



Early-phase predictors of subsequent program compliance and offending among NSW Adult Drug Court participants

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Previous research by the Bureau has shown that the cost-effectiveness of the Drug Court could be increased through the early identification of those Drug Court participants at risk of non-compliance with program requirements. There are two reasons for this. Firstly, early identification would permit appropriate adjustments to be made to treatment in order to reduce the risk of program failure. Secondly, those who are at serious risk of non-compliance with the program could be removed from the program early on to reduce the cost they impose on the program. This bulletin describes an investigation designed to identify early indicators of future program compliance.

INTRODUCTION

The New South Wales Adult Drug Court commenced operations in February 1999. This program, while based on similar initiatives in the United States, differed in two key respects. Firstly, most drug-related offenders in Australia tend to be dependent on heroin rather than cocaine and secondly, most program participants in NSW tend to be offered methadone maintenance treatment rather than abstinence-based approaches.

The primary objectives of the NSW Drug Court, as set forth in its enabling legislation, are to reduce the level of drug-related crime and reduce offenders' level of drug-dependence (NSW Drug Court Act 1998). The NSW Bureau of Crime Statistics and Research evaluation of the cost-effectiveness of the NSW Drug Court pilot program found that, while the program was more effective than conventional criminal

justice sanctions in reducing drug-related crime, the cost per day of the Drug Court program was not much less than conventional sanctions (Lind et al. 2002). This was because many of those eventually terminated from the program were not removed until after a considerable period of time.

Early identification of offenders who are likely to have difficulty complying with the Drug Court program requirements would allow the Court to identify offenders in need of additional support and supervision. It would also allow the Court to identify high-risk offenders and remove them at an earlier stage. The first outcome would improve the effectiveness of the Drug Court. The second would reduce its cost.

A small number of US studies have examined factors that predict successful outcomes on drug court programs but these studies have produced inconclusive results (Belenko 2001). Peters, Hass and

Murrin (1999) investigated predictors of program retention/graduation and re-arrest. They found that those participants in fulltime employment, those not having to care for children by themselves, those whose primary drug problem was with alcohol/marijuana rather than cocaine and those whose offence related to drug possession charges were more likely to complete the program. Further, younger participants and those with a cocaine problem were more likely to re-offend during the study period.

Schiff and Terry (1997) examined predictors of program graduation among a sample of drug court participants in Florida. They found significant relationships with race (whites more likely to complete), education (better educated more likely to complete) and level of drug use (crack cocaine users less likely to complete), but failed to find a significant association for age, marital status or social bonding variables.

A few US studies have examined factors associated with re-arrest of drug court participants, with conflicting results. Goldkamp (1994) found that the risk of re-arrest was lower for older participants, those with higher levels of educational attainment and those with fewer respective prior convictions for robbery and misdemeanour offences. Miethe, Lu and Reese (2000) examined recidivism among Las Vegas Drug Court participants and found non-whites and cocaine users had high rates of recidivism, but found no relationship between recidivism and age or gender. However, an evaluation of the Douglas County and Nebraska drug court programs found the likelihood of recidivism to be higher among younger participants, males and those with a higher number of arrests during the previous 12 months (Spohn et al. 2001).

Given the conflicting nature of these findings as well as sociodemographic differences between Australia and the US, it is difficult to generalise these findings to the Australian context. Another limitation with regard to these studies is that they tend to focus on the prior criminal history and socio-economic characteristics of participants, rather than on their behaviour after being placed on the program. This limits their value from a policy perspective, because it would be unfair to base decisions about program continuation on information about offender characteristics and behaviour prior to entry onto the program. This is especially true of the Drug Court program, which is specifically intended for offenders with a long criminal record who have failed to respond to other forms of court intervention.

Freeman (2002) conducted a preliminary examination of factors associated with retention on the NSW Drug Court program by an initial sample of program participants. As with most studies, she primarily focused on the relationship between program outcomes and characteristics of the participants rather than on the relationship between

program outcomes and the behaviour of participants in the early stages of the program. The variables included in her analysis were: gender, age, drug of choice, ethnicity, level of schooling, number of prior convictions and length of suspended sentence. Amongst these variables, only length of suspended sentence was found to be associated with time in treatment, with approximately twice as many participants given a suspended sentence of six months or longer remaining on the program for at least 12 months (or graduating within this period) compared to those receiving suspended sentences of less than six months.

In one component of the evaluation of the South East Queensland Drug Court, Makkai and Veraar (2003) used logistic regression analyses to identify variables that were independently predictive of program graduation among 155 participants. These researchers were able to examine a number of on-program indicator variables during phase 1 of each participant's program, including urine testing results and the frequency of absconding from the program. In addition to finding higher graduation rates among those participants who cohabitated with a partner and among those with longer prison sentences, this analysis found that participants who were urine tested more often and who had not tested positive to opiates during phase 1 were also more likely to graduate from the program.

