 percent of the defendants who met the eligibility criteria for the experiment would be assigned to PSA's new urine-testing program; 50 percent would be referred to treatment; and 20 percent would serve as the control group.

- Defendants who violated their conditions of release—e.g., by continuing to use drugs and/or by failing to report as scheduled for testing or treatment—would have those violations reported by PSA to the court, which could then impose a variety of sanctions, ranging from a warning with rerelease to jail sentences for contempt of court.

The pretrial urine-testing program consisted of two phases. Defendants were first placed in "regular urine testing," which provided for once-a-week urinalysis. Those persons who failed this phase of the program—by testing positive for drugs, or by failing to appear for a drug test, either twice in a row or three times over 3 months—entered a second phase: they were given the option of either entering "intensive urine testing," which provided twice-a-week urinalysis, or being referred to treatment. A violation was reported to the court only for failure in intensive urine testing or treatment, not for failure in the first phase (regular urine testing) of the program.

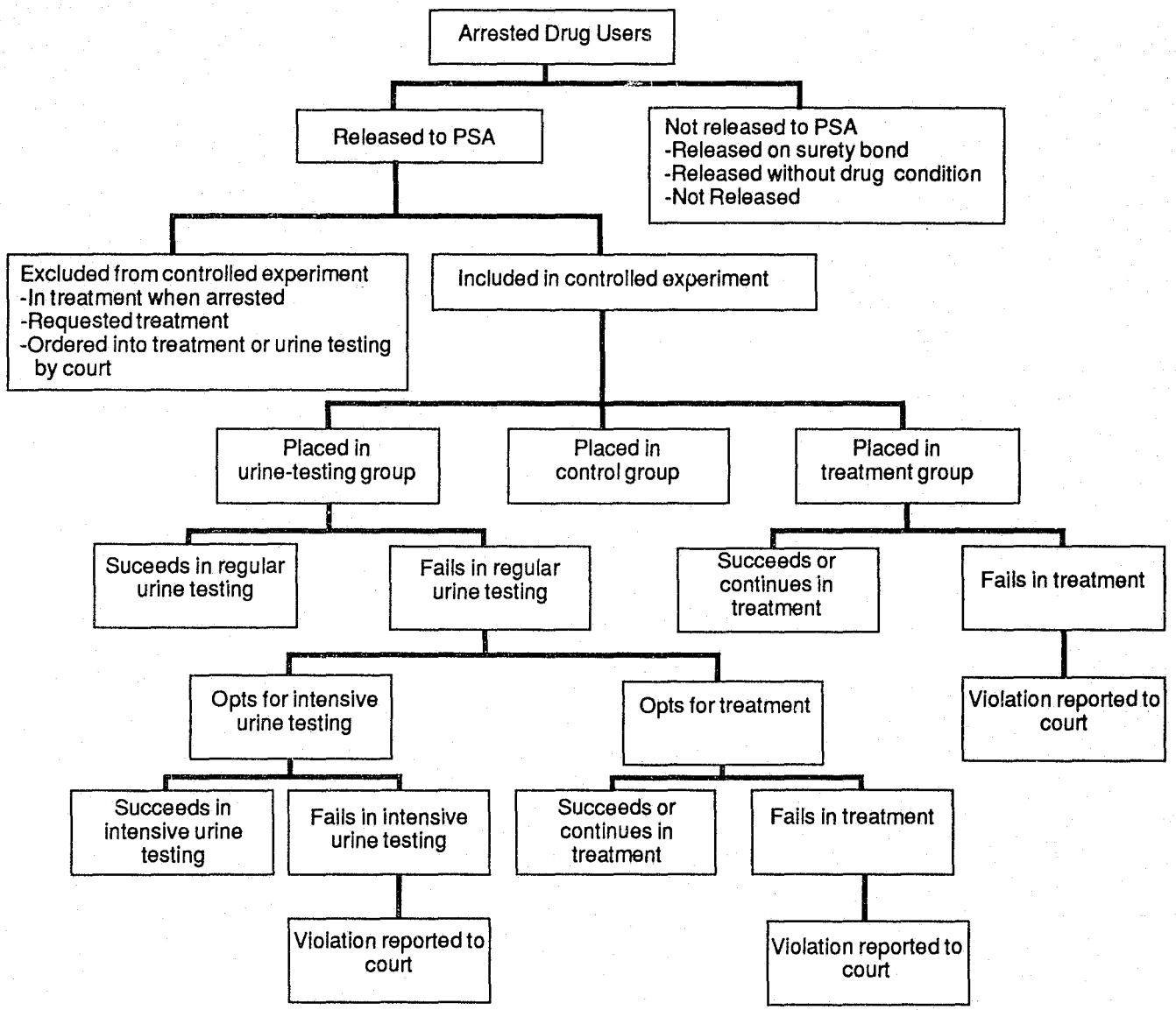
Figure B-1 provides a flow diagram of the process of selecting defendants for the experiment and monitoring their progress. It shows the ways in which defendants could be excluded from eligibility for participation in the experiment as well as the different paths that defendants, once selected, might follow.

