

The logo for NDLERF is displayed in a large, bold, sans-serif font. The letters 'NDLER' are white, and the letters 'RF' are a bright yellow-orange color. The logo is positioned on a dark blue background that is part of a larger grid of colored squares in shades of blue, white, and grey.

NDLERF

The course and consequences of the heroin
shortage in New South Wales

Monograph Series No. 4

Funded by the National Drug Law Enforcement Research Fund
An Initiative of the National Drug Strategy

The course and consequences of the heroin shortage in NSW

Louisa Degenhardt and Carolyn Day (editors)

National Drug and Alcohol Research Centre
University of New South Wales

**Funded by the National Drug Law Enforcement Research Fund,
an initiative of the National Drug Strategy**

© Commonwealth of Australia 2004

ISBN 0 642 474 29X

ISSN 1449-7476

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without written permission from the Australasian Centre for Policing Research.

Opinions expressed in this publication are those of the authors and do not necessarily represent those of the National Drug Law Enforcement Research Fund (NDLERF) Board of Management or the Australian Government Department of Health and Ageing.

The research on which this report is based, was funded by the National Drug Law Enforcement Research Fund, an initiative of the National Drug Strategy.

Acknowledgements

This project was funded by the National Drug Law Enforcement Research Fund (NDLERF), and coordinated by the National Drug and Alcohol Research Centre (NDARC). The NDARC team would like to thank Mr Roger Nicholas and Dr Jeanette Packer of NDLERF for their assistance throughout the project.

We have been fortunate to have very committed research officers who have contributed to the project along the way. Ms Linette Collins was responsible for coordinating the three States and worked diligently to this end; she also worked tirelessly in her liaison with advisory committee members, key informants, agencies, and representatives from health and law enforcement. Ms Elizabeth Conroy was integrally involved in identifying possible data sources, analysed data from large datasets collected across the spectrum, and was involved in the time series analyses of this data. She also completed the work on the most data-rich areas of the study, and was able to integrate large amounts of information with limited time. Ms Amy Gibson assisted with work on a range of areas in the study, and provided important contributions on the subject of heroin markets both locally and overseas. Thanks go to the research officers who worked on this project at earlier stages: Ms Clare Thetford, Ms Ann-Maree Weatherall, Ms Heather Niven and Ms Emma Black. We also wish to thank Associate Professor Lisa Maher and Ms Penny Sargent for assistance with recruitment and interviewing of heroin users in Cabramatta.

Dr Libby Topp was an integral member of the research team for the first half of the project. We thank her for her contribution to the project in the early stages, and for continuing to provide support and expert comment until its end despite geographic and technological impediments.

Professor William Dunsmuir provided invaluable expert advice regarding the use of time series analysis across the gamut of the data for this project. Many thanks go to him for his assistance in this regard. Thanks also go to Stuart Gilmour, who conducted much of the work on times series analysis for this study and provided other statistical advice for the project.

We would like to thank the individuals who were willing to be interviewed as key informants for the study. These individuals were chosen for their expertise and knowledge, and often have many other pressing matters to attend to. We were extremely appreciative of their willingness to complete interviews that ranged from 45 to 90 minutes, were taped and transcribed, and for which they received no compensation. Their information was at times crucial to assist us with evaluating trends in other sources of data, and gave us greater confidence in drawing conclusions about changes observed.

We would like to thank the heroin users who were willing to share their experiences about the effects that the heroin shortage had upon their life and those of their families and friends. Their reports gave personal insights into the effects upon persons who remained using and injecting a range of illicit drug types.

