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Bureau of Justice Statistics Special Report

Drug Enforcement and Treatment in Prisons, 1990

By Caroline Wolf Harlow, Ph.D.
BJS Statistician

About 7 of every 8 prisons in the Nation tested an estimated total of 565,500 inmates for one or more illegal drugs between July 1, 1989, and June 30, 1990. In State facilities, 3.6% of the tests for cocaine, 1.3% for heroin, 2.0% for methamphetamines, and 6.3% for marijuana found evidence of drug use. In Federal prisons, 0.4% of the tests for cocaine, 0.4% for heroin, 0.1% for methamphetamines, and 1.1% for marijuana were positive.

This report uses information provided to the Census of State and Federal Adult Correctional Facilities. Data were collected from 957 State prison facilities, 250 State community-based facilities, and 80 Federal prisons operating on June 29, 1990. Censuses were also conducted in 1984, 1979, and 1974, but the 1990 census was the first to gather information on drug interdiction practices, drug testing of inmates and staff, and inmate drug treatment programs.

Other findings from the 1990 census include the following:

- Ninety-eight percent of State community-based facilities — those in which at least half of the residents may leave the facility daily — tested residents. All Federal prisons and 83% of State prisons reported that they tested inmates for drug use.
- Seventy-six percent of institutions reported testing inmates for drugs when drug use was suspected. Twenty percent tested all inmates at least once during confinement.

July 1992

This study examines how State and Federal correctional facilities seek to stop the entry and use of illegal drugs. Based on the 1990 Census of State and Federal Correctional Facilities, the report indicates that nearly 9 in 10 institutions conduct urine surveillance among the inmate population, usually on a random basis or on suspicion of use. Marijuana and cocaine were the drugs most commonly detected — in Federal facilities about 1 in 100 of the tests for marijuana and 1 in 250 tests for cocaine were positive while in State facilities about 1 in 16 tests were positive for marijuana and 1 in 28 were positive for cocaine.

I want to express my deep appreciation to the employees in the 957 State prisons, 80 Federal prisons, and the 250 community-based facilities who participated in the census. The 100-percent response rate is, I believe, important testimony to the utility and significance of national data on the operations of our Nation's correctional facilities.

Steven D. Dillingham, Ph.D.
Director

- At State confinement facilities 1.4% of tests for cocaine, 1.0% for heroin, 2.3% for methamphetamines, and 5.8% for marijuana indicated drug use.
- At State community-based facilities 8.9% of tests for cocaine confirmed the presence of the drug, as did 2.2% for heroin, 1.1% for methamphetamines, and 8.1% for marijuana.

- State confinement facilities that only tested inmates suspected of drug use had higher positive rates than facilities that tested all or random groups of inmates (6% for cocaine and 14% for marijuana versus 1.5% for cocaine and 5% for marijuana).

- State and Federal facilities used a variety of methods to prevent drugs from being brought into the institution, including questioning, patdowns, clothing exchanges, and body cavity searches.

- At admission inmates were required to exchange clothing in 88% of the Federal prisons and 59% of State prisons; inmates were patted down in 88% of Federal prisons and 78% of the State prisons.

- In the facilities using the most intrusive interdiction technique, body cavity searches, positive drug test results among inmates tested were lower than in facilities using other methods of interdiction.

- Questioning and search of belongings were widely used for visitors to both Federal and State facilities.

- Federal confinement facilities reported that they could provide drug treatment for an estimated 7,800 inmates; State confinement facilities, for 114,000; and State community-based facilities, for 9,400.

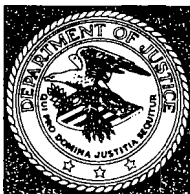
- Federal facilities were using an estimated 62% of total drug treatment capacity on June 29, 1990; State confinement facilities, 78%; and community-based facilities, 66%.

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NATIONAL INSTITUTE OF JUSTICE

Research in Brief

Charles B. DeWitt, Director

September 1992

NIJ Evaluates Drug Control Projects

The President's National Drug Control Strategy made evaluation a key research priority by calling for "development of a comprehensive information base about 'what works' in controlling drug use"

The National Institute of Justice (NIJ) measures the *impact* of a wide variety of programs to control crime and drugs, finding out what works and why, and shares that information with State and local agencies. NIJ places special emphasis on drug control projects supported by the Bureau of Justice Assistance (BJA).

This *Evaluation Bulletin* is the first in a series. It outlines the background of NIJ's evaluation efforts, describes previous evaluations, discusses ongoing programs for 1992, and explains the Institute's long-term evaluation goals. Future *Evaluation Bulletins* will examine lessons learned from such strategies as expedited court processing of drug cases, community policing in both urban and rural settings, community-based drug prevention programs, prosecution programs for complex drug cases, structured fines for drug offenders, and "boot camp" prison programs for drug-using offenders.

These *Bulletins* will present case studies of promising approaches communities may adopt. They will summarize current knowledge on criminal justice sanctions and treatment programs, drug enforcement strategies, and other issues of concern to criminal justice agencies and local communities.

Background

Across the country, a broad array of anti-drug programs, many supported with Federal assistance to States and localities, are working to diminish the impact of drugs and crime in our society. Recognizing NIJ's longstanding evaluation role, beginning with the 1968 Crime Control and Safe Streets Act, Congress included in the Anti-Drug Abuse Act of 1988 provisions directing NIJ to evaluate drug control programs financed by BJA.

Between 1989 and 1991, NIJ awarded nearly \$12 million for evaluations of State and local anti-drug programs, with funding support from BJA. These have included evaluations of police crackdowns, community policing, new court practices, sanctions targeted at both casual and persistent drug users, promising approaches to monitoring and controlling the behavior of convicted offenders, and other programs of importance to the criminal justice community. In all instances, the Institute has sought objective information on the value of these approaches and their alternatives so that State and local officials can move policy in productive directions.

Ongoing programs

NIJ's evaluation program enhances knowledge of what works to prevent and control crime and disorder, particularly in the area of drug abuse. Research that assists criminal justice professionals and policymakers can come from program assessments, process evaluations, impact evaluations,

and evaluation reviews of programs, literature, and data. In selecting topics, NIJ is guided by previous evaluation research and the priorities outlined by the Office of Justice Programs (OJP) in its annual program plan.

Areas of particular interest in the current year include evaluations of the Correctional Options Program, Operation Weed and Seed, Drug Market Analysis, Gangs, the Family Violence Prevention and Services Act, and the Denial of Federal Benefits Program.

National evaluation conference

The National Institute of Justice and the Bureau of Justice Assistance (BJA) annually cosponsor an evaluation conference in Washington, D.C.—in 1991 attracting more than 400 Federal, State, and local participants. The conference presents findings from evaluations sponsored at all levels of government, including work in progress on current programs. It also presents special workshops on evaluation topics and new program concepts.

Panel sessions span the interests of the criminal justice system, ranging from community-based anti-drug initiatives, law enforcement tactics, and new court programs to intermediate sanctions and drug treatment in corrections. The conference is of interest to researchers, administrators of Federal and State grant programs, and professionals in State and local operations.

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National Institute of Justice

*Issues and
Practices*

Assessment of Pretrial Urine Testing in the District of Columbia



National Institute of Justice

Research in Brief

May 1990

Urine Testing of Detained Juveniles To Identify High-Risk Youth

Richard Dembo, Linda Williams, Eric D. Wish, and James Schmeidler

Research in the last 10 years has revealed strong associations between illicit drug use and crime.¹ Offenders who frequently use illicit drugs tend to have higher crime rates. By identifying drug-abusing criminals and instituting effective interventions, the criminal justice system may be able substantially to reduce drug abuse and crime.²

Research has also shown, however, that both self-reports and official criminal justice records provide poor measures of drug use among offenders.³ Urine tests are therefore being increasingly adopted by the criminal justice system for identification and monitoring of drug-abusing offenders.⁴

However, almost all available research by the criminal justice system on drug use and drug testing has focused on adults. Although surveys of juveniles have found drug-crime relationships similar to those found in adults,⁵ little is known about the correlates of drug use among youths held in juvenile detention centers.

From the Director

New NIJ research on juvenile drug use, backed up by objective testing, reveals that we have a window of opportunity during early adolescence to help delinquent youth get off drugs.

This *Research in Brief* reports on the findings of an extensive 3-year study of almost 400 detained juveniles and the role of drug use in the events that brought them into contact with the justice system.

As these findings show, the older the juveniles the more into drugs they get. By the time they are 16 or 17, drug use has become significantly higher, a pattern that shows up also in the juvenile arrestees tested under NIJ's Drug Use Forecasting (DUF) program.

We know from a number of studies that adult offenders who use drugs are among the most active criminals, and that they report they began using drugs as youngsters. The evidence from this study by Dr. Richard Dembo and his associates bears this out: 51 percent of the youths who

tested positive for cocaine were rearrested or referred to juvenile authorities one or more times for a property misdemeanor. This compared to 33 percent for those who tested negative for the drug. Those who were cocaine positive apparently were also highly involved in drug distribution, reporting almost four times as many drug sale crimes as those who tested negative.

These findings underscore the urgent need to intervene early to help delinquent youth involved in drug use. By applying education and treatment resources to 13- and 14-year-olds, we may be able to forestall the progression to more serious drug use and criminality.

We know that the hardened drug-using criminal is difficult to treat. Several NIJ studies suggest that treatment seems to work best for offenders who were not heavily involved in crime before their addiction. Other research suggests that treatment with surveillance and testing works better than treatment alone.

As this research emphasizes, the justice system has an opportunity to be an agency for change for youngsters who have by law come

under its control. Drug testing can be used diagnostically to identify high-risk youth before they become established in the cycle of illicit drug use and crime. Testing also is a valuable tool for assuring that they remain in treatment and remain drug free so they can truly change destructive behavior patterns.

Properly applied, drug treatment for high-risk youths offers hope of rescuing these youngsters from a life of crime and protecting those who might otherwise have been victimized by drug-using offenders. Early intervention also may help society avoid paying more later in terms of more expensive incarceration of those offenders in adult institutions.

NIJ is pleased to have collaborated with our sister agency, the Office of Juvenile Justice and Delinquency Prevention, in supporting this research.

James K. Stewart
Director
National Institute of Justice

UJ / Testing

Study methods

The Hillsborough Regional Detention Center is a State-operated facility in Tampa, Florida, for holding youths up to age 19 who are awaiting court processing and a smaller number who are placed in detention following a court appearance. Average length of stay is 2 weeks.

Initial interviews were conducted with 399 youths (table 2 shows sample characteristics) during a 5-month period beginning December 1986. To be eligible for this study, youths had to be Florida residents who had not been transferred from another secure facility (the overwhelming majority were). All eligible females and a random sample of half the males were invited to participate and to supply a urine specimen.

All research information was confidential and protected from subpoena. Each youth was offered \$10 for the 75-minute interview and for providing a urine specimen. Ninety-eight percent agreed to participate.

Followup interviews were sought 10 to 15 months later with those youths who still lived in Florida and did not have an outstanding arrest warrant. (This represented 86 percent of the original group.) New urine specimens were sought from those who were interviewed in the community or who had reentered the detention center on a new charge or court order.

Reinterviewed youths received \$25 for a second interview and specimen. Of the 343 targeted youths, 89 percent were reinterviewed. Of these, however, 94 had previously been admitted to a jail or other secure institution (including hospitals) and were not asked for a second urine specimen. (In one case, the interviewer failed to bring a specimen cup to the interview.) Of the 210 asked to provide a specimen, 201 (96 percent) did so.

Findings from the study have been reported in 15 papers in the last 2 years. (See list at end of this document following list of other references.)

Such knowledge can be useful in light of findings from the National Institute of Justice Drug Use Forecasting (DUF) program that suggests that many adult arrestees began using illicit drugs, typically marijuana, in their teens. By identifying drug users among detained youngsters, it may be possible to deter them from continued drug abuse and progression to addictive drugs such as heroin or cocaine.

This *Research in Brief* summarizes the findings of an extensive, 3-year research project about the role of drug use in the lives of juvenile detainees and the potential benefits of urine tests for identifying those youngsters at high risk for future criminal behavior. A total of 399 youths entering a State-operated regional detention center in Tampa, Florida, agreed to undergo urine tests and confidential interviews regarding drug use. A subsample of these youngsters was selected for followup 10 to 15 months later; 89 percent of these youths were successfully interviewed. The research gathered information about their drug use, crime patterns, and psychological and behavioral adjustment.

Major findings

Among 399 male and female youths aged 10 to 18 who entered the detention center, mainly on delinquency charges, 41 percent tested positive for one drug, primarily marijuana (37 percent) or cocaine (10 percent). Seven percent tested positive for two or more drugs. The enzyme multiplied immunoassay technique (EMIT™) test, a fast, automated

urinalysis procedure, screened the subjects' urines for seven other drugs, but the rate of positive test results did not exceed 1 percent for any other drugs.⁶ Table 1 presents the test results.

As table 1 shows, marijuana use is present in the youngest age group and increases with age. Cocaine use, on the other hand, is nonexistent in the younger age group but begins to show up in the older teens. This indicates an opportunity for early intervention to forestall more serious drug use patterns.

For the 201 youths who gave samples at both the initial and followup tests, the percentage positive for cocaine more than doubled over the 15-month followup period (9 percent in initial tests, 19 percent on followup). Positive findings for marijuana remained essentially stable (34 percent initial, 37 percent at followup). (Positives in table 1, however,

About the authors

Dr. Dembo is a professor in the Department of Criminology at the University of South Florida and is associated with the Department of Epidemiology and Policy Analysis of the Florida Mental Health Institute at that university; Ms. Williams is with the Department of Criminology, University of South Florida; Dr. Wish is a visiting fellow at the National Institute of Justice; and Dr. Schmiedler is with the Departments of Psychiatry and Biomathematical Sciences, Mount Sinai School of Medicine, New York. The research reported was supported by grant number 86-IJ-CX-0050 from the National Institute of Justice and grant number 87-JN-CX-0008 from the Office of Juvenile Justice and Delinquency Prevention.

Table 1

Urine test results at initial interview (n=399)

Positive for:

Marijuana	37%
Cocaine	10
Benzodiazepines (Valium)	<1
Opiates	<1

Any of above	41%
Two or more of above	7

Positive for any drug, marijuana, and cocaine, by age

	Age (n)	10-12 (21)	13 (23)	14 (54)	15 (87)	16 (117)	17+ (97)
Positive for							
Any drug		24%	39%	28%	44%	44%	46%
Marijuana		24	39	24	40	39	41
Cocaine		0	4	4	6	14	15

are percentages of the original 399 youths: 10 for cocaine, 37 for marijuana.)

In the 18 months after the initial interview, 44 percent of the total group had at least one referral or arrest for a property felony, 35 percent for a property misdemeanor.

The urine test results for cocaine (but not for marijuana) significantly predicted subsequent arrests or referrals for property misdemeanors. Fifty-one percent of those positive for cocaine at the initial interview were arrested or referred to juvenile authorities compared to 33 percent of those who tested negative.

Youths testing positive for a drug at the initial interview were more likely to have received drug treatment during the followup period, but most drug users failed to receive any treatment because there were very few treatment program slots for adolescents in the community—particularly in the public sector.

Limitations of followup findings

Since no followup specimens were obtained from youths who had been jailed or otherwise securely confined, findings from the second test may apply primarily to the types of youth who were *less likely* to be incarcerated for long periods.

Comparing the two groups on demographic characteristics and referral history, psychosocial functioning, and alcohol-drug use, persons who were incarcerated at followup were worse on all indicators—they had significantly more prior arrests for property felonies, property misdemeanors, public disorder misdemeanors, and drug felonies.

Drug users tend to be property offenders, and thus those subjects who were not asked for second specimens may consist of more serious drug abusers. Thus the findings may underestimate the true level of drug use among detainees over time and the relationship of drug use to criminality.

Demographic characteristics of the original sample, their referral histories, and the primary reasons they were sent to the detention center are shown in table 2. Almost three-quarters were boys, and median age was between 15 and 16 years. The most frequent current offense was a property felony charge (28 per-

cent) followed by a warrant for failure to appear for another offense. Two-thirds had a prior admission to detention. Court records showed 90 percent had been referred to juvenile court at least once before on a delinquency charge and 47 percent on a status offense.

These youths were victims as well as perpetrators. Forty-seven percent had suffered sexual, physical, or emotional abuse or neglect. Only 7 percent were charged with a drug offense.

Comparing urine tests with self-reports

Urine test results and self-reports for both marijuana and cocaine appear in table 3 for the 201 youths for whom both initial interview and followup test data were available. (The shaded numbers show the time periods for which the urine tests are sensitive—a month for marijuana and 2 to 3 days for cocaine.)

At both the initial interview and at followup, only about a quarter of the youths who tested positive for cocaine reported using it in the prior 2 to 3 days, and 5 percent or fewer of the youths who tested negative reported recent cocaine use. Eighty percent of those who tested positive for marijuana reported using the drug in the past month (the period measured by the urine test). Thirty percent who tested negative reported having used it in the past month. Black youths underreported their cocaine use (compared with test results) substantially more than whites.

At both time periods estimates based on self-reports were higher for marijuana than for cocaine, as shown by table 4. These findings may be explained by the fact that cocaine use is less socially acceptable than marijuana use. Clearly, without the urine tests, recent cocaine use would have been greatly underdetected—by half at the initial interview and two-thirds at the followup.

One limitation of urine tests is that they can only detect recent drug use. Hence, they were not able to detect use in many youths who had reported using the drug at an earlier period. Of those who tested negative for marijuana at first interview, 58 percent reported they had used it one or more times earlier (table 3). Similar results were found in the followup, and similar results were found for cocaine (although at the lower level shown in table 3).

Table 2
Sample characteristics (n=399)

Male	72%
Ethnicity:^a	
Anglo	51%
Black	42
Hispanic	6
Other	1
	100%
Age	
10-12	5%
13	6
14	14
15	22
16	29
17	23
18	1
	100%
Most serious current referral charge	
Property felony	28%
Warrant—failure to appear	16
Court order	15
Violent felony	9
Property misdemeanor	8
Public disorder—misdemeanor	6
Drug felony	5
Resisting arrest	5
Violent misdemeanor	2
Drug misdemeanor	2
Status offense	2
Violation of community control	2
	100%
1 + prior referral for—	
Delinquency	90%
Status offense	47
Combined	92
Victimization^b	47%
Youths indicating this is their first juvenile detention	33%

^a Based on official record information and interview responses. Youths who said they were from Spanish-American families were classified as Hispanic.

