



Drug & Alcohol Services  
South Australia

**Into The Maze: Treatment Pathways and  
Treatment Outcomes of Heroin Dependent  
Individuals in Australia.**

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ATOS is a prospective longitudinal study based loosely on the methodology adopted by the National Treatment Outcome Research Study in the UK (Gossop et al., 1997) conducted in three states; South Australia, Victoria and New South Wales.

The project has examined the treatment outcomes for heroin dependent individuals in the three most common treatment modalities in Australia.

The purpose of this paper is to:

- Explore the treatment pathways taken by participants in the ATOS over a period of 12 months
- Examine and compare the treatment outcomes of participants who took primarily a maintenance pharmacotherapy pathway with those who took primarily a non-pharmacotherapy treatment pathway

### **Treatment Pathways**

The majority of the participants in this study had received some form of treatment for their dependence on opiates prior to being recruited into ATOS.

Maintenance pharmacotherapy (MP) was the most common treatment pathway for the participants between recruitment (baseline) and the 12 month interviews.

#### *Maintenance pharmacotherapy (MP) at baseline*

Most of the individuals who were receiving MP at baseline were receiving this form of treatment at the time of the 3 month interviews and the majority of those who were receiving MP at the time of the 3 month interviews were receiving this form of treatment at the time of the 12 months interviews. Of those who were in no form of treatment at the time of the 3 month interviews, over half were either in no treatment or receiving MP at the time of the 12 month interviews.

Over three quarters of those participants who were receiving MP at baseline were receiving this treatment at the time of the 12 month interviews.

### *Residential rehabilitation (RR) at baseline*

Most of the individuals in RR at baseline were in either RR or in no form of treatment at the time of the three month interviews. Of those individuals in RR at the time of the 3 month interviews, most were either not in any form of treatment, receiving counselling or in RR at the time of the 12 month interviews.

### *Detoxification at baseline*

The treatment pathways for those participants in detoxification at baseline were more complex than for those who were receiving MP or RR at baseline.

Of those participants in detoxification at baseline, one quarter were receiving MP, just under a half were in no form of treatment and 15% were either in RR or receiving counselling at the time of the 3 month interviews. Of those individuals receiving MP at the time of the 3 month interviews, nearly a half were receiving MP at the time of the 12 months interviews and most of the rest were not in treatment. Of those not in treatment at the time of the 3 month interviews most were either not in treatment or receiving MP at the time of the 12 month interviews. Of those in RR or receiving counselling at the time of the 3 month interviews, most were not in treatment or receiving counselling at the time of the 12 month interviews. The majority of those not in treatment at baseline were not in treatment at the time of the 3 month interviews and the majority of these were not in treatment at the time of the 12 month interviews.

Near 70% of the participants in this study had engaged in at least 1 treatment episode in addition to their baseline treatment between baseline and the time of the 12 month interviews.

### **Comparison of Mainly Maintenance Pharmacotherapy Treatment (MMP) and Mainly Non Maintenance Pharmacotherapy Treatment (MNMP) Pathways.**

At baseline, there was no significant difference between the two groups in terms of their demographic characteristics (age, sex, education etc) and their drug using history. Both groups showed typical characteristics of those with heroin dependency.

Both the MMP and MNMP groups reported a significant reduction in the median heroin OTI score between baseline and the 3 month interviews. This reduction was maintained to the time of the 12 month interviews. No difference was found between the groups at the time of the 3 month and 12 month interviews.

A significant decline in the mean number of heroin use days for both groups was reported between baseline and the 3 month interviews, which was maintained to the 12 month

interviews. The MNMP group reported significantly lower number of heroin used days at the time of the 3 month interviews compared to the MMP group.

Between baseline and the 12 month interviews, significant reductions were reported in the percentage of the MMP group reporting the use of a variety of drugs except for hallucinogens, alcohol and tobacco. However, the MNMP group reported significant reductions in all of the drugs except for tobacco.

No differences were found between the MMP and MNMP groups at the time of the 12 month interviews in the percentage using various drugs except for alcohol and cannabis. A greater percentage of the MMP group reported using alcohol and cannabis.

Both groups reported significant improvements in mean SF-12 physical and mental health scores between baseline and the time of the 12 month interviews.

The level of physical disability reported by both groups was either mild or none. At baseline there was no significant difference found in the level of physical disability between the groups. Both groups reported only a mild level of disability. At the time of the 3 month interviews, the MMP had a greater degree of disability and this difference was maintained to the 12 month period.

Overall, the MMP group showed significantly better mental health scores than the MNMP group between baseline and the time of the 12 month interviews.

Both groups reported a significant decline in criminal involvement from baseline to the time of the 12 month interviews. No difference in the proportion of the groups involved in crime was found between the groups at baseline and at the time of the 12 month interviews. A smaller proportion of the MNMP group was involved in crime at the time of the 3 month interviews.

This study reinforces that the treatment pathways for heroin dependent individuals are complex, particularly if the starting point of treatment is detoxification. Interestingly, a significant number of those in detoxification at baseline were receiving MP at the time of the 3 month interviews.



Overall the differences in treatment outcomes between the two treatment groups (MMP and MNMP) are comparable suggesting that both forms of treatment are of significant value to the individuals that receive them.

The health, social, and economic harms associated with chronic dependence on heroin such as blood borne virus transmission, criminal behaviour and psychological co-morbidity make it a serious public health issue in Australia and internationally.

Providing appropriate and effective treatment (together with early intervention and prevention programs) for heroin dependence is of significant importance. The treatment for heroin dependence in Australia is well developed. The major forms of treatment currently are maintenance pharmacotherapies (methadone and buprenorphine), residential rehabilitation (therapeutic communities and other longer term live-in treatments) and detoxification (often the entree to other forms of treatment).

There is a growing body of evidence for the efficacy of heroin treatment. For example, the National Evaluation of Pharmacotherapies for Opioid Dependence Project (NEPOD), which evaluated a number of alternative pharmacotherapy trials around the nation (Mattick, Digiusto et al. 2004), and a review of the published evidence regarding effectiveness of different treatment approaches by Gowing, Proudfoot et al. (2001). However, there has been a lack of longitudinal research in Australia that has examined the outcomes for clients of heroin treatment. Reliance has been placed on the findings of large-scale outcome studies conducted in the United States, (DARP-Simpson and Sells, 1990; TOPS-Hubbard, Marsden et al. 1989; DATOS-Fletcher, Tims et al. 1997) and the United Kingdom (NTORS-Gossop, Marsden et al. 1997) to understand the efficacy of the major treatment modalities. These longitudinal studies have found that treatment has a significant impact on drug and alcohol use, criminal activity, and the physical and psychological wellbeing of clients. In addition, it has been concluded that treatment provides a cost effective investment for their governments.

There are significant differences between the UK, USA and Australia in the way treatment services are organised and delivered and in the characteristics of illicit drug users and their pattern of drug usage. Extrapolation of findings from the USA and UK outcome studies to the Australian context is therefore not always appropriate. As a result, through the collaborative efforts of the National Drug and Alcohol Research Centre (NDARC) in NSW, Turning Point Alcohol and Drug Centre in Victoria, and Drug and Alcohol Services SA (DASSA), the Australian Treatment Outcomes Study-Heroin (ATOS) commenced in 2000. The ATOS was the first large-scale longitudinal study of treatment outcomes for heroin dependence to be undertaken in Australia.

The findings of the ATOS has been well documented (Ross, Teesson et al. 2004); Teesson, Ross et al. 2006; Bament, Cooke et al. 2004 and Holt, Ritter et al. 2004), and are similar to those found in studies overseas. Overall it was found that treatment has a positive impact on outcomes for clients in terms of drug use, mental health, injecting risk taking and involvement in criminal activity.