Makkai and Veraar (2003) also found that those who absconded more often from the program during phase 1 were less likely to graduate from the program. While this evaluation provided valuable information about potential early phase predictors of subsequent program completion, no similar analyses were undertaken to identify early phase program indicators of subsequent offending or drug use. These latter analyses are in some ways more important, because factors that predict program completion may in fact reflect considerations taken into account by the Drug Court in deciding whether to terminate an offender's program.

The purpose of the current investigation, therefore, was to extend Freeman's previous NSW research and examine in-treatment factors associated with performance on the NSW Drug Court program including subsequent offending and drug use. The study used a later cohort of participants than had been included in the original evaluation and examined a range of predictor variables, all derived from information on each participant's performance on the program during the first three months. The measures of performance examined in this study were obtained from information routinely available to the NSW Drug Court, such as sanctions received, compliance with program appointments and the results of drug testing during the early phase of a participant's program.

CURRENT INVESTIGATION

The cohort selected for investigation consisted of those participants who commenced on the NSW Drug Court program between January 1, 2001 and June 30, 2002. The investigation was restricted to participants who had remained on the program for at least three months because program failures in this group represent a more substantial drain on resources (in an opportunity-cost sense) than those terminated within the first three months of the program. In order to allow at least six months follow-up for all those in the study cohort, data collection included the period up until December 31, 2002.

There were three major outcomes of interest: (1) retention on the program at 6 months; (2) offending during months 4-6 and (3) drug use during months 5-6. The two major drug use outcome indicators were: (a) having tested positive to opiates and (b) having tested positive to both opiates and psycho-stimulants concurrently. Table 1 shows these outcomes measures as well as the data sources from which they were derived. A range of data sources were utilised for

Table 1: Study outcome measures and associated data sources

<i>Measure</i>	<i>Data source(s)</i>
Program retention at 6 months Offending (months 4-6)	Drug Court (DC) database; DC registry file DC database; BOCSAR Re-offending Database (ROD)
Drug use (months 5-6) Opiates Opiates & Stimulants (concurrent)	Urinalysis results on DC database for all drug types

Prosecutions (DPP) for those participants where the DPP had submitted a chronology to the Drug Court in the context of a program review. These files contain information relating to an offenders history of compliance with the program, including having missed program appointments. Data relating to sanctions and bench warrants issued for absconding from the program were obtained from both DPP and Drug Court (DC) data sources.

It is worth noting that by the time this cohort of participants had commenced on the program, the NSW Drug Court had adopted a policy of suspended sanctions for program breaches. This meant that rather than a participant immediately being sent back into custody for a program breach, they received a suspended sentence which was only be served once the total number of days required to be served in prison had reached a pre-determined level. As part of this process, suspended sanctions could be subsequently waived as a reward for increased program compliance. Two approaches were adopted in modelling these suspended sanctions. The first was to create a categorical predictor variable that distinguished those participants who had any of their suspended sanctions subsequently waived compared with those who had not. The second was to create a variable that represented the “net” number of sanctions received (which was obtained by subtracting the number of waived sanctions from the total number of sanctions).

Several predictor variables were created to measure drug use. These include separate variables indicating whether a participant had tested positive to the use of opiates, psycho-stimulants, benzodiazepines or cannabis. Two poly-drug use variables were also created. The first identified participants who tested positive to both opiates and psycho-stimulants concurrently. The second indicated the number of these four different drug types to which a participant had tested positive over the baseline period. Because most

Table 2: Predictor variable measures and associated data sources

<i>Measure</i>	<i>Data source(s)</i>
Program compliance (months 1-3)	
No. custodial episodes	DC database; DC registry file; DPP Chronologies
No. suspended sanctions	DC database; DC registry file; DPP Chronologies
Bench warrants issued	DC database; DC registry file; DPP Chronologies
Missed program appointments	DPP Chronologies
Drug use (months 2-3)	
Opiates	Urinalysis results on DC database for all drug types
Stimulants	
Benzodiazepines	
Cannabis	
Opiates & Stimulants (concurrent)	
No. different drug types (0-4)	

this investigation, including both administrative databases and file audits. The original Drug Court (DC) administrative database was also utilised, although it was found necessary to augment the information contained therein by accessing additional information from each Drug Court participant’s Registry file¹.

Re-offending was deemed to have occurred if a Drug Court participant was convicted of an offence that was alleged to have occurred on a date after placement on the Drug Court program. The Re-offending Database (ROD) maintained by the Bureau of Crime Statistics and Research was used to capture information relating to finalised

convictions for offences committed after commencing on the program.

Predictor variables relating to program compliance/performance during the first three months of the program included: (1) sanctions imposed by the Court (custodial and suspended sentences); (2) bench warrants issued for absconding from the program; (3) missed program appointments and (4) a range of drug use indicators during months 2-3 on the program. These predictor variables are listed in Table 2, in conjunction with the data sources from which they were derived.