^b Victim of sexual abuse, physical abuse, emotional abuse, or neglect.

These interviews, it must be emphasized, were conducted under confidential research conditions. In the potentially more threatening criminal justice setting, a youth might be even less likely to report recent illicit drug use. The Nation's first juvenile pretrial testing program, in Washington, D.C., reported that fewer than one-third of the youths who tested positive for drugs admitted to recent drug use.⁷

Test results at the initial interview compared with those at the followup are shown in table 5. Youths who tested positive at the initial interview were also likely to test positive at followup. Two-thirds of the youths who tested positive for marijuana initially tested positive for marijuana again at the followup.

Forty-four percent of cocaine positives tested positive again: 17 percent of the persons testing positive for cocaine at the followup had originally tested negative, suggesting a trend toward greater cocaine use in this population.

Subsequent arrests

Table 6 shows the distribution of offenses charged to the youths in the 18-month period following their initial interviews. Forty-four percent had at least one referral for a property felony and 35 percent for a property misdemeanor offense during the 18-month period. The researchers found that neither self-reported use of alcohol nor the lifetime frequency of reported marijuana or cocaine use significantly predicted subsequent referrals or arrests for property misdemeanors.

Urine tests, however, particularly if positive for cocaine use, were a significant predictor of property misdemeanor crimes—even after statistically controlling for the youths' age, gender, race, and socioeconomic status, referral history prior to the initial interview, mental health problems, self-reported history of alcohol, marijuana/hashish, or cocaine use, and either self-reported or official history of physical abuse or sexual victimization.

Table 7 shows that 51 percent of those testing positive for cocaine at the initial interview had referrals/arrests for property misdemeanors in the next 18 months, compared with only 33 percent of those who initially tested cocaine negative. The youths who tested positive for cocaine apparently were also highly involved in drug distribution, reporting almost four times as many drug sale crimes as those who tested negative. This finding is similar to those reported for adult drug users.⁸

Self-reported delinquencies

Arrest data may have limited use as indicators of criminal involvement.⁹ Self-report studies find that less than 1 percent of crimes result in arrest.¹⁰ While

Table 3

Urinalysis and self-reports of drug use, at initial and followup interviews
(n=201 male and female juveniles tested both times)

	Initial interview				Followup interview			
	Marijuana		Cocaine		Marijuana		Cocaine	
	D+	D-	D+	D-	D+	D-	D+	D-
Self-report	(n=69)	(n=132)	(n=18)	(n=183)	(n=74)	(n=127)	(n=39)	(n=162)
Used 3 days prior to interview	29%	5%	22%	3%*	32%	2%	26%	2%*
Used in past month	81	31*	56	17	80	29*	46	12
Ever used ^b	93	58	78	30	92	42	59	22

* Shaded figures show self-reported use that corresponds with period to which urine test is sensitive.

^b In followup interview, measures use since initial interview.

Table 4

Estimated recent drug use from self-reports and urine tests

Initial interview:	Self-report	Urine only	Combined only
Marijuana	48%	34%	55%
Cocaine	4	9	11
Followup interview:			
Marijuana	48%	37%	55%
Cocaine	6	19	21

self-reports cannot be accepted uncritically, reports of drug users have been found generally valid if obtained in confidential, nonthreatening research circumstances.¹¹

For this analysis, both self-report and urine test results were combined to measure marijuana use. Male youths who were more greatly involved with marijuana at first interview reported significantly more participation in general theft (auto theft, other property theft, breaking into a building or vehicle, and joyriding) and drug sales (marijuana/hashish or cocaine/crack and other hard drugs) in the previous year.

Similarly, the greater the youths' involvement with marijuana during the followup period, the greater their reported participation in theft offenses

Table 5

Urinalysis reports at initial interview and followup
(n=201)

Positive for:	Initial	Followup
Marijuana	34%	37%
Cocaine	9	19
Opiates	< 1	1
Any of the above	39	50
2+ drugs	4	8

during that period. Similar findings applied to the females in the study.¹²

Drug or alcohol treatment

Even though urine test results were not routinely turned over to detention center

Table 6

Referrals or arrests by category during 18-month followup period
n=398^a

Violent felonies 22%	Property felonies 44%	Drug felonies 13%
Murder, manslaughter, attempted murder or manslaughter, sexual battery, other felonious sex offenses, armed robbery, other robbery, aggravated assault or battery	Arson, burglary (breaking and entering), auto theft, grand larceny (excluding auto), receiving stolen goods	Felony violation of drug laws (excluding marijuana), felony marijuana offense
Violent misdemeanors 21%	Property misdemeanors 35%	Drug misdemeanors 5%
Assault and/or battery (not aggravated)	Petty larceny (excluding retail), retail theft (shoplifting), receiving stolen property (<\$100), criminal mischief (vandalism)	Misdemeanor violation of drug laws (excluding marijuana), misdemeanor marijuana offense
Public disorder misdemeanors 13%		
Disorderly conduct (trespassing, loitering, prowling)		

^a One youth who died after the initial interview is excluded. Percentages total to more than 100% because some had more than one arrest or referral

Table 7

Relationship of cocaine test results at initial interview to property crimes in the 18-month followup period and drug sales in year prior to initial interview

Referral/arrest information Had 1+ referrals/arrests for:	Test result at initial interview	
	Negative for cocaine (359)	Positive for cocaine (39)
Property misdemeanor	33%	51%*
Property felony	43	56
Self-reported mean number of drug sale offenses committed in year prior to initial interview	28.6	108.4**

* p < .05

** p < .01

staff (except with the youth's permission), the researchers suspected that those who tested positive at initial interview would be more likely to have been subsequently referred to treatment. This was the case, although few youths (23 percent) actually received treatment (table 8). Drug-positive youths were also more likely to have received *some* treatment, but most received none.

There were few publicly funded treatment slots in Tampa for juveniles. Many youths reported poignant experiences,

saying they were attending treatment on an outpatient basis and were abruptly terminated when their money ran out. Others were terminated from programs because of rule violations and returned to the streets to resume heavy drug use and delinquency.

Policy implications

Severe drug abuse problems exist among juvenile detainees in Tampa as well as in other large cities across the country.

Juvenile arrestees tested by the Drug Use Forecasting (DUF) program of the National Institute of Justice in San Diego, Phoenix, and Washington, D.C., also revealed considerable recent drug use.¹³ While marijuana was the drug most frequently detected in this study, an increase in cocaine use was found in the 15-month period after the initial detention.

Only 7 percent of the youths entered the detention center on drug-charge referrals, but tests showed 37 percent had recently used marijuana and 10 percent cocaine. Thus the results provide some evidence that urine tests may be useful for identifying drug use in juvenile detainees. Furthermore, youths who tested positive for cocaine had more referrals/arrests for property crimes and more involvement in drug dealing. (However, the project's analyses of "risk" reveal group—not individual—characteristics. These findings are useful in understanding how drug use relates *generally* to delinquency, but individuals within a group differ.)

The fact that many youngsters did report their recent marijuana use might lead one to conclude that urine tests were not needed to detect use of that drug. However, the research interviews were conducted under confidential and nonadversarial conditions; screening personnel in more routine criminal justice situations would not likely obtain such a high degree of self-disclosure.

Moreover, few youths who used cocaine admitted to it in interviews. Thus the evidence suggests that juvenile detainees (like adult detainees) tended to underreport recent illicit drug use.¹⁴ The finding that youths testing positive for cocaine have higher subsequent arrest rates for property crimes suggests that urine tests may significantly aid in predicting youth criminality as such tests do for adult offenders. Some jurisdictions (Phoenix, Washington, D.C.) already use urine tests to identify juvenile drug users and refer them to treatment.

Earlier project work found that youths who test positive for marijuana had more nondrug felony referrals (mostly burglary, auto theft, or grand larceny) than those who tested negative on this drug.¹⁵ Examination of subsequent arrests, however, did not reveal that youths who were marijuana-positive at initial interview had higher rearrest rates than the marijuana-negative youths, even

though the positives reported greater participation in theft and drug sales.

The higher rate of criminality among marijuana users raises a key policy issue: Because marijuana is a gateway drug to the use of other illicit drugs,¹⁶ early intervention with marijuana-using juvenile detainees may be effective in preventing many of these high-risk youths from proceeding to the use of cocaine and injectable drugs.

The project results also show the depth of emotional and behavioral problems in these juveniles. Many had been victims of child abuse and neglect. Effective treatment will have to be comprehensive, addressing a variety of mental health needs in addition to focusing on drug abuse.

As with adults, reducing drug dependence among seriously troubled youths often requires repeated interventions reinforced by improvements in social, educational, and vocational skills.¹⁷ The chronic nature of the difficulties faced by many youths needs to be recognized and addressed. Additional research will be needed to determine how the criminal justice system can best intervene and monitor these youths.

Time running out

The findings of this research underscore the need for identifying and treating drug-abusing juvenile detainees, who will be much more difficult to treat as they grow older. The number of youths in the project sample who tested positive for cocaine doubled in 15 months.

Time is running out for these youths. By 30 months after their initial interviews, 37 percent of those studied had been admitted to the Florida Department of Corrections system.

Notes

1. Ball et al. 1981, 1983; Chaiken and Chaiken 1982; Wish and Johnson 1986.
2. Stewart 1988, Wish et al. 1988.
3. Tuborg 1984, Wish et al. 1980, Wish 1987.
4. Wish and Gropper 1990.
5. Elliott, Ageton, Huizinga, Knowles, and Canter 1983.
6. Tests were conducted for alcohol, amphetamines, barbiturates, benzodiazepines,

Table 8

Were drug-positive youths likely to seek treatment? (n=201)

Treatment	Urine test results at initial interview	
	Drug neg. (123)	Drug pos. (78)
Youth reported having prior drug or alcohol treatment	6%	28%***
Record indicates youth referred by detention staff for drug/alcohol evaluation at initial interview	11%	28%**
Youth reported receiving treatment after initial interview	8%	23%**
** p < .01		
*** p < .001		

methaqualone, opiates, cocaine, phencyclidine (PCP), and cannabinoids. Alcohol tests used the GC/MS (gas chromatography-mass spectrophotometry) procedure; other drugs, the EMIT method with all positives confirmed by GC/MS. Confirmation of THC (tetrahydrocannabinol, active constituent of marijuana products) was sought only on an initial EMIT finding of 50 nanograms (ng) or greater concentration of THC per milliliter of urine (mL). All EMIT positives for cocaine and opiates were confirmed by GC/MS. The threshold for an alcohol positive was 10 ng/mL; for THC, 20 ng/mL; for PCP, 75 ng/mL; and for the other six drugs, 300 ng/mL.

In February 1987 the project initiated split-urine testing of a systematic sample of 25 of the 200 specimens subsequently provided by initially interviewed youths. The specimens went to the project's regular testing service, SmithKline Bio-Science Laboratories, and to the New York State Division of Substance Abuse Services (DSAS) testing laboratories. Twenty-four of the 25 test results (96 percent) were consistent between the two. In one instance, DSAS found traces of cannabinoids where SmithKline did not; this result was scored as a negative.

A systematic sample of 10 specimens provided at the time of followup interviews underwent split testing by the same two labs and proved 100 percent consistent.

7. Boyer and McCauley 1988.
8. Johnson et al. 1985, Collins et al. 1985.
9. David Nurco's work stimulated the development of this section.
10. Collins et al. 1982, Ball et al. 1981; Inciardi and Pottier 1986, McGlothlin et al. 1978.

11. Ball 1967, Stephens 1972, Inciardi 1986.
12. Dembo, Williams, Wothke, Schmeidler, Getreu, Berry, Wish, and Christensen 1989a.
13. Boyer and McCauley 1988, Pennell 1988, Maricopa County 1988.
14. Pennell 1988.
15. Dembo, Washburn, Wish, Schmeidler, Getreu, Berry, Williams, and Blount, 1987.
16. Single, Kandel, and Faust 1974.
17. Dembo, Williams, Schmeidler, Getreu, Berry, Genung, Wish, and LaVoie, 1988b.

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The Assistant Attorney General, Office of Justice Programs, coordinates the activities of the following program Offices and Bureaus: National Institute of Justice, Bureau of Justice Statistics, Bureau of Justice Assistance, Office of Juvenile Justice and Delinquency Prevention, and Office for Victims of Crime.

NCJ 119965

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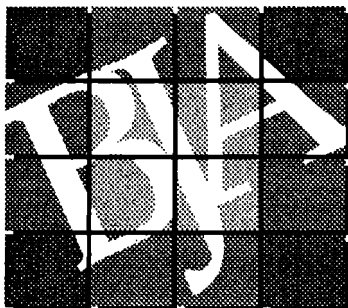
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**Implications of the
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Drug Use and Pretrial Misconduct in New York City

DOUGLAS A. SMITH, ERIC D. WISH, AND G. ROGER JARJOURA

This paper is based on research supported, in part, by the National Institute
of Justice

Reprinted from JOURNAL OF QUANTITATIVE CRIMINOLOGY
Plenum Press

Vol. 5, No. 2, June 1989
Printed in England

Drug Use and Pretrial Misconduct in New York City

Douglas A. Smith,¹ Eric D. Wish,² and G. Roger Jarjoura¹

Is recent drug use significantly associated with pretrial misconduct? Does consideration of recent drug use enhance risk classification among a sample of persons who have time free pending the disposition of their cases? Using data on arrestees in Manhattan, this paper examines these issues and some related questions. To measure recent drug use, urine samples were collected from persons shortly after their arrest and tested for four drugs: heroin, cocaine, PCP, and methadone. Two measures of pretrial misconduct are considered: whether a defendant fails to appear for a scheduled court date (FTA) and whether a defendant is rearrested prior to case disposition. Censored probit models are used to estimate the statistical association between drug test results and pretrial misconduct. Results show that drug test results are significantly associated with pretrial misconduct over and above the information typically available to judges at the time release decisions are made. Some implications of these findings for pretrial decision making are discussed.

KEY WORDS: censored probit; drug use; pretrial misconduct; risk classification.

1. INTRODUCTION

Research has shown a strong link between drug use and crime. After reviewing the literature, the National Academy of Sciences Panel on Criminal Careers concluded that hard drug use among offenders is significantly associated with a high rate of criminal activity.³ In view of these findings, criminal justice administrators are examining the usefulness of information about drug use for case processing decisions.

One area where information about a person's drug use is being increasingly considered is in making pretrial release decisions. Persons are typically interviewed by pretrial release agency staff shortly after arrest and before

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³The panel report is given by Blumstein *et al.* (1986). A review of the literature on the association between drug abuse and crime is given by Wish and Johnson (1986).

their initial court appearance. Information from these interviews is used to make recommendations to judges regarding whether an arrestee should be released to the community until his or her next court appearance. In most jurisdictions, release decisions must be based solely upon the defendant's risk of failing to appear for subsequent court dates (FTA). Some jurisdictions also permit judges to consider indicators of the person's dangerousness.

Assessments of a person's risk of FTA have traditionally been made using measures of the person's ties to the community. Factors such as whether individuals have verifiable employment, the length of time they have lived at their current address, and whether they have a history of prior FTAs often form the basis of pretrial release recommendations (Gottfredson and Gottfredson, 1988). The issue of whether to include drug abuse information in pretrial release decisions rests on the question of whether persons who are drug users at the time of arrest have a higher probability of pretrial misconduct (FTA or committing additional crimes while on release) than persons who are not using drugs.

Detecting whether an arrestee has recently used or is abusing drugs is not straightforward, however. The few studies of pretrial failure that have examined the relationship between drug use and FTA or rearrest (e.g., Roth and Wice, 1978) have relied upon individuals to disclose, during the pretrial interview, their recent drug use. Much recent evidence has shown that information on drug use obtained by interviews in criminal justice settings is of dubious value. Specifically, studies comparing self-reports of drug use with urine test results indicate that one-half or fewer of arrestees or probationers who test positive will admit to recent drug use during confidential research interviews (Toborg *et al.*, 1986; Wish and Johnson, 1986; Wish *et al.*, 1986). In view of these findings, urine tests appear to provide significantly more reliable data about recent drug use.

In this paper we examine the relationship between urine test results, based on specimens taken from arrestees shortly after their arrest, and two measures of pretrial misconduct (FTA and rearrest). The relationship between an arrestee's urine test results and pretrial misconduct has rarely been studied. In part this is because only one jurisdiction, Washington, D.C., has operated a pretrial urinalysis screening program for any length of time.⁴ Because a number of other pretrial release programs (Portland, Oregon; Phoenix, Arizona; Milwaukee, Wisconsin; Tucson, Arizona; Wilmington, Delaware; and Prince Georges County, Maryland) are currently replicating the Washington, D.C., testing program, it would be useful to examine the empirical association between urine test results and pretrial misconduct. This paper explores this question by reanalyzing urine test

⁴A description of the D.C. program is given by Carver (1986).

results and case information from a prospective study of persons arrested in New York City in 1984.⁵

2. A CONCERN IN ANALYSES OF PRETRIAL MISCONDUCT

With few exceptions (e.g., Rhodes, 1985), confidence in findings from prior research on the correlates of pretrial misconduct is often limited. The limitation arises because estimates of the association between pretrial misconduct and independent variables are based only on information contained in the sample of cases with time free prior to case disposition. However, if the question of interest is how research on the correlates of pretrial misconduct might inform *future* release decisions, then a potentially serious problem must be addressed. Specifically, defendants who have time free prior to the disposition of their case are a sample of the larger population of persons whose cases are continued after arraignment and who could have been released. If the subsample of defendants with time free is a *random* sample of all defendants who are eligible for release, then results from an analysis based only on released cases would generalize to the larger sample of defendants who were eligible for release.

However, it is likely that persons released after arraignment will differ from those who are detained and that these differences will be the result of a nonrandom selection process (i.e., cases perceived to be the best risks are the ones most likely to be released). Thus, released defendants will probably differ from those who are detained, and these differences may be related to factors that are associated with the probability of FTA or rearrest. This situation creates the potential for sample selection bias. One way to conceptualize the potential problem of sample selection bias is to ask whether the estimated relationship between drug use and pretrial misconduct in a sample of released defendants would characterize the relationship between drug use and pretrial misconduct among the sample of detained defendants *if detained defendants had been released*.