The following individuals generously provided information to us over the course of the study, and we thank them for their assistance and effort to assist us with identifying data that could inform the research questions:

- Dr Clive Aspin, Research and Education Program for Injecting Drug Users, Central Sydney Area Health Service;
- Dr Ingrid van Beek, Director, Kirketon Road Centre;

- Ms Jennine Boughton and Ms Siobhan Hennessy, Australian Crime Commission;
- Dr Toni Makkai, Ms Kiah McGregor and Ms Lee Milner, Australian Institute of Criminology;
- Mr Phil Case and Mr Juuso Huttunen, National Targeting, Transnational Crime Coordination Centre;
- Mr Rob Rushby, Todd Quinn and staff, Illicit Drugs Unit, Australian Customs Service;
- Mr Malcolm McAllister, Risk Identification and Intelligence, Australian Customs Service;
- Mr Ian Evans, Australian Federal Police;
- Ms Jackie Fitzgerald and Ms Marilyn Chilvers, NSW Bureau of Crime Statistics and Research;
- Dr Allan Hodda, Deputy Director, Division of Analytical Laboratories, Institute of Clinical Pathology and Medical Research;
- Mr Owen Westcott and Ms Jenny Iversen, NSW Department of Health;
- Dr Margaret MacDonald, National Centre for HIV Epidemiology & Clinical Research;
- Mr Brian Moir, NSW Crime Commission;
- Mr David Noonan, Manager, Drug Intervention Services Cabramatta;
- Ms Katherine Smith, Medical Records, Royal Prince Alfred Hospital;
- Ms Rebecca Cameron and Ms Devon Indig, NSW Department of Health;
- Ms Lee Taylor, NSW Department of Health;
- Mr Clive Small, Community Solutions, Crime Prevention, NSW Premier's Department;
- Mr Karl Claxton, Australian Crime Commission;
- Mr Vince Murtagh, Forensic Services Group, NSW Police;
- Ms Nerys Evans, State Crime Command, Drug Squad, NSW Police;
- Ms Sook Lee, Emergency Department, Royal Prince Alfred Hospital;
- Ms Gaye Byron, Nurse Unit Manager, The Langton Centre;
- Ms Trish Hendry, Emergency Department, St Vincents Hospital;
- Ms Mary-Louise White, Drug and Alcohol Liaison, Prince of Wales Hospital;
- Ms Karen Dawe, Health Information Services, Rozelle Hospital;
- Mr James Baldwin, Corporate Information, NSW Police;
- Mr Brad Freeburn and colleagues, Aboriginal Medical Service, Redfern;
- Sergeant Neil Gillespie and Doug Brown, Drug Unit 1, Vancouver Police Department.

We also wish to thank the following agencies that provided indicator data for the project:

- Australian Bureau of Statistics;
- Australian Customs Service;
- Australian Federal Police (Heroin Signature Program);

- Australian Crime Commission (Australian Bureau of Criminal Intelligence);
- National Centre in HIV Epidemiology and Clinical Research;
- Australian Institute of Criminology (DUMA);
- Alcohol and Drug Information Service, St Vincents Hospital;
- Division of Analytical Laboratories, Institute of Clinical Pathology & Medical Research;
- Kirketon Road Centre and K2;
- Research and Education Program for Injecting Drug Users;
- Sydney Medically Supervised Injecting Centre;
- National Drug and Alcohol Research Centre;
- NSW Bureau of Crime Statistics and Research; and
- NSW Department of Health.

The following representatives kindly agreed to provide input through the advisory committee, which assisted the project at various stages along the way:

- Professor Wayne Hall, *National Expert Advisory Committee on Illicit Drugs*;
- Mr Steve Vaughan, *Australian Government Department of Health and Ageing*;
- Mr Rob Rushby, *Australian Customs Service*;
- Mr Shaun Reynolds, *Australian Crime Commission*;
- Mr Barry Alexander, *Australian Crime Commission*;
- Mr Michael Hawley, *AFP National*;
- Ms Jude Byrne, *Australian Intravenous League*;
- Ms Charine Bennett, *Attorney-General's Department*;
- Ms Emily Pritchard, *NSW Police State Crime Command*;
- Dr Jennifer Gray, *NSW Health Drug Programs Bureau (2002)*;
- Ms Devon Indig, Ms Rebecca Cameron, *NSW Health Drug Programs Bureau (2003)*;
- Ms Lee Taylor, *NSW Health Centre for Epidemiology and Research*;
- Inspector Steve James, *Victoria Police*;
- Ms Glenn Zimmer, *Victorian Department of Health*;
- Associate Professor Robert Ali, *Drug and Alcohol Services Council*;
- Mr Allan Trifonoff, *South Australian Police*.