Significant in the treatment outcome research is the role that the treatment stability (frequency of episodes of treatment that a dependent person engages in) and retention (the length of these episodes) plays in treatment outcomes. The ATOS study (Teesson, Ross et al. 2006 and Ross, Teesson et al. 2004) and other longitudinal treatment outcome overseas (eg. Flynn, Joe et al. 2003; Hubbard, Craddock et al. 1997; Gossop, Marsden et al. 1999 and Hser, Grella et al. 1998) has found that the greater number of treatment days (treatment dose) and fewer treatment episodes (treatment stability) related to better treatment outcomes. Treatment careers for drug users are characterised in terms of discrete treatment episodes demarcated by treatment entry, exit and re-entry into treatment (Hser, Anglin et al. 1997). The questions that arise from this are; does a particular pathway in treatment make a difference to the outcomes that are observed and are there particular pathways of treatment that improve treatment dose and stability? It could be surmised that given the long term nature of opioid maintenance pharmacotherapy and residential rehabilitation that these forms of treatment may produce more positive treatment outcomes. This is an interesting question given that these forms of treatment have differing underlying premises. Residential rehabilitation

operates under the premise of establishing and maintaining its clients as drug free whilst opioid maintenance pharmacotherapy does not necessarily. The ATOS affords the opportunity to explore these questions.

The purpose of this report is to:

- Explore the treatment pathways taken by participants in the ATOS from commencement of treatment for a period of approximately 12 months.
- Examine the treatment outcomes of participants who took primarily a maintenance pharmacotherapy pathway with those who took primarily a pathway that involved primarily non-maintenance pharmacotherapy treatment.

**2.1            The ATOS study**

ATOS is a prospective longitudinal study based loosely on the methodology adopted by the National Treatment Outcome Research Study in the UK (Gossop, Marsden et al. 1997) conducted in three states; South Australia, Victoria and New South Wales.

The project examined the treatment outcomes for heroin dependent individuals in the three most common treatment modalities in Australia:

- Detoxification (clonidine or buprenorphine assisted),
- Pharmacotherapy maintenance treatment (methadone or buprenorphine) and
- Residential rehabilitation (primarily therapeutic communities).

Study participants were recruited at the beginning of a new treatment episode (baseline) and interviewed regarding their drug use, criminal behaviour, risk-taking behaviour, and physical and psychological health.

Follow-up interviews were scheduled for 3 and 12 months after the initial interviews to measure changes in these parameters.

A small sample of heroin dependent individuals not in treatment at baseline was also recruited into the study for comparison purposes.

The aims of the project were to:

- Describe the characteristics of people seeking treatment for problems associated with heroin use,
- Describe the treatment received, and
- Examine treatment outcomes (drug use, physical and mental health, risk-taking and criminal behaviour) and costs at 3 and 12 months following commencement of treatment.

**2.2            Treatment Pathway Analysis**

825 clients were successfully recruited into the study over a twelve month period. 728 of these clients were successfully followed up at the time of the 3 month interviews. 657 clients were successfully followed up and participated in

the 12 month interviews. The response rate for the Study was nearly 80%. In order for valid comparisons across the 3 measures of time, only those who participated in all 3 interviews have been included in the analysis in this paper. 623 individuals participated in all three interviews.

The first part of this paper provides a detailed description of the treatment pathways experienced by these 623 heroin dependent individuals from their starting points in maintenance pharmacotherapy, residential rehabilitation, detoxification or no treatment. The second part of the paper compares treatment pathways of mainly a maintenance pharmacotherapy type with that of a non maintenance pharmacotherapy pathway.

For the purposes of comparison two sub groups of the pathways described above were formed using the following criteria:

- Mainly maintenance pharmacotherapy treatment (MMP): Those in detoxification or maintenance pharmacotherapy (MP) at baseline and in MP at the time of the 3 and 12 month interviews (n=186).
- Mainly non maintenance pharmacotherapy treatment (MNMP): Those in residential rehabilitation or counselling at the time of the baseline, 3 and 12 month interviews (n=36).

The Opiate Treatment Index –OTI (Darke, Hall et al. 1992) and the S-12 (Ware, Kosinski et al. 1996) were used to assess participant’s outcomes. The specific measures used in this paper are:

- OTI score – heroin
- OTI score – other opiates
- OTI Mean number of heroin use days
- OTI other drug use
- OTI score -crime
- SF-12 mean physical component score
- SF-12 mean mental component score

### **2.3 Analysis of data**

Comparisons between the MMP and MNMP treatment groups were made using Pearson’s Chi Square or Student’s T-tests. In cases where the data were skewed, medians have been reported. All statistical analyses were conducted using SPSS for Windows version 12.02.

Eighty nine percent of the participants had started treatment for their opiate dependency prior to their recruitment into ATOS.

### **3.1 The Treatment Pathways**

Figures 1 through 4 show the form of treatment study participants were receiving at the time of the baseline, 3 month and 12 month interviews. The predominance of maintenance pharmacotherapy in these treatment pathways is evident.

#### **3.1.1 *Maintenance pharmacotherapy (MP) at baseline interviews***

Figure 1 shows the treatment pathways for those 218 individuals interviewed at baseline who commenced MP. Of these, 185 (85%) were receiving MP at the time of the 3 month interviews while 13.8% had dropped out of treatment. The remaining 3 individuals were in detoxification, RR or another form of treatment.

Of the 185 individuals in MP at the time of the 3 month interviews, 159 (85.9%) were receiving MP at 12 month follow up. A total of 172 individuals were receiving MP at the time of the 12 month interviews, representing 79% of the original 218 individuals receiving MP at baseline.

Of the 30 individuals who dropped out of treatment at the time of the 3 month interviews, over one half (16) were not in treatment and 12 (40%) had returned to MP at the time of the 12 month interviews.

#### **3.1.2 *Residential rehabilitation (RR) at baseline interviews***

Figure 2 shows the treatment pathways for the 135 individuals interviewed at baseline who commenced RR. Over a half (51.9%) of these individuals were in RR and 30.4% were not in treatment at the time of the 3 month interviews. The remainder were receiving MP (4.4%), in detoxification (1.5%) or some other form of treatment (5.2%)

Of the 70 individuals in RR at 3 month follow up, a large proportion were not in treatment (42.9%) at 12 month follow up. Most of the remainder were either receiving counselling (22.9%) or were receiving RR (20%) or MP (10%).

Most of those individuals not in treatment at the time of the 3 month interviews (61%) were not in treatment at the time of the 12 month interviews. The majority of the remainder were either in RR (17.1%), receiving MP (9.8%) or counselling (7.3%) at the time of the 12 month interviews.

### 3.1.3 *Detoxification at baseline interviews.*

Compared to the baseline treatments of MP and RR, the treatment pathways starting with detoxification are more complex (see Figure 3).

Of those participants in the study who were first interviewed whilst in a detoxification, one quarter were receiving MP and one half were not in any form of treatment at the time of the 3 month interviews. The remaining quarter was either in RR (7.7%), counselling (7.3%), detoxification (4.1%) or other forms of treatment (5.9%).

Of the 56 individuals who were receiving MP at three months, near half (48.2%) were receiving this form of treatment at the time of the 12 month interviews. The majority (79.3%) of the remaining 29 were not in treatment. Of the 109 who were not in treatment at the time of the 3 month interviews, most were either not in treatment (56.9%) or receiving MP (32.1%) at the time of the 12 month interviews.

Of those who were in RR or counselling at 3 months (n=33), the majority were not in treatment (n=15) or were receiving counselling (n=7) at 12 months.

A total of 73 individuals were receiving MP at 12 months, representing a third (33.2%) of the 220 individuals in detoxification at baseline. A total of 111 were in no form of treatment at the time of the 12 month interviews, representing just over a half of the 220 individuals in detoxification at baseline.



#### 3.1.4

##### *Not in treatment at baseline interviews*

Figure 4 shows the treatment pathways for those individuals who were not in drug treatment at baseline (N=50). At the time of the 3 month interviews, 78% of these individuals (n=39) were in no form of treatment, 18% were receiving MP (n=9) and the remaining two individuals were in RR or receiving counselling. Of those who were not in treatment at the time of the 3 month interviews, the majority were either not in treatment (54.4%) or MP (38.5%) at 12 months. The remaining two individuals were either receiving counselling or were in detoxification.