It should be noted that, the term ‘DPP Chronologies’ in the above table refers to files maintained by the Director of Public

participants were likely to have at least one positive drug test² during the first month, measures of drug use were restricted to months two and three.

DATA ANALYSIS

The aim of the analysis was to identify those variables measuring program compliance and drug use during the first three months of each participant’s program that were predictive of program compliance during months 4-6 on the program. Bi-variate relationships were examined using a contingency table approach and statistical significance was assessed using Chi-Square analysis. Values of each of the predictor variables were grouped into categories a priori before cross-tabulating them with the outcome of interest. All outcome variables were defined as dichotomous variables.

Logistic regression models were also fit in order to identify variables that were independently predictive of the offending outcome variable. The modelling strategy adopted was to identify independent predictors within each of two families of predictors, namely: (1) sanctioning and other program compliance (custodial and suspended sanctions; program absconding and missed appointments) and (2) drug use. Those variables found to be independently predictive within each of these families were then combined in an overall model, with non-significant terms sequentially removed until the most parsimonious model of independent predictors had been identified.

For the six-month program retention outcome variable, the predictor analyses were conducted using the full cohort of 217 Drug Court participants. However, the analysis of offending (months 4-6) and drug use (months 5-6) outcome variables was restricted to those program participants who had remained on the program for at least six months. This latter group are referred to as the “six month cohort” throughout this bulletin.

The highly variable number of valid (i.e. “confirmed”) urine samples provided by program participants posed a significant challenge in conducting the analyses. While it would have been desirable to compute positive urine test rates for each program participant, a sizeable minority of participants did not provide enough urine tests to reliably compute such a rate³. As a consequence, it was necessary to limit the analyses to binary predictor variables for each drug type. These variables were designed to do no more than indicate whether or not an individual had tested positive for drug use at least once during either the baseline or follow-up period.

It should be noted that this approach could have biased the effects of interest towards zero. This is because a substantial proportion of those who returned negative drug test results may have done so only because they provided very few valid tests. In order to reduce this potential source of bias, an indicator variable was computed which reflected the number of valid urine tests provided. This was a dichotomous variable, which compared the lowest quartile (or quintile) of test providers with the rest of the cohort. Where it was found that the baseline low-test providers were significantly more likely to have had an adverse subsequent outcome (such as program termination or offending), the drug use predictor analyses were re-analysed excluding the low-providers.⁴

RESULTS

STUDY COHORT

A total of 217 Drug Court participants were identified who met the study inclusion criteria. The socio-demographic profile of this cohort, in terms of age, gender and Aboriginal and Torres Strait Islander (ATSI) status, is shown in Table 3. Over 50 per cent of the cohort was under the age of 30 when they commenced the program. However a substantial proportion were aged 30 years and older. Almost 85 per cent were male, while nine per cent were recorded as being Aboriginal or Torres Strait Islander.

PREDICTORS OF RETENTION ON PROGRAM AT 6 MONTHS

Of the 217 participants who had been on the Drug Court program for at least three months, 79 per cent were still on the program at six months. As shown in Table 4, several indicators of program compliance during the first three months were predictive of subsequent program retention at six months.

Generally, those participants with fewer custody episodes, suspended sanctions and bench warrants issued against them during the first three months of their program were more likely to have been retained on the program by six months (Table 4). While 91 per cent of those

Table 3: Socio-demographic profile of study cohort (n=217)

<i>Variable</i>	<i>Category</i>	<i>N</i>	<i>%</i>
Age group	18-24	59	27
	25-29	56	26
	30-34	48	22
	35+	54	25
Gender	Male	183	84
	Female	34	16
ATSI status	ATSI	19	9
	Non-ATSI	196	90
	Not known	2	1

Table 4: Program compliance predictors of program retention (n=217)

Variable	Category		% still on program at 6 months	Significance
No. custody episodes	0	(n=88)	90.9	$\chi^2_2=15.6, p<0.001$
	1	(n=77)	75.3	
	2+	(n=52)	63.5	
Suspended sanctions?	No	(n=25)	100.0	$\chi^2_2=24.4, p<0.001$
	Yes, some waived	(n=72)	91.7	
	Yes, none waived	(n=120)	66.7	
No. suspended sanctions (net)	0	(n=37)	97.3	$\chi^2_2=11.6, p=0.003$
	1-4	(n=79)	69.6	
	5+	(n=101)	79.2	
No. bench warrants issued	0	(n=139)	92.8	$\chi^2_2=45.5, p<0.001$
	1	(n=53)	52.8	
	2+	(n=25)	56.0	
No. missed appointments	0	(n=83)	85.5	$\chi^2_2=3.8, p=0.15$
	1-2	(n=79)	73.4	
	3+	(n=55)	76.4	

who had not had any custody episodes during the first three months were still on the program at six months, only 75 per cent of those with one custody episode and 64 per cent of those with two or more episodes remained on the program at six months. Retention on the program was also related to whether or not a suspended sentence had been waived. While only two thirds of those who had received suspended sanctions (none waived) remained on the program at 6 months, 92 per cent of those who had had some of their sanctions waived were retained on the program. The issuing of a bench warrant for having absconded from the program was also predictive of subsequent program retention, with only around one half of those with a bench warrant issued remaining on the program compared with over 90 per cent of those who had not been issued with a bench warrant.