A number of individuals also agreed to provide expert comment upon various sections of the work. We thank them for the time they generously gave to provide feedback:

- Associate Professor Lisa Maher;
- Associate Professor Shane Darke;
- Dr Gilbert Whitten;
- Detective Superintendent Paul Jones;
- Superintendent Frank Hansen;
- Dr Libby Topp;

- Dr James Bell;
- Dr Margaret MacDonald;
- Mr Owen Westcott;
- Mr Rob Rushby;
- Ms Devon Indig;
- Ms Emily Pritchard;
- Mr Travis Cunningham;
- Ms Jenny Iversen;
- Ms Lee Taylor;
- Professor Peter Reuter;
- Professor Wayne Hall;
- Dr Kate Conigrave;
- Ms Courtney Breen;
- Mr Michael Hawley.

Abbreviations

A&E	Accident and Emergency
ABCI	Australian Bureau of Criminal Intelligence
ACCV	Anti-Cancer Council of Victoria
ACS	Australian Customs Service
AD	Anno Domini
ADCP	Adult Drug Court Program
ADIS	Alcohol and Drug Information Service
AFP	Australian Federal Police
AGD	Attorney General's Department
AHS	NSW Health Area Health Service
AIC	Australian Institute of Criminology
AIDB	AIDS and Infectious Diseases Branch
AIDR	Australian Illicit Drug Report
AIDS	Auto-Immune Deficiency Syndrome
AIHW	Australian Institute of Health and Welfare
ALP	Australian Labor Party
AMS	Aboriginal Medical Service
ANCO	Australian National Classification of Offences
AOD	Alcohol and other Drug
ASGC	Australian Standard Geographical Classification
ASNSW	Ambulance Service of NSW
ATS	Amphetamine Type Stimulants
ATSI	Aboriginal and Torres Strait Islander
AVO	Apprehended Violence Order
BBVI	Blood Borne Viral Infection
BC	Before Christ
BDO	1,4-bromo-2,5-dioxyamphetamine
BEACH	Bettering the Evaluation and Care for Health
BOCSAR	Bureau of Crime Statistics and Research
BTOM	Brief Treatment Outcome Measure
CATI	Computer Assisted Telephone Interviewing
CBD	Central Business District

CCIS	Children's Court Information System
CCN	Cannabis Caution Notice
CDAT	Community Drug Action Teams
CDHA	Commonwealth Department of Health and Ageing
CEA	Cost Effectiveness Analysis
CHS	Corrections Health Service
CIS	Client Information System
COAG	Council of Australian Governments
COB	Country of Birth
COD	Causes of Death Collection
COPS	Computerised Operational Policing System
COTSA	Clients of Treatment Service Agencies
CSS	Crime and Safety Survey
CSAHS	Central Sydney Area Health Service
D&A	Drug and Alcohol
DAL	Division of Analytical Laboratories
DAPIR	Drug and Alcohol Performance Indicator Reporting
DASAS	Drug and Alcohol Specialist Advisory Service
DASC	Drug and Alcohol Services Council
DCAS	Drugs and Community Action Strategy
DCS	Department of Corrective Services
DEA	Drug Enforcement Agency
DET	Department of Education and Training
DLE	Drug Law Enforcement
DOB	Date of Birth
DoCS	Department of Community Services
DPB	Drug Programs Bureau
DTMS	Drug Trends Monitoring Group
DUIP	Drug Use in Prison Survey
DUMA	Drug Use Monitoring in Australia
ED	Emergency Department
EDC	Emergency Department Collection
EDIS	Emergency Department Information Systems
EUR	Euro
EWI	Early Warning Indicators