Of the 9 individuals receiving MP at 3 months, 7 were receiving MP and 2 were not in treatment at the time of the 12 month interviews.

Figure 1: Type of treatment that study participants were receiving at the time of the 3 month and 12 month interviews when baseline treatment was maintenance pharmacotherapy.

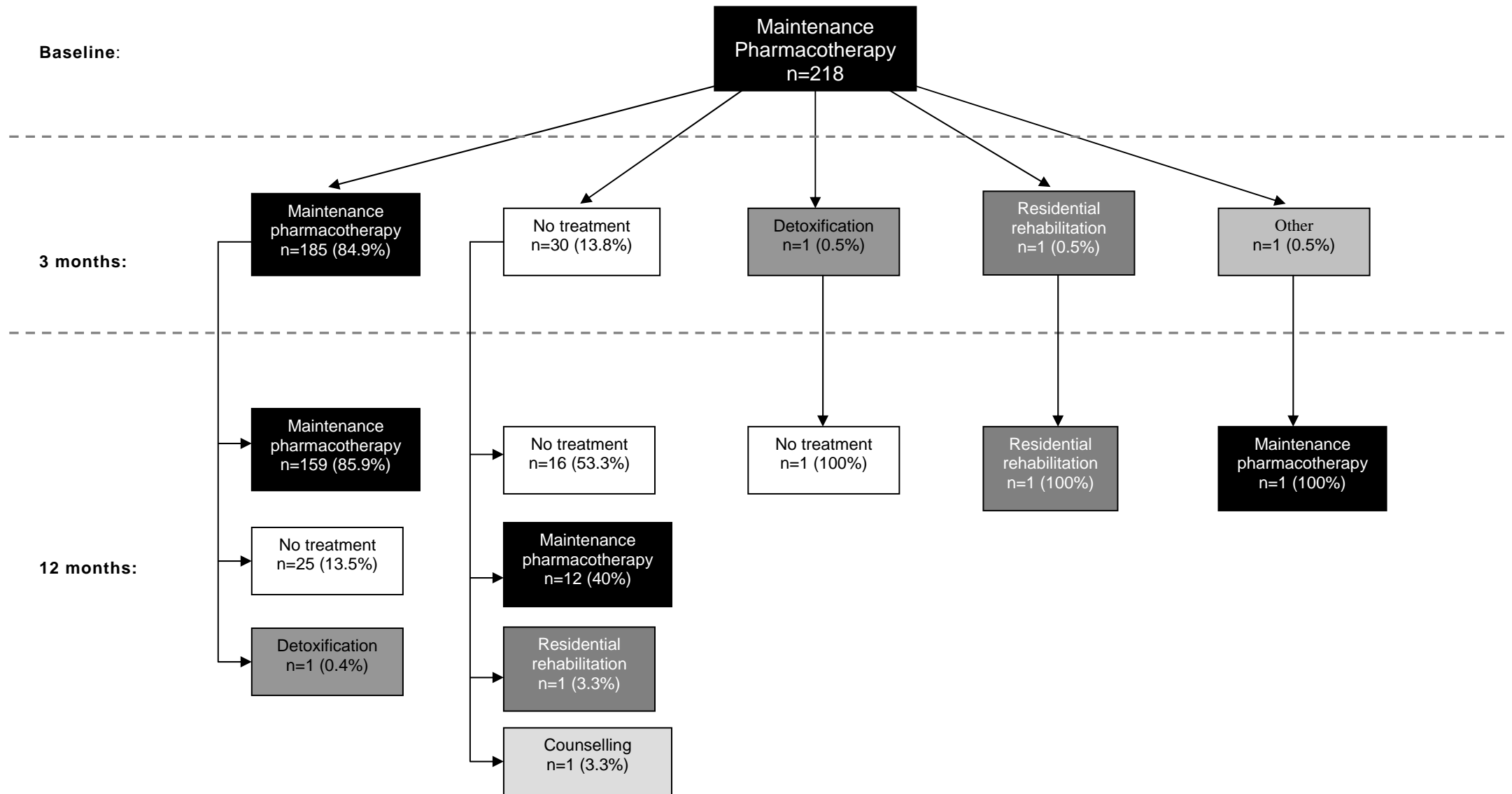


Figure 2: Type of treatment that study participants were receiving at the time of the 3 month and 12 month interviews when baseline treatment was residential rehabilitation.

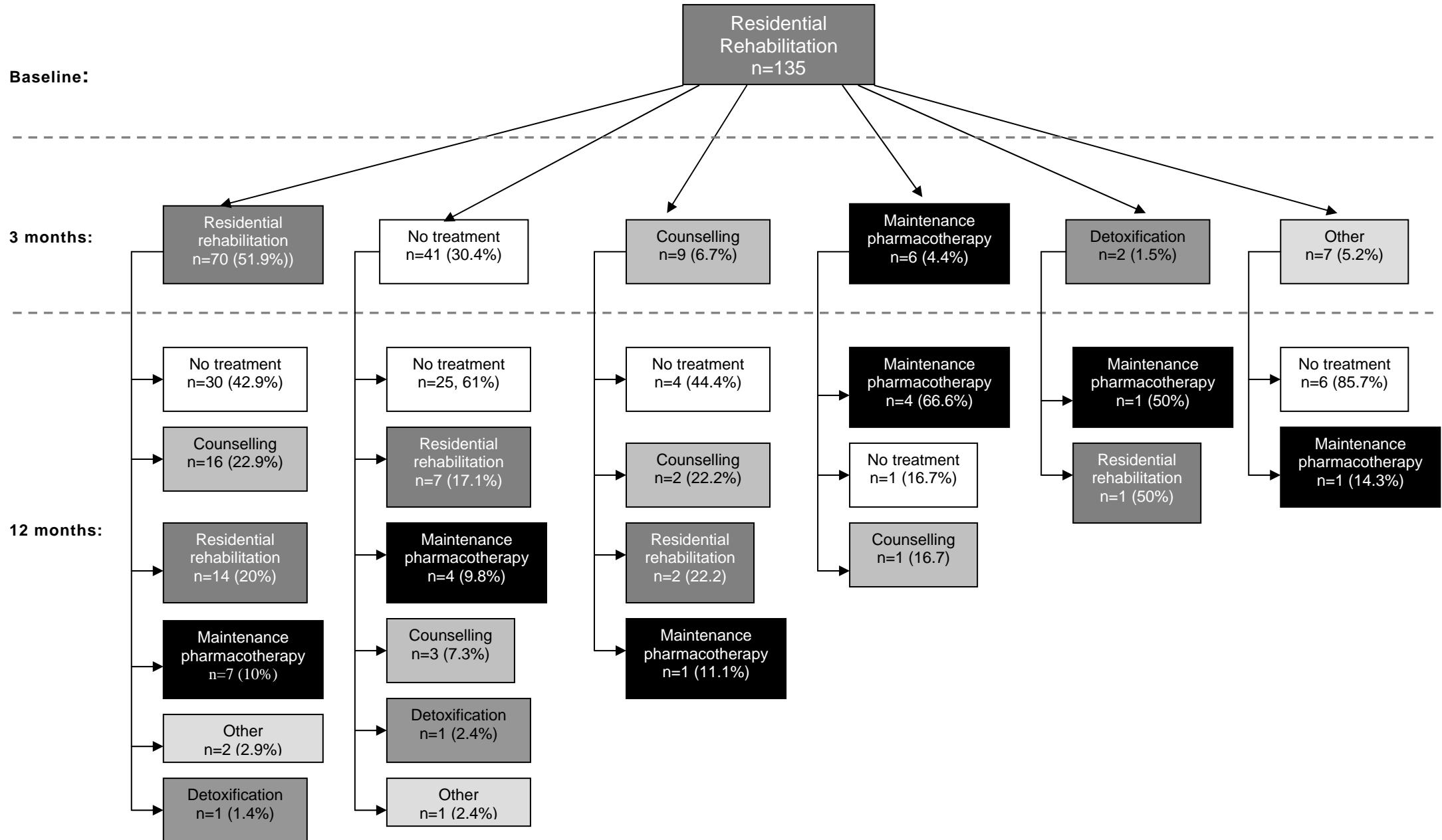


Figure 3: Type of treatment that study participants were receiving at the time of 3 month and 12 month interviews when baseline treatment was detoxification.