It could be argued that the compliance indicators shown in Table 4 are not really that useful because we would expect the Court's decisions in relation to an individual's program compliance at an early point in time to be correlated with decisions it makes in relation to the same individual at a later point in time. From the Drug Court's point of view, it would be more useful to identify a predictor of program retention that is independent of its own decision-making processes. One such factor is the extent of each participant's drug usage during the early phase of the program. Table 5 shows a range of drug use measures as bi-variate predictors of six-month program retention.

Inspection of Table 5 suggests that the only positive drug-use test variable that predicted program retention was that measuring whether or not a participant tested positive to cannabis. It is clear from the final rows of Table 5, however, that those participants who provided a very low number of urine test samples were less likely to have been retained on the program by six months. As previously explained, this may have biased effects of the specific drug type indicators toward zero (or "no effect").

Table 5: Drug use predictors of program retention (n=217)

Variable	Category		% still on program at 6 months	Significance
Test positive opiates?	No	(n=92)	78.3	$\chi^2_1=0.0, p=0.9$
	Yes	(n=125)	79.2	
Test positive stimulants?	No	(n=109)	79.8	$\chi^2_1=0.1, p=0.7$
	Yes	(n=108)	77.8	
Test positive for both opiates & stimulants? (same occasion)	No	(n=123)	79.7	$\chi^2_1=0.1, p=0.7$
	Yes	(n=94)	77.7	
Test positive benzodiazepine?	No	(n=158)	77.8	$\chi^2_1=0.3, p=0.6$
	Yes	(n=59)	81.4	
Test positive cannabis?	No	(n=114)	71.9	$\chi^2_1=6.7, p=0.009$
	Yes	(n=103)	86.4	
Total number of drug types tested positive for	0	(n=58)	72.4	$\chi^2_4=7.1, p=0.13$
	1	(n=33)	90.9	
	2	(n=43)	72.1	
	3	(n=56)	78.6	
	4	(n=27)	88.9	
No. of urine tests provided	≤ 7	(n=55)	45.5	$\chi^2_1=49.0, p<0.001$
	> 7	(n=162)	90.1	

In order to remove this bias, the analyses were re-run, excluding those who provided fewer than eight drug tests. The results of this revised analysis are shown in Table 6.

It can be seen from Table 6 that, when the analysis is restricted to those program participants (n=162) who provided more than seven valid drug test samples, a number of illicit drug use indicators become predictive of subsequent program retention. Rates of program retention are higher for: those who test negative to opiates, those who test negative to stimulants and those who have fewer positive drug test results overall. They also appear to be lower for those who test positive for both opiates and stimulants on the same occasion.

PREDICTORS OF SUBSEQUENT OFFENDING DURING MONTHS 4-6

In this section of the Bulletin, the study population of interest is the group of 171 participants who were still on the program at 6 months. For convenience, this group will be referred to as the “six month cohort”. In terms of offending, 23 per cent (n=39) of the six-month cohort had committed at least one proven offence during months four through six of the program. Table 7 gives a breakdown of the offence types that these program participants had been convicted of committing during this period. Theft-related offences comprised approximately one third of all offences, while break and enter offences accounted for almost 10 per cent. Driving-related matters accounted for just over one quarter of all offences committed, with the majority of these (n=19) being licence or registration-related matters. Only around five per cent of offences were drug-related and all of these (n=6) were for the possession of illicit drugs. There were no offences involving the trafficking or manufacture of illicit drugs.