To address the question of whether defendants who test positive for drugs have a higher likelihood of FTA or rearrest if released, it is necessary to control for the selection process which determines whether defendants are released or detained pending case disposition. Since only released defendants can fail, information on the relationship between drug use and pretrial misconduct can be observed only for that sample of cases. When the sample of defendants with time free is a nonrandom subset of all

⁵An earlier analysis using these data to assess the relationship between urine test results and FTA is given by Wish *et al.* (1988). The present study extends the results in that report by including rearrest as a measure of pretrial failure and by estimating models that control for sample selection bias.

defendants eligible for release, the potential for bias exists. Specifically, estimated parameters from a model using only released defendants may confound the behavioral relationship of interest (whether evidence of recent drug use increases the probability of pretrial misconduct) with parameters of a model that determines whether a defendant has time free prior to case disposition.

Analyses presented in this paper address this concern by estimating a censored probit model which uses information about released *and* detained defendants to control for the nonrandom selection process by which defendants are at risk of FTA or rearrest (see Farber, 1983; Meng and Schmidt, 1985; van de Ven and van Praag, 1981). Results from this model yield consistent and efficient estimates of the association between independent variables, such as drug test results, and the probability of pretrial misconduct, which may be used to test whether drug test results are statistically associated with either FTA or rearrest.

3. AN OUTLINE OF THE MODEL

This section outlines issues in estimating the relationship between drug test results and pretrial misconduct. First, we present a basic probit model for estimating the association between drug test results and pretrial failure conditional on defendants being "at risk" of failure.⁶ We identify necessary conditions under which results from this model apply to the complete sample of both released and detained defendants. Finally, we present a model that corrects for possible sample selection bias by simultaneously estimating two probit equations—one for the release decision and the other for whether a released defendant fails.

To begin, assume that we have a sample of (N) defendants whose cases are continued after arraignment. Some subset of these persons (n_1) will be detained by the court, pending the disposition of their cases, while others (n_2) will be released. Only those defendants who have time free prior to case disposition are "at risk" of FTA or rearrest. In the sample of released defendants it is possible to determine if the conditional probability of pretrial failure (FTA or rearrest) varies with urine test results, while controlling for the influence of other variables that are associated with pretrial failure. Specifically, we assume that there is a latent variable Y_1^* , which is an index of failure propensity. This latent variable is related to several other variables (x_j) by the regression function

$$Y_1^* = X\beta + \varepsilon_1 \quad (1)$$

⁶In this section, "failure" is used to refer to both types of pretrial misconduct, FTA and rearrest.

where X is an $n_2 \times j$ data matrix of independent variables and β is a $j \times 1$ coefficient vector to be estimated. We cannot observe Y_1^* , but only whether a defendant fails or not (Y_1). Specifically,

$$\begin{aligned} Y_1 &= 1, & \text{if } Y_1^* > 0 \\ Y_1 &= 0, & \text{otherwise} \end{aligned} \quad (2)$$

Based on (1) and (2), the estimated probability that the i th individual will fail is the probability that y_{i1} is equal to 1. This can be written as

$$P(y_{i1} = 1) = F(X_i\beta) \quad (3)$$

where $F(\cdot)$ is the cumulative distribution function for ε_1 , and X_i indicates the row of the matrix of independent variables corresponding to the i th individual. If we assume that the disturbances are independent normal variables with zero mean and constant variance, then the model for estimating failure probabilities in the probit model (see Goldberger, 1964). Under these assumptions, the parameters of Eq. (1) can be estimated by maximizing the log likelihood:

$$\log L = \sum_{i=1}^{n_2} y_{i1} \log \Phi(X_i\beta) + (1 - y_{i1}) \log[1 - \Phi(X_i\beta)] \quad (4)$$

where $\Phi(\cdot)$ is the standard normal cumulative distribution function.

The utility of this model is that estimated parameters from Eq. (1) (i.e., β) can be used to test whether specific exogenous variables, such as urine test results, are significantly related to the underlying index of failure propensity (Y_1^*) and, hence, to the probability of pretrial misconduct. However, maximizing the likelihood function in (4) on the sample of defendants with time free may result in biased parameter estimates because those defendants are a nonrandom subset of all defendants who are eligible for release. Specifically, defendants whose cases are continued after arraignment may be either released or detained by the court. Let Y_2^* be an underlying index of the court's assessment that a defendant is a good risk for release. Further, since release decisions are not made randomly, this index will be related to a number of other variables (z_k), such as prior FTAs, by the regression function

$$Y_2^* = Z\gamma + \varepsilon_2 \quad (5)$$

where Z is a $N \times k$ data matrix and γ is a $k \times 1$ vector of coefficients to be estimated.

As was the case with FTA, we observe only whether a defendant has time free or is detained prior to case disposition (Y_2). Specifically,

$$\begin{aligned} Y_2 &= 1, & \text{if } Y_2^* > 0 \\ Y_2 &= 0, & \text{otherwise} \end{aligned} \quad (6)$$

Thus, from (5) and (6), the probability that the i th defendant will have time free pending case disposition is the probability that $y_{i2} = 1$. The parameters in (5) can also be estimated using a probit model under the same assumptions that applied to the disturbance term in Eq. (1).

For our purpose it is important to note that the primary variable of interest, whether a defendant fails (Y_1), can be observed only for defendants with time free (i.e., $Y_2 = 1$). Thus, one source of concern involves the relationship between the population regression function for the latent index of failure propensity [Eq. (1)] and the regression function for this failure index for the subsample of defendants with time free. The population regression function from Eq. (1) may be written as

$$E(Y_1^* | X) = X\beta \quad (7)$$

while the regression function for the subsample of defendants with time free is

$$E(Y_1^* | X, Y_2 = 1) = X\beta + E(\varepsilon_1 | X, Y_2 = 1). \quad (8)$$

The model for pretrial failure in Eq. (1) omits the second term on the right-hand side of Eq. (8), which is the expected value of the truncated normal error term. Thus, estimating a failure equation on a sample of persons with time free assumes that this term is 0. Under what conditions is this assumption reasonable? Van de Ven and van Praag (1981) show that if the disturbance terms in the selection and failure equations have a bivariate standard normal distribution with correlation coefficient ρ , then for the i th individual,

$$E(\varepsilon_{i1} | X_i, Y_{i2} = 1) = \rho\lambda_i \quad (9)$$

where λ_i is a hazard rate equal to $\phi(\hat{y}_{i2}^*)/\Phi(\hat{y}_{i2}^*)$, where ϕ and Φ represent, respectively, the probability density function and cumulative distribution function of the standard normal distribution. Equation (9) would equal 0 only if $\hat{\rho}$ (the estimated correlation between the disturbance terms in the selection and failure equations) were 0. If the data are inconsistent with this assumption (i.e., $\hat{\rho} \neq 0$), estimated coefficients in the failure equation may be biased (see Heckman, 1976, 1979).

It is possible to estimate coefficients in the failure equation that adjust for potential sample selection bias. In this research we use a model that simultaneously estimates the probability that a defendant will be at risk of

failing (the selection equation) and, if at risk, whether he fails or not (the primary equation).⁷ Using an equation for failure [Eq. (1)], and an equation for whether a defendant is at risk of failing [Eq. (5)], and assuming that the disturbance terms in these equations are bivariate standard normal variables with correlation coefficient ρ and cumulative distribution function H , the log likelihood for the censored probit model is (from Meng and Schmidt, 1985):

$$\log L = \sum_{i=1}^N \{ (1 - y_{i2}) \log \Phi(-Z_i\gamma) + (y_{i1}y_{i2}) \log H(X_i\beta, Z_i\gamma; \rho) + y_{i2}(1 - y_{i1}) \log [\Phi(Z_i\gamma) - H(X_i\beta, Z_i\gamma; \rho)] \}. \quad (10)$$

This likelihood function has three parts that correspond to the three possible outcomes that are observed in the data. The first term of the likelihood involves the probability that a defendant does not have free time prior to case disposition $\Phi(-Z_i\gamma)$. The second term involves the joint probability that a defendant has time free and fails $H(X_i\beta, Z_i\gamma; \rho)$. The third term involves the probability that a defendant has time free and does not fail. If the correlation between disturbances in the release and misconduct equations was zero (i.e., $\rho = 0$), estimating a standard probit model for misconduct on the subsample of released defendants would yield unbiased estimates of the association between independent variables and the conditional probability of misconduct. However, if the disturbances in the release and failure equations are correlated, estimating a standard probit model on the sample of released defendants will result in biased estimates of the association between independent variables and the conditional probability of pretrial misconduct. Under these conditions it is necessary to maximize the likelihood in (10) to obtain consistent estimates of the association between independent variables and the probability of pretrial misconduct. The following analysis reports results from estimating this model on a sample of defendants in New York City.

4. DATA AND VARIABLES

Persons arrested in Manhattan are brought to the central booking facility for identification and processing prior to being arraigned in court.

⁷Van de Ven and van Praag (1981, pp. 235-240) discuss a two-stage method for estimating a censored probit model. In this paper we use a maximum-likelihood estimator discussed in their paper and by Meng and Schmidt (1985).

The data used in this paper were collected as part of a study to determine the feasibility of establishing a drug testing program for arrestees in New York City.⁸ Between April and October 1984, research staff were stationed in Manhattan Central Booking for the purpose of interviewing male arrestees and obtaining voluntary urine specimens. After the pretrial interview was completed, persons primarily charged with nondrug felony offenses were approached and asked to participate in a voluntary confidential research interview. Arrestees were also asked to provide a voluntary urine specimen. Arrestees were told that all of the information they provided was for research purposes only and could not affect their current case. Ninety-five percent of the 6056 persons approached (excluding 350 who were ill or sent to court before the interview could be requested) agreed to the interview. Of these, 84% (4847) voluntarily provided a urine specimen.

Urine specimens were sent to the New York State Testing Laboratory in Brooklyn to be analyzed by EMIT techniques for opiates, cocaine, PCP, and methadone. In addition to information gathered in the research interview, information was obtained from records maintained by several criminal justice agencies. Information about each person's prior and subsequent arrest history and pretrial time incarcerated and details of case processing and disposition were added to the data base.⁹

Because the following analysis is concerned with estimating the association between drug test results and pretrial misconduct (FTA or rearrest) among persons who are eligible for release, only those cases that were continued after arraignment were considered. This left a sample of 2919 cases. Additional cases were dropped if they contained missing data on the independent variables used in this study. The final sample used in this paper contains information on 2606 defendants who could have been released.

4.1. Dependent Variables

Three dependent variables are used in this analysis. The dependent variable in the selection equation is a dummy variable coded as 1 if the person has some time free prior to case disposition and 0 otherwise. Of the 2606 cases considered in this analysis, 1967 (or 75.5%) have at least 1 day free prior to disposition. Two measures of pretrial failure were created for the sample of defendants with time free. The first, *failure to appear* (FTA), was measured as a dummy variable using information on whether a warrant was issued for failing to appear for a scheduled court date prior to case

⁸A complete description of the methodology of the data collection and testing program is given by Wish *et al.* (1988).

⁹Only male defendants are examined in this analysis.

disposition.¹⁰ If a warrant was issued for failing to appear, the case was coded as 1 on the variable FTA. Cases without warrants issued were coded as 0. In these data, 33% of defendants with time free failed to appear for at least one subsequent court appearance. The second measure of pretrial failure, *rearrest*, was set equal to 0 if the defendant was not rearrested by the end of the data collection period. For those with subsequent arrests, the date of the first rearrest was compared to the date of disposition. If the arrest occurred prior to disposition the case was coded as 1 on the variable rearrest. If the arrest occurred after case disposition the defendant case was coded as not having been rearrested prior to disposition. In these data, 25.3% of released dependants were rearrested prior to having their original cases disposed.

5. ANALYSIS AND RESULTS

Information on the percentage of cases released by categories of the independent variables is shown in Table I. In addition, the percentage of FTAs and persons rearrested prior to case disposition is reported for the 1967 defendants with time free prior to disposition. Data in Table I indicate that the percentage of eligible defendants that is released declines with the number of positive drug test results. While 79.9% of those who do not test positive for any drugs have time free prior to disposition, only 66.5% of those who test positive for two or more drugs has time free. Examination of the drug-specific test results indicates that defendants who test positive for heroin are the least likely group to have time free pending case disposition. It should be remembered that judges did not have access to the urine test results.

5.1. Pretrial Failure and Drug Test Results: Descriptive Data

Among the sample of defendants with time free, the percentage who fail, by either FTA or rearrest, increases with the number of positive test results (see Table I). Drug-specific test results indicate that the percentage of FTAs is largest among released defendants who test positive for heroin

¹⁰An alternative specification to examining the relationship between recent drug use and pretrial misconduct could involve estimating models of time to failure. We are unable to pursue this route for FTA because the data do not contain the exact date on which a defendant failed to appear for a scheduled hearing. Moreover, while the data do contain the date of arrest for persons arrested during the pretrial period, we think the important substantive question is *whether* a released defendant fails to appear or is rearrested during the pretrial period, rather than the time interval until the failure event.

Table I. Percentage Released, FTA, and Rearrested by Independent Variables

Variable	% released ^a	% FTA ^b	% rearrested ^b
All cases (2606)	75.5	33.0	25.3
Felony (2291)	76.1	32.0	24.7
Misdemeanor (315)	71.1	41.1	30.4
Violent (450)	82.9	27.6	17.2
Robbery (473)	63.0	26.2	30.2
Burglary (221)	64.3	35.9	31.0
Other property (598)	70.6	41.2	26.8
Drug (450)	87.3	32.1	30.0
Other weapon (103)	81.6	26.2	20.2
Other (311)	82.0	37.3	20.4
Urinalysis results			
No drugs (1159)	79.9	28.2	19.8
One drug (891)	75.3	36.5	28.3
Two or more drugs (556)	66.5	38.6	33.8
Positive for heroin (517)	64.2	41.9	33.1
Positive for cocaine (1098)	72.6	36.9	29.0
Positive for PCP (320)	74.1	33.8	40.1
Positive for methadone (173)	72.3	38.4	24.8
16-20 years old (598)	81.4	29.4	29.2
21-25 years old (675)	73.9	36.1	27.9
26-30 years old (526)	73.0	35.2	27.3
31-35 years old (329)	71.1	35.9	22.6
36 years and older (478)	75.9	29.5	16.3
Single (1623)	75.7	33.9	26.5
Married (426)	78.6	31.0	21.2
Separated/divorced/widowed (283)	70.7	34.5	20.0
Common law (274)	74.5	29.4	30.4
Black (1452)	73.0	33.2	26.5
White (260)	86.9	26.5	15.0
Hispanic (894)	76.2	34.8	26.9
Employed (920)	83.5	28.6	19.0
Unemployed (1176)	68.8	38.2	30.0
Irregular employment (326)	72.4	36.0	30.9
In school (184)	83.7	22.7	23.4
Not high-school graduate (1487)	74.4	30.3	26.9
High-school graduate (735)	74.1	39.3	25.3
Post-high school education (384)	82.3	31.6	19.9
In previous 2 years			
Arrested (1243)	64.5	38.2	39.2
Warrants (579)	57.9	48.4	46.6
Felony convictions (631)	58.2	35.4	34.6

Table I (continued)

Variable	% released ^a	% FTA ^b	% rearrested ^b
Open cases at arrest			
None (1306)	85.7	27.9	18.5
One (652)	74.5	40.3	31.7
Two or more (648)	55.9	39.0	37.8
Pretrial release recommendation			
Recommendation for release (662)	84.6	21.8	21.4
Qualified recommendation (411)	84.2	25.7	22.0
Insufficient ties (990)	74.8	42.5	25.6
Warrants, other problems (543)	58.9	38.4	35.0
Days free to disposition			
1-60 (616)	—	10.9	16.6
61-120 (422)	—	20.6	21.6
121-180 (290)	—	29.0	30.0
180+ (639)	—	64.3	34.1

^aN = 2606.^bBased on defendants with at least 1 day free prior to disposition of case (N = 1967).

(41.9%), while released defendants who test positive for PCP are the most likely to be rearrested (40.1%).

These results are conditional on defendants having time free and do not control for the influence of other variables on the probability of pretrial misconduct. To obtain a more valid estimate of the statistical association between drug use and failure requires simultaneous control for other variables that may influence failure and an adjustment for the nonrandom selection into the released sample. To control for the possible selection bias on parameter estimates in the failure equations, a model estimating the probability that a defendant will have time free prior to case disposition is necessary.¹¹

¹¹The factors that influence whether defendants have time free prior to case disposition is not our primary substantive concern. However, to obtain unbiased estimates of the association between drug test results and pretrial misconduct, it is necessary to estimate an equation that models the process by which defendants are released or detained. The selection model is also important for the identification of parameters in the failure equation. If the independent variables in the selection and failure equation are identical, then the coefficients in the failure model are identified only by the distributional assumptions regarding the disturbance terms in these two equations. Models become better identified to the extent that there are variables in the selection equation that are not in the failure equation. A discussion of the identification issue in censored probit models, including more restrictive models than the one used in this paper, is given by Poirier (1980) and Meng and Schmidt (1985).