FDS	Family Drug Support
GP	General Practitioner
GPRN	General Practice Research Network
HAV	Hepatitis A Virus
HBV	Hepatitis B Virus
HCD	Higher Court Database
HCV	Hepatitis C Virus
HIC	Health Insurance Commission
HIE	Health Information Exchange
HIV	Human Immunodeficiency Virus
HOIST	Health Outcomes Information Statistical Toolkit
LAC	Local Area Command
IDA	Illicit Drugs in Australia
ICD-9	International Classification of Diseases – 9 th revision
ICD-10	International Classification of Diseases – 10 th revision
ICPMR	Institute of Clinical Pathology and Medical Research
ICPC-2	International Classification of Primary Care – 2 nd edition
ICU	Intensive Care Unit
IDRS	Illicit Drug Reporting System
IDU	Injecting Drug User
IHS	Inmate Health Survey
ISC	Inpatient Statistics Collection
KI	Key Informants
KRC	Kirketon Road Centre
LAC	NSW Police Local Area Command
LCP	Liberal Country Party
LECP	Law Enforcement Cooperation Program
LGA	Local Government Areas
LSD	Lysergic Acid Diethylamide
MCS	Methadone Client Statistics
MDA	3,4-methylenedioxyamphetamine
MDEA	3,4-methylenedioxyethamphetamine (aka Eve)
MDMA	3,4-methylenedioxymethamphetamine (aka Ecstasy)
MERIT	Magistrates Early Referral Into Treatment Program
MHOAT	Mental Health Outcome and Assessment Tool

MMT	Methadone Maintenance Treatment
MSIC	Medically Supervised Injecting Centre
NCADA	National Campaign Against Drug Abuse
NCHECR	National Centre in HIV Epidemiology & Clinical Research
NCIS	National Coronial Information System
NDARC	National Drug and Alcohol Research Centre
NDD	Notifiable Diseases Database
NDLERF	National Drug Law Enforcement Research Fund
NDSHS	National Drug Strategy Household Survey
NESB	Non-English Speaking Background
NGO	Non-government organisation
NHMD	National Hospital Morbidity Database
NHMRC	National Health and Medical Research Council
NIDS	National Illicit Drugs Strategy
NMDS-AODTS	National Minimum Data Set – Alcohol and other Drug Treatment Services
NNDSS	National Notifiable Diseases Surveillance System
NSP	Needle and Syringe Program
NSW	New South Wales
OCR	Operational Crime Review
ODP	Office of Drug Policy
OMCG	Outlaw Motor Cycle Group
ONCB	Office of the Narcotics Control Board
PaLMS	Pacific Laboratory Medicine Service
PCA	Prescribed Content of Alcohol
PDR	People’s Democratic Republic
PFS	Pharmacy Fitpack Scheme
PMA	4,-methoxy-1-methylphenylethylamine
PSB	Pharmaceutical Services Branch
R & R	Rest and Relaxation
RCD	Recorded Crime Statistics Database
RRMA	Rural, Remote and Metropolitan Areas
RTP	Royal Thai Police Narcotics Suppression Bureau
SA	South Australia
SCC	State Crime Command

SESAHS	South Eastern Sydney Area Health Service
SLA	Australian Bureau of Statistics Statistical Local Area
SP	Starting Price
SSDA	Social Sciences Data Archives
SSD	Australian Bureau of Statistics Statistical Sub-Division
SWSAHS	South Western Sydney Area Health Service
TC	Therapeutic Communities
TSA	Time Series Analysis
UN	United Nations
UNDCP	United Nations International Drug Control Program
US	United States
WHO	World Health Organisation