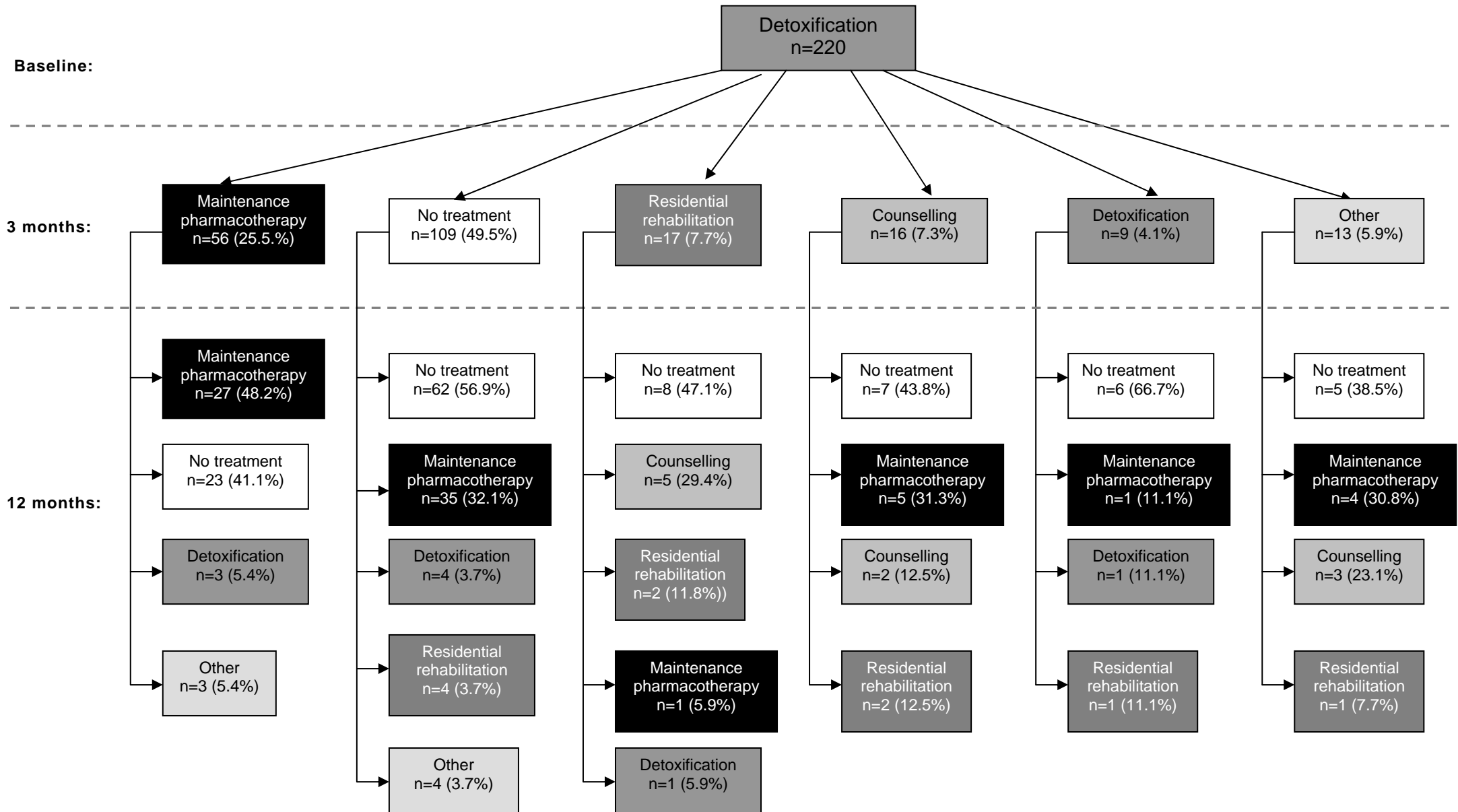
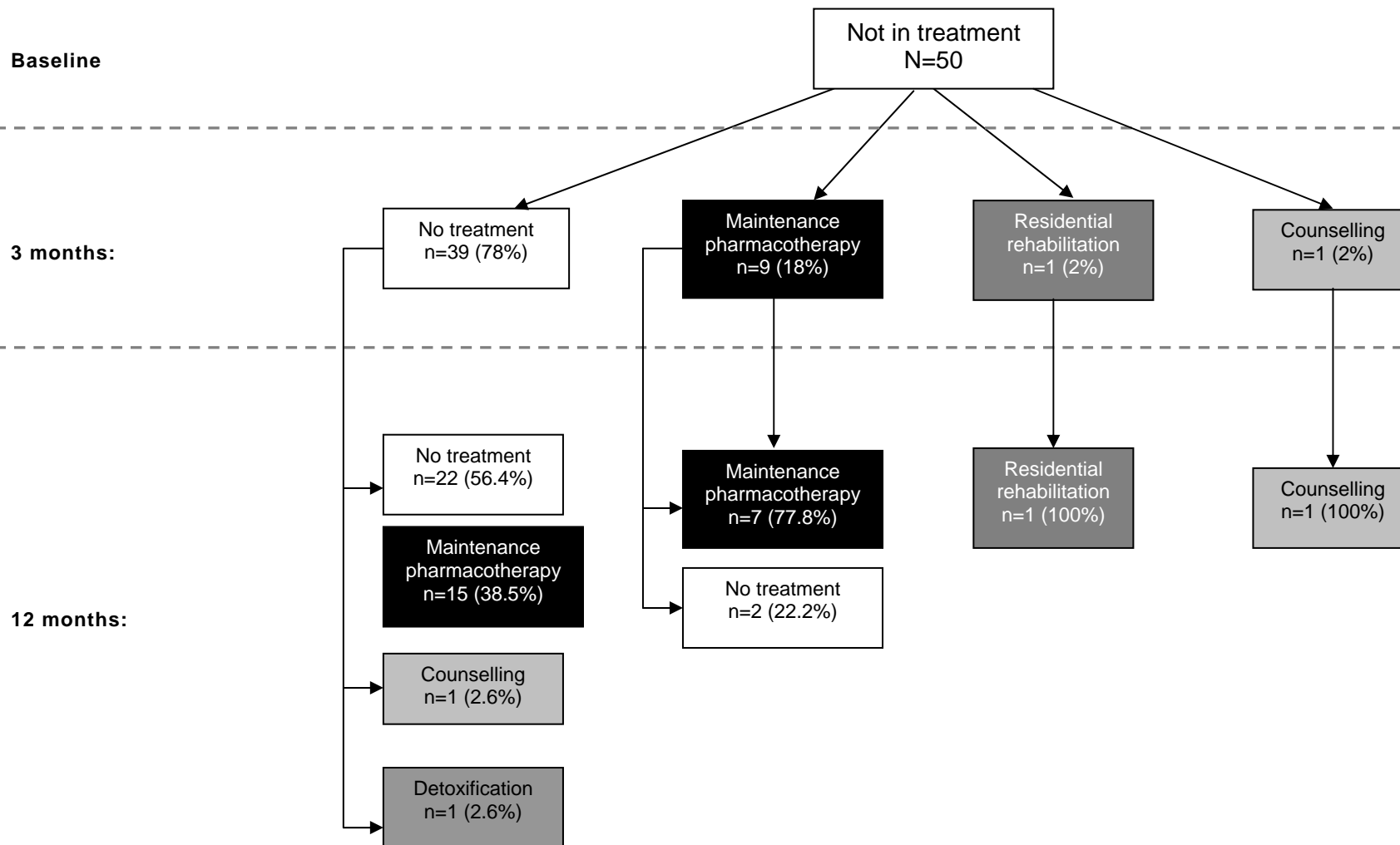


