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**Research methodologies used to obtain
retrospective self-reports of the impact of
changes in heroin supply on regular users**

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RESEARCH METHODOLOGIES USED TO OBTAIN RETROSPECTIVE SELF-REPORTS OF THE IMPACT OF CHANGES IN HEROIN SUPPLY ON REGULAR USERS

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ABBREVIATIONS

ADIS	Alcohol and Drug Information Service
AHS	Area Health Service
ATSI	Aboriginal or Torres Strait Islander
CSAHS	Central Sydney Area Health Service
DASC	Drug and Alcohol Services Council
DDU	Drugs of Dependence Unit
DPB	Drug Programs Bureau
GP	General Practitioner
IDRS	Illicit Drug Reporting System
IDU	Injecting Drug Users
MP	Maintenance Pharmacotherapy
NSW	New South Wales
OTI	Opiate Treatment Index
SESAHS	South Eastern Sydney Area Health Service
SD	Standard Deviation
SF	Short Form
SWSAHS	South Western Sydney Area Health Service
T1	Time 1
T2	Time 2
TLFB	Timeline Follow-Back
TM	Trade Mark

EXECUTIVE SUMMARY

In early 2001 Australia experienced a dramatic disruption to heroin supply. In order to investigate the impact of this phenomenon, heroin users were interviewed retrospectively to determine changes in drug use behaviour over a two year period.

Two methods were used to obtain such data:

1) A 24 month retrospective recall of drug use and associated behaviour;

2) Retrospective interviews with maintenance pharmacotherapy clients entering treatment prior to and during the shortage, using qualitative and quantitative methods.

Time-line follow-back

Test-retest interviews were conducted with heroin users to examine the reliability of the timeline follow-back (TLFB) technique in determining heroin users' patterns of drug use, drug treatment seeking, criminal behaviour and adverse events associated with their drug use over a two year period,.

Current heroin users were recruited through a number of services and interviewed retrospectively about their drug use behaviour using the calendar method of the TLFB technique. Test-retest reliability was measured over seven days. Validity was assessed against data collected from a sub-sample of participants involved in a longitudinal cohort study.

Recall of drug use was generally high, even after 24 months. Recall was poorest during January to April 2001, the peak period of the heroin shortage. Recall of criminal activity and weekly expenditure on drugs was variable, though generally poor. Recall of treatment entry and drug related health problems such as overdose was also variable.

The two year TLFB did not obtain information reliable enough to examine sporadic drug use or to assess overall changes the patterns of drug use associated with the heroin shortage at the level necessary for this research.

Pharmacotherapy client interviews

Interviews with pharmacotherapy clients who entered treatment before and during the heroin shortage were conducted in Sydney, Melbourne and Adelaide. Participants were similar across a number of demographic variables. State data were combined and analysed as two groups: those who entered pharmacotherapy maintenance treatment before the shortage (pre-shortage group) and those entered during the shortage (shortage group).

There were few demographic differences between the two groups, therefore representing two relatively similar groups of people receiving maintenance pharmacotherapy. The two groups differed slightly on reason for entering treatment: those who entered during the shortage were more likely to report entering treatment due to police and/ or legal reasons or increased time take to procure heroin, whereas those who entered prior to the shortage were more likely to report that they did so because they 'wanted to stop using heroin'. This, in conjunction with qualitative reports, suggests the heroin shortage acted as catalyst for treatment entry and retention.

There were few differences between the two groups in terms of level of social functioning, patterns of drug use and criminal activity. Given the time lag between the onset of the heroin shortage and interviews this was not surprising.

Conclusion

This research identified numerous problems with interviewing heroin users retrospectively about changes in drug supply. The techniques trialled were either not reliable enough to examine changes in the patterns of drug use at the level necessary or, the time lag between the shortage and interview was too great to determine changes. Although qualitative data provided an insight to some of the changes consequential to the shortage, it is subject to recall bias and was not accurate enough to detect definitive population change. The development of reliable, alternative methods of data collection, such as prospective cohort studies is warranted.

1. BACKGROUND

1.1. The heroin shortage

In early 2001, reports emerged of a dramatic decline in the availability of heroin in Sydney (Day *et al.*, 2003), where previously heroin had been readily available and decreasing in price (Darke *et al.*, 2002). The 2001 Illicit Drug Reporting System (IDRS) revealed a similar pattern across Australia, with an overall reduction in the availability and purity of heroin concurrent with a marked increased in price for all major Australian heroin markets (Topp *et al.*, 2002).

The heroin shortage, as it has become known, provides a unique natural experiment of the impact of reduced heroin availability. Earlier work into the phenomenon suggested that the shortage resulted in an increase in price (Day *et al.*, 2003) and a marked change in the patterns of drug use (Topp *et al.*, 2003). There has also been speculation that a number of heroin users left the market (Weatherburn *et al.*, 2001), though this has been challenged by alternative explanations (Maher, 2002). In order to investigate this unique phenomenon further, a program of research was commissioned (Degenhardt & Day, in preparation; Degenhardt *et al.*, in preparation). The aim of the project was to examine the effect of the heroin shortage upon heroin and other drug use, public health, police and other emergency services and characteristics of those who left the heroin market as a result of the shortage.

It was therefore very desirable to obtain information from heroin users on drug use behaviour for a period prior to the heroin shortage, during the peak period of the shortage and more recent drug use behaviour (post shortage). Thus information from heroin users on drug use, overdose, income, drug treatment, drug dealing and crime spanning a two-year period was necessary. Similar work by Wood et al. (Wood *et al.*, 2003) examining the impact of a large seizure of heroin on street availability and patterns of drug use utilised data from an on going prospective cohort of injecting drug users (Wood *et al.*, 2003). In the case of the Australian shortage, no such cohort data existed, necessitating the use of retrospective interviewers with heroin users.

1.2. Collecting retrospective data

Collecting retrospective information is subject to flaws. Recall of drug use and associated behaviour can be affected by a range of factors, including the comments of peers and others, the media, and simple forgetting. Australia had no prospective cohort studies to adequately examine the phenomenon, so it was necessary to examine the extent to which we were able to examine the experience of regular heroin users retrospectively.

In order to obtain such data two methods were trialled: 1) retrospective cross-sectional interviews with IDUs via the extension of validated methods of recall such as the time-line follow-back technique and; 2) retrospective interviews with maintenance pharmacotherapy clients entering treatment prior to and during the shortage, using qualitative and quantitative methods. These two methods were examined in two separate studies which aimed to investigate changes to patterns of drug use, treatment seeking and other related behaviours as a result of the shortage among heroin users.

2. 24 MONTH TIMELINE-FOLLOW-BACK TECHNIQUE

2.1. Introduction: Use of the timeline follow-back method

The timeline follow-back (TLFB) procedure was developed to retrospectively measure self-reported drinking behaviour (Sobell *et al.*, 1979) and has been used extensively in alcohol research and, to a lesser extent, clinically (Carroll & Rounsaville, 2002). The TLFB works by use of a calendar, which facilitates recall of substance use and related behaviours. All salient, infrequent and regular events are marked on the calendar, including public (e.g. Christmas), and private events (e.g. birthdays), frequent and routine events (e.g. pay day) as well as infrequent and unique salient events (e.g. hospitalisation, incarceration). These events are used to assist with recall around drug use and related activities.

The TLFB has been successfully used over various periods of time, ranging from 30 day intervals to 365 day intervals and with different populations and drugs and drugs (Fals-Stewart *et al.*, 2000). For example, the TLFB technique was found to be a valid and reliable measure of alcohol, opiates, cocaine, cannabis, amphetamines, barbiturates and benzodiazepine use among outpatients with a substance use disorder other than alcohol (Fals-Stewart *et al.*, 2000). Reliability was stable for intervals of 30, 90 and 365 days (Fals-Stewart *et al.*, 2000). Elicitation of drug use related behaviours, such as arrests, incarceration and hospitalisation have also been validated using the TLFB technique (Cooper *et al.*, 1981; Maisto *et al.*, 1982-83).

There have been few studies attempting to ascertain drug use or associated behaviour for periods longer than one year. Therefore the aim of this study was to examine the test-retest reliability of a questionnaire based on the principles of the timeline follow-back calendar to determine patterns of drug use behaviour and associated harms retrospectively over a two-year period among current heroin users.

2.2. Methods

2.2.1. Subjects

Subjects were current injecting drug users (IDU) recruited through a primary health care service for IDUs; a crisis accommodation service for the homeless; via street intercept and through snowballing. Staff working at the agencies assisted in identifying suitable participants, who were then approached by a member of the research team and invited to take part in the research. All participants were volunteers.