Table of Contents

Acknowledgements.....i

Abbreviations.....v

List of Figures.....xvii

List of Tablesxx

Executive Summary.....xxi

Introduction.....1

Louisa Degenhardt and Carolyn Day

Chapter 1. The NSW heroin market in the 1990s.....3

Louisa Degenhardt, Wayne Hall and Linette Collins

Summary.....3

1.1. Introduction.....4

1.2. The size of the NSW heroin market.....4

1.3. NSW drug law enforcement and heroin markets.....6

1.4. Changes to criminal syndicates importing and distributing illicit drugs.....7

1.5. The location of drug markets.....7

 1.5.1. Kings Cross.....8

 1.5.2. Cabramatta.....8

 1.5.3. Redfern.....9

1.6. Conclusions.....9

Chapter 2. Documenting the heroin shortage.....11

Carolyn Day

Summary.....11

2.1. Introduction.....12

 2.1.1. Data sources used in this analysis.....12

2.2. Documenting the shortage.....13

 2.2.1. Availability of heroin.....13

 2.2.2. Heroin price.....14

 2.2.3. Heroin purity.....15

2.3. Chronology of the shortage.....16

2.4. Conclusions.....17

Chapter 3. Changes in patterns of drug use.....19

Louisa Degenhardt and Carolyn Day	
Summary.....	19
3.1. Introduction.....	20
3.2. Heroin.....	20
3.2.1. Substitution of other drugs for heroin.....	22
3.3. Methamphetamine.....	24
3.4. Cocaine.....	25
3.5. Benzodiazepines.....	27
3.6. Cannabis.....	29
3.7. Other drug use.....	30
3.7.1. Diversion of pharmaceutical opioids.....	30
3.7.2. Polydrug use.....	30
3.8. Conclusions.....	30
Chapter 4. Changes in Injecting Drug Use.....	31
Louisa Degenhardt, Carolyn Day, Linette Collins and Amy Gibson	
Summary.....	31
4.1. Introduction.....	32
4.2. Extent of injecting drug use.....	32
4.2.1. New South Wales.....	32
4.2.2. Kings Cross market.....	34
4.2.3. Cabramatta market.....	35
4.2.4. Redfern market.....	36
4.3. Injecting frequency.....	37
4.4. Injecting risk behaviour.....	38
4.5. Injection related problems.....	39
4.6. Blood borne viral infections.....	41
4.7. Conclusions.....	43
Chapter 5. Changes in the number of heroin users.....	45
Louisa Degenhardt and Valerie Rendle	
Summary.....	45
5.1. Introduction.....	46
5.2. Populations of heroin users.....	46
5.2.1. Dependent heroin users.....	46
5.2.2. Regular heroin users.....	46

- 5.2.3. Occasional heroin users.....47
- 5.3. Methods of estimating the number of heroin users.....47
- 5.4. Estimates of the number of regular heroin users.....47
- 5.5. Conclusions.....49
- Chapter 6. Changes in the health effects of drug use.....51**
- Louisa Degenhardt, Elizabeth Conroy, and Stuart Gilmour
- Summary.....51
- 6.1. Introduction.....52
- 6.2. Non-fatal overdose.....53
 - 6.2.1. Heroin.....53
 - 6.2.2. Methamphetamine.....55
 - 6.2.3. Cocaine.....55
 - 6.2.4. Benzodiazepines.....56
- 6.3. Drug related deaths.....57
- 6.4. Heroin withdrawal.....60
- 6.5. General physical health.....60
- 6.6. Drug induced psychosis.....61
- 6.7. General mental health and psychosocial functioning.....62
- 6.8. Aggression.....63
- 6.9. Drug use in pregnancy.....64
- 6.10. Conclusions.....65
- Chapter 7. Changes in drug treatment.....67**
- Elizabeth Conroy, Louisa Degenhardt and Stuart Gilmour
- Summary.....67
- 7.1. Introduction.....68
- 7.2. Treatment for problematic heroin use.....68
 - 7.2.1. Entry into opioid pharmacotherapy.....69
 - 7.2.2. Entry into other forms of heroin treatment.....72
 - 7.2.3. Adherence to treatment for heroin dependence.....74
 - 7.2.4. Retention in treatment for heroin dependence/misuse.....75
 - 7.2.5. Concurrent treatment for other drug problems.....76
- 7.3. Treatment for problematic psychostimulant use.....77
 - 7.3.1. ATS.....77
 - 7.3.2. Cocaine.....79