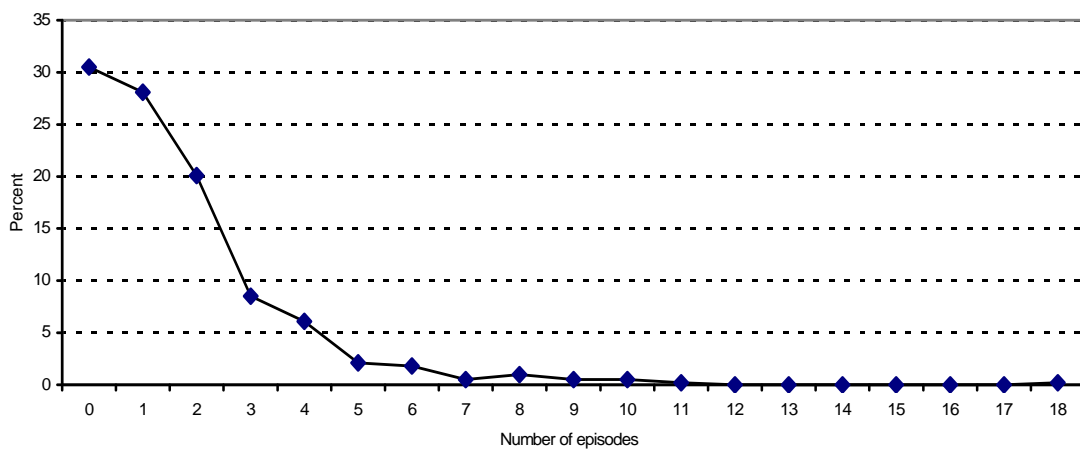
Figure 4: Type of treatment that study participants were receiving at the time of the 3 month and 12 month interviews when there was no baseline treatment.



Figures 1 through 4 represent snapshots of the treatment at the time of the three points of data collection for the study. Participants did move in and out of treatment during the time between baseline and the three month interviews and between the 3 month interviews and 12 month interviews.

Figure 5 summarises the number of treatment episodes that the participants received up to the time of 12 month interviews (excluding the treatment they were in at time of the baseline interviews). Nearly 70% of the participants had engaged in at least 1 treatment episode in addition to their baseline treatment.

Figure 5: *Percentage of individuals commencing new episodes of treatment between baseline and the 12 month interview (excluding baseline treatment) N=623*



The description of the pathways above indicates that the study participants experienced a range of treatment types over the 12 months and that maintenance pharmacotherapy was the most common treatment engaged. Does following a pathway that is predominantly MP lead to treatment outcomes that are better or comparable to a pathway that is primarily of a non-maintenance pharmacotherapy? To answer this question, the rest of this paper explores whether there are any significant differences in the characteristics of those that experienced MMP treatment with those that experienced a MNMP treatment. It then examines the treatment outcomes for both groups.

### 3.2 Characteristics of Mainly Maintenance Pharmacotherapy (MMP) and Mainly Non-maintenance pharmacotherapy (MNMP) Treatment Samples

A total of 623 individuals were successfully interviewed at the baseline, 3 month and 12 month interviews. The following table summarises the characteristics of the MMP and the MNMP groups and for the total 623 participants at the time of the baseline interviews.

Table 1: Comparison of the characteristics of the MMP (186) and MNMP (n=36) and the total 623 participants in the study at the time of the baseline interviews.

Characteristic	MMP	MNMP	Total sample
Age (mean years)	29.5	28.9	29.5
Percent male	51.1	<b>66.7</b>	62.4
School education (mean years)	10.0	10.6	10.2
Completed course/s since school (%)			
No courses	58.9	52.8	59.0
Trade/technical	32.4	36.1	33.9
University/college	8.6	11.1	7.1
Income - main source in last month (%)			
Wage or salary	19.4	16.7	18.5
Government pension, allowance, benefit	54.8	47.2	50.4
Criminal activity	14.5	19.4	18.8
Other	11.2	16.7	12.3
Ever been in prison (%)	38.2	<b>25.0</b>	36.1

Table 1 shows that there is little difference in the characteristics of two groups. The MNMP group has a greater percentage of males and a smaller percentage of those who have been in prison (figures in bold), but these differences are not statistically significant.

### 3.2.1 Heroin Use and Treatment History

At the time of the baseline interviews, the participants' heroin use history showed the typical characteristics of individuals with heroin dependency. This history is summarised in the following Table 2.

Table 2: Heroin Using History of MMP (n=186), MNMP (n=36) and Total Participants (N=623) at the time of the baseline interviews.

	MMP	MNMP	Total sample
Mean age when first got high (years)	13.6	12.5	13.5
Mean age first used heroin (years)	19.1	19.0	19.7
Heroin use career (years)			
Mean age first injected heroin	20.5	19.1	20.3
Mean age used heroin regularly*	20.6	19.9	20.7
Mean days used heroin in last 6 months	127.7	112.7	125.9
Mean age treatment first sought (years)**	24.1	22.8	24.2

\*At least once a month

\*\*Most commonly inpatient detoxification

There were no significant differences found between the MMP and the MNMP groups in relation to drug and heroin using history. Neither group showed any differences in drug using history compared to the total 623 participants.

### 3.3 Analysis of treatment pathways outcomes

#### 3.3.1 Treatment "dose"

Table 3 show the median number of days that the groups spent in the major forms of treatment for heroin dependency

Table 3: Median number of treatment days and episodes reported at the time of the 12 month interviews

	MP	Detox	RR	Other	Episodes*
MMP (n=186)	341.5	0	0	0	0.9
MNMP (n=36)	0	0	195.5	3.9	2.0
Total sample (n=623)	90	0	0	0	1.0

\*Excludes treatment at baseline

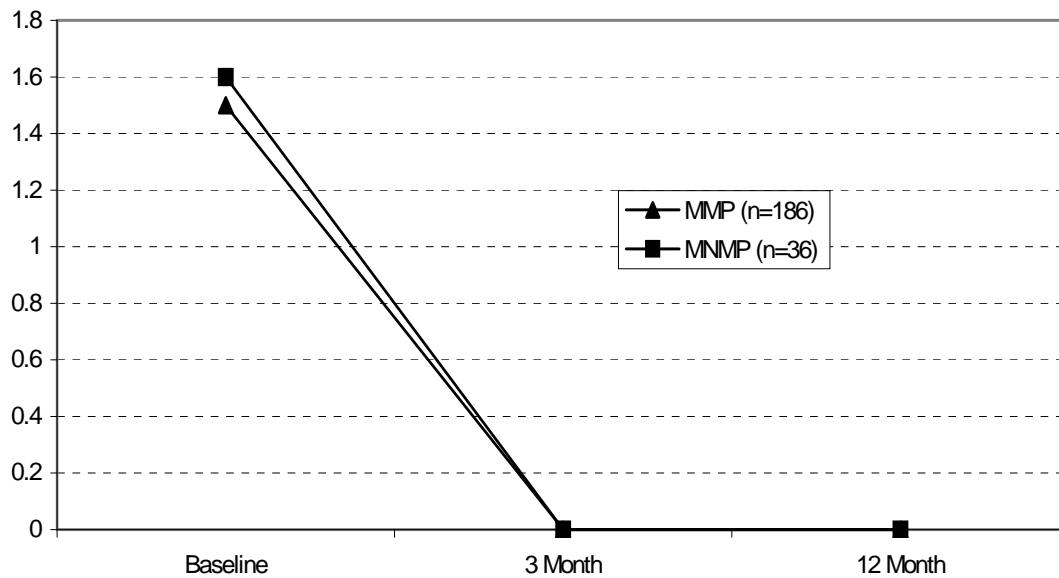


The data in Table 3 suggests that the two groups selected on the basis of the treatment they were in at the time of the three interviews are distinct in the treatment that they had received. Clearly the MMP group has received almost exclusively maintenance pharmacotherapy and the MNMP received mainly residential rehabilitation. The “other” category includes primarily counselling. On average the MNMP group received double the number of treatment episodes received by the MMP group and total sample.