Table 8 shows the baseline program compliance measures that were bi-variate predictors of subsequent offending during months 4-6. While the number of custodial episodes during the first three

Table 6: Drug use predictors of program retention excluding those who provided a small number of urine tests, i.e. ≤ 7 tests (n=162)

Variable	Category		% still on program at 6 months	Significance
Test positive opiates?	No (n=64)		95.3	$\chi^2_1=3.2, p=0.07$
	Yes (n=98)		86.7	
Test positive stimulants?	No (n=75)		96.0	$\chi^2_1=5.4, p=0.02$
	Yes (n=87)		85.1	
Test positive for both opiates & stimulants? (same occasion)	No (n=87)		94.3	$\chi^2_1=3.6, p=0.06$
	Yes (n=75)		85.3	
Test positive benzodiazepines?	No (n=111)		91.0	$\chi^2_1=0.3, p=0.6$
	Yes (n=51)		88.2	
Test positive cannabis?	No (n=74)		90.5	$\chi^2_1=0.3, p=0.9$
	Yes (n=88)		89.8	
Total number of drug types tested positive for	0 (n=34)		100.0	$\chi^2_4=9.6, p=0.05$
	1 (n=25)		96.0	
	2 (n=35)		80.0	
	3 (n=43)		86.0	
	4 (n=25)		92.0	

Table 7: Breakdown of offence types committed by those 39 program participants found guilty of offences committed during months 4-6 on Program

Offence type	No. Offences	%
Theft	33	31.4
Driving	28	26.7
Public order	14	13.3
Break and enter	10	9.5
Drug	6	5.7
Deception	5	4.8
Other offences	9	8.6
Total	105	100.0

months was positively related to subsequent offending during months 4-6, this effect was not statistically significant. Likewise, while there appeared to be an increase in the likelihood of subsequent offending among those with more baseline sanctions, this effect was not

statistically significant. One likely explanation of the lack of statistical significance is low statistical power, arising from the modest sample sizes in this study (particularly when more than two categories of each predictor variable were employed). When the number of

Table 8: Program compliance predictors of offending during months 4-6 (n=171)

<i>Variable</i>	<i>Category</i>		<i>% offended at least once, 4-6 months</i>	<i>Significance</i>
No. Custody episodes	0	(n=80)	18.8	$\chi^2_2=1.9, p=0.4$
	1	(n=58)	24.1	
	2+	(n=33)	30.3	
Suspended sanctions?	No	(n=25)	8.0	$\chi^2_2=4.8, p=0.09$
	Yes, some waived	(n=66)	21.2	
	Yes, none waived	(n=80)	28.8	
No. suspended sanctions (net)	0	(n=36)	11.1	$\chi^2_2=3.8, p=0.15$
	1-4	(n=55)	23.6	
	5+	(n=80)	27.5	
No. bench warrants issued	0	(n=129)	18.6	$\chi^2_1=5.3, p=0.02$
	1+	(n=42)	35.7	
No. missed appointments	0	(n=71)	8.5	$\chi^2_2=17.7, p<0.001$
	1-2	(n=58)	39.7	
	3+	(n=42)	23.8	

Table 9: Drug use predictors of offending during months 4-6 (n=171)

<i>Variable</i>	<i>Category</i>		<i>% offended at least once, 4-6 months</i>	<i>Significance</i>
Test positive opiates?	No	(n=72)	15.3	$\chi^2_1=4.0, p=0.045$
	Yes	(n=99)	28.3	
Test positive stimulants?	No	(n=87)	16.1	$\chi^2_1=4.5, p=0.03$
	Yes	(n=84)	29.8	
Test positive for both opiates & stimulants? (same occasion)	No	(n=98)	14.3	$\chi^2_1=9.5, p=0.002$
	Yes	(n=73)	34.2	
Test positive benzodiazepines?	No	(n=123)	17.1	$\chi^2_1=8.1, p=0.004$
	Yes	(n=48)	37.5	
Test positive cannabis?	No	(n=82)	15.9	$\chi^2_1=4.3, p=0.04$
	Yes	(n=89)	29.2	
Total number of drug types tested positive for	0	(n=42)	14.3	$\chi^2_4=12.4, p=0.015$ $\chi^2_1=9.7, p=0.002$ (linear trend)
	1	(n=30)	13.3	
	2	(n=31)	16.1	
	3	(n=44)	29.5	
	4	(n=24)	45.8	
No. urine tests provided	≤10	(n=34)	17.6	$\chi^2_1=0.6, p=0.4$
	>10	(n=137)	24.1	

suspended sanctions was re-analysed as a dichotomous variable (none versus one or more), the effect of this variable almost obtained statistical significance at the conventional 5 per cent level (11.1% v 25.9%; $\chi^2_1=3.5, p=0.06$).

There was, however, a statistically significant bi-variate effect in terms of whether or not a participant had been issued with a bench warrant for having absconded from the program during the first three months. While over 35 per cent of those who had been issued with a baseline bench warrant subsequently offended during months 4-6 of the program, less than one fifth of those who had not absconded during the baseline period subsequently offended. There was also a clear relationship between missed appointments during the first three months and subsequent offending. While only 8.5 per cent of those who had never missed a baseline program appointment subsequently offended, almost 40 per cent of those with one or two missed appointments and 24 per cent of those with three or more missed appointments did subsequently offend.

Logistic regression analysis was conducted to identify which of the program compliance and sanctioning indicators shown in Table 8 were independently predictive of subsequent offending. This analysis revealed that the missed appointments indicator was the only independent predictor of offending among this group of indicators.