5.2. A Probit Model for Whether Defendants Have Time Free

Three equations estimating the probability that a defendant has time free prior to case disposition are shown in Table II. The dependent variable in each equation is a binary measure coded 1 if the defendant has time free

Table II. Estimated Probit Models for Whether Defendant Has Any Free Time Prior to Disposition of Case ($N = 2606$)

Independent variable	Full model		Reduced model
	Eq. I	Eq. II	Eq. III
Age	-0.067 ^a (-3.16) ^b	-0.065 (-3.03)	-0.070 (-3.60)
Age squared	0.001 (3.14)	0.001 (3.05)	0.001 (3.42)
Married	0.012 (0.10)	0.017 (0.14)	
Single	0.084 (0.81)	0.083 (0.79)	
Common law	0.243 (1.88)	0.243 (1.87)	
Employed	0.252 (2.54)	0.255 (2.56)	0.318 (4.81)
Unemployed	-0.075 (-0.82)	-0.069 (-0.75)	
In school	0.098 (0.64)	0.109 (0.70)	
White	0.415 (3.36)	0.424 (3.41)	0.404 (3.32)
Hispanic	0.135 (2.02)	0.146 (2.17)	0.102 (1.59)
Not high-school graduate	-0.010 (-0.14)	-0.014 (-0.21)	
Post-high school education	0.153 (1.49)	0.154 (1.50)	
Prior arrests	-0.291 (-3.85)	-0.295 (-3.88)	-0.315 (-4.19)
Prior FTAs	-0.218 (-2.71)	-0.218 (-2.70)	-0.213 (-2.66)
Prior felony convictions	-0.489 (-7.26)	-0.487 (-7.21)	-0.501 (-7.54)
Open cases	-0.252 (-6.29)	-0.251 (-6.26)	-0.252 (-6.37)
Recommended for release	0.450 (5.74)	0.443 (5.65)	0.456 (5.90)
Qualified recommendation	0.367 (3.91)	0.364 (3.88)	0.373 (4.05)
Felony	0.244 (2.52)	0.243 (2.51)	0.226 (2.36)
Drug offense	0.841 (8.06)	0.832 (7.95)	0.858 (8.82)
Violent offense	0.280 (2.85)	0.277 (2.81)	0.328 (3.65)
Burglary	-0.171 (-1.52)	-0.166 (-1.48)	
Robbery	-0.299 (-3.36)	-0.302 (-3.39)	-0.257 (-3.19)
Other weapon offense	0.139 (0.82)	0.120 (0.71)	
Other offense	0.361 (3.15)	0.363 (3.17)	0.396 (3.64)
Number of positive tests	-0.043 (-1.05)		
Heroin		-0.131 (-1.65)	
Cocaine		0.003 (0.04)	
PCP		0.062 (0.67)	
Methadone		0.038 (0.32)	
Intercept	1.607	1.542	1.678
Log likelihood	-1165.37	-1164.15	-1172.70

^aMaximum-likelihood probit coefficient.

^b t ratio of estimated coefficient.

prior to case disposition and 0 otherwise. Equation I includes all independent variables and the number of positive drug tests (coded as 0, 1, 2, or more). Equation II contains all independent variables and four binary measures of drug-specific test results. Separate equations are required for the two ways of coding drug test results because of redundant information in these measures. Equations I and II show that the probability that a defendant will have time free prior to case disposition varies with a number of factors. However, neither equation indicates that the probability of release varies with drug test results once other variables are included in the model. This is not surprising since the court was not given the drug test results from this study.

The third equation in Table II is a reduced model that was estimated by successively eliminating variables that were not significantly associated with whether a defendant has any time free prior to case disposition. Results of a likelihood-ratio test between this equation and either of the full equations is consistent with the hypothesis that the variables omitted from the reduced equation are not significantly associated with whether a defendant has time free pending disposition.¹² Thus, the reduced equation will be used in subsequent analyses to model the selection process.

5.3. Multivariate Models of FTA

The next set of results concern variables associated with FTA and are shown in Table III. Three equations are presented. The first includes all independent variables except measures of drug use. The reported coefficients are maximum-likelihood estimates from a model in which the release equation and failure equation are estimated simultaneously by maximizing the likelihood in Eq. (10). The coefficient labeled "rho" is the estimated correlation between the disturbances in these two equations. In the interest of parsimony only results from the equations describing FTA are reported. The independent variables in the selection equation are those included in the reduced model presented in Table II.¹³

¹²The likelihood-ratio test is based on the fact that two times the absolute difference between the log likelihoods of two nested models is approximately distributed as chi-square with degrees of freedom equal to the difference between the number of independent variables in the two models. For this example, the likelihood-ratio test comparing the reduced model to Eq. I is 14.66 with 10 degrees of freedom. Assuming that the test statistic is distributed as chi-square, we would not reject the hypothesis that the two models fit the data equally.

¹³The estimated coefficients associated with variables in the selection model are not significantly different from those reported in the reduced model in Table II. Full results are available from the author on request.

Table III. Estimates from Censored Probit Models for Failure to Appear ($N = 2604$, 1965)^a

Independent variable	Eq. I	Eq. II	Eq. III
Age	-0.004 ^b (-1.07) ^c	-0.004 (-1.10)	-0.005 (-1.16)
Married	-0.058 (-0.54)	-0.048 (-0.44)	-0.048 (-0.44)
Single	-0.059 (-0.61)	-0.052 (-0.53)	-0.052 (-0.53)
Common law	-0.156 (-1.30)	-0.172 (-1.41)	-0.174 (-1.43)
Employed	-0.254 (-2.63)	-0.248 (-2.53)	-0.251 (-2.59)
Unemployed	0.036 (0.41)	0.027 (0.31)	0.028 (0.32)
In school	-0.233 (-1.75)	-0.211 (-1.58)	-0.214 (-1.61)
White	-0.237 (-2.13)	-0.249 (-2.22)	-0.253 (-2.25)
Hispanic	0.018 (0.27)	0.011 (0.17)	0.002 (0.36)
Not high-school graduate	-0.254 (-3.72)	-0.250 (-3.65)	-0.243 (-3.56)
Post-high school education	-0.116 (-1.29)	-0.105 (-1.15)	-0.103 (-1.14)
Prior arrests	0.110 (1.30)	0.096 (1.12)	0.102 (1.21)
Prior FTAs	0.388 (4.41)	0.386 (4.38)	0.379 (4.31)
Prior felony convictions	0.180 (1.69)	0.153 (1.41)	0.157 (1.47)
Open cases	0.145 (2.76)	0.133 (2.51)	0.136 (2.60)
Recommended for release	-0.596 (-8.33)	-0.600 (-8.32)	-0.597 (-8.35)
Qualified recommendation	-0.445 (-5.28)	-0.444 (-5.23)	-0.446 (-5.29)
Felony	-0.171 (-1.74)	-0.177 (-1.79)	-0.181 (-1.84)
Drug offense	-0.566 (-5.03)	-0.599 (-5.28)	-0.604 (-5.43)
Violent offense	-0.418 (-4.59)	-0.391 (-4.25)	-0.392 (-4.29)
Burglary	-0.164 (-1.44)	-0.175 (-1.51)	-0.170 (-1.48)
Robbery	-0.321 (-2.32)	-0.320 (-2.33)	-0.316 (-2.29)
Other weapon offense	-0.339 (-2.20)	-0.345 (-2.21)	-0.340 (-2.19)
Other offense	-0.192 (-1.74)	-0.177 (-1.59)	-0.187 (-1.69)
Scheduled appearances	0.019 (2.82)	0.019 (2.81)	0.019 (2.83)
Number of positive tests		0.109 (2.75)	
Heroin			0.129 (1.66)
Cocaine			0.112 (1.88)
PCP			0.026 (0.31)
Methadone			-0.003 (-0.02)
Intercept	0.609	0.546	0.570
Rho	-0.694 (-2.60)	-0.680 (-2.49)	-0.700 (-2.66)
Log likelihood	-2321.52	-2317.47	-2317.29

^aOf the 2606 cases used in this analysis, 1967 had at least 1 day free prior to disposition. However, two additional cases were lost due to missing data on the independent variable measuring number of scheduled appearances.

^bMaximum-likelihood estimate.

^ct ratio.

Results from Eq. I show that a number of variables are related to the probability of FTA. The probability of FTA varies significantly with whether the defendant is employed and has a history of prior FTA and the current charge. The reference category for the charge dummy variables is other

property crimes (larceny, stolen property, and theft). Defendants are also more likely to FTA as the number of scheduled court appearances increases.¹⁴ Additionally, defendants who receive either full or qualified recommendations for release from the pretrial release agency are less likely to fail than defendants who do not receive such recommendations.

But our primary concern is with whether drug test results are associated with the probability of FTA. Information to assess this question is presented in Eqs. II and III. Results from Eq. II show that the number of drugs a defendant tests positive for is significantly associated with the probability of FTA. This association is independent of the other variables included in this equation. In addition, this relationship is independent of the selection process by which defendants are at risk of failing. Thus, evidence in Eq. II is consistent with the hypothesis that the probability of failing to appear for subsequent court dates increases significantly with the number of positive drug test results.

Information in Eq. III addresses the question of whether the probability of FTA varies with different types of drug use. Four dummy variables are used to measure whether a defendant tested positive for heroin, cocaine, PCP, or methadone. Results indicate that defendants who test positive for heroin or cocaine are somewhat more likely to fail to appear than defendants who are similar in other respects but who do not test positive for these two drugs. However, a likelihood-ratio test between this equation and Eq. I does not reject the hypothesis of no association between drug-specific test results and FTA ($P > 0.07$).¹⁵

¹⁴A preliminary analysis of the FTA model included the number of days during the pretrial period that a defendant was not in custody as an independent variable to control for the length of time that a defendant was at risk of failing. However, we now believe that the number of days free is not appropriate for this purpose in our analysis of FTA. While there was an extremely strong statistical association between days free and FTA, the number of days free may not be exogenous to the dependent variable in the FTA equation. Specifically, defendants who fail to appear must be found and this artificially inflates the number of days they are free. Thus, to some extent, the number of days free is a function of whether defendants failed to appear. The number of scheduled appearances strikes us as a substantively more appropriate measure of exposure risk. While a defendant may be at risk of committing another *crime* on any given day he is free, he is at risk of FTA only on those days on which he is scheduled to appear in court. Thus, to control for exposure risk in the FTA analysis we use the number of scheduled court appearances. For the analysis of rearrest, the number of days free until the first arrest is used as a control for exposure risk.

¹⁵It should be noted that the likelihoods of the models for the equation that includes the number of positive drug tests and the equation that includes drug-specific test results are essentially identical (-2325.05 vs -2325.15). Thus, the likelihood-ratio tests between these equations and the equation that excludes drug test results are the same. The difference in statistical significance reflects the difference in degrees of freedom (1 vs 4) between these two tests. Thus, the drug-specific model fits the data as well as the model that uses only the number of positive tests but it requires more information to achieve the same degree of fit.

5.4. Multivariate Models of Rearrest

Table IV shifts attention to the relationship between drug test results and the probability of rearrest. Three equations are presented, one without drug use information (Eq. I), one with the number of positive drug tests (Eq. II), and one with drug-specific test results (Eq. III). The reported coefficients are maximum-likelihood estimates from a model that estimates

Table IV. Estimates from Censored Probit Models for Rearrest ($N = 2606$, 1967)^a

Independent variable	Eq. I	Eq. II	Eq. III
Age	-0.021 ^b (-4.04) ^c	-0.021 (-4.09)	-0.019 (-3.75)
Married	0.002 (0.01)	0.015 (0.11)	0.005 (0.03)
Single	-0.062 (-0.49)	-0.054 (-0.44)	-0.076 (-0.61)
Common law	0.132 (0.89)	0.119 (0.81)	0.116 (0.78)
Employed	-0.254 (-2.07)	-0.251 (-2.03)	-0.256 (-2.06)
Unemployed	-0.005 (-0.05)	-0.013 (-0.12)	-0.008 (-0.08)
In school	-0.221 (-1.38)	-0.198 (-1.23)	-0.190 (-1.17)
White	-0.175 (-1.22)	-0.197 (-1.36)	-0.172 (-1.17)
Hispanic	0.003 (0.04)	-0.009 (-0.12)	0.007 (0.08)
Not high-school graduate	0.011 (0.13)	0.018 (0.22)	0.013 (0.16)
Post-high school education	0.031 (0.28)	0.044 (0.39)	0.050 (0.44)
Prior arrests	0.481 (4.89)	0.473 (4.82)	0.467 (4.75)
Prior FTAs	0.211 (2.02)	0.212 (2.03)	0.209 (1.99)
Prior felony convictions	0.303 (2.31)	0.287 (2.18)	0.282 (2.12)
Open cases	0.126 (1.84)	0.120 (1.73)	0.123 (1.77)
Recommended for release	-0.190 (-1.60)	-0.202 (-1.67)	-0.207 (-1.72)
Qualified recommendation	-0.094 (-0.78)	-0.100 (-0.82)	-0.096 (-0.78)
Felony	-0.172 (-1.48)	-0.186 (-1.59)	-0.186 (-1.57)
Drug offense	-0.066 (-0.37)	-0.144 (-0.62)	-0.111 (-0.59)
Violent offense	-0.279 (-2.23)	-0.250 (-2.00)	-0.265 (-2.10)
Burglary	0.114 (0.84)	0.107 (0.79)	0.109 (0.80)
Robbery	0.048 (0.40)	0.061 (0.51)	0.038 (0.31)
Other weapon offense	-0.134 (-0.70)	-0.134 (-0.70)	-0.137 (-0.72)
Other offense	-0.202 (-1.40)	-0.192 (-1.32)	-0.188 (-1.28)
Natural log of days free	0.260 (7.84)	0.262 (7.85)	0.262 (7.85)
Number of positive tests		0.120 (2.58)	
Heroin			0.162 (1.75)
Cocaine			0.050 (0.69)
PCP			0.320 (3.23)
Methadone			-0.136 (-0.96)
Intercept	-1.293	-1.342	-1.368
Rho	-0.045 (-0.10)	-0.078 (-0.17)	-0.070 (-0.15)
Log likelihood	-2135.30	-2131.92	-2127.71

^aOf the 2606 cases used in the analysis, 1967 had at least 1 day free prior to disposition.

^bMaximum-likelihood estimate.

^ct ratio.

the release and rearrest equations simultaneously and allows the disturbance terms across these equations to be correlated. The variables used in the selection equation are the same as those contained in the reduced model in Table II. Again, only results from the rearrest equations are presented.

Results from this analysis show that the number of positive drug tests is significantly associated with the probability that a defendant will be rearrested prior to case disposition. This relationship is independent of all other variables included in Eq. I and the selection process by which defendants are selected into the sample of persons with time free. When drug-specific test results are considered, defendants testing positive for PCP are significantly more likely to be arrested prior to case disposition than defendants testing negative for all drugs. Defendants who test positive for heroin have a slightly higher risk of rearrest, while defendants testing positive for methadone are somewhat less likely to be rearrested than other defendants.

5.5. Summary of Multivariate Analyses

Reduced equations for models of FTA and rearrest are presented in Tables V and VI, respectively. These results are obtained by successively eliminating nonsignificant variables from the full models of FTA and rearrest reported in Tables III and IV. Results from these reduced models do not alter the findings regarding drug use measures and pretrial failure. The risk of both FTA and rearrest still increases significantly with the number of drugs the defendant tested positive for at the time of arrest. Defendants who tested positive for heroin or cocaine at the time of arrest have marginally higher risks of FTA, while those defendants testing positive for PCP have a significantly elevated risk of rearrest.¹⁶

While we have focused on assessing whether a statistical association exists between drug test results and pretrial misconduct, it is also possible to examine the substantive significance of these results. For example, we may ask how the average probability of FTA differs among two defendants who are similar on all independent variables except the drug test results. To consider this question we use the results of the final reduced models of FTA and rearrest. If we use the mean probability of FTA (0.33) as a baseline, the predicted probability of FTA for a defendant whose only difference

¹⁶We also examined the possibility that certain combinations of drug test results may be more strongly related to pretrial misconduct than the main effects of the drug test. Specifically, we estimated several models that included product terms among the drug test results to test for whether the influence of testing positive for, say, both heroin and cocaine significantly increased the probability of pretrial misconduct. Results of these analyses did not reveal any significant interaction effects among the drug-specific test results.

Table V. Estimates from Censored Probit Models for Failure to Appear Reduced Models
(*N* = 2604, 1965)

Independent variable	Eq. I	Eq. II	Eq. III
White	-0.216 ^a (-1.98) ^b	-0.229 (-2.10)	-0.226 (-2.05)
Employed	-0.258 (-3.70)	-0.251 (-3.61)	-0.254 (-3.66)
Not high-school graduate	-0.219 (-3.53)	-0.219 (-3.54)	-0.216 (-3.49)
In school	-0.241 (-1.98)	-0.204 (-1.69)	-0.206 (-1.70)
Prior FTAs	0.430 (4.89)	0.428 (4.97)	0.424 (4.91)
Open cases	0.112 (2.13)	0.105 (2.04)	0.108 (2.08)
Violent crime	-0.353 (-4.14)	-0.330 (-3.88)	-0.332 (-3.90)
Robbery	-0.358 (-3.52)	-0.341 (-3.34)	-0.344 (-3.37)
Drug offense	-0.381 (-3.96)	-0.441 (-4.52)	-0.440 (-4.49)
Other weapon offense	-0.312 (-1.95)	-0.313 (-1.95)	-0.311 (-1.94)
Recommended for release	-0.553 (-7.28)	-0.566 (-7.53)	-0.564 (-7.46)
Qualified recommendation	-0.412 (-4.70)	-0.418 (-4.78)	-0.419 (-4.79)
Scheduled appearances	0.022 (3.20)	0.021 (3.14)	0.021 (3.16)
Number of positive tests		0.120 (2.92)	
Heroin			0.135 (1.61)
Cocaine			0.119 (1.86)
PCP			0.069 (0.75)
Methadone			-0.010 (-0.08)
Intercept	0.093	0.041	0.048
Rho	-0.291 (-1.46)	-0.353 (-1.82)	-0.355 (-1.83)
Log likelihood	-2329.27	-2325.05	-2325.15

^aMaximum-likelihood estimate.^bt ratio.

was that he tested positive for heroin is 0.38.¹⁷ Thus, testing positive for only heroin increases the probability of FTA by 0.05 on average. If the defendant tested positive for both heroin and cocaine, his predicted probability of FTA is 0.42, an increase of 0.09.

If we consider differences in the probability of rearrest, we find that a positive test for PCP increases the average probability of rearrest from 0.25 to 0.37.¹⁸ Thus, it appears that defendants who test positive for certain drugs or who test positive for multiple drugs have a higher risk of pretrial failure

¹⁷The predicted probabilities of misconduct are a nonlinear function of the independent variables. Thus, the estimated change in the probability of pretrial misconduct due to a specific independent variable will differ depending on the baseline probability used in calculating the difference. In calculating the differences reported in this paper, we assume that there are two defendants who are similar in all respects except on the variable of interest (e.g., drug test results). We then ask how the probability of failing differs for the drug-positive defendant if the probability of failure for the drug-negative defendant was equal to the mean probability of failure (0.33 for FTA and 0.25 for rearrest).