Inclusion criteria were English language proficiency; aged 18 years or older; the use of heroin **at least** once a week on average, over the preceding two years; and being resident in the Sydney metropolitan area, Wollongong, Newcastle, or Melbourne metropolitan area. In order to obtain an accurate picture of regular heroin using behaviour, IDU who had been in prison for six or more consecutive months during the study period (preceding two years), or who had been in prison consecutively throughout the peak period of the heroin shortage, January to April 2001, were ineligible.

An additional sample of IDU who had left the market was recruited through a cohort study of hepatitis C incidence. Cohort study staff conducting follow-up interviews identified eligible candidates and invited them to participate (Maher *et al.*, 2002). The interviews were carried out by the cohort study staff trained in the administration of the heroin shortage TLFB questionnaire (see below).

2.2.2. Instrument

Timeline follow-back technique

A questionnaire was developed to retrospectively elicit information on drug use, overdose, income, drug treatment, drug dealing and crime. Information on these domains was elicited using the timeline follow back (TLFB) method. The period of interest was from mid-2000 (prior to the shortage) through to the time of interview. The time frame incorporated a pre-shortage period (July to December 2000), the peak period of the shortage (January to April 2001), an unstable period of heroin supply following the shortage (May to December 2001), and the period preceding the shortage when heroin

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supply was assumed to have stabilised (though not necessarily returned to pre-shortage levels).

The two year time frame was initially divided into eight periods (Table 2.1). The piloting process revealed that due to the number of questions and topics covered in the questionnaire, and the length of time covered, this number of time periods was too great. Thus the number of time periods was condensed to six time periods. Further piloting resulted in the time periods being reduced to four, covering the period prior to the onset of the shortage, the peak period of the shortage, the period following the shortage and the six months preceding interview (Table 2.1).

The TLFB method was designed to assist recollection of past drug use (Sobell *et al.*, 1979). Participants are presented with a calendar and prompted for information about important dates and their drug use across different periods of time. By locating different points in time in a participant's history, recollection of drug use is made easier as a bigger picture of their life during that time is created, their drug use can then be linked to those more salient events. The ultimate goal of the calendar is to obtain detailed and accurate information about the participants' use of different drugs and other activities over time.

The first stage of the TLFB involved establishing changes in the life and important events for the participant over the period of time in question on a visual calendar. The method used in this study differed to conventional use of the TLFB in that drug use was not assessed every day. Patterns of drug use over time were derived using the calendar method. Once the calendar was completed, participants were asked a series of questions pertaining to drug use, overdose, income, drug treatment, drug dealing and crime, and the calendar was used to assist recall of these events.

Variables

Participants were asked to estimate the number of day they had used heroin, cocaine, amphetamines, non-prescribed benzodiazepines, alcohol and cannabis and to estimate their weekly expenditure on each of these drugs across each time period. The number of heroin overdoses and days in drug treatment for each of the time frames were also reported by participants.

Table 2.1:   Time periods covered by three versions of the questionnaire

Version 1	Version 2	Version 5
n=15	n=37	n=30 (test-retest)
Apr - Jun 2002	Jan - Jun 2002	Preceding six months
Jan - Mar 2002	Oct - Dec 2001	Apr - Jun 2001
Oct - Dec 2001	Jul - Sep 2001	Jan - Mar 2001
Jul - Sep 2001	Apr - Jun 2001	Jul - Dec 2000
Apr - Jun 2001	Jan - Mar 2001	
Jan - Mar 2001	Jul - Dec 2000	
Oct - Dec 2000		
Jul - Sep 2000		

Participants were also asked whether heroin the drug of choice; were they in drug treatment; were they employed, whether they had been charged with a property crime, sold cannabis and/or heroin. These questions were asked for each time frame and dichotomised into yes/no responses.

2.2.3. Procedure

Trained interviewers administered the questionnaire between May and September 2002. Participants, aided by the interviewer, completed a personal calendar of events over the preceding two years to facilitate recall, covering eight, six or four discrete periods (Table 2.1). Questions relating to six key domains: drug use, overdose, income, treatment, dealing and crime, were asked retrospectively for each time period. Each of these sets of questions was asked for a series of the time periods (Table 2.1). The calendar of events was used to facilitate this process.

Participants were interviewed at baseline and followed up seven days later to measure test-retest reliability. All participants were reimbursed AU$30 for travel expenses, at baseline and follow-up.

2.2.4. Statistical analysis

Two-sample t-tests were used to compare means between the demographics of the groups. Chi-square tests were used for comparison of group proportions. Correlation for the test-retest methods were measured using Spearman's rank correlation coefficients (Rho) and tested for significance at the 0.01 level. Dichotomous variables were analysed using McNemar's test which tests significant *differences* between groups. All data was analysed using SPSS 11.0.

2.2.5. Ethics approval

The study was approved by the University of New South Wales Human Research Ethics Committee, South Eastern Sydney Area Health Service Human Research Ethics Committee, South Western Area Health Service Human Research Ethics Committee and Central Sydney Area Health Service Human Research Ethics Committee.

2.3. Results

2.3.1. Sample characteristics

For the test-retest analyses of the different time periods, the interview results from 27 subjects in NSW and Victoria were considered. No significant differences between the two states were noted in any of the demographic measures (see Appendix A).

The majority of the sample was male (70%), unemployed (63%), and had a median age of 32 years (22-54). Seven percent of the sample was of Aboriginal and/or Torres Strait Islander descent.

Participants had a median of 12 years (7-13) schooling. Over half of the sample (59%) had completed qualifications since leaving school, most commonly trade or technical qualifications (52%) and seven percent of subjects had a university or college qualification.

2.3.2.   Test-Retest Reliability

Time period 1 (subjects recalling events in the previous 6 months)

A significant correlation between the test and retest interviews was found for all drug classes (heroin, cocaine, amphetamines, non-prescribed benzodiazepines, alcohol and cannabis; Table 2.2) in time period 1. Weekly expenditure on heroin, cannabis and alcohol was also correlated (Table 2.2). Both the number of overdoses and the number of days in treatment were well correlated. There were no significant differences between test 1 and test 2 for any of the dichotomous responses (Table 2.2), indicating that reliable information was collected on these variables.

Time period 2 (subjects recalling events in the previous 12 to 15 months)

Heroin, cocaine, alcohol and cannabis use were significantly correlated between test and retest interviews for time period 2, but not for amphetamine and non-prescribed benzodiazepine use (Table 2.3). Expenditure was significantly correlated across the two interviews for alcohol and cannabis only (Table 2.3). The number of days in treatment was correlated between the test and retest interviews, but not heroin overdose. There was good reliability for all dichotomous variables (Table 2.3).

Time period 3 (subjects recalling events in the previous 16 to 18 months)

For time period 3 well-correlated continuous variables included the number of days amphetamines and alcohol were used, weekly drug expenditure on cocaine, amphetamines and cannabis, and the number of days in treatment (Table 2.4). No significant differences in response were found between interview one and two on any of the dichotomous variables, indicating good reliability (Table 2.4).

Time period 4 (subjects recalling events in the previous 18 to 24 months)

The results for time period 4 are shown in Table 2.5. Participants gave consistent responses for the days used heroin, cocaine, amphetamines, alcohol and cannabis, but not for non-prescribed benzodiazepines. Alcohol and cannabis were the only two drugs where weekly expenditure was correlated between the two interviews. The number of overdoses and days in treatment were also correlated between the two interviews. There were no significant differences between interviews for any of the dichotomous variables.

Table 2.2: Test-retest analysis of the Time 1 period – previous 6 months (January – June 2002)

Variable n = 183 days	Test one			Test two		
Days used drugs	n	Mean	SD	Mean	SD	Rho
Heroin	27	102.7	62.8	88.4	67.2	.787*
Cocaine	27	7.6	20.8	15.1	40.3	.832*
Amphetamines	26	14.2	23.8	4.9	7.6	.881*
Benzodiazepines (street)	27	16.8	48.5	13.9	33.6	.668*
Alcohol	27	43.9	59.5	44.4	63.1	.814*
Cannabis	27	84.7	76.1	82.3	76.4	.857*
Weekly drug expenditure						
Heroin	26	$437.31	$475.93	$348.27	$495.99	.663*
Cocaine	25	$53.28	$202.04	$28.60	$80.31	.566
Amphetamines	23	$18.30	$41.94	$12.46	$29.73	.467
Benzodiazepines (street)	24	$9.79	$25.13	$12.71	$41.47	.599
Alcohol	23	$29.17	$45.29	$13.17	$19.02	.725*
Cannabis	26	$36.92	$38.60	$34.04	$38.81	.889*
Health Outcomes						
No. heroin overdoses	27	.11	.424	.11	.424	.786*
No. days in treatment	27	50.70	74.84	64.63	80.66	.927*

Variable	n	n same response T1 and T2	% consistent T1 and T2	McNemar's Test (P)
Heroin main drug of choice	27	24	88.9	1.000
In drug treatment	26	23	88.5	1.000
Employment status	26	21	87.5	0.250
Crime				
Property crime	27	26	96.3	1.000
Drug crime	27	26	96.3	1.000
Selling cannabis	27	20	74.1	0.453
Selling heroin	27	21	77.8	0.219

* Variables significant at the 0.01 level.