Table 9 shows the bi-variate relationships between a number of baseline drug test result predictors (during months 2-3) and subsequent offending during months 4-6. Participants who tested positive for opiates during the baseline period were significantly more likely to have offended during follow-up (28% versus 15%), as were those who had tested positive for stimulants (30% versus 16%). There was also a significant bi-variate association between subsequent offending and having tested positive to both opiates and stimulants on the same testing occasion during baseline. Thirty-four per cent of those with a concurrent

positive test for both opiates and stimulants subsequently offended but only 14 per cent of those without a concurrent positive test offended during the follow-up period.

A strong bi-variate relationship was apparent between offending and testing positive for benzodiazepines, with over 37 per cent of this group subsequently offending, compared with 17 per cent of those without a positive baseline benzodiazepine result. There was also a significant bi-variate relationship between testing positive to cannabis and subsequent offending. Twenty-nine per cent of those with a positive test result subsequently offended, compared with 16 per cent of those who did not have a positive cannabinoid result.

Table 9 also shows evidence of a significant bi-variate relationship between the number of different drug types to which a participant tested positive during the baseline period and offending during follow-up. Between 14 and 16 per cent of those testing positive to fewer than three different drugs subsequently offended. The corresponding figures for those testing positive to three and four different drugs were, respectively, 30 and 46 per cent.

Logistic regression analyses were undertaken to identify which particular types of drug use were independently predictive of offending. The final logistic regression model indicated that, having tested positive to both stimulants and opiates (concurrently), and having tested positive to benzodiazepines, were each independently predictive of subsequent offending. Specifically, the odds of subsequent offending were 2.5 times greater among those with a concurrent positive test for both opiates and stimulants (compared to those without) and 2.2 times greater among those who tested positive for benzodiazepines. With each of these two predictor variables in the logistic regression model, there was no longer any significant relationship between offending and the number of different drugs types to which an individual had tested positive during baseline.

Table 10: Independent baseline predictors of subsequent offending during months 4-6 (logistic regression)

Covariates	Category	Odds Ratio	Significance
Missed Appointments	None (referent)	1.0	$\chi^2_2=12.0, p<0.001$
	1-2	5.6 **	
	3+	2.4	
Positive for both opiates & stimulants	No (referent)	1.0	$\chi^2_1=4.0, p=0.04$
	Yes	2.3 *	

** $p<0.01$ * $p<0.05$

Table 11: Program compliance predictors of testing positive for opiates during months 5 & 6 (n=171)

Variable	Category	% test positive for opiates	Significance	
No. custody episodes	0 (n=80)	45.0	$\chi^2_2=4.8, p=0.09$	
	1 (n=58)	56.9		$\chi^2_1=4.8, p=0.03$
	2+ (n=33)	66.7		(linear trend)
Suspended sanctions?	No (n=25)	28.0	$\chi^2_2=7.6, p=0.02$	
	Yes, some waived (n=66)	59.1		
	Yes, none waived (n=80)	56.3		
No. suspended sanctions (net)	0 (n=36)	36.1	$\chi^2_2=5.4, p=0.07$	
	1-4 (n=55)	56.4		
	5+ (n=80)	58.8		
No. bench warrants issued	0 (n=129)	55.8	$\chi^2_1=1.4, p=0.23$	
	1+ (n=42)	45.2		
No. missed appointments	0 (n=71)	43.7	$\chi^2_2=4.5, p=0.1$	
	1-2 (n=58)	60.3		
	3+ (n=42)	59.5		

Logistic regression modelling was also undertaken to combine both the drug testing and the program compliance measures shown in Table 8. The results of this final logistic regression model are shown in Table 10. The only baseline variables found to be independently predictive of subsequent offending in this final model were ‘having missed appointments during the first three months on the program’ and ‘having

tested positive for both opiates and stimulants on the same testing occasion during months 2-3’. The effect appeared to be more pronounced for those who had missed 1-2 appointments than for those who had missed 3 or more appointments. Lack of statistical power, as a consequence of the relatively small sample size for this latter group (n=42), may be one explanation of this differential effect.

