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THE EFFECTIVENESS OF METHADONE MAINTENANCE TREATMENT IN CONTROLLING CRIME: AN AGGREGATE-LEVEL ANALYSIS

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This article presents the results of a study into the effectiveness of methadone maintenance treatment in preventing crime. Using court appearance records, the officially recorded offending rates of a sample of 11,126 people on the public methadone program between 1 January 1999 and 31 December 2000 were determined to see whether they were lower during periods when they were on the methadone program than during periods when they were off the program. After adjusting for time spent in custody, officially recorded offending rates were found to be significantly lower for most people during periods when they were in methadone treatment than during periods when they were out of it. A reduction in officially recorded offending rates was found for all age groups and both men and women but the reduction was much more substantial for young women. When the reductions in officially recorded offending were scaled up to allow for offences that do not result in the prosecution of an offender, it was found that, for every 100 persons in methadone for one year, NSW gets 12 fewer robberies, 57 fewer break and enters and 56 fewer motor vehicle thefts.

INTRODUCTION

In recent years drug treatment has come to play an increasingly important role in the management of drug-related crime. This is partly due to growing appreciation of the limited effectiveness of traditional measures (e.g. arrest and imprisonment) in controlling such crime (Kleiman 1992; MacCoun & Reuter 2001) and partly because researchers have amassed an impressive body of evidence on the effectiveness of treatment as a crime control measure. In his review of the relevant literature Hall (1996; p. 10) concluded that:

‘There is consistent evidence that MMT reduces heroin dependence and crime while heroin-dependent persons receive adequate doses of methadone in programs with a maintenance treatment goal’

Although the available evidence is consistent with the assumption that methadone maintenance treatment (MMT) is effective as a crime control measure, that evidence is not without its problems. As Hall pointed out in his review (Hall 1996), much of the support for methadone either comes from small-scale randomised controlled trials or from observation studies which compare a group of MMT clients with another group of opiate users who either do not have access to MMT or who have been placed on some form of treatment other than MMT. The effects found in small-scale trials may give an exaggerated impression of the benefits of the program-wide benefits of MMT because it is easier in small studies to guarantee treatment fidelity (see Caulkins et al. 1999). Even in the best-conducted comparison studies, on the other hand, it is impossible to dismiss the

possibility of selection bias, particularly where programs have high dropout rates and/or studies employ only limited statistical controls.

The residual uncertainty surrounding the effectiveness of MMT has been highlighted by a study reported in the *British Journal of Criminology* by Best et al. (2001). They compared self-reported rates of involvement in crime among a sample of 51 patients who had been prescribed methadone in the month before entering the study with 49 others who had not. No significant differences were found in the total number of acquisitive or violent crimes or in the frequency of heroin use. They also found no relationship between the dose of methadone received and the total number of self-reported acquisitive or violent offences. Interestingly enough, the methadone patients they studied *did* report more frequent use of crack. Those on higher doses of methadone also reported spending more on crack. This suggests that, for poly-drug users at least, methadone treatment may not automatically lead to a reduction in drug-related offending. Indeed it is possible that methadone simply provides some drug users with a means by which to spend money on illicit drugs other than heroin without having to put up with the pain and discomfort of heroin withdrawal.

Although findings such as these pose a significant challenge to the assumption that there is a mechanical link between methadone prescribing and criminal desistance, they do not provide a sound basis on which to judge the overall crime prevention benefits of a large-scale methadone program. As Best et al. acknowledge, their study was cross-sectional in design and their sample of subjects was small and non-representative. Overall judgements about the effectiveness of methadone treatment ought ideally to be based on a larger and more representative sample of methadone clients. The problem is how to do this without resorting to a comparison group that may differ in systematic but unmeasured ways from the methadone treatment group being studied. Many heroin users cycle in and out of MMT during the course of their opiate using careers. One way to get around the problem of selection bias while still evaluating the effectiveness a methadone program, in situ, is to use each person on a methadone program as his or her own control. If MMT reduces crime we would expect people to offend less frequently while they are in MMT than while they are out of it.