Although PSA's urine-testing program began in March 1984, it took several months for the various procedures to stabilize. Consequently, the first few months of operations were excluded from the analysis of the experimental results. That analysis was based on arrests during the 8-month period from June 1, 1984, through January 31, 1985. There were a total of 16,130 arrests during this period. These involved a total of 11,458 individuals, with repeat arrests accounting for the difference between arrest cases and persons arrested.

Lockup test results were available for 62 percent of all arrests. Approximately 60 percent of the lockup tests were positive for at least one drug. Based on the lockup test and the specific decision to release on personal recognizance with conditions, 2,153 cases were initially placed in the experiment, including 650 in urine testing, 1,109 in treatment referral, and 394 in the control group. The rates of predisposition rearrest for these three groups were 22 percent, 23.5 percent, and 24.1 percent, respectively. These small differences in the rates of rearrest subsequently proved to be nonsignificant.

Analyses showed that these three groups had indeed been assigned randomly. While there were very significant

Figure B-1
Flow Diagram for Arrested Drug Users in the District of Columbia (June 1984–Jan. 1985)



differences in the demographics, prior criminal record, and other background characteristics of defendants in the experiment, these differences were not significantly related to the initial assignments to the three groups.

Although the initial random assignment process worked as planned, problems subsequently arose in maintaining the comparability of the three groups throughout the pretrial period. These problems developed in part because of the length of the pretrial period in the District of Columbia. It is not unusual for a case to take 6 to 8 months—or even longer—to reach disposition, and during this time a defendant may be required to appear in court on several occasions on a variety of matters related to the same case. After PSA's urine-testing program began, and judges became more knowledgeable about it, a number of judges started ordering defendants who had not been initially assigned to the urine-testing program to enter it and comply with its requirements. These judicial orders often occurred during court proceedings that were held several months after the defendant's initial release to await trial and, thus, several months after the initial assignments to the experimental groups had been made.

Another problem in maintaining group comparability arose because some defendants in both the urine-testing and control groups opted to enter treatment during the course of the pretrial period. As stated previously, any defendant who wanted to enter treatment at the time of the initial arrest—which was also the time of PSA's interview and initial (lockup) urine test—was permitted to do so; such defendants were excluded from eligibility for the experiment. This procedure seemed fair and reasonable, given that Washington, D.C., has a citywide drug abuse treatment program (with both outpatient and residential components) that any D.C. resident can seek to enter at any time. To deny any defendants the opportunity to enter treatment would have deprived them of a service available to all other District of Columbia residents—and of a service that would have been available to them, but for the experiment. This was, therefore, rejected as an option.

Although it was anticipated that defendants who wanted to enter treatment would indicate this at the time of initial arrest—and many did so—other defendants decided to seek treatment later in the pretrial period. Some of these defendants had initially been assigned to the experiment's urine-testing or control groups. Again, this problem arose in part because the pretrial period is often a long one in the District of Columbia. Also, as discussed previously, the urine-testing program was designed to give defendants who failed the first stage of it the option of seeking treatment before a violation was reported.

Finally, some problems with maintaining group comparability arose because many defendants had multiple arrests during the experimental study period. Although PSA attempted to keep rearrested defendants in their originally assigned groups (i.e., urine testing, treatment referral, or control), the releasing magistrates in new cases would sometimes order them into different groups. Thus, a defendant who was originally assigned to urine testing could have been ordered by the court at the time of rearrest to enter treatment. Similarly, a rearrested defendant originally assigned to the treatment referral group could have been ordered by the court into urine testing. Additionally, rearrest could change the release status of a defendant from own recognizance to bond or preventive detention; such defendants would no longer be supervised by PSA and, hence, would be removed from the experiment.