7.4. Treatment for problematic use of other drugs.....	81
7.4.1. Benzodiazepines.....	81
7.4.2. Other drugs.....	81
7.5. Conclusions.....	82
Chapter 8. Changes in drug crime.....	85
Louisa Degenhardt, Linette Collins and Elizabeth Conroy	
Summary	85
8.1. Introduction.....	86
8.2. NSW Drug distribution.....	86
8.2.1. Heroin.....	86
8.2.2. Methamphetamine.....	88
8.2.3. Cocaine.....	88
8.3. Drug use offences.....	89
8.3.1. Heroin.....	89
8.3.2. Methamphetamine.....	91
8.3.3. Cocaine.....	92
8.3.4. Other drugs.....	94
8.4. Market Visibility.....	94
8.5. Conclusions.....	95
Chapter 9. Criminal activity associated with drugs.....	97
Elizabeth Conroy and Louisa Degenhardt	
Summary.....	97
9.1. Introduction.....	98
9.2. Association between drug crime and other crime.....	98
9.2.1. Crimes committed by those involved in drug distribution.....	98
9.2.2. Crimes committed by drug users.....	99
9.3. Robbery.....	102
9.4. Theft.....	103
9.4.1. Break and enter offences.....	103
9.4.2. Motor vehicle theft.....	104
9.4.3. Stealing.....	104
9.4.4. Fraud.....	105
9.5. Illicit sex work.....	106
9.6. Homicide and assault.....	106

- 9.7. Weapons offences.....108
- 9.8. Against justice procedures.....109
- 9.9. Driving offences109
- 9.10. Conclusions.....110
- Chapter 10. Impact upon law enforcement operations.....111**
- Linette Collins, Carolyn Day and Louisa Degenhardt
- Summary.....111
- 10.1. Introduction.....112
- 10.2. NSW Police.....112
 - 10.2.1. Changes in aims of drug law enforcement.....112
 - 10.2.2. Changes in the volume and difficulty of work.....113
 - 10.2.3. Changes in drug law enforcement resource distribution.....114
 - 10.2.4. Increases in drug units.....115
 - 10.2.5. Changes in the outcome of drug investigations.....116
 - 10.2.6. Changes in intra-agency communication.....116
 - 10.2.7. Changes in inter-agency communication.....118
- 10.3. NSW government agencies.....118
- 10.4. Confounding factors.....119
- 10.5. Conclusions.....120
- Chapter 11. Changes in health agency operations as a result of the heroin shortage..... 121**
- Amy Gibson and Carolyn Day
- Summary.....121
- 11.1. Introduction.....122
- 11.2. Changes in drug use.....122
 - 11.2.1. Staff knowledge and adaptability.....122
 - 11.2.2. Treatment.....123
 - 11.2.3. Medical complications.....123
 - 11.2.4. Other complications.....124
- 11.3. Aggression and violence.....124
 - 11.3.1. Staff response.....124
 - 11.3.2. Agency level response.....125
- 11.4. Inter-agency links.....125
 - 11.4.1. Mental health services.....125
 - 11.4.2. Law enforcement.....126