The present brief reports the results of such a study with a sample of more than 11,000 heroin users

enrolled in the NSW methadone program at least once between 1 January 1999 and 31 December 2000. The study was undertaken at the request of the NSW Government following its decision to expand the public methadone program in the wake of the NSW Drug Summit (NSW Government 1999). Rates of offending are measured via court appearance records pertaining to offences alleged to have occurred during periods in and out of MMT. Appropriate adjustments are made for any time spent in custody (when offending would have been much more difficult, if not impossible). In order to control for the differential effects on crime of age and gender, separate analyses are conducted for men and women and for different age groups.

METHOD

Data sources

The term 'charge rate' in what follows refers to the number of offences, dealt with by a Local Court, which are alleged to have occurred over a specified period of time. The study involved linking data from three data sources.² The three data sources were methadone treatment records, court appearance records and imprisonment records. The general strategy adopted was to draw a sample of records from the database of people on the public methadone program³ and then to calculate a charge rate for each of these subjects, in and out of methadone treatment, over a four-year study period from 1 January 1998 to 31 December 2001, making due allowance for any time spent in custody.

The criteria employed for selection in the sample for the comparison of charge rates while in and out of methadone treatment were as follows:

- the subject was a patient on the public methadone program who began an episode⁴ of methadone treatment, of at least one day's duration, between 1 January 1999 and 31 December 2000;
- the subject was aged at least 18 on 1 January 1998 (the start date of the study period);
- the subject had not transferred *from* an interstate treatment program before or during the study period, or *to* an interstate treatment program during the study period;
- the subject did not have 'deceased' as a reason for leaving treatment during the study period;
- the person did not have any episodes of non-methadone treatment in the four-year study period.

The second data source used in the study is the Reoffending Database⁵ maintained by the NSW Bureau of Crime Statistics and Research. Using the name, gender and date of birth of the sample subjects from the methadone data, matches were made with data in the Reoffending Database.⁶ Wherever a match was obtained, the Reoffending Database was used to obtain information on offence dates and types.

The third and final data source used in the study was the Offender Management System maintained by the NSW Department of Corrective Services. This data source was used to determine the periods of time spent in custody by subjects during the study period. For each individual selected in the sample who was found to have a court appearance record in the Reoffending Database, identifying information was sent to the NSW Department of Corrective Services. The Department of Corrective Services provided dates of entry and exit from prison for all subjects for whom a match was obtained.⁷

Counting rules

Charge rates were calculated for both (1) an offence of any type (including theft) and (2) a theft offence. A theft offence was defined to be an offence falling into any of the following ASOC⁸ categories:

- robbery
- unlawful entry with intent / burglary, break and enter
- theft and related offences
- fraud, forgery or false financial instruments

If more than one offence of the same type was alleged to have occurred on the same day, only one offence was counted. Charge rates were calculated as the number of alleged offences per unit of non-custodial time. Because offence numbers were small, the unit

of time selected was quite large, namely four years (calculated as $4 \times 365.25 = 1,461$ days).

Analysis

The Wilcoxon signed rank test (for paired data) was used to test for differences in charge frequency while in and out of methadone treatment over the entire four-year study period. Separate analyses were conducted for different age groups and offence types.

RESULTS

Charge rates while in and out of methadone treatment

Table 1 shows the age⁹ by gender breakdown for the sample of 11,126 subjects who met the selection criteria. Around two-thirds (67.5%) were male and more than half (54.5%) were aged under 30. Females tended to be younger than males with 57 per cent being aged under 30, compared with 53 per cent of males.

Out of this sample of 11,126 there were only 9,057 subjects who spent some time out of custody both in and out of methadone treatment during the study period. However, for some of these subjects, the time spent out of custody was quite short. When rates per unit time are based on very short time periods the presence or absence of a single event can have a substantial effect on the rate.¹⁰ For this reason we restricted the analysis to subjects who spent more than 30 days out of custody both in and out of methadone treatment. This restriction reduced the sample size for analysis to 8,154.