Thus, after the initial random assignment of defendants but before case disposition, a variety of events occurred that affected the comparability of the three experimental groups. As a result, straightforward comparisons of pretrial rearrest rates and failure-to-appear rates across the three groups—a key feature of the original analysis plan—were inconclusive. Those comparisons showed no significant differences across groups, but it is impossible to determine whether that was (1) because there was no difference in the impact of urine testing, treatment referral, or no intervention; or (2) because the comparability of the three groups was not maintained throughout the pretrial period and, if it had been maintained, important differences in outcomes might have been found.

Although this question could not be resolved in the context of this experiment, there are a number of important findings that stem from the analysis of the data collected in connection with the experiment. These are discussed in the body of the report and have to do in particular with the way in which participation in the pretrial urine-testing program served as a "signaling" device that separated defendants according to levels of pretrial release risk.

Appendix C
Detailed Results of Analyses Supporting Conclusions on Signaling

The material in this appendix provides the statistical estimation results for the pretrial misconduct analyses discussed in chapter 4, concerning signaling behavior by participants in the pretrial urine-testing program. Estimation was performed using a linear probability model in which ordinary least squares regression was employed to estimate the relation between the independent variables and a binary dependent variable equal to one in the case of pretrial misconduct and zero otherwise.

Estimated coefficients of this model provide unbiased and consistent estimates of the partial effect on the probability of pretrial misconduct (or pretrial rearrest or failure to appear, as the case may be) of changes in the independent variable. The linear probability model estimated under ordinary least squares is not efficient, but there were sufficient observations so that efficiency was not a problem; and the ease of interpretation of results was deemed an advantage over nonlinear probit or logit estimates. Similar results were obtained with a binary probit estimator.

The summary numbers in the first part of table C-1 indicate the decrease in the expected probability of pretrial rearrest compared to the reference group, that is, defendants assigned

Table C–1
Differences in Probability of Pretrial Rearrest, Failure To Appear, and Overall Pretrial Misconduct Based on Appearance for Urine Testing

Urine-testing status/appearance	Increase in probability	Standard error
	Results for pretrial rearrest, mean probability = 0.204	
Urine testing/dropped out (ref. group)	0.000	0.000
Urine testing/appeared	0.167*	0.040
Treatment referral group	-0.127*	0.035
Control group	-0.123*	0.041
	Results for failure to appear, mean probability = 0.197	
Urine testing/dropped out (ref. group)	0.000	0.000
Urine testing/appeared	-0.165*	0.039
Treatment referral group	-0.137*	0.034
Control group	-0.148*	0.040
	Results for overall pretrial misconduct, mean probability = 0.357	
Urine testing/dropped out (ref. group)	0.000	0.000
Urine testing/appeared	-0.236*	0.047
Treatment referral group	-0.169*	0.041
Control group	-0.179*	0.047

*Indicates significant difference from reference group at 1-percent level

Results are presented as decreases in expected probability compared to those assigned to urine testing who dropped out by failing to appear for tests.

Table C–2
Relation Between Defendant Characteristics, Including Lockup Test Results and Pretrial Misconduct

Independent variable	Dependent variable PTARREST	FTA	MISCON
CONSTANT	0.610*	0.560*	0.956*
	(3.97)	(3.75)	(5.31)
AGE	-0.020*	-0.014	-0.026*
	(-2.27)	(-1.61)	(-2.50)
AGESQ	0.0002	0.00019	0.00029*
	(1.58)	(1.46)	(1.81)
MALE	0.070*	0.004	0.061*
	(2.32)	(0.14)	(1.72)
EMPLYD	-0.029	0.001	-0.030
	(-1.35)	(0.01)	(-1.21)
RAPE	-0.018	0.10	0.110
	(-0.16)	(0.89)	(0.81)
BURGLE	0.054	0.115*	0.116*
	(0.90)	(1.97)	(1.65)
DRUGS	0.013	0.028	0.035
	(0.33)	(0.72)	(0.76)
FLIGHT	-0.271	0.292	0.101
	(-0.95)	(1.05)	(0.30)
FORGERY	0.058	1.54*	0.151*
	(0.60)	(1.69)	(1.33)
FRAUD	0.378	0.310	0.237
	(1.33)	(1.21)	(0.71)
KIDNAP	-0.164	0.889*	0.743
	(-0.41)	(2.29)	(1.59)
LARCENY	0.008	0.122*	0.118*
	(1.38)	(2.14)	(1.73)
ROBBERY	-0.038	0.044	0.024
	(-0.64)	(0.76)	(0.34)
PROSTI	-0.027	0.338*	0.291*
	(-0.38)	(4.90)	(3.51)
STOLCAR	0.058	0.105*	0.116*
	(1.05)	(1.95)	(1.78)
STOLPTY	-0.030	0.229*	0.164*
	(-0.45)	(3.52)	(2.10)
WEAPONS	-0.028	-0.031	-0.026
	(-0.44)	(-0.50)	(-0.35)
PRESCRM	0.033	-0.164	-0.059
	(0.20)	(-1.00)	(-0.32)