Table 12: Program compliance predictors of testing positive for both opiates and stimulants on the same testing occasion during months 5 & 6 (n=171)

Variable	Category		% test positive for both opiates & stimulants	Significance
No. custody episodes	0	(n=80)	30.0	$\chi^2_2=7.5, p=0.02$
	1	(n=58)	39.7	$\chi^2_1=7.2, p=0.007$
	2+	(n=33)	57.6	(linear trend)
Suspended sanctions?	No	(n=25)	12.0	$\chi^2_2=8.7, p=0.01$
	Yes, some waived	(n=66)	43.9	
	Yes, none waived	(n=80)	42.5	
No. suspended sanctions (net)	0	(n=36)	16.7	$\chi^2_2=9.5, p=0.009$
	1-4	(n=55)	41.8	
	5+	(n=80)	46.3	
No. bench warrants issued	0	(n=129)	38.8	$\chi^2_1=0.0, p=0.9$
	1+	(n=42)	38.1	
No. missed appointments	0	(n=71)	26.8	$\chi^2_2=7.4, p=0.02$
	1-2	(n=58)	44.8	
	3+	(n=42)	50.0	

BASELINE COMPLIANCE PREDICTORS OF SUBSEQUENT DRUG USE

Of the 171 participants who remained on the program at 6 months, 91 (53%) tested positive for opiates at least once during months 5-6. Table 11 shows bi-variate relationships between the various baseline program compliance indicators and having tested positive to opiates at least once during follow-up. The number of baseline custody episodes was found to be predictive of subsequent opiate use. While 45 per cent of those with no baseline custodial episodes subsequently tested positive to opiates at least once during follow-up, 57 per cent of those with one custodial episode and 67 per cent of those with two or more custodial episodes had a positive opiate test result. There was also a predictive effect of suspended sanctions with over 56 per cent of those with such sanctions subsequently testing positive for opiates, compared with 28 per cent of those who had never

received a baseline sanction. Whether or not any of these baseline suspended sanctions had subsequently been waived did not appear to have had any predictive effect in terms of later opiate use.

There was no significant relationship between the number of baseline bench warrants issued and later opiate use. As can be seen from Table 11, around 60 per cent of those with one or more missed baseline appointments had a positive opiate result during follow-up, compared with 44 per cent of those who had not missed any such baseline appointments. When the number of missed appointments was analysed as a dichotomous variable (none versus one or more missed appointments), this bi-variate association was found to attain statistical significance (43.7% v 60.0%; $\chi^2_1=4.6, p=0.04$).

Of the 171 participants who remained on the program at 6 months, 66 (39%) tested positive for both opiates and stimulants on the same testing occasion at least

once during months 5-6. Table 12 shows bi-variate relationships between the various baseline program compliance indicators and having concurrent positive tests for both opiates and stimulant at least once during follow-up (months 5 and 6).

The general pattern of findings here was similar to that for having tested positive to opiates alone. Baseline custodial episodes, suspended sanctions and missed appointments were all predictive of subsequent concurrent opiate and stimulant usage but no relationship was found between the number of bench warrants issued and the likelihood of subsequently testing positive for both opiates and stimulants. A similar null result was obtained in relation to whether or not suspended sanctions had been subsequently waived. Comparing Table 12 with Table 11, it would appear that custodial sanctions and missed appointments were somewhat clearer predictors (in terms of statistical significance) of simultaneous stimulant and opiate use than they were of opiate use alone.

DISCUSSION

This investigation identified a number of early-phase indicators in a cohort of NSW Drug Court participants that were predictive of subsequent program compliance and offending. Whether or not sanctions had been imposed during the first three months (including custodial episodes and suspended sanctions) was predictive of a participant having been subsequently terminated prematurely from the program at six months. Interestingly, those participants who had accrued suspended sanctions during the baseline period but who had then had some of them waived (for improved program compliance), were less likely to be subsequently terminated from the program than those who did not have any of their sanctions waived. The number of bench warrants issued for having absconded from the program was also predictive of subsequent program termination. In terms of the utility of baseline urinalysis testing, low-test provision during the first three months

was highly predictive of subsequent program termination.

Missed program appointments and having tested positive to both stimulants and opiates during the baseline period were identified as being independently predictive of subsequent offending. This later finding is consistent with other lines of evidence showing that those who inject both opiates and psycho-stimulants are at greater risk on a range of adverse crime and health outcomes than those who just use opiates (Darke, Kaye and Topp 2002; Grella, Anglin and Wugalter 1995). In terms of the logistic regression modelling that only examined drug use indicators and subsequent offending, testing positive to benzodiazepines was independently predictive of subsequent offending as was testing positive to both opiates and stimulants concurrently.

A range of baseline compliance indicators predicted later concurrent use of stimulants and opiates, including custodial sanctions, suspended sanctions and missed program appointments. Bench warrants issued for absconding from the program during the first three months, however, were not predictive of subsequent opiate and stimulant usage. It is also of note that while the waiving of suspended sanctions (for improved program compliance) was predictive of subsequent program termination (compared to those who did not have their sanctions waived), it was not predictive of subsequent offending or drug use.

These findings have significant implications for the management of the NSW Drug Court program. At present the NSW Drug Court Team has no reliable means by which to identify who will perform well on the Drug Court program and who will not. As a result, poor-performing offenders often remain on the program for a considerable period of time before being excluded from it. These 'program failures' raise the cost of the program and reduce its overall effectiveness. The present findings could be used as a basis for excluding likely

program failures at an earlier stage, thereby reducing the cost of the program and increasing its measured effectiveness were these places made available to other potential participants who may be more likely to benefit from the program.