### 3.3.2 Drug Use: Heroin

The median scores on the OTI were used to estimate the frequency of consumption of heroin and other opiates in the month prior to being interviewed. Figure 6 displays median heroin OTI score for the MMP and MNMP groups.

Figure 6: Median OTI heroin scores for the MMP and MNMP groups at baseline, 3 month and 12 month interviews

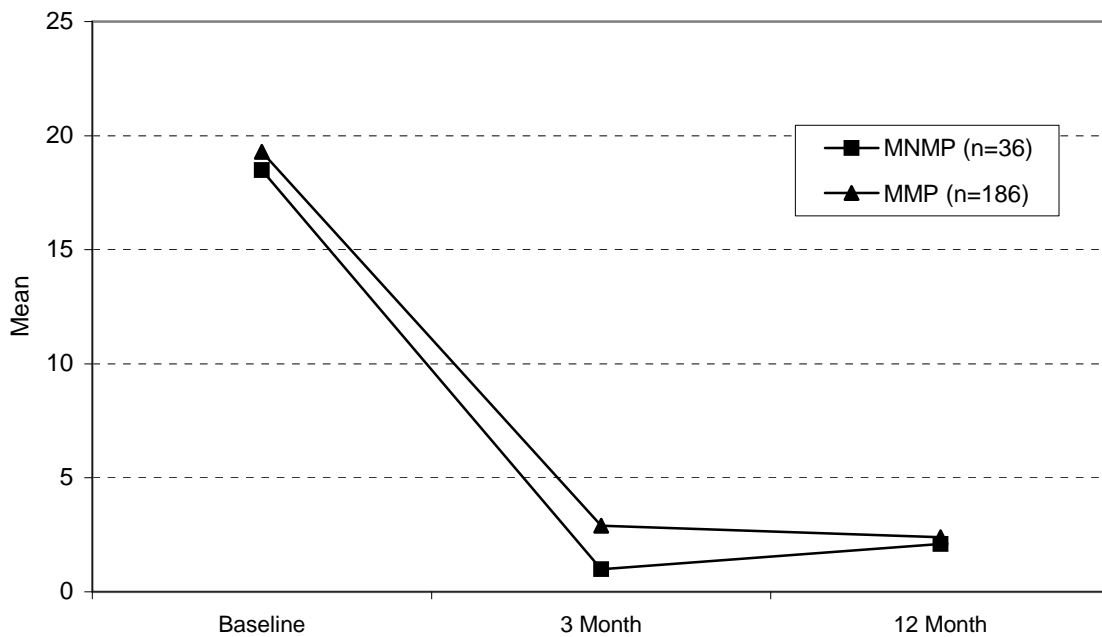


A significant reduction in the frequency of heroin use between baseline and the 3 month interviews was reported for both the MMP group (change in median from 1.5 to 0,  $Z=-10.9$ ,  $p<0.01$ ) and MNMP group (change in median from 1.6 to 0,  $Z=-4.9$ ,  $p<0.01$ ). This translates to a reduction from daily use to abstinence on average. This reduction was maintained to the time of the 12 month interviews. No differences were found between the MMP and MNMP groups.

The median OTI scores for other opiates was zero for both groups at the time of all three interviews.

The number of days that heroin was used in the month prior to interview was also used as a measure of heroin use frequency. The change in the mean number of days is shown in Figure 7.

Figure 7: Mean number of days on which heroin was used for the MMP and MNMP groups in the month prior to baseline, 3 month and 12 month interviews



The mean number of heroin use days in the month prior to the baseline interviews was 19.3 (SD=8.1, range=0-28) for the MMP group and 18.5 (SD=7.7, range=1-28) for the MNMP. These means were not statistically different. The mean number of days at the time of the 3 month interviews had significantly declined to 2.9 (SD=5.9, range=0-28) for the MMP group ( $t=26.1$ ,  $df=185$ ,  $p<0.01$ ) and to 1.0 for the MNMP group ( $t=13.4$ ,  $df=35$ ,  $p<0.01$ ). The MMP mean was significantly higher than that of the MNMP ( $t=2.6$ ,  $df=79.3$ ,  $p<0.05$ ). At the time of the 12 month interviews the mean for the MMP group was 2.4 (SD=6.2, range=0-28) and the mean for the MNMP was 2.1 (SD=5.5, range=0-20). These small changes at 12 months were not statistically significant. No statistical difference was found between the MMP and MNMP groups at the time of the 12 month interviews.

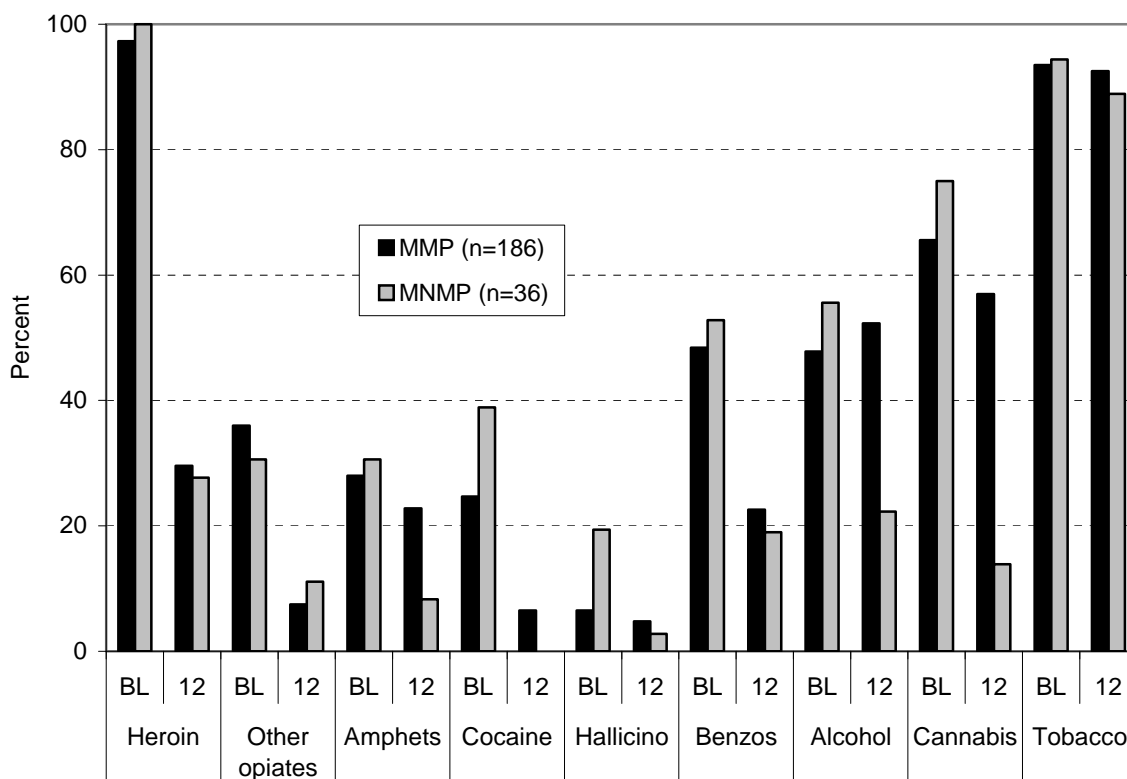
### 3.3.3

#### *Drug Use: Main Types*

Participants were asked what drugs they had used in the month prior to being interviewed. Figure 8 shows the percentage of the MMP and MNMP groups who used various drugs in the month prior to the baseline and 12 month interviews.

No differences were found between the percentage of the MMP and MNMP groups at baseline except for a larger proportion of the MNMP group who reported using hallucinogens ( $X^2=6.5$ ,  $df=1$ ,  $p<0.05$ ).