Table C–2 *(continued)*
Relation Between Defendant Characteristics, Including Lockup Test Results and Pretrial Misconduct

Independent variable	Dependent variable PTARREST	FTA	MISCON
DESTPTY	-0.041	-0.024	-0.053
	(-0.53)	(-0.32)	(-0.58)
EXCON	0.030*	0.008	0.032*
	(4.61)	(1.13)	(4.01)
PENDCASE	0.095*	0.031	0.083
	(1.82)	(0.60)	(1.36)
PAROLL	0.002	0.010	-0.012)
	(0.05)	(0.22)	(-0.49)
PROBTN	-0.026*	-0.144	-0.067*
	-(0.48)	(-1.34)	(-1.74)
ADMIT	0.015	-0.012	0.003
	(0.65)	(-0.53)	(0.09)
AMPHAM	-0.058	-0.205*	-0.217*
	(-0.56)	(-2.07)	(-1.86)
METHDO	0.152	-0.240	-0.052
	(0.92)	(-1.49)	(-0.28)
OPIATE	0.044	-0.037	-0.024
	(1.088)	(-0.93)	(-0.59)
PCP	-0.043	-0.117*	-0.156*
	(-1.38)	(-3.80)	(-4.26)
OPICOC	0.026	-0.004	0.006
	(0.70)	(-0.12)	(0.41)
PCPCOC	0.043	-0.041	-0.012
	(1.18)	(-1.14)	(-0.29)
OPIPCP	0.022	-0.119*	-0.088*
	(0.051)	(-2.88)	(-1.78)
TWODRG	0.028	-0.045	-0.043
	(0.36)	(-0.61)	(-0.48)
APPEAR	-0.157*	-0.143*	-0.202*
	(3.44)	(-3.19)	(-3.75)
CLEAN	-0.020	-0.143*	-0.074
	(-0.44)	(-2.05)	(-1.36)
TREAT	-0.127*	-0.137*	-0.169*
	(-3.57)	(-3.98)	(-4.08)
CONTROL	-0.123	-0.148*	-0.179*
	(-3.01)	(-3.71)	(-3.72)
F(35,1458)	2.52*	3.46*	3.67*

"t-ratios" in ( ) under estimated coefficients *Indicates statistical significance at the 10-percent level
The glossary following appendix D defines each variable.

to urine testing who did not meet the appearance criterion of showing up for three tests beyond the lockup test and are labeled "dropped out." For example, the coefficient of -0.167* for the group labeled "Urine-Testing/Appeared" means that the expected probability of pretrial rearrest for those assigned to urine testing who appeared for four or more total tests was 16.7 percentage points lower than for the reference group, i.e., those assigned to urine testing who appeared for fewer than four total tests. This difference of almost 17 percentage points associated with appearance for urine testing is approximately 80 percent of the mean expected probability of pretrial rearrest of 20.4 percent. Thus, participation in urine testing separated defendants into groups with significant differences in expected pretrial rearrest rates.

Note that both the defendants referred to treatment and those in the control group had expected pretrial rearrest rates about 12.5 percentage points below that for those assigned to urine testing who did not appear for four or more total tests. The difference in expected pretrial rearrest rate between those appearing for tests and defendants referred to treatment or in the control group is about 4 percentage points (16.7-12.5). While this may not appear large, 4 percentage points is 20 percent of the 20.4 percent mean for the entire sample.

For both pretrial rearrest and failure to appear, individuals in urine testing who appeared for testing had probabilities between 16 and 17 percentage points lower than urine-testing dropouts. For overall pretrial misconduct (pretrial rearrest and/or failure to appear), the individuals appearing in urine testing had expected probabilities over 23 percent lower than the urine-testing dropouts. This difference is approximately two-thirds of the mean pretrial misconduct rate.

Those defendants assigned to urine testing who appeared for more than three tests (after the lockup test) can be further divided into two groups based on the proportion of positive versus negative tests. In order to secure a more or less equal division between groups, the standard of less than 25-percent positive tests for any drug was used to characterize the defendants appearing in urine testing who are termed "clean," with those exceeding the 25-percent standard termed "dirty." Thus, in the statistical analysis, the variable CLEAN was equal to one for those with less than 25-percent positive tests for any drug and zero for those with 25-percent or more positive tests.