Out of the 8,154 subjects, there were 2,271 (28%) who had zero charge rates both in and out of treatment and 3,972 (49%) who had zero theft charge rates both in and out of treatment. Table 2 shows the proportions of subjects for whom there was a decrease, no change

Table 1: Age and gender of sample subjects

<i>Age on 1 Jan 1998</i>	<i>Male</i>		<i>Female</i>		<i>Total</i>	
	<i>Number</i>	<i>%</i>	<i>Number</i>	<i>%</i>	<i>Number</i>	<i>%</i>
18-24	2,217	29.5	1,217	33.6	3,434	30.9
25-29	1,773	23.6	856	23.6	2,629	23.6
30-34	1,388	18.5	739	20.4	2,127	19.1
35-39	1,203	16.0	496	13.7	1,699	15.3
40+	925	12.3	312	8.6	1,237	11.1
TOTAL	7,506	100.0	3,620	100.0	11,126	100.0

and an increase in charge rates while in treatment, compared with when they were out of treatment. The table also shows the results of the Wilcoxon tests. For both an offence of any type and a theft offence the statistical test results are significant. It is clear from the table that the rate at which subjects are charged with offences was more likely to fall than to increase while in methadone treatment. For an offence of any type, 41.3 per cent of subjects exhibited a decrease in charge rates while in treatment, whereas 30.8 per cent exhibited an increase in charge rates while in treatment. For a theft offence the corresponding proportions were 29.4 per cent and 21.9 per cent, respectively.

The average and 90 percentile frequencies for charge rates while in and out of treatment are shown in Table 3, for both an offence of any type and a theft offence. The data in Table 3 are based on the frequency distributions of the in-treatment and out-of-treatment charge rates for all subjects, rather than the *difference* in charge rates that was used in Table 2. It can be seen in Table 3 that both the mean and the 90 percentile charge rates are higher while out of treatment than while in treatment. It should be noted that the table includes all 8,154 subjects, a substantial proportion of whom had zero charge rates both in and out of treatment. Hence the mean and 90 percentile rates are quite low.

Figures 1 and 2 show the frequency distribution of charge rates. Figure 1 shows the charge frequencies

for an offence of any type and Figure 2 for a theft offence.

For an offence of any type, 51 per cent had a zero charge rate while in treatment and 42 per cent had a zero charge rate while out of treatment. The relative frequency of non-zero charge rates was higher while out of treatment than while in treatment for all charge rate categories except in the upper tail of the distribution.

Figure 2 shows that, for a theft offence, 69 per cent had a zero charge rate while in methadone treatment and 62 per cent had a zero charge rate while out of treatment. As with an offence of any type, the relative frequency of non-zero charge rates was higher while out of treatment than while in treatment for all charge rate categories except in the upper tail of the distribution.

We now examine the results disaggregated by age and gender. Before doing so, we present the sample numbers in each of the age by gender categories. Table 4 shows the breakdown by age and gender for the sample of 8,154 people who spent more than 30 days out of custody both in and out of treatment. Males account for two-thirds of the sample. Sixty per cent of the sample was aged under 30 at the start of the study period and there were relatively more females than males in this category. Note that this proportion is higher than we saw for the full sample in Table 1, where 55 per cent of the sample was under 30. Hence those excluded from the reduced sample

Table 2: Change in charge rates while in methadone treatment, compared with while out of methadone treatment

<i>Type of offence</i>	<i>Percentage of subjects with:</i>			<i>Wilcoxon signed rank test</i>
	<i>Decrease</i>	<i>No change</i>	<i>Increase</i>	
Offence of any type	41.3%	27.9%	30.8%	$p < 0.0001$
Theft offence	29.4%	48.7%	21.9%	$p < 0.0001$

Table 3: Charge rates (charges per four-year period out of custody)