Figure 8: Percent of MMP and MNMP groups using main types of drugs in the month prior to the baseline (BL) and 12 month interviews



Significant reductions ( $p < 0.01$ ) were reported in the percentage of the MMP group reporting the use of all of the drugs shown in Figure 8 except for hallucinogens, alcohol and tobacco between baseline and the time of the 12 month interviews (no significant change in the percentage was reported in these drugs). For the MNMP group however, significant reductions were reported in all of the drugs ( $p < 0.01$ ) except for tobacco.

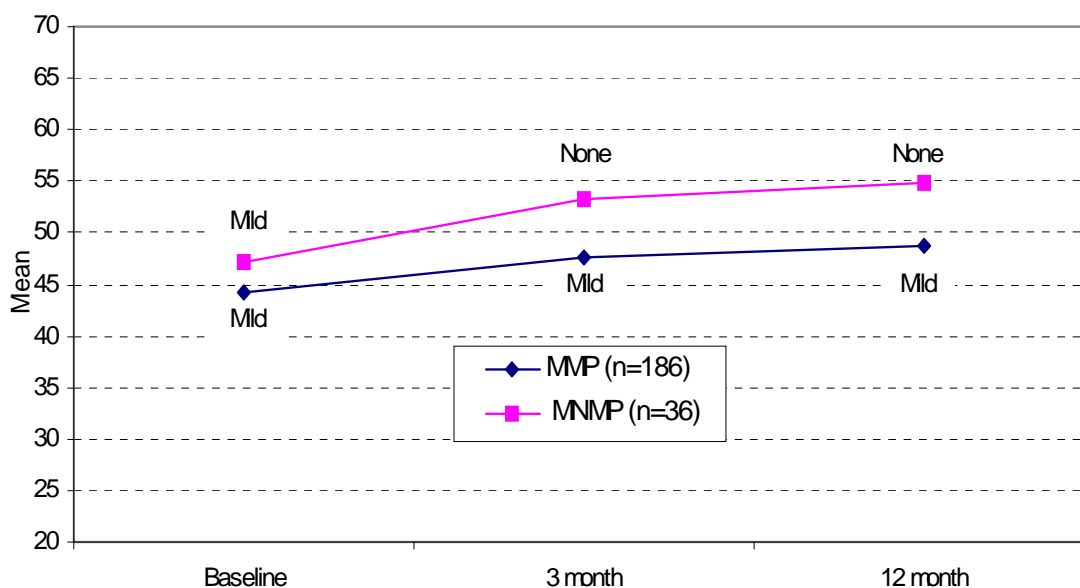
No differences were found between the percentage of MMP and MNMP groups at the time of the 12 month interviews using the various drugs except for alcohol and cannabis. A greater percentage of the MMP group reported drinking alcohol ( $X^2 = 11.6$ ,  $df = 1$ ,  $p < 0.01$ ) and using cannabis ( $X^2 = 22.4$ ,  $df = 1$ ,  $p < 0.01$ )

#### 3.3.4 *Health status; Physical*

Figure 9 displays the mean SF-12 physical component scores for the MMP and MNMP groups for the month prior to the baseline, 3 month and 12 month interviews. Both the MMP and MNMP groups reported either mild or no disability over the course of the research. Both groups reported significant improvements in mean physical health scores at the time of the 3 month interviews (MMP;  $t=-4.6$ ,  $df=184$ ,  $p<0.01$  and MNMP;  $t=-4.0$ ,  $df=34$ ,  $p=0.01$ ) that was maintained to time of the 12 month interviews (i.e. no difference in scores between 3 month and 12 month interviews).

Significant differences were found between the two groups. At baseline there were no significant difference found in the level of physical disability, with both groups reporting only a mild level of disability. However, at the time of the 3 month interviews the MMP had a significantly lower mean physical component score compared to the MNMP group indicating a greater degree of disability ( $t=-3.3$ ,  $df=219$ ,  $p<0.01$ ). It must be noted however, that the mean scores represent only a difference between mild (the MMP group) and no disability (the MNMP group). This difference between the groups was maintained to the time of the 12 month interviews ( $t=-3.5$ ,  $df=190$ ,  $p<0.01$ ) with the MNMP reporting no disability and the MMP reporting mild disability.

Figure 9: SF-12 Mean Physical Component Scores for the MMP and MNMP groups in the month prior to the baseline, 3 month and 12 month interviews.



Key to Scores:  
 50 or more – no disability  
 40-49 –mild  
 30-39 – moderate  
 <29 - severe

### 3.3.5 Health status; Mental

Figure 10 shows the mean SF-12 Mental component scores for the MMP and MNMP groups for the month prior to the baseline, 3 month and 12 month interviews. The MMP group reported significant improvements in mean mental component scores from baseline to the time of the 3 month interviews ( $t=-9.5$ ,  $df=184$ ,  $p<0.01$ ) and from the 3 month interviews to the time of the 12 month interviews ( $t=-2.5$ ,  $df=155$ ,  $p<0.05$ ). This represents a change from moderate disability to mild disability over the course of the research.

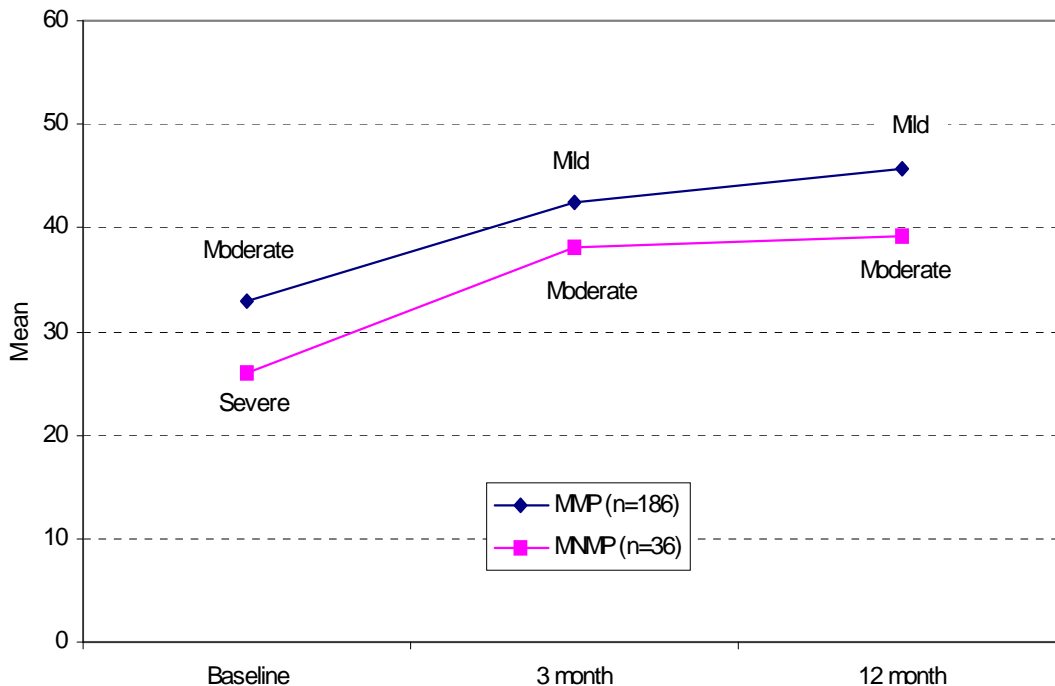
The MNMP group also showed significant improvements in the mean mental component score. This group significantly improved its mean score from baseline to the time of the 3 month interviews ( $t=-4.8$ ,  $df=34$ ,  $p=0.01$ ) and maintained this improvement to the 12 month interviews (i.e. no difference in

mean scores between 3 month and 12 month interviews). This improvement represented a change from severe disability to moderate disability.

Figure 10 shows clearly that significant differences existed between the MMP and MNMP groups. At baseline, the MNMP group reported a significantly poorer mean mental component score compared to the MMP group, representing a difference between severe and moderate disability ( $t=4.0$ ,  $df=56.2$ ,  $p<0.01$ ).