Table 2.3: Results of the test-retest analysis of the Time 2 period – 12-15 months prior (April - June 2001)

Variable n = 92 days		Test one		Test two		
Days used drugs	n	Mean	SD	Mean	SD	Rho
Heroin	27	55.7	36.8	52.7	39.6	.747*
Cocaine	26	13.2	26.6	6.6	18.4	.766*
Amphetamines	27	5.00	10.1	5.3	17.8	.458
Benzodiazepines (street)	26	1.3	4.8	9.5	25.9	-.090
Alcohol	25	23.9	33.8	30.9	33.2	.728*
Cannabis	26	40.9	40.5	39.9	38.4	.828*
Weekly drug expenditure						
Heroin	24	$252.92	$243.53	$340.00	$385.18	.465
Cocaine	26	$71.81	$142.80	$54.62	$197.47	.689
Amphetamines	26	$18.08	$44.09	$9.81	$23.49	.607
Benzodiazepines (street)	26	$0.77	$3.92	$9.42	$30.21	- .064
Alcohol	24	$15.42	$32.16	$23.33	$33.74	.802*
Cannabis	26	$38.65	$57.45	$26.15	$36.86	.805*
Health Outcomes						
No. heroin overdoses	25	0.2	0.408	0.1	0.3	.590
No. days in treatment	26	28.2	43.1	28.0	42.8	.820*

Variable	n	n same response T1 and T2	% consistent T1 and T2	McNemar's Test (P)
Heroin main drug of choice	23	19	82.6	0.625
In drug treatment	25	22	88.0	1.000
Employment status	23	20	86.9	0.250
Crime				
Property crime	25	19	76.0	0.687
Drug crime	26	24	92.3	0.500
Selling cannabis	26	19	73.0	0.453
Selling heroin	26	22	84.6	0.625

* Variables significant at the 0.01 level.

Table 2.4: **Results of the test-retest analysis of the Time 3 period – 16-18 months prior (January – March 2001)**

Variable n = 90 days		Test one		Test two		
Days used drugs	n	Mean	SD	Mean	SD	Rho
Heroin	25	54.4	36.9	41.8	38.2	.484
Cocaine	26	9.3	21.8	6.0	18.3	.463
Amphetamines	24	11.4	32.1	1.6	3.7	.764*
Benzodiazepines (street)	26	1.7	5.4	4.4	9.5	.593
Alcohol	25	21.3	33.1	24.8	33.7	.772*
Cannabis	25	35.0	37.3	34.2	35.5	.660
Weekly drug expenditure						
Heroin	24	$299.17	$313.84	$214.88	$275.16	.528
Cocaine	26	$40.00	$111.53	$34.23	$94.62	.850*
Amphetamines	25	$11.00	$24.58	$5.60	$21.23	.803*
Benzodiazepines (street)	25	$2.04	$9.99	$4.60	$13.99	.675
Alcohol	22	$16.36	$33.46	$18.59	$35.80	.677
Cannabis	25	$32.00	$45.69	$25.68	$37.95	.808*
Health Outcomes						
No. heroin overdoses	25	0.1#	0.3	0.1#	0.3	--
No. days in treatment	26	31.2	43.7	24.7	40.5	.830*

Variable	n	n same response T1 and T2	% consistent T1 and T2	McNemar's Test (P)
Heroin main drug of choice	24	18	75.0	0.219
In drug treatment	26	23	88.4	1.000
Employment status	22	17	77.3	0.375
Crime				
Property crime	26	19	73.0	0.453
Drug crime	26	24	92.3	0.500
Selling cannabis	26	19	73.0	1.000
Selling heroin	26	19	73.0	0.453

\# The correlation cannot be computed because the standard error of the difference is 0.

* Variables significant at the 0.01 level.

Table 2.5:   Results of the test-retest analysis of the Time 4 period – 18-24 months prior (July – December 2000)

Variable n = 181 days		Test one		Test two		
Days used drugs	n	Mean	SD	Mean	SD	Rho
Heroin	27	122.5	67.8	116.3	67.1	.659*
Cocaine	27	21.2	45.5	19.2	50.1	.697*
Amphetamines	26	3.5	12.6	12.7	24.6	.595*
Benzodiazepines (street)	25	3.4	15.1	4.0	15.6	.271
Alcohol	26	45.8	69.8	47.5	68.6	.903*
Cannabis	27	79.4	80.4	65.3	76.4	.769*
Weekly drug expenditure						
Heroin	24	$471.46	$655.25	$867.25	$1,568.08	.537
Cocaine	26	$72.31	$187.88	$163.46	$630.56	.580
Amphetamines	27	$18.52	$96.22	$16.11	$35.15	.376
Benzodiazepines (street)	26	$4.62	$19.85	$0.38	$1.96	-.058
Alcohol	23	$13.04	$31.25	$13.09	$30.70	.905*
Cannabis	24	$35.00	$51.58	$29.17	$45.86	.844*
Health Outcomes						
No. heroin overdoses	26	0.2	0.8	0.4	0.9	.911*
No. days in treatment	29	45.2	72.3	54.0	76.0	.775*

Variable	n	n same response T1 and T2	% consistent T1 and T2	McNemar's Test (P)
Heroin main drug of choice	22	18	81.1	0.625
In drug treatment	27	24	88.9	1.000
Employment status	24	17	73.9	0.687
Crime				
Property crime	27	24	88.9	0.250
Drug crime	27	26	96.3	1.000
Selling cannabis	26	21	80.8	0.375
Selling heroin	27	20	74.1	0.453

* Variables significant at the 0.01 level.

2.4. Discussion

The test-retest reliability of participants' responses changed as they were asked to recall events from the different time periods. As subjects were recalling more distant time periods, the number of continuous variables reliably reported decreased.

Correlation between the two tests on questions of drug use tended to be better for particular drugs. Drugs used frequently and regularly over long periods of time such as cannabis, were more reliably reported than those used sporadically, such as cocaine and benzodiazepines. Drugs used rarely or very infrequently, such as alcohol, were also more reliably recalled. Reports of heroin use were reliable over the two year period, and this was not surprising given the centrality to participants' lives and stable use patterns. Similarly, for many of the participants cannabis was used daily facilitating recall.

Recall for dichotomous variables had better reliability than recall for continuous variables and there were no significant differences between dichotomous responses given for questions between the first and second tests in any of the time periods. Salient events such as hospitalisation and incarceration were also highly correlated on the test-retest analysis.

It is interesting that the reliability of drug use recall was poorest for January to March 2001, the period considered to be the peak of the shortage. Participants were only able to reliably recall amphetamine and alcohol use during this period limiting the utility of this method in determining changes in patters of drug use associated with the shortage. Participants reliability recalled dichotomised variables; however as it is the *level* of drug use that was of interest for the different time periods, dichotomising drug use would not have been sensitive enough to detect changes across the different time periods as the level of poly drug use is typically high among heroin users (Darke & Hall, 1995).

The reliability of cocaine and non-prescribed benzodiazepine use was typically poor; yet the use of these two drugs were of particular interest to the heroin shortage study, as earlier research identified an increase in the use of these drugs related to the heroin shortage (Miller *et al.*, 2001; Day *et al.*, 2003; Topp *et al.*, 2003). Moreover, it was also not possible to assess the validity of participant responses.

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The interview was long, requiring a high degree concentration and commitment on behalf of the participants who were often street based drug users with chaotic lifestyles, making the interview difficult for both the participant and interviewer. Given these factors the survey method was deemed impractical for assessing changes in patterns of drug use over such a protracted period.