¹⁸We use the sample mean of rearrest as the baseline probability.

Table VI. Estimates from Censored Probit Models for Rearrest Reduced Models ($N = 2606$, 1967)

Independent variable	Eq. I	Eq. II	Eq. III
Age	-0.018 ^a (-4.40) ^b	-0.019 (-4.65)	-0.017 (-3.97)
Employed	-0.199 (-2.73)	-0.182 (-2.48)	-0.190 (-2.58)
Prior arrests	0.474 (5.50)	0.451 (5.19)	0.447 (5.15)
Prior FTAs	0.193 (1.99)	0.183 (1.89)	0.185 (1.91)
Prior felony convictions	0.277 (2.90)	0.240 (2.50)	0.241 (2.50)
Open cases	0.109 (2.13)	0.093 (1.82)	0.099 (1.92)
Violent crime	-0.239 (-2.63)	-0.195 (-2.11)	-0.209 (-2.24)
Recommended for release	-0.177 (-2.03)	-0.171 (-1.97)	-0.184 (-2.07)
Qualified recommendation	-0.087 (-0.88)	-0.076 (-0.77)	-0.078 (-0.78)
Natural log of days free	0.255 (7.93)	0.256 (8.00)	0.257 (8.02)
Number of positive tests		0.127 (2.88)	
Heroin			0.159 (1.78)
Cocaine			0.062 (0.89)
PCP			0.324 (3.39)
Methadone			-0.120 (-0.85)
Intercept	-1.639	-1.715	-1.763
Rho	0.173 (0.87)	0.218 (1.10)	0.194 (0.97)
Log likelihood	-2141.99	-2137.89	-2133.78

^aMaximum-likelihood estimate.^b t ratio.

than defendants who do not test positive for drugs. At the same time, there is no guarantee that probabilistic predictions such as these will improve our ability to predict which specific individuals within the group of drug-positive defendants will fail or not. To illustrate this, assume that we predict that the probability that a defendant will be rearrested is 0.37. Whether *that* defendant is rearrested or not cannot be used to assess the accuracy of the prediction. But if we observe the outcomes of 100 defendants, each of whom had a predicted probability of failure of 0.37, we would expect 37 of them to fail. Thus, if 100 defendants who tested positive for PCP were released and 100 defendants who were similar in other respects except that they did not test positive for PCP were also released, we would expect that there would be 12 additional failures (persons rearrested) among the group of defendants who tested positive for PCP $[(0.37-0.25)*100]$.

5.6. Assessing the Relationship Between Actual and Predicted Probabilities of Failure

Finding a statistical association between drug test results and pretrial failure does not tell us how future predictions of FTA or rearrest based on a new sample of data would be improved by using drug test results. A

meaningful answer to this question requires an independent set of data which is not available to us. However, we can show how well the predictions of pretrial failure based on models estimated in this research correspond to actual failure rates. This section is devoted to that issue.

Using the estimated coefficients from the reduced model of FTA that does not contain drug test information, we calculated the joint probability that each defendant would be released and fail to appear given his values on the independent variables.¹⁹ Dividing this term by the predicted probability that the defendant would be released gives an estimated probability of failure conditional on having been released. We then divided the range of predicted probabilities of failure into 10 groups based on dividing the range of predicted probabilities of failure by 10. For example, the range of predicted probabilities of FTA based on the model without drug information ranged from 0.06 to 0.76. Thus, persons with predicted probabilities of failure ranging from 0.06 to 0.13 are grouped in the first column in Table VIIA. The mean *predicted* probability of failure given release for these 110 defendants is 0.11. Thus, the model predicts that 12.1 persons in this group will fail to appear. The actual number who failed to appear is 14 cases. Thus, the *actual* probability of failure among these 110 persons is 0.127. Comparing actual failure rates to failure rates predicted by the model allows an assessment of how well predicted rates correspond to actual rates of failure. A chi-square test of no significant difference between actual and expected number of failures produces a χ^2 of 10.68 with 10 degrees of freedom ($P \approx 0.38$).²⁰

Table VIIB presents similar data using coefficients from the model that includes drug-specific test results. Thus, the difference between Table VIIA and Table VIIB is that the predicted values in Table VIIB are based on a model which includes drug-specific test results. The range of predicted probabilities for this model also runs from 0.06 to 0.76, but the number of cases that fall in each of the 10 groups differs from those based on a model

¹⁹This involved evaluating the area under the bivariate standard normal distribution where the upper limits of integration are $X_i\beta$ (the predicted score for the i th defendant on the index of failure propensity) and $Z_i\gamma$ (the predicted score for the i th defendant on the underlying index in the release equation). The value of ρ estimated from the data was used for the correlation between these two variables.

²⁰This chi-square test is based on an assumption that the expected number of failures in a group is the result of a mixed binomial process. If p_i is the predicted probability of pretrial failure for the i th defendant, then the expected number of failures in a group is simply the sum of the p_i for persons classified in that group. The variance of the expected number of failures is the sum of $p_i(1 - p_i)$ across all defendants classified in that group. This information is used to create a z score for each of the 10 groups. The z scores are then squared and summed and this sum is distributed as chi-square with degrees of freedom equal to the number of groups.

Table VII. Risk Classification Tables of FTA and Rearrest Based on Final Models^a

(A) FTA (no drug information), $\chi^2 = 10.68$										
Observed	0.127	0.144	0.237	0.280	0.425	0.486	0.476	0.535	0.684	0.600
	14	43	73	112	121	126	78	46	25	12
Expected	0.110	0.167	0.236	0.306	0.372	0.442	0.514	0.580	0.647	0.713
	12.1	49.9	72.8	122.5	106.1	114.9	84.2	49.8	24.6	10.7
N	110	299	308	400	285	260	164	86	38	15
(B) FTA (with drug-specific items), $\chi^2 = 5.15$										
Observed	0.103	0.175	0.223	0.280	0.406	0.463	0.536	0.529	0.641	0.647
	12	51	72	106	127	106	81	55	25	11
Expected	0.109	0.165	0.236	0.304	0.374	0.441	0.513	0.581	0.647	0.725
	12.6	48.1	76.2	115.0	117.1	101.1	79.6	60.4	25.2	12.3
N	116	291	323	378	313	229	155	104	39	17
(C) Rearrest (no drug information), $\chi^2 = 8.93$										
Observed	0.038	0.107	0.233	0.287	0.337	0.443	0.472	0.600	0.667	0.400
	10	47	83	85	71	70	59	39	32	2
Expected	0.051	0.119	0.199	0.275	0.356	0.438	0.519	0.597	0.673	0.741
	13.5	52.4	70.9	81.5	75.1	69.2	64.9	38.8	32.3	3.7
N	264	439	356	296	211	158	125	65	48	5
(D) Rearrest (with drug-specific items), $\chi^2 = 7.73$										
Observed	0.036	0.127	0.191	0.315	0.353	0.418	0.514	0.644	0.650	0.546
	11	54	66	91	71	71	55	47	26	6
Expected	0.052	0.119	0.198	0.277	0.358	0.436	0.520	0.602	0.669	0.765
	15.6	50.8	68.3	80.0	71.9	74.1	55.6	43.9	26.8	8.4
N	304	427	345	289	201	170	107	73	40	11

^aThe first and third rows in each table show the actual and expected proportion of failures in each of the 10 groups. Numbers in the second and fourth rows are the actual and expected number of failures in each group. Values in the row labeled N are the number of cases classified in each of the 10 groups.

without drug use information. The fit between actual and expected rates of FTA is somewhat better when drug test information is included in the model ($\chi^2 = 5.15$ with 10 df, $P \approx 0.88$) compared to a model which generates predicted rates of FTA without using the drug test information. Tables VIIC and D apply the same methodology to evaluate the fit between expected and actual probabilities of rearrest, with and without the drug-specific test results.

We urge caution in interpreting data reported in tables such as Table VII. These data address only the issue of how drug test results improve risk

classification over the entire sample of defendants (both drug positive and drug negative). An extreme example illustrates the concern. Assume that knowledge of a positive test for some hypothetical drug perfectly predicted if a released defendant would be rearrested. That is, each released defendant who tested positive for this hypothetical drug would be rearrested during the pretrial period. How would this fact be reflected in the data shown in Table VII? The answer to this question depends on the number of defendants who test positive for this hypothetical drug since Table VII is based on *all* released defendants. If only one defendant in the sample tested positive for the hypothetical drug, we would not expect any difference in risk classification tables based on models with and without this additional information. But this lack of improvement in the risk classification of all released defendants would not be evidence against the claim that knowledge of a positive test for the hypothetical drug was a very good indicator of subsequent pretrial misconduct.

To put this in the context of the current research, it appears that drug use information has only a small effect on risk classification of rearrest despite the fact that the association between testing positive for PCP and rearrest is the strongest finding regarding drug use and pretrial misconduct in this study. The apparent inconsistency between the results from the censored probit model in Table VI and the risk classification in Table VII is due to the fact that PCP has a low prevalence of use among defendants in these data. Only 237, or 12%, of released defendants tested positive for PCP. In Table VIII we present the results of a classification table for pretrial rearrest using only these 237 defendants. Table VIIIA shows the relationship between actual and predicted probabilities of rearrest using predictions that do not include the urine test results. Table VIIIB shows the same information where predictions of pretrial rearrest include the urine test results. It is evident that for persons testing positive for PCP, use of this information results in predicted probabilities of rearrest that correspond more closely to actual rates of failure. This suggests that if PCP were more widely used among defendants in these data the risk classification results over the entire sample of defendants with time free would show a greater improvement. Thus, we regard the results from Tables V and VI more germane to the question of whether drug test results are significantly associated with pretrial misconduct.

We cannot overemphasize that the data reported in Table VII address the issue of classification and not prediction. While it is true that drug test information is significantly associated with both FTA and the probability of rearrest, and the use of drug use information does improve the fit between predicted and actual probabilities of pretrial misconduct, it is not possible to determine the degree to which future predictions of FTA or rearrest,

Table VIII. Risk Classification Tables of Rearrest for Defendants Testing Positive for PCP ($N = 237$)^a

(A) Without urine test results ($\chi^2 = 14.01$)										
Observed	0.071	0.147	0.417	0.300	0.371	0.700	0.633	0.750	0.625	1.0
	1	5	15	15	13	14	19	6	5	2
Expected	0.045	0.125	0.204	0.283	0.355	0.438	0.519	0.598	0.667	0.764
	0.6	4.3	7.3	14.1	12.4	8.8	15.6	4.8	5.3	1.5
N	14	34	36	50	35	20	30	8	8	2

(B) Using urine test results ($\chi^2 = 5.60$)										
Observed	0.000	0.167	0.143	0.343	0.342	0.405	0.545	0.680	0.733	0.600
	0	2	4	12	14	17	12	17	11	6
Expected	0.050	0.118	0.203	0.281	0.362	0.437	0.516	0.596	0.682	0.767
	0.4	1.4	5.7	9.8	14.8	18.4	11.4	14.9	10.2	7.7
N	7	12	28	35	41	42	22	25	15	10

^aThe actual proportion rearrested among defendants testing positive for PCP is 0.401 (95/237). The model without urine test information predicts that 31.6% will fail, while the model using urine test results predicts that 39.9% will fail.

using a new set of data, would be improved if information on recent drug use were added to the model used to predict who would fail and who would not. While in these data, defendants with recent drug use are more at risk of FTA and rearrest, validation of these findings requires a new set of data.

6. CONCLUSION

This paper has examined whether information about recent drug use, obtained from urine samples taken shortly after arrest, is significantly associated with two measures of pretrial misconduct (FTA and rearrest). The data indicate that the number of drugs a person tests positive for is related to the probability of FTA and rearrest, even after controlling for other factors typically available to the judge at the time of the pretrial release decision. While the number of positive tests is associated with both FTA and rearrest, drug-specific test results are differentially associated with these measures of pretrial misconduct. Persons testing positive for heroin or cocaine have a somewhat higher probability of FTA, while those testing positive for PCP are significantly more likely to be rearrested. Finally, persons who test positive for methadone, many of whom are probably receiving the drug from treatment programs, have somewhat lower risks of being arrested during the pretrial period.

These findings are consistent with studies of the nation's only fully operational pretrial urine testing program in Washington, D.C. Using similar

urine testing techniques, Yezer and his associates (1988) report that urine test results make a significant incremental contribution to pretrial risk classification among arrestees in the District of Columbia. Moreover, they report that persons who test positive for cocaine and/or heroin are more likely to FTA, while persons testing positive for PCP or three or more drugs are more likely to be arrested during the pretrial period. The general agreement in findings from New York and the District of Columbia is interesting in light of the different drug use patterns found among arrestees in these two cities. For example, PCP was three times more likely to be detected in arrestees in Washington than in New York in 1984. Yet in both studies, PCP use was related to a significantly higher risk of rearrest during the pretrial period.

While findings from the current study indicate that drug test information is significantly associated with the risk of pretrial misconduct, it would be premature to conclude that individual predictions of pretrial misconduct would be significantly improved by explicit consideration of a defendant's urine test results. When we used the statistical results to assess whether drug use information improved risk classification in the construction sample, we found more improvement with regard to FTA than to rearrest. But the problems of translating models of risk assessment into individual predictions are substantial (Shannon, 1985). It is much easier to identify a group of persons that have a higher risk of pretrial misconduct than to identify the specific individuals who will fail.

Nevertheless, the utility of using information on recent drug use to make pretrial release decisions depends on the existence of a significant association between urine test results and pretrial misconduct. Results of this analysis show that in Manhattan drug tests do provide information that is associated with pretrial misconduct over and above the information typically available to judges. Drug test results might therefore be a useful source of information for a judge to consider along with other information when determining whom to release or detain and in setting conditions on those released. However, a number of legal and ethical issues must also be confronted.

For example, making urine tests mandatory seems at odds with Fourth Amendment protections which guard against searches and seizures. Additional concerns involve the accuracy of the tests, the confidentiality of test results, and the proper use of information obtained from analysis of urine samples (see Wish, 1987). The latter point is especially important because a single positive urine test tells nothing about the arrestee's long-term drug use history.

These concerns about pretrial drug testing must be weighed against the potential benefits of identifying defendants who are more likely to fail

to appear in court or commit crimes during the pretrial period. Findings reported in this paper and those from the study of arrestees in Washington, D.C., provide some evidence that supports the assumption that recent drug use by arrestees is positively correlated with pretrial failure to appear and rearrest. However, we cannot assess whether the findings from these studies would generalize to other cities that have different levels of drug problems and different pretrial processes. The planned evaluations of the D.C. urine testing program in six other sites will provide important information about the generalizability of findings reported in this paper. Ultimately, it will be up to the courts to decide whether the potential benefits promised by pretrial testing programs are sufficient to justify testing of all arrestees.

ACKNOWLEDGMENTS

The authors would like to thank Mary Cuadrado for her assistance in constructing and maintaining the data base used in this paper. We also thank Christy Visser, Charles Wellford, Richard Linster, and JQC's reviewers for many helpful suggestions as this work evolved. This project was supported, in part, by Grant 83-IJ-CX-K048 and Contract OJP-88-M-282 awarded by the National Institute of Justice. Points of view expressed in this paper do not necessarily represent the official position of the U.S. Department of Justice. Some computer assistance was generously provided by the Computer Science Center at the University of Maryland.

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How many jurisdictions use electronic monitoring devices to supervise probationers? How many devices were available for use in 1993 and for how many weeks were they worn?

39 jurisdictions employ electronic monitoring devices to supervise probationers. In 29 jurisdictions, 16,081 devices were available for use on January 1, 1994. Probationers wore the devices for an average of 12.4 weeks in 27 jurisdictions during 1993.

	Devices	Duration		Devices	Duration
Alabama ^{*1}	40	14.0	New Hampshire		26.0
Arizona	109	18.7	New Jersey		
California			New Mexico ⁶	130	12.0
Colorado	180	12.0	New York		
Connecticut			North Carolina*	1,200	12.0
Delaware*			North Dakota*	25	10.0
Dist. of Col.	60		Oklahoma ⁷		
Florida*	950	20.0	Oregon*	371	6.0
Hawaii ²	12	4.0	Pennsylvania ⁸	794	8.0
Idaho*	45	12.0	South Carolina ⁹	200	13.0
Illinois			Tennessee	2,000	26.0
Indiana ³	2,099		Texas		13.0
Iowa*	110	6.0	Utah	15	12.0
Kansas	85	2.0	Virginia ⁹	110	12.9
Michigan ⁴	4,146	17.0	Washington*	60	4.0
Minnesota ⁵	96	3.0	West Virginia ⁶	200	16.0
Missouri	49	11.0	Wisconsin ¹⁰	210	
Montana*	74	15.0	Wyoming ¹¹	7	12.0
Nebraska			Federal*	2,500	16.0
Nevada	204		Total/Average	16,081	12.4

*Includes parole. ¹Duration est. ²Duration avg. based on 30 days. ³Probation & Comm. Corr. ⁴1,261 units not in use on 1/1/94. Units not kept separate for different populations; no. represents total owned/leased. ⁵Duration avg. based on 2-4 weeks. ⁶Devices and duration est. ⁷Within budgetary limits, any no. of devices; prog. began 8/93. ⁸Duration avg. based on 60 days of continuously wearing device. ⁹Duration avg. based on 90 days. ¹⁰No. weeks wearing device varies. ¹¹Devices are leased.

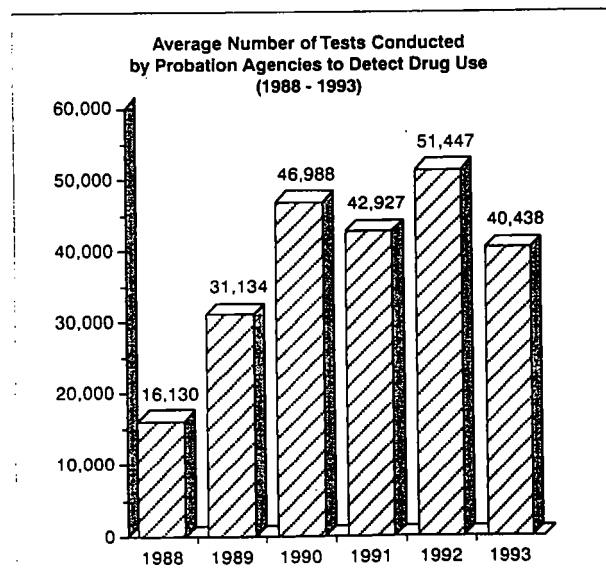
How many jurisdictions use urine tests to determine if probationers are using drugs, how many tests were administered, and how many revocations for drug violations occurred in 1993?