Although the MMP group reported mild disability and the MNMP reported moderate disability at 3 months this difference was not statistically significant. At the time of the 12 month interviews MNMP group reported a significantly poorer mean mental component score compared to the MMP group; a difference between moderate and mild disability ( $t=3.1$ ,  $df=190$ ,  $p<0.01$ )

Figure 10: S-12 Mean Mental Component Scores fro the MMP and MNMP groups in the month prior to the baseline, 3 month 12 month interviews



Key to Scores:

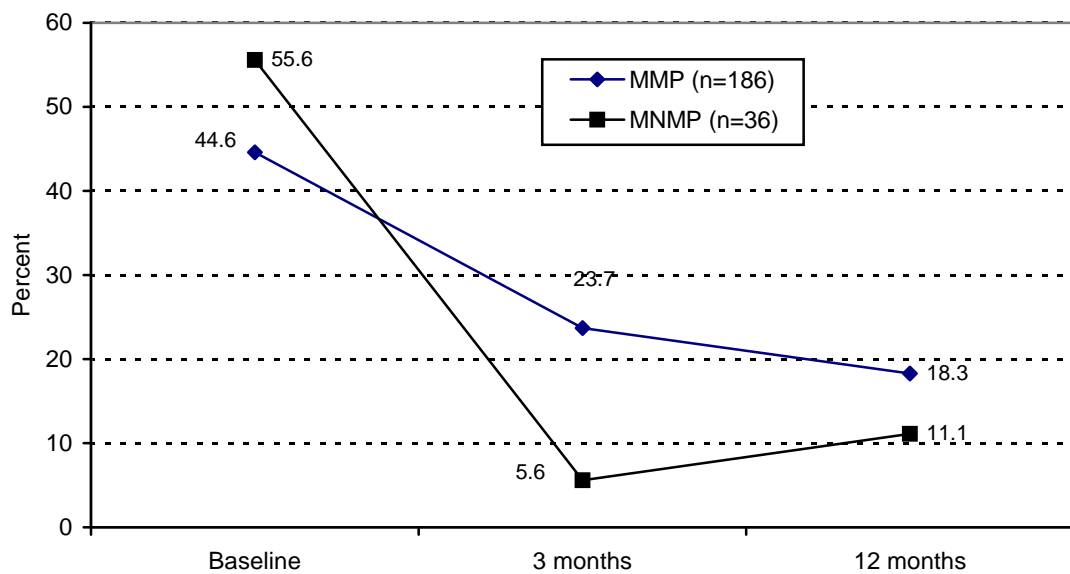
- 50 or more – no disability
- 40-49 –mild
- 30-39 – moderate
- <29 - severe

A significant difference was found between the two groups at the time of the 12 month interviews ( $t=3.1$ ,  $df=190$ ,  $p<0.01$ ); MMP-mild disability and MNMP-moderate to mild disability. This level of disability is still greater than has been reported in the general population, where an average score of 52 equating to “no disability” has been found (ABS, 1997).

### 3.3.6 Criminal Involvement

There was a significant reduction in the amount of criminal behaviour in which both the MMP and the MNMP groups were involved in from baseline to the time of the 12 month interviews. Figure 11 shows the proportion of both the MMP and the MNMP groups who were involved in any form of crime in the month prior to the baseline, 3 month and 12 month interviews.

Figure 11: Percentage of MMP ( $n=186$ ) and MNMP ( $n=36$ ) group who had committed any crime in the month prior to baseline, 3 month and 12 month interviews.



There was no difference in the proportion of participants of both the MMP and MNMP groups who reported being involved in any form of crime at baseline and at the time of the 12 month interviews. However, a significantly smaller



percentage of participants in the MNMP group reported not being involved in any form of crime at the time of the 3 month interviews ( $\chi^2=6.0$ ,  $df=1$ ,  $p<0.05$ )

The frequency of involvement in criminal behaviour was measured using the crime measure of the OTI. Both the MMP and MNMP groups reported a significant decrease in their involvement in criminal activity at the time of the 3 month interviews compared to baseline (MMP;  $Z=-5.7$ ,  $p<0.01$  and MNMP;  $Z=-3.8$ ,  $p<0.01$ ). This reduction in crime was maintained to the 12 month interviews (no significant difference between 3 month and 12 month interviews for both groups). No significant difference was found between the MMP and the MNMP groups at baseline and at the time of the 12 month interviews, however the MNMP group did show significantly lower OTI crime scores than the MMP group at the time of the 3 month interviews ( $Z=-2.5$ ,  $p<0.05$ ).

## SECTION 4 DISCUSSION

This study examined two main questions; what are the treatment pathways taken by heroin dependent individuals and does it make a difference in terms of treatment outcome if a primarily maintenance pharmacotherapy pathway is taken?

It is clear that the participants in this study were no strangers to treatment for their dependence. Most had entered into some form of treatment prior to recruitment into this study and most had received treatment of some description during the course of the study. As was found by (Simpson, 2004) and other drug treatment outcomes research, this study found that heroin dependent individuals often followed complex treatment pathways. This was particularly the case if their baseline treatment was detoxification. Maintenance pharmacotherapy (MP) was the most common form of treatment in which the participants received. For those that entered MP, a large proportion remained with this form of treatment for the period of the study.

Interestingly, a quarter of those individuals who were in detoxification at baseline were found to be in MP at three months. This may be somewhat at odds with the popular belief regarding the passage of clients from detoxification to non drug oriented forms of treatment, where it may have been expected that a larger proportion may have moved to more drug free forms of treatment such as residential rehabilitation or counselling. This finding does have implications for the connection between opioid withdrawal services and MP services. Services may need to give greater attention to the pathway between detoxification and MP, as the outcomes for this group were no worse than for other pathways. In fact, the pathway from detoxification to MP is legitimate for those who were unable to maintain their commitment to abstinence post detoxification.

A comparison of the characteristics of the MMP and MNMP groups revealed little or no differences, apart from the MMP group showing significantly poorer mental health at baseline. In addition, it appears that taking a pathway that is primarily one involving MP doesn't make a great deal of difference to treatment outcomes than one that is based primarily on treatment that is non medication based. It has been found by (Ross, Teesson et al. 2004), (Bament, Cooke et al. 2004) and (Holt, Ritter et al. 2004) reporting on the ATOS study, that treatment has a positive impact on heroin dependent individuals. Both the MMP and the MNMP treatment groups showed significant reduction in heroin use, reductions in the levels of other drug use, improvements in physical health, mental health and involvement in crime.

Small differences were found between the groups in terms of the drugs they used. At the time of the 12 month interviews a greater proportion of the MMP group were using alcohol and cannabis. This may reflect a greater emphasis of the MNMP than the MMP treatment on abstaining from heroin and all other drugs. The differences in frequency of heroin use and involvement in crime found between the two groups at the time of the 3 month interviews may reflect the opportunity to obtain drugs or commit criminal acts. Almost 89% of the MNMP group was in residential rehabilitation at the time of the 3 month interviews.

Differences that were found in this study also reflect the type of individuals in each of the pathway groups rather than the specific impact of the form of treatment they received. The MNMP group reported having greater mental health disability than the MMP at baseline and although both groups reported improvements over the twelve month period, the MNMP group reported poorer mental health. This concurs with (Hser, Grella et al. 1998) who found that RR programs tend to attract individuals who were more dysfunctional than those receiving other forms of drug treatment.

Proponents of MP may argue that these findings suggest that the value of MP over other forms of treatment has been demonstrated. MP requires less in terms of treatment engagement than RR or counselling but can produce similar treatment outcomes. Conversely, proponents of non-drug treatment may argue that as the MMP group had on average both fewer treatment episodes and more treatment days it should have achieved relatively better treatment outcomes than were derived.

Overall, the differences in treatment outcomes between the two pathway groups are comparable, suggesting that both forms of treatment are of significant value to the individuals that receive them. The types of treatment pathway an individual engages in relates to the needs and treatment goals of the individual – a case of “horses for courses”

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