	<i>Mean</i>		<i>90 percentile</i>	
	<i>In methadone treatment</i>	<i>Out of methadone treatment</i>	<i>In methadone treatment</i>	<i>Out of methadone treatment</i>
Offence of any type	7.4	8.2	20.8	23.0
Theft offence	3.1	3.6	8.5	10.8

Figure 1: Charge rates for an offence of any type

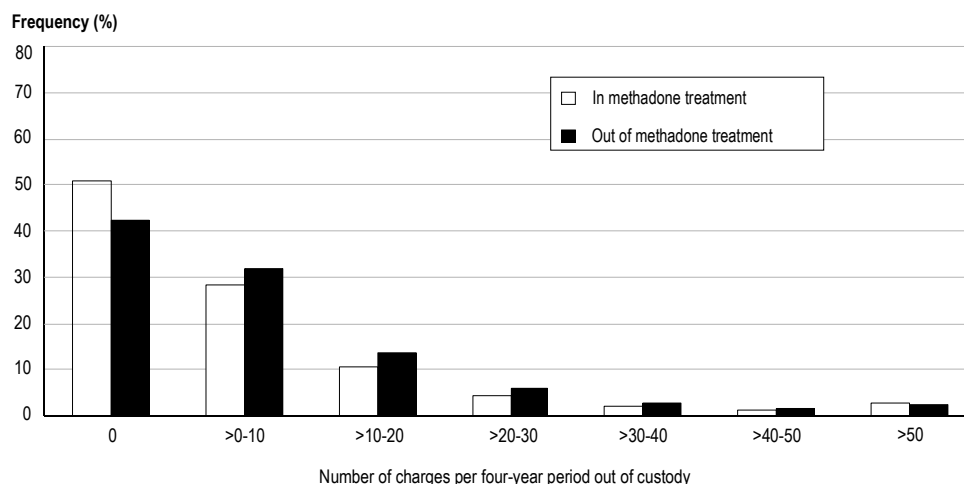


Figure 2: Charge rates for a theft offence

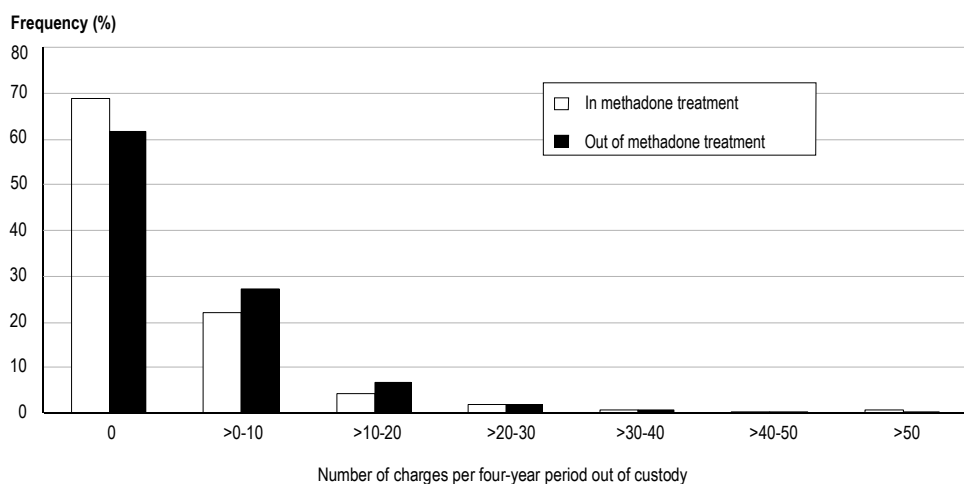


Table 4: Age and gender of subjects with more than 30 days out of custody both in and out of methadone treatment

<i>Age on 1 Jan 1998</i>	<i>Male</i>		<i>Female</i>		<i>Total</i>	
	<i>Number</i>	<i>%</i>	<i>Number</i>	<i>%</i>	<i>Number</i>	<i>%</i>
under 30	3,144	57.6	1,726	63.9	4,870	59.7
30 and over	2,311	42.4	973	36.1	3,284	40.3
TOTAL	5,455	100.0	2,699	100.0	8,154	100.0

in Table 4, that is, those with little or no time out of custody either in or out of methadone treatment, were more likely to be 30 and over.