3. Interviews with Heroin Users in Opioid Maintenance Treatment

3.1. Introduction

Previous research has documented an association between law enforcement activity and entry into treatment for opioid dependence (Weatherburn & Lind, 1995). Other studies, however, have found that dependent heroin users cite a number of motivations for seeking treatment, and that law enforcement activity and legal issues are less important than other reasons such as a desire to cease heroin use, dissatisfaction with the associated lifestyle, interpersonal problems and financial concerns (e.g. Day *et al.*, 2002; Dietze *et al.*, 2002). Problems with supply was not cited as a reason for reducing heroin use or entering treatment, in a recent study of heroin users motivations for entering treatment or reducing heroin use (Day *et al.*, 2002; Dietze *et al.*, 2002).

3.2. Aims

The aim of this methodological component was to examine the effect of a reduction in heroin availability on heroin users entering treatment. Specifically the research was designed to examine three key questions:

   (i)   whether the sample characteristics of heroin users who entered treatment during the peak period of the shortage differed from those who entered treatment during a period when heroin was apparently more freely available;

  (ii)   whether the reduced availability of heroin motivated some heroin users to seek treatment; and

 (iii)   whether heroin users who entered treatment during the peak period of the shortage reported different reasons for entry into treatment to those who entered treatment during a period when heroin was apparently more freely available.

3.3. Methods

3.3.1. Study sample and inclusion criteria

To examine the impact of the heroin shortage on treatment seeking, comparisons were drawn between two groups of dependent heroin users who sought opioid maintenance pharmacotherapy (MP; methadone and buprenorphine) during specific time periods. These were:

(i)   a sample of dependent heroin users who entered MP during the period August 2000 – October 2000, prior to the reported peak period of the shortage; and

(ii) a sample of dependent heroin users who entered MP during the period February 2001 – May 2001, the peak period of the shortage.

The criteria for entry to this study were:

(i)   participants must have entered MP during one of the two time periods specified above;

(ii) participants must not have been incarcerated for a consecutive period of six months or more during the preceding two years;

(iii) participants must not have been incarcerated during the peak period of the shortage, namely January – April 2001;

(iv) participants must have resided in the Sydney metropolitan area, Wollongong or Newcastle, the Melbourne metropolitan area or South Australia during the shortage; and

(v)   proficiency in English.

3.3.2. Measures

A questionnaire was developed to collect information on a range of drug use issues:

(i)   demographic characteristics;

(ii) drug use history, including overdose;

(iii) current drug use, including needle risk behaviour;

(iv) criminal activity and incarceration history; and

(v)   drug treatment history.

Mental and physical disability was measured using the 12–item Short Form (SF12) mental health and physical health summary measure (Ware *et al.*, 1996). The SF12 score is not readily interpretable, thus the SF12 mental health summary scale has been collapsed the into 4 levels of disability: ≥50 no disability, 40-49 mild disability, moderate disability 30-39, severe 30 (Sanderson & Andrews, 2002). Social functioning was measured using the Opiate Treatment Index (OTI) social functioning measure (Darke *et al.*, 1991).

Participants were also asked whether they had noticed any changes in the drug market from July 2000 to the present. Participants who reported a change were then asked a series of open ended qualitative questions pertaining to the change, including when the change occurred, what changes took place and the impact of these changes on the participant and others known to them.

3.3.3. Interview sites

NSW

A list of the public and private MP services for South West Sydney Area Health Service (SWSAHS), South Eastern Sydney Area health Service (SESAHS) and Central Sydney Area Health Service (CSAHS) was obtained from the Alcohol and Drug Information Service (ADIS). The focus was on these Area Health Services (AHS) as they contain Sydney's three largest open-air drug markets, which were considered sentinel sites for documenting changes associated with the heroin shortage.

Recent policy changes in the Drug Programs Bureau (DPB) of NSW Health have meant that, when stabilised in treatment, clients of public MP clinics are transferred to private clinics and pharmacies for dosing. All clients eligible to be interviewed for the study had been in MP for at least 12 months, and were thus likely to have stabilised and been transferred to private clinics. For this reason, primarily private clinics were approached to assist with recruitment. Table 3.1 depicts the total number of public and private MP clinics within each of the three AHS, the number approached to request assistance with the study, and the number which agreed to participate. A total of nine MP clinics were approached of which eight agreed to participate.

Table 3.1: **MP clinics that assisted with recruitment of their clients for the study**

AHS	Number of clinics			Number approached			Number participated		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
SWSAHS	4	3	7	1	1	2	1	1	2
SESAHS	3	1	5 [a]	1	1	3 [a]	1	1	3 [a]
CSAHS	1	3	5 [b]	0	3	4 [b]	0	2	3 [b]
Total						9			8

a. One MP clinic in SESAHS was both private and public

b. One MP provider in CSAHS was a general practitioner who specialised in drug and alcohol treatment

Victoria

Recruitment was undertaken with the assistance of pharmacists and general practitioners involved in the Victorian pharmacotherapy program from metropolitan Melbourne.

Participants who were screened for eligibility via the telephone were asked to attend for an interview at Turning Point Alcohol and Drug Centre in Fitzroy. Private interview rooms at Turning Point were made available to the researchers for these interviews. If it was not convenient for the participant to attend Turning Point for the interview the researcher would endeavour to arrange an alternative public location such as a coffee shop or park.

Five pharmacies across the Melbourne metropolitan area also assisted the research team as interview sites for the study. Participants were interviewed on site if space permitted, or were taken to Turning Point, a nearby café or other public location for the interview.

South Australia

The Drug and Alcohol Services Council (DASC) in South Australia has responsibility for operating the public maintenance pharmacotherapy program, through its network of clinics across Adelaide. In addition, the private pharmacotherapy program is operated through a network of general practitioner prescribers and pharmacy distribution sites. There are just over 50 prescribers and approximately 160 pharmacies participating in the pharmacotherapy program in South Australia. Overall responsibility for the coordination

of the public and private pharmacotherapy programs in South Australia resides with the Drugs of Dependence Unit (DDU) of the South Australian Department of Human Services.

Flyers were distributed to clinics and pharmacies involved in the distribution of methadone and buprenorphine to clients across the metropolitan area of Adelaide. This was done because the majority of clients receiving pharmacotherapies for opiate dependence are managed through the private program. It would also have been infeasible to have interviewers located at the many pharmacies to conduct face-to-face recruitment and interviewing.

In South Australia, some of the research interviews were conducted within pharmacy and treatment clinic premises, but the majority were conducted in other locations such as nearby coffee shops and other public locations.

3.3.4. Recruitment

NSW

The study was advertised in the MP clinics. In order to verify the MP commencement date of participants, the identification of potential participants was conducted primarily by MP clinic staff. Clinics used one or a combination of the following methods to identify and inform clients who were eligible for the study:

(i) a manual search of hard copy clinic treatment entry records using dates of entry into MP;

(ii) an electronic search of clinic treatment entry databases using dates of entry into MP; and/or

(iii) placement of an advertisement for the study in clinic waiting and dosing areas.

Following identification, clients were informed of their eligibility in the following ways:

(i) the eligibility of clients for the study was tagged on their electronic treatment record;

(ii) the eligibility of clients for the study was tagged on their hard copy treatment record (dosing card);

(iii) the names of eligible clients were given to clinic cashiers who reminded clients of

their eligibility; and/or;

(iv) the names of eligible clients were given to dosing staff who reminded clients of their eligibility.

Through this process, the rationales for the study and the timeframes of were discussed with clients who were eligible to participate. Participants were then able to contact the researchers in any of a number of ways:

(i) telephone the researchers directly to make an appointment for interview;

(ii) approach the staff of the MP clinics to make an appointment for interview; and

(iii) approach the researchers on the days they attended the MP clinics.

'Snowballing' was also possible, in which MP clients told other clients about the study.

Victoria

A variety of methods were employed to recruit participants to the study. In the first instance researchers contacted dispensing pharmacies for assistance with this process. An information package was sent to all pharmacotherapy dispensing pharmacies in Melbourne. The package contained a letter requesting the pharmacists' assistance in the study and a copy of the research project information sheet.

Thirteen pharmacies from around metropolitan Melbourne responded with interest to participate in the study. A total of 138 information packages were then sent to the pharmacies for their clients. The packages contained a research project information sheet with researcher contact details. Clients wishing to participate in the study then contacted the researcher via the telephone. Clients were screened for eligibility and an interview was arranged.

Researchers regularly made contact with participating pharmacies, in person or via telephone, to monitor how recruitment was progressing. Researchers also spent time on site at five of the participating pharmacies and invited eligible clients to participate when they attended the pharmacy to pick up their dose.