51 jurisdictions employ urine testing of probationers to determine drug use. 34 jurisdictions conducted 1,374,883 tests during 1993, an average of 40,438 per jurisdiction. In seven agencies 1,849 probationers had their probation revoked because of drug violations.

	Tests	Revoc.		Tests	Revoc.
Alabama*	22,330		Connecticut	14,556	
Alaska ^{*1}	28,000		Delaware*		
Arizona ²	12,000	88	Dist. of Col.	13,117	
Arkansas ^{3,4}	10,611	24	Florida ^{*1}	160,000	
California			Georgia	40,000	
Colorado	36,256		Hawaii	3,085	

Drug Testing	Tests	Revoc.	Tests	Revoc.
Idaho			New York	
Illinois			North Carolina*	91,133
Indiana			North Dakota*	6,000
Iowa*			Ohio* ⁷	3,400
Kansas	9,090	739	Oklahoma*	27,187
Kentucky*	6,913		Oregon	
Louisiana*			Pennsylvania*	58,800
Maine			South Carolina*	18,931
Maryland*	22,659		South Dakota	
Massachusetts			Tennessee	6,003
Michigan			Texas	450
Minnesota	2,804		Utah	1,740
Mississippi* ⁵	75,761		Vermont*	400
Missouri*	12,000		Virginia* ⁶	60,000
Montana			Washington*	9,929
Nebraska ⁸	46,143		West Virginia ¹	2,200
Nevada			Wisconsin*	32,330
New Hampshire*	2,783	200	Wyoming*	4,722
New Jersey			Federal*	450,000
New Mexico*	84,000		Total	1,374,883
				1,849

*Includes parole. ¹Tests given est. ²1,876 violations. ³Rev. or Pet. revoke filed. ⁴Tests given, revoc. est. ⁵FY '93. ⁶Testing for drugs & alcohol. ⁷Tests avg. 3 per client per time, and are often re-tested; no. represents no. urines collected. ⁸At least 60,000 tests given.



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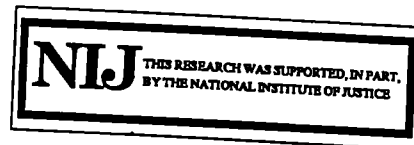
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"Drug Tests and the Prediction of Pretrial
Misconduct: Findings and Policy Issues"

by Steven Belenko, Iona Mare-Drita,
and Jerome E. McElroy



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Drug Tests and the Prediction of Pretrial Misconduct: Findings and Policy Issues

Steven Belenko
Iona Mara-Drita
Jerome E. McElroy

Growing concern about the impact of drug abuse and the proliferation of drug-related caseloads in urban courts has fueled interest in urine screening and monitoring programs to detect drug use among pretrial defendants. Research on the predictive utility of urine tests in New York City and elsewhere suggests that this information does not improve the ability to classify high-risk offenders, nor does urine monitoring appear to reduce pretrial misconduct under supervised release programs. Coupled with technical and process concerns surrounding drug tests, the evidence thus far suggests caution in the adoption of pretrial drug-testing programs.

The surge in the number of drug arrests and drug-involved offenders in recent years has created major management and policy problems for the criminal justice system. The number of drug arrests and the percentage of all arrestees who are charged with drug offenses have increased substantially since 1980 (Belenko 1990). A study of the impact of drug cases on urban trial courts in 26 cities found an average increase in the felony drug caseload of 56% between 1983 and 1987, with drug cases comprising an average of 26% of the felony dispositions in 1987 (Goerdts and Martin 1989). In many jurisdictions, drug offenders are now the largest single category of arrestees and jail or prison inmates (U.S. Bureau of Justice Statistics 1989; Belenko 1990).

Other evidence suggests that drug involvement is common among arrestees, whether or not explicitly charged with drug offenses. The Drug Use Forecasting (DUF) program of the National Institute of Justice, a 24-city

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This research was supported in part by National Institute of Justice Grant No. 83-IJCX-K048 to Narcotic and Drug Research, Inc. The points of view expressed in this article are those of the authors and do not necessarily represent the official position of the U.S. Department of Justice or Narcotic and Drug Research, Inc.

effort to monitor drug use rates through urine tests among samples of new arrestees, found drug-positive rates among male arrestees during 1989 which ranged from 53% to 81% (including marijuana). Positive tests for cocaine were found in 72% of male Manhattan arrestees, 74% of those in Philadelphia, 65% of Miami arrestees, and 59% of those in Washington, D.C., and Chicago (National Institute of Justice 1990). Across all DUF sites, drug-positive rates were relatively high among male arrestees charged with burglary (75%), robbery (73%), larceny/theft (71%), and stolen property (70%), as well as drug sale/possession (83%).

The shift in antidrug policy toward apprehension and punishment of low-level street drug dealers and away from drug treatment and rehabilitation (Zimmer 1987; The White House 1990; Zimring and Hawkins 1991) has been fueled in part by a hardening of societal values against drug use and trafficking. This is manifest both in public opinion polls showing drug use as one of the top social concerns and in surveys that indicate wide support for harsh punishment of drug offenders (Flanagan and Maguire 1988). The criminal justice system in general, and pretrial programs in particular, have struggled to respond to public pressure to be "tough" on drugs, while simultaneously confronting severe jail overcrowding and courtroom congestion.

Research has suggested that drug use may be an important contributing factor to criminality, although the causal mechanisms and direction of those effects have not been adequately determined (see, for example: Gandossy, Williams, Cohen, and Harwood 1980; Goldstein 1985, 1989; Inciardi 1981; McBride 1981; Speckart and Anglin 1986; Wish and Johnson 1986). Many criminal justice policymakers feel, therefore, that the goal of controlling crime cannot be realized without effective controls on the extent and nature of illicit drug use. There is also concern that drug use is associated with substantial social instability, which may, in turn, reduce the likelihood that the individual will comply with the demands of the criminal justice system, such as appearing for scheduled court hearings. In short, the criminal justice system's goal of controlling or eliminating drug use among criminal defendants is driven by two concerns (aside from the desire to apprehend and punish users and sellers of illicit drugs): reducing criminal behavior and assuring the appearance of the defendant at court hearings or other required meetings.

PRETRIAL DRUG TESTING AS A RESPONSE TO GROWTH IN DRUG OFFENDER CASELOADS

One initiative that has emerged in recent years in response to the drug crisis is pretrial drug testing—testing arrestees for recent use of illicit drugs

and using this information to set pretrial release conditions or to monitor released defendants. These projects use the analysis of various biological specimens to determine whether or not the person has used drugs in the past, as well as the number and nature of the drugs he or she has used. In the criminal justice setting, urine testing is the most commonly used method, although hair analysis may become more popular in the future if that technology becomes more accurate and less costly. The urine test identifies the presence of drug metabolites, rather than the drug itself, in the body. Urine tests cannot show precisely how recently the drug was used or the quantity ingested, and the length of time during which metabolites remain in the system varies with the drug. Marijuana, for example, can be detected for up to several weeks after use, and cocaine for up to 3 days (Zeese 1989). Because urine specimens can be substituted or altered, the voiding must be observed.

The tests are used as a means to identify illicit drug users, to monitor drug use where conditions of abstinence have been imposed, and as a tactic designed to deter such use. Monitoring may be intended both as a diagnostic and therapeutic tool within the context of a treatment regimen. It may also be used to trigger the imposition of sanctions within the context of supervisory programs such as conditional release, probation, or other community corrections interventions. Testing may also serve as a deterrent to drug use for those defendants who are both fearful of the pending sanctions and able to control the frequency of drug use.

The largest and oldest pretrial drug-testing program is operated by the District of Columbia Pretrial Services Agency (Carver 1986). This agency tests all arrestees held for arraignment and reports the results to the arraigning judge. In addition, defendants released with the condition of abstaining from illicit drug use have their urine monitored regularly during pretrial release. Demonstration programs to replicate the D.C. program were established with federal funding in 1987 and 1988 in six other cities (Goldkamp 1989). Evaluations of these replication efforts, as well as the original program, have recently been completed and will be discussed later in this article. In addition, a 1989 national survey found that 13 state and local pretrial programs did both pre- and post-initial appearance urine testing, and 72 state and local programs (about 40% of the survey respondents) administered urine tests when ordered to do so by the court as a condition of pretrial release (Segebarth 1991).

A main assumption of the pretrial drug-testing initiative is that drug-using defendants who are granted release are at a higher risk for pretrial misconduct — failure to appear (FTA) for a scheduled court date or being rearrested during the adjudication of the first case — than defendants who do not use drugs.¹ Rather than simply detaining drug-positive defendants and thus

exacerbating jail overcrowding, supervised release is used to monitor these defendants. Any defendant would be in violation of his or her release conditions by failing to appear in court or being rearrested, but drug-positive defendants under supervised release carry the additional requirement of abstaining from drug use and proving their abstinence by submitting to periodically administered drug tests. In some cases, drug-positive defendants may also be obliged to participate in drug-treatment programs. Violating any release condition could lead to stricter monitoring conditions and possible revocation of release; thus, a drug-using defendant may be incarcerated before trial for FTA, rearrest, continuing to test positively for drugs, or failure to attend drug treatment.

The debate over pretrial drug testing encompasses a number of controversial issues, such as the validity and reliability of drug test technologies, the constitutionality of drug testing, the ability of drug use to predict pretrial misconduct, and the utility of drug testing in reducing pretrial detention and drug addiction.

The technological issues center on the reliability, cost, and practical limitations of drug testing. Although the accuracy of such tests can be quite high under ideal operational conditions, many time-consuming and costly measures are needed to ensure these conditions. Constitutional issues generally arise from the state's interests in maintaining public order and safety, weighed against the individual's rights to due process, Fifth Amendment rights against self-incrimination, and Fourth Amendment protections against unnecessary search and seizure. Although some constitutional issues surrounding drug testing in noncriminal justice settings have been addressed by the courts, the specific demarcations of when and how drug testing is constitutionally permissible during the pretrial period are still undecided (Rosen and Goldkamp 1989).

The effectiveness of judges' pretrial release decisions can be measured by the defendant's subsequent pretrial behavior. Assessments of the defendant's likelihood of rearrest or pretrial FTA are important factors in determining initial release conditions. Although the process by which judges make decisions to set bail or release defendants may be routinized out of necessity (given the brief amount of time generally available to make a release decision at the initial hearing), prediction of pretrial behavior remains an inexact science. Judges in most jurisdictions currently assess pretrial risk from a combination of factors including social and community ties (e.g., employment and residential status), the current offense, and criminal history. Research on the relationship between substance use and crime, which suggests that during periods of regular drug use, crime commission rates increase

(Ball, Roxen, Flueck, and Nurco 1981; Nurco, Hanlon, Kinloch, and Duszynski 1988), has raised hopes that the introduction of drug test results or other drug-use indicators might improve current predictions of FTA and pretrial crime.

In the next section, we summarize results from a research project which suggest that, at least in New York City, mass drug screening of arrestees may not be a cost-effective mechanism for identifying defendants at high risk for pretrial misconduct. These findings are compared to other evaluations of pretrial drug-testing programs. The final part of this article discusses some of the central policy issues surrounding the utility of universal prearrestment drug screening and pretrial drug testing.

DRUG TESTS AND THE PREDICTION OF PRETRIAL FAILURE-TO-APPEAR: RESEARCH FINDINGS

New York City

METHODS

These data were gathered as part of a larger study of drug use patterns and pretrial behavior among a sample of male Manhattan arrestees from 1984, conducted jointly by Narcotic and Drug Research, Inc. (NDRI) and the New York City Criminal Justice Agency (CJA) (Belenko and Mara-Drita 1988). The goal of the present research was to further the understanding of the relationships among drug use at arrest, other defendant characteristics, and pretrial FTA as one key measure of pretrial misconduct.

The central empirical question was whether the addition of objective or subjective measures of drug use adds to the ability to identify defendants at high risk for FTA beyond what is possible using currently available data such as community ties, prior record, or charge. Another goal was to learn more about the interactions among drug use and other defendant and case characteristics. These analyses could help inform the debate among criminal justice researchers and policymakers on the efficacy of prearrestment drug testing as a method for enhancing the release decision at arraignment, improving the early identification of defendants at risk of pretrial FTA, and developing more effective pretrial supervision and diversion programs. Improving the ability to predict FTA would help judges make better-informed pretrial release decisions and perhaps reduce unnecessary pretrial confinement. Empirical

analyses of potential uses for drug testing or monitoring at other stages of the criminal justice process, such as probation, parole, or alternative sentencing programs, were not addressed in this study. The relationship between positive drug tests and pretrial rearrest was examined in this sample by Smith, Wish, and Jarjoura (1989), and their findings are summarized later in this article.

The sample included 6,103 males arrested in Manhattan and held for arraignment between April and October 1984, who were approached in the central booking lockup by NDRI interviewers for a confidential interview and a urine sample and for whom complete court processing records were found.² The interview included questions about the arrestee's background, including present and past drug use and dependence and drug treatment experience. Urine was tested by the New York State laboratory for recent use of cocaine, opiates, methadone, and phencyclidine (PCP), using the EMIT immunoassay test (see below). The arrestees were also administered a standardized pretrial release interview by CJA staff. Because this was purely a research study, strict confidentiality guidelines were established, and neither the urine test nor NDRI interview results were given to the court. Of those interviewed, 24% either declined to or could not provide a urine specimen.

The FTA prediction analyses included only defendants who had some pretrial time at risk (that is, were not held in detention for the entire pretrial period), who had volunteered for the NDRI interview, and who had provided a urine sample ($N = 3,462$). The characteristics of these defendants are compared in Table 1 with those whose cases were completed at the initial court hearing or who were held for the entire pretrial period. Because the subgroup of at-risk defendants (54% of the total sample) did differ somewhat with respect to background characteristics from defendants who were held for the entire pretrial period, we cannot know for certain what the FTA rate would have been for detained defendants had they been released.³ These subsample differences should be borne in mind when considering the following analyses. A pretrial drug-testing program may cause the release of defendants normally detained, and it is not clear how defendants in this sample who had no time at risk, would have behaved had they been released. It is possible that factors associated with a greater likelihood of pretrial detention would also predict a higher probability of FTA, or, alternatively, that different factors would be associated with the detention decision and FTA (Smith et al. 1989). However, other researchers have argued that statistical controls for such "selection bias" are not appropriate in this type of prediction analysis, and even if applied, do not affect the results (Goldkamp, Jones, and Gottfredson 1990).

TABLE 1: Percentage of Defendant Characteristics by "At-Risk" Category (N = 5,916)

	<i>Adjudicated/Sentenced at Initial Arraignment (N = 1,436)</i>	<i>Held (N = 1,018)</i>	<i>At Risk (N = 3,462)</i>
Age	—	—	—
18 or younger	7	7	13
19-20	10	8	10
21-25	24	27	26
26-30	24	24	19
31-35	16	16	13
36-40	9	9	8
Over 41	10	9	11
Median (years)	27	27	26
Affidavit charge severity			
A Felony	0	3	1
B Felony	1	17	14
C Felony	2	15	10
D Felony	4	19	19
E Felony	3	10	8
Misdemeanors/others	90	36	48
Pretrial release recommendation			
Recommended, verified			
community ties	17	15	27
Qualified, unverified community ties	10	10	17
Bench warrant	28	31	16
Insufficient community ties	36	32	30
Other	9	12	10
Employment status			
Employed-unverified	17	18	23
Employed-verified	11	7	16
Unemployed-unverified	59	61	46
Unemployed-verified	13	14	15
At current address at least 1 1/2 years			
Yes-unverified	39	44	38
Yes-verified	23	18	29
No-unverified	31	31	24
No-verified	7	7	9
Criminal history			
First arrest	26	7	28
Prior arrests, no convictions	20	17	28
Prior arrests, no convictions	33	34	24
Misdemeanor conviction(s) only	21	42	20
Felony conviction(s)			

(continued)

TABLE 1: Continued

	Adjudicated/Sentenced at Initial Arraignment (N = 1,436)	Held (N = 1,018)	At Risk (N = 3,462)
EMIT test results ^a			
Negative	34	27	35
Positive	42	48	41
Refused drug test	7	6	6
Could not provide urine	6	6	8
Declined interview	5	5	5
No interview-other	6	8	5
Used drugs ^a in last 24-48 hours, by self-report			
No	52	43	70
Yes	37	44	21
Declined interview	5	6	5
No interview/other	6	7	4

NOTE: Excluded were 187 cases with missing court outcome or release status information.

a. Includes cocaine, opiates, methadone or PCP.

FINDINGS

Overall, 39% of defendants with time at risk failed to appear. The bivariate analyses, presented in an earlier report (Belenko and Mara-Drita 1988), showed that defendants who failed to appear in court had more extensive criminal histories, were more likely to have received a negative risk evaluation by CJA interviewers, and were more likely to have had a prior FTA than those who appeared for all court hearings. First arrestees (30%) and those who were recommended or qualified for release on recognizance by the pretrial services agency (28%) were least likely to fail to appear. Defendants with insufficient community ties had a relatively high FTA rate (48%). Defendants who failed to appear in the past were most likely to fail to appear; 51% of those with an outstanding bench warrant at the time of arrest failed to appear during their sample pretrial period. This association between prior and current FTA behavior emerged in the analysis as consistently strong.