The partial effect of membership in the group of defendants in urine testing who appeared and were clean was judged by using estimates for the linear probability model of various types of pretrial misconduct referred to earlier. The estimated coefficient of the CLEAN dummy variable is interpreted as the additional fall in the probability of pretrial misconduct associated with testing clean as opposed to dirty. Not surprisingly, the estimated coefficient of the clean variable is always negative, but it is nonsignificant in the pretrial rearrest equation and only significant at the 20-percent level in the pretrial misconduct equation (see table C–2). It is significant at the 5- percent level in the failure to appear equation, with an estimated effect of 14.3-percentage points; i.e., the expected rate of failure to appear is 14.3-percentage points lower for those with clean urine-test patterns than for those with dirty test results. This difference is quite consequential compared to the mean 19.7-percent rate of failure to appear.

Overall, these results are consistent with signaling behavior. Defendants signal their low-risk status by moderating or eliminating drug use, so that the proportion of negative tests is higher for those with lower rates of failure to appear.

Appendix D
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Glossary of Variables

Personal Characteristics of the Defendant

AGE – age of the defendant in years
AGESQ – age in years squared
MALE - dummy variable equal to unity for male, 0 otherwise
EMPLYD – dummy variable equal to unity if defendant employed, 0 otherwise

Criminal Justice Record of the Defendant

EXCON – number of prior convictions
PAROLL – dummy variable equal to unity if defendant on parole, 0 otherwise
PENDCASE – number of cases pending against the defendant
PROBATION – dummy variable equal to unity if defendant on probation, 0 otherwise

Most Serious Charge at Arrest (all 0-1 dummy variables)

RAPE – 1 if arrested for rape, 0 otherwise
BURGLE – 1 if arrested for burglary, 0 otherwise
DRUGS – 1 if arrested for drug possession or distribution, 0 otherwise
FLIGHT – 1 if arrested for flight to avoid prosecution, 0 otherwise
FORGERY – 1 if arrested for forgery, 0 otherwise
FRAUD – 1 if arrested for fraud, 0 otherwise
KIDNAP – 1 if arrested for kidnapping, 0 otherwise
LARCENY– 1 if arrested for larceny, 0 otherwise
ROBBERY– 1 if arrested for robbery, 0 otherwise
PROSTI – 1 if arrested for prostitution, 0 otherwise
STOLCAR – 1 if arrested for auto theft, 0 otherwise
STOLPTY – 1 if arrested for possession of stolen property, 0 otherwise
WEAPONS – 1 if arrested for illegal possession of weapons, 0 otherwise
PSESCRM – 1 if arrested for possession of criminal tools, 0 otherwise
DESTPTY – 1 if arrested for destruction of property, 0 otherwise

Lockup Test Results (all 0-1 dummy variables)

AMPHAM – 1 if test positive for amphetamines and negative for other drugs, 0 otherwise
METHDO – 1 if test positive for methadone and negative for other drugs, 0 otherwise
OPIATE – 1 if test positive for opiates and negative for other drugs, 0 otherwise
PCP – 1 if test positive for PCP and negative for other drugs, 0 otherwise
OPICOC – 1 if test positive for opiates and cocaine and negative for others, 0 otherwise
PCPCOC – 1 if test positive for PCP and cocaine and negative for other drugs, 0 otherwise
OPIPCP – 1 if test positive for opiates and PCP and negative for other drugs, 0 otherwise
TWODRG – 1 if test positive for two or more drugs but not for any of the three drug combinations shown above, 0 otherwise

Urine-Testing Performance and Group Indicators (all 0-1 dummy variables)

TREAT – 1 if defendant assigned to treatment referral, 0 otherwise
CONTROL – 1 if defendant assigned to control group, 0 otherwise
APPEAR – 1 if in urine testing and appear for four or more tests, including the lockup test (i.e., three tests beyond the lockup test), 0 otherwise
CLEAN – 1 if APPEAR=1 and less than 25% of drug test results positive for each of the five drug types tested, 0 otherwise

Pretrial Misconduct Variables (all 0-1 dummy variables)

FTA – 1 if bench warrant issued on defendant for failure to appear before disposition of case or end of observation period, 0 otherwise
PTARREST – 1 if defendant arrested before disposition of case or end of observation period, 0 otherwise
MISCON – 1 if either FTA = 1 or PTCRIM = 1, 0 otherwise