In an attempt to further increase the sample size, pharmacotherapy-prescribing general practitioners from inner metropolitan Melbourne were contacted. A letter seeking

assistance with recruitment for the study was sent to pharmacotherapy prescribing GPs. The letters contained information cards with researcher contact details to be distributed to eligible clients. Researchers screened clients for eligibility via the telephone and interviews were scheduled.

South Australia

Fliers distributed to clinics and pharmacies contained basic information on the project, and sought expressions of interest from clients who commenced treatment in the specified periods in late 2000 and early 2001. Potential interviewees were invited to contact research staff by telephone for further information, or to make an appointment for an interview.

Approximately 400 flyers were initially distributed to approximately 15 of the larger pharmacotherapy treatment sites – mainly pharmacies. These sites served between 20 and 150 clients per day. Two to three weeks later, a further 400 flyers were distributed by mail to another 50 pharmacies with smaller case loads.

Eligibility of clients who received fliers was assessed following the initial contact telephone call. Clients were asked when they commenced a program and starting dates were checked against records of the Drugs of Dependence Unit. All checking of treatment start dates was done using secure fax communications. Clients were required to leave a name and contact telephone number, so they could be contacted by research staff for an interview if they were eligible for the study.

3.3.5. Procedure

All interviews were conducted face-to-face by trained interviewers in a private environment within the grounds of participating clinics, pharmacies or other suitable locations agreed to by both participants and interviewers, such as cafes. Interviews took between 30 and 45 minutes to conduct.

Participants were assured that all information provided was confidential. Participants provided written informed consent to allow the researchers to confirm with MP clinic or pharmacy staff the date on which they entered MP. Participants were reimbursed

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between $20 and $30 for the costs incurred during their participation.

3.3.6. Ethics approval

In NSW the study was approved by the Human Research Ethics Committees of the University of New South Wales, CSAHS, SESAHS, SWSAHS and the Aboriginal Health and Medical Research Council.

In Victoria the study was approved by the Victorian Department of Human Service Ethics Committee and the Flinders Clinical Research Ethics Committee in South Australia

3.3.7. Analysis

For proportional data Pearson's chi squared test was used, except where expected values in cells were less than five in which case Fischer's exact (2 tailed) test was used. Student's t test was used for continuous data, except where the data was not normally distributed, in which case the Mann Whitney U test was employed. All analyses were carried out using SPSS 11.0.

Qualitative data were recorded via interviewer hand written notes which were then entered into Microsoft Excel (2002). These notes were then assessed for thematic content. Only NSW data was used for the qualitative analysis.

3.4. Results

There were 141 participants recruited into the study, 56 (40%) from NSW, 42 (30%) from Victoria and 43 (31%) from South Australia. Due to the limitations inherent in the requisite eligibility criteria for recruitment, no jurisdiction was able to recruit 100 maintenance pharmacotherapy clients within the project timelines. Analysis of maintenance pharmacotherapy client (MP) data from the three jurisdictions showed no significant differences across key variables (Appendix B). Therefore samples from all jurisdictions were combined to enhance the statistical power of the data (n=141).

3.4.1. Response rates

NSW

Table 3.2 depicts the number of clients of each participating NSW MP clinic, the number who were eligible, and the number of interviews conducted with these clients.

Table 3.2: **Recruitment of eligible clients of participating MP clinics in NSW**

Clinics	Client numbers[a]	Number of clients eligible (%)	Number of interviews conducted	% of eligible clients recruited
SESAHS 1	500	20-30 (4-6)	7	35 – 23
SESAHS 2	220	Unknown	3	Unknown
SESAHS 3	317	36 (11)	1	3
CSAHS 1	300	12 (4)	7	58
CSAHS 2	300	18 (6)	7	39
CSAHS 3	121	9(7)	5	45
SWSAHS 1	300	53 (18)	18	34
SWSAHS 2	250	20-30 (8-12)	9	30 -45
Total	2308	178 (8)[b]	57	30 3

a. An estimate as clinic numbers vary daily

b. Percentage was calculated excluding SESAHS 2 clinic population as the number of eligible clients was unknown.

Victoria

The response from pharmacists and GPs in metropolitan Melbourne contacted to assist with participant recruitment was low. This was due to their busy work schedules and a lack of eligible clients.

The health practitioners who did agree to assist with recruitment for the study distributed information sheets to eligible clients. Approximately 50 clients telephoned to enquire about the study, of which some were ineligible and others did not attend for their interview. In all, a total of 44 MP clients were interviewed. Of these, two respondents

were deemed ineligible during the interview and were excluded from data analysis, resulting in 42 eligible participants.

South Australia

Following the distribution of flyers advertising the interview study in Adelaide, a total of approximately 100 calls were received from pharmacotherapy clients interested in participating in the study. Approximately a quarter of these were deemed in ineligible over the phone as they feel outside the treatment start dates. In all, 77 persons had their treatment records screened for treatment start dates, resulting in 43 eligible clients completing the research interview.

It should be noted that Victoria and South Australia had to recruit almost exclusively through pharmacies. This led to a range of difficulties including engaging pharmacies; time taken to recruit MP clients through both passive and active recruitment.

3.4.2.   Sample characteristics

The total sample comprised 141 people receiving methadone or buprenorphine maintenance treatment. There were 70 participants who entered treatment prior to the shortage and 71 participants who entered treatment during the shortage (Table 3.3). The median age of the sample was 32 years (SD 8.6). There was no significant difference in age between subjects entering treatment prior to and during the shortage. The majority of the sample was male (58%), there was no differences in gender for those entering treatment before or during the shortage. Five percent of the sample was of Aboriginal and/or Torres Strait Islander descent (Table 3.3).

Participants had completed a mean of 11 years of schooling. Participants who entered treatment before the shortage had completed slightly more years of schooling than those who entered during the shortage (11.1 years v 10.5 years, t_{139}=2.02, p<0.05). Close to half the sample (49%) had completed courses since leaving school (technical/trade or university/ college); there was no difference between the groups (Table 3.3). Close to a third (30%) of the sample were employed and there was no difference between the groups. The main source of income for a majority of subjects was a government pension, benefit or allowance (74%). There was little difference between the groups in this regard.

Table 3.3: **Sample characteristics for the pre shortage and shortage groups**

	Sample (n=141)	Pre-shortage (n=70)	Shortage group (n=71)
%Male	58.2	62.9	53.5
Mean age (SD)	32 (8.6)	33 (9.4)	31 (7.8)
%ATSI	5	6	4
Main source of income last month %			
Wage/salary	21	20	23
Government pension, benefit, allowance	74	74	73
Crime	1	0	1
Child support	1	1	0
Other	4	4	3
%Employed	30	33	28
Mean years of school (SD)	10.7 (1.8)	11.1 (1.7)	10.5 (1.8)*
%Completed courses post school	49	51	47
Mean SF12 scores (SD)			
Physical	46 (10.3)	46 (10.5)	47 (10.5)
Mental	41 (12.8)	40 (13.1)	41 (12.6)
Mean OTI social functioning (SD)	18 (7.40)	18 (7.6)	18 (7.3)

*$P<0.05$

3.4.3. Awareness of the heroin shortage

Participants recruited were asked if they had noticed changes in the drug market in early 2001. Responses in the affirmative were very high (93%) with little difference between the pre-shortage (96%) and the shortage group (90%).

In depth analysis of the NSW qualitative data revealed similar responses; only one informant did not personally experience any change in heroin purity, price or availability, but instead noted the effect of reduced heroin availability on other heroin users at the time. The exact timing of the heroin shortage was not explored in detail in the qualitative

questions, although the great majority of participants agreed with the suggested occurrence of the shortage being between January 2001 and March 2001. Other participants used the timing of the Sydney Olympics as an aid to recall.

> "Prior to the Olympics it [heroin supply] was flowing and had been for about two years. After the Olympics it dried out a lot. I wasn't using a lot at the time and my dates are a bit fuzzy." (Male, 36 years old, Liverpool)

Like this participant, the majority of participants refer to the reduction in heroin availability as being a "drought", or drug supplies "drying out". Most participants only referred to the one period of reduced heroin availability in the last two years, but one participant commented on their experience of another "drought" in the past. As the second oldest informant to be interviewed, it is likely that this person had greater experience with major fluctuations in the availability of heroin than other, less experienced heroin users.