It might be objected that this course of action would mean excluding from the program the very people it was designed to assist (i.e. those with persistent drug abuse problems). It is important to remember, however, that this investigation has focused solely on the behaviour of Drug Court participants after placement on the program. It has not focused on pre-existing demographic, social or prior offending factors. There is nothing in the present results, therefore, which would tend to exclude certain classes of offenders from participation on the Drug Court program. The results simply open the possibility of identifying and removing those who are likely to fail on the program at an earlier stage than they currently are, thereby making it possible to place other drug dependent offenders on the program who may be more likely to succeed. Exclusion of those who perform poorly on the program during the first stage may still trouble those who feel that substantial evidence of failure is required before someone can properly be excluded from the program. Even in this circumstance, however, the present results provide a useful means by which to identify those in need of more intensive supervision, support and treatment.

Finally, a number of limitations of the current investigation need to be acknowledged. Firstly, this investigation was retrospective in nature and, of necessity, relied upon existing administrative databases and file records. This meant that we were restricted in the range of potential early-phase predictor variables that could be reliably examined. Because the treatment regimes which particular individuals received were not routinely recorded, their influence on subsequent program performance could not be examined. This is a problem that could really only be resolved through a prospective cohort investigation.

A second limitation of the current investigation was the relatively modest sample size. This would have limited the statistical power to detect the effects of some predictor variables, especially in the regression analyses. Conducting the study over a longer time period would have reduced this problem but it would also have led to a delay in publishing the research findings.

One of the major problems for the analyses in this investigation was the inability to construct reliable measures of changes in drug use frequency over time. This was because a substantial proportion of the study cohort provided too few valid urine samples during each of the baseline and follow-up periods. Once again, the solution to this problem would be to conduct a prospective investigation that reliably recorded changes in levels and types of illegal drug use by Drug Court participants.

Another methodological issue of note was that because the missed appointments variable was derived from DPP chronology files, this measure was really only available for those participants where the DPP had pursued a breach against them in the Drug Court. This was the case for 78 per cent of the cohort, which meant that for just over one fifth of the sample there was no source of data for missed program appointments. It is not, however, unreasonable to assume that those participants who did not have a chronology submitted by the DPP for a program breach, were those who were in fact more compliant with their program requirements. If this assumption is made the findings relating to appointments may be deemed reliable.

One final caveat to the current investigation needs to be mentioned. Although the present study provides useful information on predictors of program performance, this information should not be used as the sole basis on which to decide whether or not to exclude someone from the Drug Court program. Rather, a potentially more useful approach is to combine information on predictors of program success with all the other information routinely gathered by the Court in the

course of managing each individual's performance. That way, the unique circumstances of each individual can be taken into account when judging whether or not they should be allowed to continue on the program.

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- 'confirmed'. The "internal" test-type usually indicates that the person was supposed to provide a sample that day but did not, or admitted to drug use rather than actually providing a sample. While in some cases an "internal" record contained a field indicating the drug type that the program participant admitted using, there was a concern that this had not been systematically recorded for all participants. It was therefore decided to only rely upon 'confirmed' drug testing results when classifying an individual as having tested positive to a particular substance during the baseline or follow-up period. One consequence of this decision is that some individuals have a low number of "confirmed" tests over the study period, thereby making it difficult to measure changes in the frequency of drug use for these participants. A further complicating factor was that individuals who were placed in abstinence-oriented residential rehabilitation as part of their program regime also had a low number of urinalysis tests. This was because the residential facilities tended to conduct their own testing procedures and inform the Court of any breaches.
- For example, one quarter of the cohort of 217 provided less than eight valid samples for testing during months 2-3 on the program. Conventional statistical consensus is that a denominator for a stable rate should be a least 15 in magnitude.
 - A further analysis issue with respect to the urinalysis data related to how positive drug traces were to be treated. The approach to the analysis was to adopt the same criteria that the Drug Court applies when sanctioning program participants. The advice received from the Drug Court was that positive traces for morphine or benzodiazepines are not usually subject to sanctioning, as in the former case such traces can reflect legitimate medicine use (e.g. codeine), while in the latter, the very long half-life means that a trace may reflect a binge episode which had occurred up to 10 days previously. Therefore traces for either opiates or benzodiazepines were not treated as positive drug using episodes. This was not the case however with respect to psycho-stimulants traces, and such traces were treated as a positive drug use test result.

NOTES

- The original Drug Court administrative database was replaced with a new database designed by the NSW Judicial Commission in February 2003. Given that this investigation covered the period up until December 31, 2002, only the original database could be utilised thereby necessitating further file audit.
- There were a number of methodological issues with the urinalysis data source. Urine test types were classified on the database as either 'internal', 'interim' or

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