The significance test results are presented in Table 5 for males and females in the under 30 and 30+ age groups (with age being measured at the start of the

study period). The table also shows the proportions of subjects for whom there was a decrease, no change and an increase in charge rates while in methadone treatment, compared with when they were out of treatment. The Wilcoxon signed rank test results are significant for all four of the age by gender groupings.

For each age by gender grouping it is clear that there is a higher percentage with a decrease in charge rates, than with an increase in charge rates, while in treatment.

The mean and 90 percentile charge rates while in and out of methadone treatment are shown in Table 6 for the four age by gender categories.

With one exception, the means and 90 percentiles are higher while out of treatment than while in treatment for all age by gender groups and both offence types. The exception is the 90 percentile value for an offence of any type for males under 30, where the in-treatment value is a little higher than the out-of-treatment value. The table also shows that

Table 5: Change in charge rates while in methadone treatment, compared with while out of methadone treatment, by age and gender

<i>Type of offence</i>	<i>Percentage of subjects with:</i>			<i>Wilcoxon signed rank test</i>
	<i>Decrease</i>	<i>No change</i>	<i>Increase</i>	
<i>Males aged under 30</i>				
Offence of any type	48.2%	18.2%	33.7%	$p < 0.0001$
Theft offence	35.7%	38.9%	25.4%	$p < 0.0001$
<i>Males aged 30 and over</i>				
Offence of any type	35.1%	34.1%	30.7%	$p = 0.0008$
Theft offence	21.9%	59.4%	18.7%	$p = 0.0030$
<i>Females aged under 30</i>				
Offence of any type	42.7%	30.2%	27.1%	$p < 0.0001$
Theft offence	32.6%	45.2%	22.2%	$p < 0.0001$
<i>Females aged 30 and over</i>				
Offence of any type	31.6%	40.1%	28.4%	$p = 0.0301$
Theft offence	21.1%	61.4%	17.6%	$p = 0.0179$

Table 6: Charge rates (charges per four-year period out of custody) by age and gender

	<i>Mean</i>		<i>90 percentile</i>	
	<i>In methadone treatment</i>	<i>Out of methadone treatment</i>	<i>In methadone treatment</i>	<i>Out of methadone treatment</i>
<i>Males aged under 30</i>				
Offence of any type	10.5	10.9	28.8	28.0
Theft offence	4.4	4.7	12.8	13.7
<i>Males aged 30 and over</i>				
Offence of any type	6.1	6.9	17.3	19.2
Theft offence	2.2	2.7	5.7	7.4
<i>Females aged under 30</i>				
Offence of any type	5.4	7.2	16.4	20.8
Theft offence	2.8	3.7	8.5	10.1
<i>Females aged 30 and over</i>				
Offence of any type	3.6	4.7	10.6	14.1
Theft offence	1.3	2.0	4.0	5.7

charge rates for males are higher than for females and that charge rates are higher for those under 30 than for those aged 30 and over.

An interesting finding is that, compared with males, females have bigger reductions in their charge rates while in methadone treatment. The differences are largest for females under 30. For an offence of any type the mean charge rate for females under 30 reduces by 1.7 (from 7.2 to 5.4) charges per four-year period and the mean theft rate reduces by 0.9 (from 3.7 to 2.8) charges per four-year period.

Estimated reductions in charges resulting from the methadone program

The results indicate that, for every 100 persons in methadone treatment for one year there is a minimum reduction of 22 charges of any type (including theft) and 13 charges for theft.