> "The drought was very sudden; it didn't come on gradually…[N]ormally with a drought its gradual; you can see it coming. This time you couldn't see it coming. The last drought we had was about ten years ago but it wasn't as bad." (Male, 46 years old, Surry Hills)

Responses ranged from there being "nothing around" to reports of only being able to obtain heroin at increased prices. The reports of reduced availability of heroin were commented on by participants in all recruitment areas of the study, and for males and females of different ages and heroin-using histories. The following gives examples of two male participants of different ages. For both participants, the availability was remarked to have decreased. In the case of the younger informant, this led to a decreased interest in seeking out heroin. Other research studies concerning the heroin shortage have confirmed that many younger heroin users reduced their regular heroin use during the time of the shortage (Degenhardt *et al.*, 2002).

> "Even long term users with good contacts often struggled to score." (Male, 46 years, Kogarah)

> "Heroin is not what it used to be. It was bad quality and the cost increased a

lot. It became very hard to find, to the point where I just didn't bother any more." (Male, 25 years, Kogarah)

Reports of reduced purity or a changed consistency in the heroin available were also common across the different recruitment areas. The reduced purity of heroin available during the shortage was commonly compared to the high purity of heroin available prior to the shortage, and some participants reported that the quality of the heroin was hardly worth buying. Many participants reported increased "cutting" (mixing) with impurities such as sugar, codeine or Panadol™ tablets, leading many users to believe they had been "ripped off" when they did not get the desired effect from the heroin.

> "That's when there was nothing around. If you could get any heroin you were basically getting ripped off. People were selling sugar and all sorts of stuff." (Female, 39 years old, Kogarah)

> "It was really crap gear [heroin]. The heroin was like buying baby powder so…it didn't even stop you from hanging out [heroin withdrawal] anyway." (Female, 30 years, Kings Cross)

Participants also referred to a change in colour from white to brown, black, yellow or grey and increased problems in preparing the drug for injection as it was less soluble in water, more "gooey" and therefore more difficult to draw up and administer from a syringe.

> "The heroin was so badly cut, or some of it was difficult to use, brown sticky stuff, and of poor quality." (Female, 24 years old, Canterbury)

> "Everything you got had residue at the bottom of the spoon. It looked like the gooey stuff you get when you put chewy through the wash." (Female, 28 years old, Bondi Junction)

Reports of changes to heroin purity and consistency did not appear to differ via recruitment areas, ages or gender.

3.4.4. Social functioning

The sample had a mean score in the SF12 physical component scale of 46 (SD 10.5), and 41 (SD 12.5) in the SF12 mental component scale. There was no significant difference between the groups in either scale. The mean score for the sample in the OTI social functioning scale was 18 (SD 7.4, range 3-37). Similarly, there was no significant difference in mean scores for the OTI social functioning scale between the groups.

3.4.5. Psychosocial functioning and health during the heroin shortage

The heroin shortage was reported as being a time of great stress and anxiety by many participants. Not only did participants have to spend more time and effort searching for heroin supplies, many experienced poor physical and mental health. Users became more wary, desperate and irritable.

> "My life was in total disarray, it was madness for a little while as I was so dependant on heroin. I use and function normally, a change messes you around." (Female, 37 years, Waterloo)

Seven participants from NSW lost jobs or accommodation during the shortage, although five participants who reduced their heroin use were able to gain employment. For some participants, the heroin shortage was a time of increased financial strain due to the increased cost of heroin supply. There were some reports of increased begging, gambling and borrowing money from friends and family.

> "They were very irritable. They experienced big financial problems. Many women turned to sex work and weren't buying food so they could buy heroin. They were begging on the street, asking people for a dollar or two dollars. Their gambling also increased to try to win money to pay for the heroin. They were all borrowing money from family and friends." (Female, 29 years, Waterloo)

Participants reported that the physical appearance and general health of drug users declined during the shortage. The most common effect on the general health of participants was the frequent recurrence of withdrawal symptoms. For two participants,

this led to their families becoming aware of their drug-using status for the first time. The decline in health was exacerbated when participants spent what little money they had on drugs rather than food.

> "In general the effects of the shortage were very bad. People's health and well being, their physical appearance had deteriorated terribly." (Female, 31 years, Chippendale)

3.4.6. Drug use

Age of first use

The median age of first heroin use was 18 years (range 8-45), first morphine use was 23 years (range 7-65) and first methadone use both in a treatment setting and without a prescription was 25 years (range 12-62). Forty-five percent of participants had ever used methadone obtained without a prescription. There were no differences between the groups in any of these variables (Table 3.4).

The median age of first use of benzodiazepines obtained both with and without a prescription was 20 years (range 6-41), with no difference between the two groups (Table 3.4). Forty-seven percent of the sample had used benzodiazepines obtained without a prescription; there was no difference between the two groups.

Apart from cannabis, psychostimulants were the most commonly first-used illicit drugs. The median age of first use of 'speed' was 17 years (range 9-55), 21 years (range 11-39) for cocaine and 25 years for base and ice (range 10-48). There was no difference between the groups in the age of first use of these drugs (Table 3.4). Less than 50% of the sample had ever used base (40%) or ice (44%).

The median age of first use of both alcohol and cannabis was 14 years (range 5-32 and 8-45, respectively). There was no difference between the groups in the age of first use of these drugs (Table 3.4).

Table 3.4:   Age of first drug use for the pre-shortage and shortage group

	Total Sample (n=141)	Pre-shortage group (n=70)	Shortage group (n=71)
Median age of first drug use (range)			
Heroin	18 (8-45)	18 (8-45)	18 (12-35)
Methadone			
script	25 (12-62)	24 (12-62)	25 (16-43)
street	25 (15-46)	24 (15-46)	26 (15-40)
Morphine*	23 (7-65)	24 (15-65)	22 (7-38)
Benzodiazepines			
script	20 (6-41)	20 (6-33)	20 (13-41)
Street*	20 (9-36)	20 (9-36)	20 (12-32)
Cocaine	21 (11-39)	20 (11-37)	21 (15-39)
'Speed'	17 (9-55)	18 (9-55)	17 (12-39)
Base*	25 (10-46)	25 (10-40)	25 (14-46)
Ice*	25 (11-48)	24 (12-48)	26 (11-46)
Alcohol	14 (5-32)	14 (7-25)	14 (5-32)
Cannabis	14 (8-45)	14 (8-45)	14 (8-22)

*represents <50% of the sample

Drug use in the preceding six months

Apart from cannabis, heroin was the illicit drug most commonly used by this sample with just over half (57%) the participants reporting use in the six months prior to interview. Seventeen percent had used morphine or opiates and five percent had used methadone without a prescription. Almost half the sample (47%) reported using benzodiazepines obtained with or without a prescription. There was no difference between the pre-shortage and shortage groups on any of these measures (Table 3.5).

Just over a third (39%) of the sample reported methamphetamine use; approximately a quarter of the sample (23%) reported base or ice use and 12% of the sample reported cocaine use in the 6 months preceding interview. The levels of use did not differ between the two groups (Table 3.5).

Table 3.5:   **Drug use in the preceding six months**

Drug use in past 6 months %	Total Sample (n=141)	Pre-shortage group (n=70)	Shortage group (n=71)
Heroin	57	61	52
Methadone script	83	77	89
Street	5	4	6
Morphine and other opiates	17	17	17
Benzodiazepine (script/street)	47	49	45
'Speed'	39	40	38
Base and ice	23	27	20
Cocaine	12	13	11
Alcohol	72	80	65*
Cannabis	65	70	59

*P<.05

Seventy-two percent of the sample reported using alcohol in the six months prior to being interviewed. Alcohol use was more common in the pre-shortage group (55%) than the shortage group (45%, χ^2 = 4.08, p=.04). Two thirds of respondents used cannabis, with no significant difference between the two groups (Table 3.5).

Injecting drug use

Respondents were asked about recent (preceding six months) heroin, cocaine and methamphetamine injecting. Participants most commonly reported heroin as the drug most recently injected (41%); with no difference between the pre-shortage (39%) and the shortage groups (44%). Two participants reported recent cocaine injection in the pre-shortage group (1.4%) and none in the shortage group. Twenty-eight percent of the sample reported methamphetamine use. Methamphetamine use was reported by slightly more pre-shortage participants (34%) than shortage participants (21%), though the difference was not significant.

NSW participants reported that many people increased their use of a wide range of substances (both licit and illicit) during the heroin shortage. As one participant stated, "each found their own distraction". In particular, several participants reported increased use of cocaine by either themselves or others known to them. Some participants reported cocaine to be more widely available and of more reliable quality than heroin, although the price of the drug was not always less expensive. Heroin was used in combination with a

range of other drugs, but the most commonly reported combination was cocaine and heroin.