Although drug use as measured by the urine test was associated with FTA, self-reported data of drug use had similar associations (Table 2). Thirty-six percent of the defendants who told the NDRI interviewers they had not used drugs in the 24-48 hours prior to sample arrest failed to appear. Thirty-four percent of EMIT drug-negative defendants failed to appear. Similarly, 44%

TABLE 2: Percentage With Failure-to-Appear by EMIT Drug Test and Self-Reported Use of Drugs (24-48 Hours Prior to Sample Arrest) for Defendants With Time at Risk (*N* = 3,462)

	EMIT Drug Test				Self-Reported Use ^a		
	Negative	Positive	Refused Urine	Other	Negative	Positive	Other
No warrants	66	56	67	60	64	54	57
Predisposition warrant	25	33	27	30	27	35	34
Post disposition warrant	9	11	6	10	9	11	9
Total	100	100	100	100	100	100	100
Total <i>N</i>	1,224	1,421	221	596	2,440	710	312

a. Defendants who claimed to have used alcohol and marijuana only were classified as drug-negative in order to parallel the EMIT classification.

of the defendants who tested positive failed to appear compared to 46% of the defendants who self-reported recent drug use. However, drug use was underreported by this sample of defendants: whereas 56% of the defendants with a valid drug test were drug positive, only 27% of the interviewed defendants admitted to using drugs.

Drug use, as determined by EMIT urine tests, was associated with pretrial FTA only for certain subgroups of defendants, namely those with limited or no criminal records and those with strong community ties (Tables 3 and 4). For defendants with other indications of risk, such as criminal records (especially a history of FTA) or poor community ties, the EMIT test results were not consistently associated with FTA.

Among those with criminal records, subgroups with a high risk of FTA were more readily isolated by using prior FTA behavior than by using EMIT results (Table 3). Prior FTA had a consistently stronger association with FTA than EMIT. However, among defendants with strong community ties or no prior arrests, drug-positives had higher FTA rates than drug-negatives, although their rates were still relatively low compared with mean FTA rate for the full sample.

We used discriminant analysis⁴ to assess the marginal contributions of drug use indicators, by examining predictive models of FTA based on information obtained in a prearrest interview and other key informa-

TABLE 3: Percentage of Defendants With Failure-to-Appear by EMIT Test Results and Prior Warrant History (*N* = 2,576 Defendants at Risk With an EMIT Test Result)

EMIT Test Results	Prior Warrant History							
	No Prior Arrests Past 2 Years		Arrest(s) No FTA		One or More FTA		Total FTA	
	Number at Risk	% FTA	Number at Risk	% FTA	Number at Risk	% FTA	Number at Risk	% FTA
Negative	789	29	232	36	160	55	1,181	34
Positive	665	41	387	40	343	59	1,395	45
Total	1,454	34	619	38	503	58	2,576	40
Pearson's <i>r</i>	0.12		0.04		0.04		0.11	
Significance	.000		.176		.189		.000	

NOTE: Warrant history included arrests occurring up to 2 years prior to sample arrest.

TABLE 4: Failure-to-Appear Rates for Defendants With Prior Arrests in Last Two Years by EMIT Test and Prior Failure-to-Appear (N in parentheses)

	<i>Drug Negative</i>	<i>Drug Positive</i>	<i>No Prior FTA</i>	<i>Prior FTA</i>	<i>Total</i>
CJA recommendation					
Recommended	31% (97)	38% (204)	30% (187)	46% (114)	36% (301)
Qualified	19% (57)	42% (114)	29% (96)	41% (75)	35% (171)
Insufficient community ties	53% (118)	56% (214)	47% (210)	70% (122)	55% (332)
Bench warrant	54% (85)	56% (163)	41% (85)	63% (163)	56% (248)
Other	60% (35)	51% (35)	46% (41)	69% (29)	56% (70)
Criminal history					
Previous arrests	30% (47)	29% (62)	24% (90)	53% (19)	29% (109)
Open cases	50% (118)	61% (157)	40% (129)	70% (146)	56% (275)
Misdemeanor convictions only	41% (152)	49% (289)	40% (245)	54% (196)	46% (441)
Felony conviction	47% (68)	47% (213)	42% (147)	52% (134)	47% (281)
Affidavit charge severity					
Felony	43% (190)	47% (409)	38% (318)	54% (281)	45% (599)
Misdemeanor	45% (202)	51% (321)	39% (301)	63% (222)	49% (523)
Total	44% (392)	49% (730)	38% (619)	58% (503)	47% (1122)

tion currently available to the judge at arraignment, and by expanding the models to include EMIT test results as well as self-reported information on drug use. Differences in the strength of the models determine the increases in predictive ability gained by introducing drug use data.

Based on the associations observed in the descriptive analyses and after eliminating highly correlated independent variables, four models were constructed that test the contribution of drug use data to predict FTA. The nondrug variables used in the analysis represent those key factors that judges currently use in making release decisions—prior FTA, CJA release recommendation, affidavit charge, and age. EMIT test results (positive or negative)

TABLE 5: Summary of Discriminant Models of Failure-to-Appear

	Model 1	Model 2	Model 3	Model 4
% predicted correctly	61.8%	58.4%	61.9%	61.7%
% false positive	36.7%	40.9%	35.5%	36.0%
N	3,140	2,576	2,418	2,864
Standardized Discriminant Coefficients				
Release recommendation	0.68	NE	0.67	0.69
EMIT	NE	0.44	0.33	NE
Self-report (use)	NE	NE	NE	0.22
Prior FTA	0.60	0.76	0.51	0.53
Affidavit charge	0.24	0.36	0.24	0.21
Age	-0.18	-0.15	-0.15	-0.24
Model statistics				
Canonical correlation	0.26	0.21	0.27	0.26
Wilks's lambda	0.93	0.96	0.93	0.93
Chi-squared	219.02	111.87	187.43	198.28

NOTE: NE = Not entered in model.

were entered into the models, as was the self-reported drug use variable. Where appropriate, the variables were scaled from least likely to most likely on FTA.

In general, our ability to predict FTA with the available defendant data was limited, although a number of models were constructed which improved this prediction beyond chance. None of the models enabled us to classify more than 63% of the defendants correctly, and the canonical correlation and Wilks's lambda statistics indicated relatively weak models. The false positive rates ranged around 35-37%. Neither the EMIT nor the self-reported drug use variables added to the strength of FTA prediction. In some cases the models became slightly weaker when drug use data were added to factors already available to the arraigning judge to assess pretrial risk. Among all the independent variables, the strongest predictor was the CJA release recommendation, followed by prior FTA during the last 2 years. EMIT status was never better than the third best predictor, and its coefficient was always much lower than both CJA recommendation and prior FTA. Affidavit charge severity tended to be roughly equivalent to EMIT status as a predictor of FTA; FTA was more likely among misdemeanants.

The results of the discriminant models on FTA with and without drug use measures are summarized in Table 5. The first model used only key predictor variables available to the arraigning judges in Manhattan (CJA community

ties indicator, affidavit charge, age, and warrant history); the second model used the drug test result but not the community ties indicator; the third model used both; and the fourth model substituted a self-reported drug use item for the drug test result. In this way the degree to which the overall model was enhanced by the inclusion of drug test results was assessed.

Model 1 included the CJA recommendation with the standard variables used by the arraigning judges in determining release. FTA was correctly predicted for 61.8% of the defendants, and CJA recommendation and prior FTA history were the strongest contributors to the model. Using the drug test result without the community ties measure weakened the prediction of FTA (model 2) and showed prior FTA to be the strongest predictor.

Comparing the first and third models directly indicates that drug test results did not marginally improve the prediction of FTA. The addition of the drug test result did not increase the percentage of cases correctly classified, although it did slightly reduce the false positive rate from 36.7% to 35.5%.

Model 4 used a self-reported drug use dummy variable (excluding marijuana or alcohol) in place of the EMIT results. If self-reports were a better predictor, then jurisdictions interested in using drug use status in a classification or release recommendation scheme could save the costs of urine testing. Although fewer defendants might admit to illicit drug use than test positively, they might represent a group more motivated to accept drug treatment intervention as a condition of release.

This model performed the same as the equivalent model using EMIT (model 3). Slightly under 62% of the cases were correctly classified, and the false positive rate was 36.0%. The best predictors were CJA release recommendation (0.69) and prior FTA (0.53), with self-reported drug use (0.22) about equivalent to age (-0.24) and charge severity (0.21). EMIT status (0.33) was a better predictor than self-reported drug use, although relatively weak compared with recommendation and prior FTA.

The models without EMIT test results or self-reported drug use, therefore, performed similarly to the models with drug use information in classifying whether defendants in this sample would fail to appear. Thus, there was no clear evidence from these data that urine test results (or self-reported drug use) would improve a judge's ability to classify a defendant at arraignment as a good or bad risk. With or without drug use data, a judge using these statistical models would wrongly predict an FTA for around 35% of the defendants and would classify about 62% of the defendants correctly as good or bad risks, better than chance but with sufficient error rate to render the models of limited utility for making release decisions for individual defendants.

Findings From Other Studies

An evaluation of the Washington, D.C. pilot testing program (Toborg, Bellassai, Yezer, and Trost 1989) concluded that prearrestment urine test results were predictive of pretrial behavior—conclusions that were supported in later reanalyses (Visser and Linster 1988; Visser 1990). However, the significance and relative strength of the association varied by type of drug. The research conducted by Toborg et al. (1989) also concluded that urine monitoring resulted in a reduction of pretrial misconduct rates for those defendants who remained in the program and that failure to show up for urine tests during the early stages of release was associated with a higher likelihood of pretrial misconduct. However, the analyses by Toborg et al. (1989) and Visser (1990) concluded that there were no overall differences in rearrest or FTA rates among defendants assigned to urine monitoring and those assigned to drug treatment only or control groups.

Evaluations of five of the six replication sites have also been completed. In contrast to the D.C. research, these studies were generally consistent in finding:

1. little or no improvement in the prediction of pretrial misconduct (FTA or rearrest) by adding prearrestment urine test results to the other information available at the time of the release decision
2. no increase in pretrial release rates
3. no reduction in pretrial FTA or rearrest rates for defendants placed under drug-test-monitoring conditions.

In addition, all the evaluated sites experienced implementation problems and unanticipated costs which sometimes affected regular pretrial service operations (Goldkamp 1989).

The evaluators of the Multnomah County (Portland, OR) Detection and Monitoring of Drug-Using Arrestees (DMDA) program (Kapsch and Sweeny 1990) found that the DMDA did not achieve any of its hypothesized effects. First, rates of release from pretrial detention did not increase (there was, however, a shift from straight recognizance or unsecured release to conditional release, and pretrial supervisory caseloads, especially for misdemeanants, increased substantially). Second, judges often did not make use of the drug test results in making release decisions. Third, the monitoring program did not reduce pretrial misconduct—there were no differences in FTA or rearrest rates between released defendants placed on urine monitoring and a matched control group not receiving urine surveillance.

The evaluation by Goldkamp, Jones, and Gottfredson (1990) of the Milwaukee and Prince George's County (Maryland) drug testing programs reached similar conclusions. Two basic hypotheses were tested at these sites:

1. drug test results would be independently predictive of pretrial misconduct
2. pretrial urine monitoring would help reduce FTA and rearrest rates.

Neither hypothesis was confirmed. Multivariate analyses indicated that prerelease urine test results had no significant independent association with FTA or rearrest rates, and there was no empirical evidence that drug-monitored defendants reduced their pretrial misconduct rates. The evaluators speculated that implementation problems in the two sites might have affected program results, especially given that sanctions for violations of release conditions were not effectively implemented, but they also pointed out that the implementation difficulties experienced by these two programs may be characteristic of any drug testing effort of this type.

The evaluation of the Tucson and Phoenix drug test replication programs by Gottfredson, Britt, and Goldkamp (1990) also concluded that drug test results did not meaningfully increase the ability to predict pretrial misconduct beyond the predictive ability of existing information. In one of the sites, testing positive for cocaine did provide a modest increase in the ability to predict pretrial rearrest. In agreement with findings from the other replication sites, urine monitoring during pretrial release did not reduce pretrial misconduct. The researchers concluded:

The most general conclusions are that programs of this type should anticipate only small effects (if any at all) on pretrial misconduct, that available methods of estimating pretrial misconduct that do not rely on drug testing probably work about as well as those that include information about drug tests, that sanctioning systems for drug test failures during the pretrial period are difficult to implement, and that pretrial drug screening is costly. (p. 3)

Other assessments of the efficacy of pretrial drug test results for predicting pretrial misconduct have been conducted in New York City and Dade County (Miami), Florida (although neither jurisdiction has had an operational pretrial testing program). In New York City, NDRI conducted its own analyses of the data described in this article (Wish, Brady, and Cuadrado 1986). Their preliminary findings were subsequently reviewed and reanalyzed using different statistical techniques (censored probit models), and that reanalysis supported the NDRI research team's original findings (Smith et al. 1989). These authors reported an incremental benefit of drug test information on

pretrial risk prediction and classification in New York for some drugs, in contrast to the conclusions reached by the present authors. There was a marginally higher risk of FTA among those testing positive for heroin or cocaine and significantly higher rearrest rates for defendants who were positive for PCP (however, the prevalence of PCP use in this sample was relatively low — about 12%).

Recent research in Miami (Goldkamp, Gottfredson, and Weiland 1990) examining the impact of drug use on pretrial risk found, like the replication site findings, no relationship between drug use and pretrial FTA when other factors were controlled for using multivariate analysis. In contrast to the other replication sites, however, there was a significant relationship between drug use and pretrial rearrest. In terms of the utility of drug test results in classifying defendants' risk of rearrest, above and beyond other extant predictive factors, there was only a slight improvement in predictive capability.

POLICY AND PROGRAM ISSUES

With the drug testing net now cast over the criminal justice system, it is important to consider carefully what the goals of a pretrial drug-testing program should be, and whether they are worth pursuing. Further, important implementation and cost issues (both social and fiscal) which affect the potential utility of drug testing programs, need to be examined.

Pretrial Release and Supervision

Proponents of drug testing have argued that such programs would increase the frequency of pretrial release, because judges would be more inclined to release those they would ordinarily detain if they could place them under closer monitoring or supervision. Although intuitively plausible, there has been no empirical evidence that this has actually happened in any of the jurisdictions with pretrial drug-testing programs. Indeed, if higher rates of release were found, it could be because judges were more inclined to give defendants supervised release (regardless of type of supervision), including those whom they would ordinarily grant release on recognizance without supervision. This is what occurred in the Tucson and Portland programs (Gottfredson et al. 1990; Kapsch and Sweeny 1990).

It is also quite possible, though, that an unintended consequence of a drug testing program would be to increase pretrial detention. By instituting more conditions of release, a program creates more opportunities for a defendant to violate conditions or be held in contempt of court, then punished with

pretrial detention. Where periodic urine monitoring is a condition of release, the defendant might be held in contempt of court for not appearing for a scheduled drug test, for not attending a treatment session, for having one or more dirty urines, or, of course, for FTA or rearrest. For most jurisdictions, jail overcrowding is such an overriding problem that pretrial release programs generally strive to maintain a political and programmatic commitment to reducing unnecessary pretrial confinement rather than building more jail cells.

Resources

Although the costs of instituting a drug testing program would vary substantially across jurisdictions, the expenses of maintaining an expanded support staff as well as purchasing and maintaining the primary and secondary drug-testing technology are substantial (Clark 1989). Jurisdictions would need to assess whether funds from other programs would have to be redirected to drug testing and whether available drug treatment services are sufficient or likely to expand with the needs of the pretrial services community. Because drug treatment facilities in most jurisdictions have waiting lists for admission, the potential benefits of conditional pretrial drug treatment and monitoring might be lost. And because most jurisdictions have limited resources, prudent social policy would dictate that defendants sent to treatment actually be in need of treatment, so that they would not consume scarce resources. Because a urine test does not indicate drug dependence or treatment need, follow-up interviews assessing need for treatment would be needed to help the judge decide what form of supervised release to impose. This would increase costs considerably. The present research suggests that existing drug treatment facilities could be quickly overwhelmed simply by voluntary self-referrals by defendants. If a key objective of prearrestment drug testing is to identify defendants who want and need treatment, they can be readily found without administering urine tests to every arrestee.

The Technology of Drug Testing

The accuracy and reliability of drug test technology is pivotal in determining the feasibility or desirability of a drug testing program. The accuracy of a test is measured in terms of its false positive (incorrectly concluding that a drug has been used) and its false negative (incorrectly concluding that a drug has not been used) rates. In the context of the criminal justice applications, false positive test results have important due process implications for a defendant, given the possibility that he or she would be inaccurately

identified as a drug user and subjected to consequent constraints on liberty. Although a false negative result might not harm a defendant, it may create an inaccurate picture of a program's effectiveness by overestimating the percentage of defendants refraining from drug use.

The capacity of a urine test to detect drug use varies with the drug used, the length of time between use and the administration of the test, the quantity of the drug used, the time of day at which the specimen was taken, the presence of reactive agents in the subject's body (including many legal substances), and the introduction of neutralizing agents into the specimen. Moreover, no tests are able to determine precisely when a particular drug was used or the extent, if any, of functional impairment experienced by the user.

Although new technologies will undoubtedly appear in the future, the Enzyme Multiplied Immunoassay Technique (EMIT) test, manufactured by the Syva Corporation, has thus far been the most popular urinalysis technology among pretrial programs. The EMIT test provides information about drug ingestion by detecting metabolic reactions in the urine that are peculiar to a specific drug. One important advantage to using a urine rather than other test is that drugs and their metabolites are generally present in higher concentrations in urine than in other tissues or fluids because of the concentrating function of the kidneys.

The Syva Corporation has reported a 95% accuracy rate for EMIT,⁵ albeit under perfect operational conditions. However, operational issues such as specimen identification, specimen storage, proper cleaning of beakers (to avoid contamination of results), calibration of test equipment, qualification and training of personnel, chain-of-custody documentation, cross-reactions to legal substances, and "blind test" quality control to monitor reliability must be considered, because shortcomings in these areas can substantially increase error rates. Additionally, forensic scientists and testing equipment manufacturers generally recommend that a confirmatory test be conducted using a different technology (preferably gas chromatography/mass spectrometry [GC/MS], a more specific test) following a positive EMIT screen, in order to offset the nonspecificity and other inadequacies inherent in radioimmunoassay tests. Obviously, similar operational concerns pertain to the second technology chosen. Presumably because of time and cost constraints, existing state and local pretrial drug-testing programs seldom confirm positives with a different test (Segebarth 1991).