Figure 3 shows the estimated reduction in charges for males and females in the under 30 and 30 and over age groups. The figure shows that:

- for every 100 *males under 30* on the methadone program for one year, there is a reduction of 10 charges of any type and 8 theft charges;
- for every 100 *males aged 30 and over* on the methadone program for one year, there is a reduction of 20 charges of any type and 11 theft charges;
- for every 100 *females under 30* on the methadone program for one year, there is a reduction of 44 charges of any type and 23 theft charges;

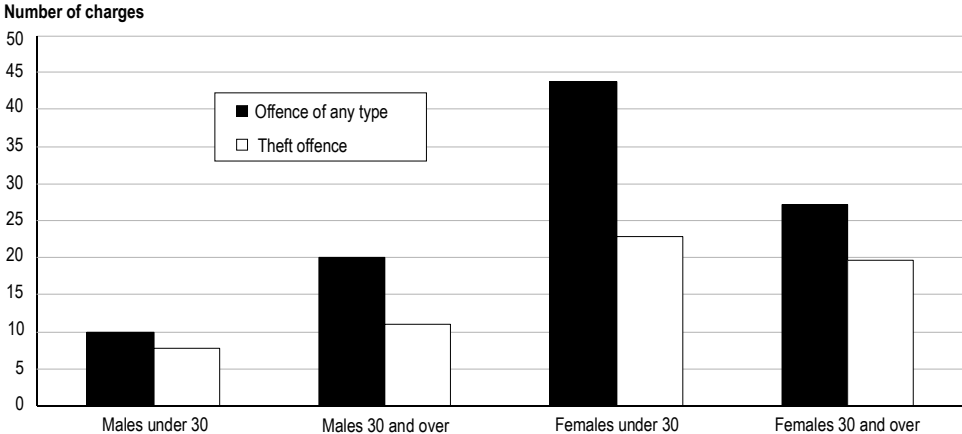
- for every 100 *females aged 30 and over* on the methadone program for one year, there is a reduction of 27 charges of any type and 20 theft charges.

Estimated savings in crime from the NSW MMT program

The reduction in charge rates observed among subjects in this study while they are in treatment provides a conservative picture of the crime reductions produced by the methadone program. This is because only a fraction of all offending comes to the attention of the police and, of that which does, only a fraction results in someone being charged and dealt with by a court. It is impossible to estimate the total reduction in crime associated with MMT because we do not know what proportion of all crime is reported to police or what proportion of all crime recorded by them results in someone being charged with an offence and brought to court. We can obtain estimates of the reduction in robbery, break and enter and motor vehicle theft, however, because crime victim survey data can be used to determine what proportion of these offences are reported to police, while police clear-up data can be used to estimate the proportion of recorded offences that result in someone being charged and brought to court.

According to the 2001 NSW Crime and Safety Survey (Australian Bureau of Statistics 2001) the proportions of robberies, break and enters and motor vehicle thefts reported to police were, respectively, 38.6%, 73.1% and 95.3%. According to the 2002 NSW Recorded

Figure 3: Estimated reduction in charges for each 100 persons in methadone treatment for 12 months



Crime Statistics Report (Doak, Fitzgerald & Ramsay 2003), the 180-day clear-up rates for these offences in 2001 were 16.6%, 5.8% and 6.9%, respectively. To estimate the crime reduction from the methadone program we therefore scale up the reduction in charges of robbery, break and enter and motor vehicle theft by the corresponding reporting and clear-up rates. The estimated reductions in charges for 100 persons in methadone treatment for one year were 0.8 (robbery), 2.4 (break and enter) and 3.7 (motor vehicle theft). Scaling these reductions up by the appropriate values gives an estimated reduction of 12 robberies, 57 break and enters and 56 motor vehicle thefts for every 100 persons in methadone treatment for one year.