> "Dealers were selling both heroin and cocaine at the same time – dealers who previously only sold heroin. People were also using heroin and cocaine at the same time." (Female, 24 years, Kogarah)

Increased use of benzodiazepines by themselves or by others was also reported by participants. Injection of these drugs was also reported and this was associated with injection-related vein damage and finger amputations in some people.

> "Lots of people who use heroin moved on to licit methadone and started to shoot up [inject] Normison tablets. They also injected their methadone and sold their methadone to buy gear [heroin]." (Male, 27 years, Liverpool)

> "I started injecting umm, Normison, which are like oil based and they're really fuckin' bad for you. And I had a stroke and I lost a finger … a lot of people I know have got really bad, I know another person that's lost their finger now and I know ummm, a lot of people with a lot of physical ummm problems due to injecting Normison. Heaps of 'em. Heaps of missing fingers." (Female, 30 years, Kings Cross)

Participants also reported increased methamphetamine use. A small number of NSW participants reported an increased market for street methadone. Very few participants reported increased ecstasy use.

Participants reported many medical and psychosocial issues relating to the use of drugs other than heroin, particularly the stimulant drugs such as cocaine and methamphetamine. Cocaine, a shorter acting drug, was associated with increased levels of injecting compared to heroin, sometimes resulting in collapsed veins. The use of stimulant drugs compounded mental health problems for some participants, making some people more psychotic, "crazy" and paranoid. For a few, this was linked to participants considering doing types of crimes not previously committed, such as armed robbery.

"I got into trouble with the police trying to keep up with the coke habit. Personally I got psychotic, paranoid and realised I was heading for a mental institution." (Male, 37 years, Canterbury)

"I was really ratty because I was hanging out for heroin and I was on cocaine. It was just madness 'cos there was no heroin. I just didn't know what to do. I just went crazy. A lot of things changed." (Female, 30 years, Kings Cross)

"I had never used coke but when the drought hit I was using coke for five months. As a user I never got into thieving, before dealing I worked the streets, then I got into dealing for 9 years. With the coke I lost all self - respect, I had a knife and was ready to rob any bastard - I didn't do it, I talked to myself and threw away the knife." (Female, 28 years, Bondi Junction)

3.4.7. Drug Treatment

Participants reported a variety of reasons for entering drug treatment and there were few differences between the pre-shortage and shortage groups (Table 3.6). A large proportion of participants (73%) reported being 'sick of the lifestyle' associated with heroin use as their reason for starting drug treatment and this was reported by similar proportions in both groups (Table 3.6). The desire to stop using heroin was given as a reason for entering treatment by 51% of the sample. Significantly more participants who entered treatment before the shortage cited this as a reason for starting treatment compared to those (61% vs 39%, χ^2 = 6.43, 1df, p=0.01) than those who entered before the shortage (Table 3.6).

Thirty-eight percent of participants reported the high cost of heroin as a reason for entering drug treatment and 21% reported the poor quality; though there was little difference between the groups in this regard (Table 3.6). A greater proportion of the shortage than the pre-shortage group gave the length of time taken to obtain heroin (7% vs 19%, χ^2 = 4.08, 1df, $p <$ 0.05) and reduced availability (9% v 19%) as reasons for starting drug treatment, though the later failed to reach significance. There was also no difference in the proportion of the sample citing the distance they had to travel to obtain

heroin as a reason for starting treatment (4%).

A desire to cease criminal activity was given as a reason for entering treatment by similar proportions of the pre-shortage and shortage group (14% vs 17%). Around 15% of the sample gave police and/or legal problems as a reason for entering treatment. Participants from the pre-shortage group were significantly more likely to give this as a reason for entering treatment (χ^2 = 5.83, 1*df, p*< 0.02). Participants from the pre-shortage group were also more likely to report going to jail as a reason for starting treatment (6% vs 0%) although this was not statistically significant.

Table 3.6:   Participants' reasons for entering drug treatment

%	Sample % (n=141)	Pre-shortage group % (n=70)	Shortage group % (n=71)
Sick of lifestyle	73	73	73
Wanted to stop	51	61	39*
Cost too much	38	36	40
Health problems	32	40	24
Save money	26	30	23
Poor quality	21	19	23
Police/legal problems	14	21	7*
To stop criminal activity	14	17	11
No heroin available	14	9	19
Took long to get drugs	13	7	19*
Pressure from friends/partner	13	19	7
Pressure from family	13	16	10
Started employment	6	6	7
Had to travel too far to get drugs	4	4	4
Went to jail	3	6	0
other	41	39	44

*P<0.05

Thirty participants in NSW sample cited the reduced availability of heroin as the primary reason for entering opiate maintenance treatment. In addition, 11 participants directly associated the heroin shortage with their decision to cease heroin use during their treatment, several regarding the heroin shortage as a "good opportunity" or that the heroin shortage made their attempts at abstinence easier. One 46-year old male participant from Kogarah claimed that more people at the time seemed to be taking their opioid maintenance treatment seriously, and that many people entering treatment at the time were only entering treatment "to get by until they could score properly again".

> "I used less often as I couldn't get hold of heroin. The shortage played a part in my decision to start methadone treatment." (Male, 20 years, Liverpool)

> "I was on methadone so it really gave me an incentive to stop using heroin altogether." (Female, 24 years, Canterbury)

> "It was a good opportunity to get clean. I'd been battling it for a long time; I've been going on and off methadone for a long time. It's a lot easier this time to stay off heroin as it's not as easily available. Finally you realize there is no heroin out there." (Male, 28 years, Waterloo)

> "I started taking the methadone programme seriously. It had a positive effect as it changed my attitude. If heroin was easy to get I would leave and would be using more. I went and found myself a job." (Female, 23 years, Waterloo)

Not all participants reported a decrease in their heroin use during the shortage. A small number of participants reported that to maximise the effect of a scarcer, lower quality heroin supply, they changed their route of heroin administration from smoking to injecting.

> "I was mainly a smoker when heroin was in good supply but when it got less and less I started injecting because there was less of it and it wasn't as good quality." (Male, 34 years, Chippendale)

3.4.8. Crime and incarceration

In the two years 2000-2002 just over half the sample report being charged with a property crime, crime against person or drug category (Table 3.7). Property offences were the crimes respondents reported being most commonly charged with (40%). Similar proportions of both the pre-shortage and shortage groups were charged with all offences (Table 3.7).

There was also no difference between the pre-shortage and shortage groups in terms of incarceration. Seventeen percent of the sample had been in juvenile justice (19% pre-shortage and 16% shortage) and 37% had been to prison (42% pre-shortage and 37% shortage group) at some time. There was no significant difference between the groups on either variable.

Table 3.7: Criminal activity

	Sample (n=141)	Pre-shortage group (n=70)	Shortage group (n=71)
Criminal charges 2000-2002 %			
Property crime	40	40	39
Crimes against the person	19	18	18
Drug crime	25	27	23
Total (any of the above crimes)	52	51	52

Overall, participants reported that they and others known to them were committing more crimes. In a few cases, participants commenced criminal activity when they had not previously done so and others began to get involved in different types of crime. In a couple of cases, cocaine use or opiate withdrawal was mentioned as a reason for being involved in more violent crimes such as armed robbery.

> "I just started doing criminal activity and I never got busted for anything in
> my life and I used for 18 years and I ended up, I was gonna go down for 12
> years 'cos I went and did an armed robbery in this really big place. You could

say it was like David Jones in town. It was just stupid of me but I was just so fucking hanging out." (Female, 30 years, Kings Cross)

'Rorting' or 'ripping people off' was the crime most commonly reported to have increased and was reported by approximately a quarter of NSW participants. This generally involved one drug user offering to obtain heroin for another and then failing to return with the drug or the money. This caused conflict and distrust among participants and other drug users.

"There were bashings and stand-overs. Some people got really desperate. People would go to the Cross who didn't know the area and people at the Westpac (outside the bank) would take their money to go and score and then would take their money. Then there was no-one to rob." (Female, 28 years, Bondi Junction)

"During the shortage the main people who had it were set up in shops or flats, on the streets they would be robbed. Dealers were being robbed, it was open season… People did crimes they wouldn't usually do, as you'd spend all your money and it would be rubbish and you'd still be hanging out. If people rip you off you go straight out and rip them off." (Male, 39 years, Liverpool)

Participants reported increased levels of property crime such as shop-lifting, break and enter and stealing from motor vehicles. A small number of participants saw themselves as being forced into sex work to pay for the increasing costs of their habits.