Zeese (1989) has reviewed a number of scientific studies on EMIT urine test accuracy which reported error rates higher than that claimed by the manufacturer. In studies that used GC/MS to confirm positive EMIT tests, false positive rates ranged from 3% to over 60%, depending upon the drug and the sample type. False positive rates for marijuana tended to be higher

than for other drugs. In a recent study of arrestees in Miami, Goldkamp, Gottfredson, and Weiland (1990) found false positive rates for cocaine of 3% when confirmation of a radioimmunoassay (like EMIT) test was made using GC/MS, and a false negative rate of 18%. In a recent comparative study using DUF urine data of four different technologies (EMIT, Abuscreen, TDx, and thin-layer chromatography) confirmed by GC/MS, Visher and McFadden (1991) reported false positive rates ranging from 0.3% to 4.1% for opiates or cocaine.

Cross-reactions are also common for certain drugs using the EMIT technology. Prescription and over-the counter medications containing phenethylamine-type drugs, such as ephedrine (including Nyquil and a number of diet and cold preparations), can give a false positive result for amphetamines. The test cannot distinguish between opiates and dextromethorphan and codeine, which are present in many prescription drugs. Over-the-counter anti-inflammatory drugs containing ibuprofen, fenoprofen, and naproxen (such as Advil, Motrin, Nuprin, and Nalfon) can cross-react with THC metabolites and thus give false-positive results for marijuana.

Although the EMIT urine test can usually answer the threshold question of whether a drug was recently used, it does not (nor does any drug testing technology) reveal the amounts used, methods of use, frequency of use, whether impairment followed, how (if at all) the drug use was related to the crime for which the arrest took place, or whether there is drug dependence and therefore need for treatment. As such, it is impossible to infer anything about an individual's drug use patterns or level of dysfunction from a urine test result, without further investigation, such as in-depth interviews or a medical exam. These would, of course, add considerable time and expense to a drug-testing screening or supervision program.

Even if one assumes a low false positive rate such as 3%, most defendants receive multiple tests while under criminal justice supervision; thus the real probability of a defendant receiving at least one false test result over time is actually greater than 3%. In a drug treatment, prison, probation, or parole setting, tests are commonly conducted at least weekly. Over a 1-year period, then, a defendant would be administered about 50 urine tests. Given a 3% false positive rate, between one and two false positive results would be expected, with a consequent possibility of incarceration for violating supervision or sentencing conditions.

Constitutional and Due Process Issues

The state has an obligation to find the least intrusive way of fulfilling its social control obligations. Assuming that reducing FTA and pretrial rearrest

are legitimate criminal justice system objectives, the constitutional question becomes: Is a urine drug test the least intrusive way to pursue these goals? If it is not the least intrusive, is it so much more instructive and effective than other, existing methods that its intrusiveness is justified? These questions can be answered by assessing whether a positive drug test is a good predictor of FTA and rearrest, whether the information can indeed be used to reduce these problems, and whether drug testing is superior enough to other information in these applications to override constitutional considerations. The research findings to date converge to suggest that pretrial drug testing has a limited utility at best for resolving these issues.

Other areas of concern include the constitutional questions of the permissibility of requiring a suspect to give a biological specimen for testing and what specific conditions, if any, must be present to make it permissible. However, even if involuntary mass drug screening of offenders is found to be constitutionally permissible by the courts, the wisdom of such testing should be decided in relation to the separate objectives pursued in the pretrial phase and the special cautions that are appropriate in dealing with defendants at this stage in the process. That a defendant is merely accused of a crime and presumed innocent at this point suggests that care should be taken in requiring anything of him or her other than participation in the adjudicatory process (although judges have always been free to impose conditions of release or sentence). Moreover, in deciding whether or not a proposed procedure should be required, the potential negative consequences for the defendant must be carefully considered. Drug testing, for example, may not be a wholly benign intervention, regardless of its intentions. This is especially so when the consequences of the test are to impose restrictions on the defendant's freedom (such as requiring continued participation in a drug monitoring regimen) and when failure to comply with those restrictions may expose him or her to even more severe constraints than would have been faced as a result of the original arrest. And the claim that such tests can result in referring the defendant for drug treatment (presumed to be in the defendant's long-term interest) must be weighed against the real paucity of treatment slots available for poor criminal defendants.

Also, although a "small" error rate for drug test technologies may satisfy judges, prosecutors, and pretrial practitioners, even a single false positive test may result in an adverse impact on the subject's liberty or reputation. Failure to follow precise operating guidelines could also conceivably reduce the likelihood that the court will accept the validity of the test results.

Finally, it is important to ask whether the drug test result is going to be used for decisions other than pretrial release. Other things being equal, are drug-positive defendants more likely than drug-negative defendants or those

not tested to be convicted of drug charges? Although not formally specified for use in evidentiary proceedings, judges and prosecutors know the drug test results and may be influenced by them in bail, disposition, or sentencing decisions. If so, then it should be considered whether the urine screening is consistent with the goals of pretrial service programs or of justice in general.

These considerations suggest caution in adopting mandatory, restrictive, and potentially damaging pretrial intervention programs unless they clearly offer demonstrable and substantial gains, in relation to one or more of the legitimate system objectives at the pretrial stage.

CONCLUSIONS

Universal prearrest drug screening of arrestees to try to identify higher-risk defendants is not likely to be cost-effective for several reasons. First, many arrested defendants have no pretrial time at risk, so there would be considerable wasted resources. Second, factors such as prior FTA behavior, charge, and community ties are already available to the judge at arraignment and are as useful as urine tests for isolating higher-risk defendants. The bulk of the recent research on pretrial testing programs also confirms the relative weakness of urine test results as a predictor of pretrial misconduct (Gottfredson et al. 1990; Goldkamp, Jones, and Gottfredson 1990; Goldkamp, Gottfredson, and Weiland 1990; Kapsch and Sweeny 1990). Third, the lack of predictive power is not surprising from a statistical perspective because drug use is very common among arrestees and pretrial misconduct a relatively rare event.

The emergence of crack has given new urgency to the search for more effective ways to control drug use among criminal defendants. Research on the drug-crime connection has suggested that, at least for heroin addicts, crime commission rates increase during periods of active drug use and decline during periods of reduced use or abstinence. Comparable data on crime rates of active crack or powdered cocaine users are only just becoming available (Belenko, Chin, and Fagan 1989; Belenko, Fagan, and Chin 1991; Fagan and Chin 1989; Goldstein, Brownstein, Ryan, and Bellucci 1989; Chin and Fagan 1990). But many questions remain about the extent to which initiation into addictive drugs such as crack increases levels of nondrug crime, especially violent crime. Although anecdotal and newspaper accounts suggest that crack has "caused" an increase in violent crime, the question of whether this reflects the psychopharmacological effects of the drug, the speed of addiction, or the unregulated crack distribution markets has not been fully answered (Goldstein et al. 1989). Although some of the prior research on the

drug-crime relationship suggests that the association between drug use and nondrug crime may be spurious (Elliott, Huizinga, and Menard 1989; Fagan and Weis 1990), the effects of new and powerful drugs such as crack may alter the structure of that relationship. Further, the enhanced street-level law enforcement efforts against crack, resulting in huge numbers of drug arrests, confound the ability to separate the effects of crack or cocaine on drug-related offenses from the generally increased probability of arrest.

Criminal justice policy should be sensitive to the multidimensional character of drug abuse. Rather than simply focusing on the presence or absence of a drug metabolite in the urine, separate consideration should be given to evidence about the number and types of drugs used, the duration of the use, the level of the abuse, and the costs of maintaining the drug use habit. Each of these variables may exert different levels of influence on pretrial behavior. However, although these factors may be of potential significance in assessing an individual defendant's relative level of risk, urine tests in and of themselves tell us nothing more than the identity and number of drugs that were present. Further screening would thus be desirable, requiring interviews and medical examinations, which would add greatly to the costs (in terms of dollars and system impact) of assessing the nature of a defendant's drug problem and eligibility for intervention. One can infer from this that, absent a theoretical framework and a treatment regimen based on that framework, drug tests provide little that is useful, but perhaps much that is misleading, with respect to the effects of drug use on an individual defendant's behavior. Thus, an argument for including drug treatment strategies as part of a crime reduction strategy may be made in a fairly compelling way without assuming or asserting that the drug abuse is itself a cause of the criminality.

In addition, there are issues to consider about the efficacy of drug treatment as a condition of pretrial release. First, there are limited effective treatments available for poor urban users of cocaine and crack, the primary drugs of abuse in this population at present (National Institute of Justice 1990). Second, even if effective programs were available, such treatment could take considerably longer than the pretrial period. Finally, individuals in drug treatment, especially when placed involuntarily, are likely to continue to use drugs, at least initially, thus increasing the likelihood that defendants will violate conditions of release.

Extrapolating the data obtained in this study to New York City as a whole, at least 168,000 defendants a year would test drug-positive by EMIT (excluding marijuana), 81,000 defendants a year would self-report illicit drug use at the time of arrest, and 93,000 would report current or past dependency. One of the arguments of the proponents of drug testing is that drug screening can help to identify defendants who could be diverted to drug treatment. If so,

then more than sufficient numbers of self-reported users could be found, having similar levels of risk for FTA as those identified by EMIT (and possibly better motivated to receive treatment). With only about 48,000 treatment slots available in the entire State of New York,⁶ it is fairly clear that the number of defendants self-reporting a need for treatment would quickly overwhelm the number of slots that would ever realistically be available. Also, because urine screening only detects the presence of a drug and not the level of use or abuse, further medical screening and interviewing would be necessary anyway to determine appropriateness for treatment. For those placed in treatment as a condition of release, urine testing might be a potentially useful tool for monitoring compliance with the treatment program requirements. However, there is still no clear empirical evidence that urine test monitoring is a cost-effective way of monitoring compliance with drug treatment or other types of pretrial release conditions.

Finally, the drug-positive rates found among this sample of defendants (56%) and more recent DUF prevalence data demonstrate that drug use is quite common among arrestees. Obviously, given a system where most defendants are drug users, it is less likely that the presence of drugs by itself can be used effectively to make differential pretrial release decisions. The higher the percentage of defendants who are drug positive at arrest, the less useful EMIT tests (or any drug screening mechanism) are for predicting FTA. Other factors currently used by arraigning judges are more useful for identifying relatively high-risk defendants. Among defendants usually considered low risk, however, prearrestment EMIT testing may have some utility for identifying candidates for diversion to drug treatment (if dependency is also indicated through further screening or diagnostic intervention). However, this subgroup of defendants, even those who are drug-positive, still has relatively low FTA rates compared to other defendants (including drug-negative defendants with other risk factors), and the possible benefits of drug testing must be weighed against the costs and the potential abuse of the testing, as well as the possible effects on disposition or sentencing decisions.

NOTES

1. As we will see below, this assumption is not entirely supported by the empirical research literature.

2. An additional 303 defendants were interviewed and approached for a urine sample but had missing court or detention status information.

3. Defendants with time at risk were more likely to be recommended or qualified for a pretrial release recommendation, had less extensive criminal histories (28% of at-risk defendants were first arrestees), and more stable life-styles (i.e., were employed and had the same residence

for at least 1 1/2 years). In addition, they were less likely than held defendants to have tested positively for at least one drug or to report recent drug use.

4. Discriminant analysis is most commonly used to investigate the combinations of variables which discriminate among known, mutually exclusive groups. The efficacy of the models is determined by applying them to known cases and computing rates of correct and incorrect predictions, called classification scores. The statistical assumptions of discriminant analysis are fairly simple. Different linear combinations of the predictor variables are formed and the "optimal" combination of variables (and their weights) is determined. The weight of each predictor variable indicates its relative contribution to group membership, and its order of entry into the model indicates the relative strength of the individual (univariate) relationship of that variable to group membership.

5. Including both false negatives and false positives.

6. The majority of these are methadone maintenance treatment slots.

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TABLE 1: Average Monthly Drug Testing Results for Bureau of Prisons Institutions,
by Security Level - February 1991 Through February 1995.

Security Level and Time Period	Average Population	All Tests				Random		Suspect		Community	
		Aver. No. Tests	Aver. U.P.* Tests	U.P. Rate as %	Refusals	Aver. No. Tests	U.P. Rate as %	Aver. No. Tests	U.P. Rate as %	Aver. No. Tests	U.P. Rate as %
All BOP											
Feb - June '91	61,580	6856	131	1.9	17	3744	1.2	2544	3.3	568	.5
June - Dec '91	64,107	6922	115	1.7	16	3946	.9	2475	3.1	501	.7
Jan - June '92	66,955	7094	198	2.8	22	3992	1.5	2651	5.1	452	.8
July - Dec '92	71,009	7127	180	2.5	24	3791	1.2	2752	4.7	584	.6
Jan - June '93	75,539	7592	217	2.9	29	3710	1.5	3236	5.0	648	.4
July - Dec '93	80,034	8336	214	2.6	30	4054	1.4	3565	4.3	718	.3
Jan - June '94	83,645	8721	243	2.8	29	4104	1.3	3824	4.9	792	.4
July - Dec '94	85,698	9539	252	2.6	40	4271	1.1	4407	4.6	860	.3
Jan - Feb '95	86,477	9975	357	3.6	51	4221	1.5	4817	6.0	937	.5

* U.P. refers to unauthorized positive drug tests.

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Mr. Dennis K. Burke
Senior Policy Analyst
Domestic Policy Council
The White House
1600 Pennsylvania Avenue, NW
Washington, DC 20500

Dear Dennis:

I am writing to share some quick reactions to your two-page memo proposing a universal arrestee drug testing program. Bob Wasserman and I had a discussion this morning, so I am also responding to some of the concerns you and he have identified.

First, you should know how exciting this initiative is. The devil will be in the details, but the overall thrust is very positive. Allow me to reiterate some of the rhetorical points that should be kept in mind as the initiative proceeds:

- The purpose of this initiative is to use the powers of the criminal justice system to break the link between drugs and crime -- to use testing and treatment as a way to reduce the level of drug use in the population of offenders under criminal justice supervision, and thereby to reduce the level of their criminal behavior. This is, first and foremost, a public safety initiative.
- The purpose of this initiative is NOT to put more people in prison. Although some more may have bail revoked by virtue of failing to adhere to conditions of release (see *infra*), that additional "dosage" of incarceration should be used sparingly; on the other side, it is the experience of local jurisdictions that have used drug testing programs that judges are more willing to take risks in pretrial release when they know that there will be some form of supervision through testing and/or treatment.
- The President will be announcing a policy direction for the Nation, with the federal government taking the lead. He is following the example of several local jurisdictions, and urging other states and localities to follow.
- The incremental cost of this initiative -- when measured against the cost of supervision (probation, parole, pretrial release) or the cost of incarceration -- is minuscule. The cost --

when compared to reduced levels of crime and increased human capital -- is not an issue. Overall, society (and the Administration) have been willing to expend large amounts of taxpayer funds through policing, prison construction, judicial personnel, etc., in response to crime. Here, we are proposing that government use inexpensive technology, and judicial oversight, to significantly reduce drug use.

Now, from rhetorical issues to more operational issues.

Testing everyone.

- There will be some resistance to testing everyone. Why should a white collar defendant be tested? The answer is two-fold: first, lots of white collar defendants commit crimes because of addiction; second, the criminal justice system should not make these types of discriminations when the possibility of adverse decisions flows from this initiative.
- There will be operational questions about how and when these defendants are to be tested. We should look at the time between arrest and arraignment as a window for testing. The testing technology is now quite portable and quite inexpensive. There are obvious chain of custody issues, but those can be worked through. The real issue here is finding ways to get the results back quickly to the judge. Ideally, as in the District of Columbia, there will be an in-house capability to take the samples and provide results within a matter of hours. This should be the goal, particularly within large jurisdictions where economies of scale are possible. However, even if the results come in after arraignment, if the results are positive, release conditions can still be established that will ensure testing during pretrial release.

United States Attorneys.

- I would have stated the United States Attorney's position differently, less like it is presented in paragraph (1) and more like that under "current procedure." The posture should not be that bail will be opposed unless the defendant agrees to drug testing; in fact, most everyone will agree. The affirmative statement should be that in the case of drug-abusing defendants, it will be the position that RELEASE should be conditioned upon a continuing regimen of drug testing. This makes the policy more forward looking, more like "tough love" than "lock-em up." This different characterization raises an important operational question: the outline does not talk about the costs and responsibilities of operating an on-going program of testing for pretrial releasees. In the District of Columbia, this is the responsibility of the Pretrial Services Agency; I would assume that the federal Pretrial Services Agency would be the responsible entity in the federal system. They will need to develop a cost analysis and operational plan.

- I would also propose a different emphasis regarding violations of conditions of bail. It is the experience of drug courts, in dozens of jurisdictions, that the automatic revocation of bail for positive urine tests is ill-advised. It takes time for addicts to respond to treatment and testing; this should be a matter of judicial discretion. The posture of the prosecutors in these drug courts is to give some latitude, and to use graduated sanctions before revoking conditions of release. The wholesale revocation of release for every positive urine test will doom this initiative. Again, the President can point to the lessons of local jurisdictions.

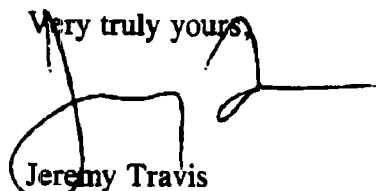
State and local follow-up.

- State Attorneys General. In most states, the local prosecuting agent is the district attorney, not the state attorney general. I think the group that stands with the President should be expanded. For example, the group should include representatives of the judiciary, prosecutors, police if possible, and treatment providers. This should be seen as a community-wide, criminal justice system-wide response to the link between crime and drug abuse. We can be helpful in thinking of lists in each of these categories.
- The federal role *vis-a-vis* the states. There should be a positive statement about the support we can provide -- through technical assistance, research, funding of innovations, etc. But overall, this is a matter for local funding and commitment.

Again, I want to tell you how exciting this is. If presented in the full context of drugs and crime, and with sensitivity to the role of federal leadership and the presidential bully pulpit, this will help to define a new approach to drug abuse and crime.

As I mentioned in a voice-mail message, we are gathering some data and research findings that might be helpful. Let me know if you have any questions about this letter.

Very truly yours,



Jeremy Travis
Director

cc: Robert Wasserman