DISCUSSION

The present study adds to the weight of evidence already gathered suggesting that methadone maintenance treatment is an effective way of reducing heroin-related crime. The study findings are notable because they involve a large and fairly representative sample of methadone clients, they are based on a design in which each person serves as their own control and the procedure chosen to measure crime (charges dealt with by a court), though reliable, is nonetheless quite conservative. The differences in the rate at which people are charged with criminal offences during periods in and out of MMT are not spectacular but they are significant. When the differences in charge rates are scaled up to obtain estimates of savings in crime, the results are fairly substantial. Even so, they may still be underestimates. Crimes are often cleared by arrest (or other means) without any individual being charged and brought to court. Our estimates of crime savings take no account of this fact. Nor do they take account of savings in offences other than robbery, burglary and motor vehicle theft.

It is worth noting that, although MMT is effective in preventing crime, it is not equally effective in achieving this goal with all methadone clients. There were significant reductions in charge rates for both males and females and for both younger and older methadone clients. The estimated reductions in charge rates, however, were greater for females than for males, particularly for younger females. Judged

from the charge data, the reductions in offending which accrue for women under the age of 30 are three to four times higher than for men in the same age group. There also appears to be a small group of individuals who have higher rates of offending in treatment than when they are out of treatment. It is not possible to identify the characteristics of these individuals in the present study but the finding itself echoes that obtained by Best et al. (2001) in their study, thus reinforcing the point that some groups of heroin users may not curb their offending behaviour in response to placement in MMT. More needs to be done to identify the characteristics of these individuals and the factors that lead them to offend more frequently when they are in MMT than when they are out of it.

The varying effectiveness of MMT in reducing criminal behaviour across different groups of individuals suggests a need for caution in making generalisations about its value as a crime control tool. Previous research has shown that the effectiveness of MMT in controlling heroin use (and crime) can depend on the dose provided and on the clinical context in which treatment occurs (Hall, Ward & Mattick 1998). The research by Best et al., cited earlier, suggests that MMT may be less effective in reducing crime amongst poly-drug users, particularly where they use crack. The present research shows that there are also important variations in the effectiveness of methadone by age and by gender. All of this tends to suggest that the effectiveness of methadone as a means of reducing crime is likely to vary across individuals, locations and programs. Perhaps future research should focus on the question of what factors make individual MMT programs more or less effective in achieving this goal.

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NOTES

- 1 Director, National Drug and Alcohol Research Centre (Australia).
- 2 Of necessity, to carry out the linking of records, identifiable data were used from each data source. Ethics approval for the study was obtained from the NSW Department of Health Ethics Committee.
- 3 This database is the Pharmaceutical Drugs of Addiction System maintained by the Pharmaceutical Services Branch of the NSW Department of Health. The data provided by the Pharmaceutical Services Branch consisted of records for all treatment episodes any part of which took place during the four-year study period.
- 4 We defined a treatment episode as having started if the reason for leaving was not recorded as 'did not start' and if the start and end dates were at least one day apart. If two episodes of methadone treatment were such that the time between the end of one program and the start of the next was less than or equal to one day, then the two were treated as one continuous methadone treatment episode.
- 5 This database consists of linked court appearance records for individual offenders. It contains data for adult criminal court appearances in NSW dating from 1996. Local Court appearances recorded in the database were used as the source of information on charges. District Court records were not used because the date of the alleged offence is not recorded for these court appearances. (Note, however, that 97 per cent of offences are dealt with in the Local Court in NSW, so this limitation is likely to have negligible influence on the study outcomes.)
- 6 The procedures used for this matching were those developed by the Bureau of Crime Statistics and Research for building the Reoffending Database (see Weatherburn, Lind & Hua 2003). These procedures allow for variations in spelling of names and slight differences in dates of birth, as well as making use of any alias names provided in court records.
- 7 The identifying information included all combinations of personal identifiers from the Reoffending Database in order to maximise the chances of achieving a match with imprisonment records.
- 8 The Australian Standard Offence Classification (ASOC) was used to categorise offence type (Australian Bureau of Statistics 1997).
- 9 The age is at the start of the study period, that is, on 1 January 1998.
- 10 For example, there was one subject with only three days out of custody while in methadone treatment; the subject was charged with four offences in this time, thereby having a charge rate of 1,948 offences per four-year period, four times higher than the next highest charge rate.