"It forced me into the sex industry… First a parlour and then for 1-2 months on the street. The Wall [location for male sex work] had just started up again. Other people were in my situation." (Male, 27 years, Liverpool)

"Some friends began to work on Canterbury road to get more money, because after being ripped off by purchasing poor quality heroin, there was no other way to get money quickly to purchase more." (Female, 24 years, Canterbury)

3.5. Discussion

This research has found few differences between those who entered pharmaco-maintenance treatment prior to the onset of the heroin shortage and those who entered during the shortage. There were very few differences in demographic or drug use variables between the two groups. There was a significant difference in the mean number of years of education received between groups, in the magnitude of half a school year. This significant result is likely to be due to very little variance in the data and as such does not point to a real difference between the samples. The study sample therefore represents two relatively similar groups of people receiving maintenance pharmacotherapy.

3.5.1. Reasons for entering treatment

There were a small number of notable differences between the pre-shortage and shortage group in terms of reasons for entering treatment. Half the participants who entered treatment prior to the shortage reported that they entered treatment because they 'wanted to stop using heroin'. This result is similar to that reported by Day et al. (2002) who found that 54% of heroin users interviewed reported simply 'wanting to stop using heroin' as reason for entering methadone maintenance treatment. In the current study, however, only 39% of the sample who entered treatment during the heroin shortage reported 'wanting to stop using heroin' as the reason for entering treatment. This suggests the shortage 'coerced' some heroin users into treatment.

Only a small proportion of participants entered treatment due to police and/ or legal problems, though the proportion of the shortage group stating this was significantly smaller than the pre-shortage group. The time taken to procure drugs was also only identified as reason for entering treatment by a small proportion of the sample, but this was reported more frequently by the shortage group than the pre-shortage group. This finding is consistent with other research on the shortage which clearly documented an increase heroin search time (Miller *et al.*, 2001; Weatherburn *et al.*, 2003; Day *et al.*, 2003).

All other reasons for entering treatment were similar across the two groups. Research by Dietze and colleagues (2002) suggests that heroin users enter treatment for a range of

reasons and these reasons do not differ greatly between treatment modes. These generic issues, such as being "sick of the heroin using lifestyle" and wanting a "change of lifestyle" are the constant, underlying reasons for treatment entry. It could therefore be argued that even if the heroin shortage served as the catalyst for treatment entry, other reasons remain the underlying reason for treatment entry.

The qualitative data suggested that the heroin shortage enabled some people to take their treatment more seriously. More than a quarter of participants who entered treatment during the shortage did not necessarily want to stop using heroin, but have nevertheless remained in treatment. How closely these factors are related is unclear, but these data do suggest that the heroin shortage may have served as catalyst for greater treatment retention among heroin users in treatment.

3.5.2. Impact of the shortage

The two groups reported similar levels of social functioning and mental and physical health. Not surprisingly social functioning and mental and physical health were lower than population norms (Sanderson & Andrews, 2002), but greater than heroin users entering treatment (Ross *et al.*, 2003). The qualitative interviews revealed that the shortage did impact on the lives of many of the participants interviewed. The interviews took place some two years following the heroin shortage, so any measurable difference between the two groups occurring as a result of the shortage is likely to have dissipated.

There were very few differences between the two groups in terms of patterns of drug use and criminal activity. As stated above, given the time lag between the onset of the shortage and the interview, few changes were expected. Qualitative interviews suggested that there was increased use, particularly injecting, of benzodiazepines and cocaine. These changes were also reported by Topp and colleagues (2003). Participants also reported an increased involvement in criminal activity during the shortage. While a number of participants conceded that involvement in property crime had increased among their peers, increased crime between users in the form of drug fraud ('rorts') was more commonly reported. This finding supports the claims of earlier studies into the shortage , of increased violence and aggression among users (Miller *et al.*, 2001; Day *et al.*, 2003).

3.5.3. Limitations

Despite concerted attempts at participant recruitment, the study failed to recruit a large sample of maintenance pharmacotherapy clients, thereby reducing the power of the study. These problems were due to a range of reasons and differed by state. In NSW participants are transferred to private clinics, often general practice clinics and pharmacies once stabilised on their program. The time frames of interest – August to October 2000 and February to May 2001, meant that the target population first entered treatment approximately two or more years prior to being interviewed. Thus potential participants would have been transferred or ceased treatment. As a result recruitment was restricted to a small number of private clinics. In Victoria and South Australia the situation was further exacerbated as all participants had to be recruited through private pharmacies or GP clinics. These restrictions had a substantial impact on the recruitment.

These restrictions lead to an unavoidably biased sample, as only those remaining in treatment approximately two years following treatment entry were able to be recruited into the study. The sample therefore represents a group of "treatment successes" who may be different from other heroin users who entered treatment at the time of the shortage but subsequently ceased treatment. Nevertheless the sample was similar on a number of demographic variables to a cohort of heroin users entering methadone maintenance in 2001; although the current sample was typically slightly older (32 years versus 29 years) and more likely to be employed (Ross *et al.*, 2003).

There were also a number of limitations with the qualitative data. Interviews were not always transcribed and responses were not necessarily written verbatim, resulting in the loss of some data and participants' phrasing. Not recording interviews also meant that emotion or turns of phrase was unable to be captured. The analysis was not done concurrently with the interviews, so interviews were not able to be modified as analysis progressed. The data may also have been compromised by different researchers using different probes or interviewing styles.

Data were collected retrospectively; therefore the accuracy of comments was dependent on the participants' recall ability. The data was also likely to be influenced by recall bias, with more dramatic and therefore salient events being recalled more readily. This potentially resulted in a skewed perspective of the shortage. Inadvertent prompting on

behalf of the researchers who also had background knowledge of the heroin shortage may have exacerbated this potential recall bias. Likewise, many of the questions were influenced by pre-existing researcher knowledge of the shortage.

3.5.4. Conclusion

The study found few differences between those who entered maintenance pharmacotherapy before or during the heroin shortage. The samples were demographically similar, reported similar patterns of drug use and criminal activity and had similar levels of social functioning. Despite a small number of notable differences between the two groups in reasons for entering treatment, the two groups largely reported the heroin shortage did not appear to overtly influence treatment entry, although it may have been an important motivating factor for treatment retention.

4. CONCLUSION

The heroin shortage constituted a unique natural experiment in which to study the impact of drug market changes. To investigate this phenomenon it was necessary to identify methods for retrospective data collection. This research has, however, identified numerous problems with interviewing heroin users retrospectively about changes in drug supply. The timeline follow-back technique was not reliable enough to examine changes in the patterns of drug use at the level necessary for this research. Similarly, the time lag between the onset of the heroin shortage and the interview resulted in few differences being detected between heroin users who entered maintenance pharmacotherapy treatment before and during the heroin shortage. Although qualitative data provided an insight to some of the changes consequential to the shortage, it was subject to recall bias and was also not accurate enough to detect definitive population change.

Further research involving detailed interviews with key informants from law enforcement and health services working with drug users and in depth analysis of indicator data is currently underway. Nevertheless, reliable alternative methods of data collection, such as the establishment of drug user cohorts to examine a range of drug use related phenomenon is warranted.

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6.   APPENDICES

Appendix A: Sample demographics for timeline follow-back test-retest analysis

Demographics	NSW n=15	Victoria n=12	Significance
Male (%)	80	58	(χ^2_1=1.50, p=0.22)
Age (median, range)	32 (23-54)	31 (22-44)	(t_{25}=1.06, p=0.30)
ATSI (%)	7	8	(χ^2_1=0.03, p=0.87)
Unemployed (%)	67	58	(χ^2_4=2.22, p=0.70)
Years of schooling (median, range)	12 (7-13)	12 (7-13)	(t_{25}=-0.23, p=0.82)
Post-school education level			
None (%)	33	50	
Trade/technical (%)	67	33	
University/college (%)	0.0	17	(χ^2_4=4.38, p=0.11)

Appendix B: Sample demographics for maintenance therapy clients by state

Demographics	NSW n=56	SA n=43	VIC n=42	Significance
% male	59	49	67	χ^2_2=2.80, p=0.25
Mean age (SD)	31 (7.5)	32 (8.7)	32 (10.1)	$f_{2, 138}$=0.27, p=0.76
% ATSI	2	2	12	χ^2_1=6.04, p=0.05
% unemployed	59	56	74	χ^2_2=3.41, p=0.18
Mean years school (SD)	11 (1.8)	11 (1.6)	11 (1.9)	$f_{2, 138}$=0.71, p=0.50
% tertiary education	41	50	62	χ^2_2=4.18, p=0.12