11.4.3. Other health services.....	126
11.5. Staff issues and treatment demand.....	126
11.5.1. Changes in clients attending treatment services.....	126
11.5.2. Changes in service delivery.....	127
11.5.3. Effect on staff members.....	127
11.6. Confounding factors.....	127
11.7. Conclusions.....	128
Chapter 12. Conclusions	129
Carolyn Day and Louisa Degenhardt	
References.....	131
APPENDIX A. TIME SERIES ANALYSIS.....	139
Introduction.....	139
Estimating the effect of the heroin shortage.....	139
Intervention models.....	139
Linear models.....	142
Auto-correlation in Poisson processes.....	143
The problem of multiple non-random shocks.....	143
The initial model selection process and type-I error.....	144
APPENDIX B. QUALITATIVE METHODOLOGY.....	145
Key informants.....	145
Heroin users.....	146
Street level user-dealers.....	147
APPENDIX C. QUANTITATIVE METHODOLOGY.....	149

List of Figures

Figure 1.1: Number of opioid deaths among those aged 15-44 years, NSW 1980-2000.....5

Figure 1.2: Number of methadone clients in NSW on 30 June by year, 1987-1999.....5

Figure 2.1: Proportion of IDU who described heroin as very easy to obtain, 1996-2002.....14

Figure 2.2: Proportion of IDU who reported that heroin had recently been more difficult to obtain, 1996-2002.....14

Figure 2.3: IDU estimates of heroin price at street level in NSW, 1996-2002.....15

Figure 2.4: Purity of heroin seizures analysed in NSW, by quarter, 1999-2002.....16

Figure 3.1: Number of inquiries to ADIS regarding heroin, NSW July 1996-June 2002.....21

Figure 3.2: Number of visits to a Kings Cross NSP where heroin was reported as the last drug injected, 1997-2003.....22

Figure 3.3: Number of inquiries to ADIS regarding methamphetamine, NSW July 1996-June 2002.....24

Figure 3.4: Number of visits to a Kings Cross NSP where methamphetamine was reported as the last drug injected, 1997-2003.....25

Figure 3.5: Number of inquiries to ADIS regarding cocaine, NSW July 1996-June 2002.....25

Figure 3.6: Number of visits to a Kings Cross NSP where cocaine was reported as the last drug injected, 1997-2003.....26

Figure 3.7: Rate of benzodiazepine prescriptions per 1000 patient visits per week in NSW, 1999-2003.....27

Figure 3.8: Number of inquiries to ADIS regarding benzodiazepines, July 1996-June 2002.....27

Figure 3.9: Number of visits and clients involving benzodiazepines in the Kings Cross MSIC, May 2002-June 2003.....28

Figure 3.10: Number of inquiries to ADIS regarding cannabis, July 1996-June 2002.....29

Figure 4.1: Number of needles distributed in NSW, 2000-2003.....33

Figure 4.2: Number of needle/syringes distributed by geographical location, NSW 2000-2003.....34

Figure 4.3: Number of needle/syringes distributed in the Kings Cross area, 1997-2003.....34

Figure 4.4: Number of needle/syringes distributed in the Cabramatta area, 1997-2003.....35

Figure 4.5: Number of needle/syringes distributed in the Redfern area, 2000-2003.....36

Figure 4.6: Number of drug related ED admissions and hospital separations for injection related problems, NSW 1997-2003.....	39
Figure 4.7: Number of HIV, Hepatitis B and C notifications, NSW 1997-2003.....	41
Figure 4.8: Hepatitis C notifications, by age group, NSW 1997-2003.....	42
Figure 4.9: Hepatitis B notifications, by age group, NSW 1997-2003.....	42
Figure 5.1: Median estimate of the number of regular heroin users in NSW, 1997-2001.....	48
Figure 5.2: Median estimates of the number of regular heroin users in NSW by gender, 1997-2001.....	48
Figure 5.3: Median estimate of the number of regular heroin users in NSW by age, 1997-2001.....	49
Figure 6.1: Ambulance callouts to suspected heroin overdoses, 1995-2003.....	53
Figure 6.2: Heroin overdose presentations to NSW emergency departments, 1997-2003.....	54
Figure 6.3: Methamphetamine overdose presentations to NSW emergency departments, 1997-2003.....	55
Figure 6.4: Cocaine overdose presentations to NSW emergency departments, 1997-2003.....	56
Figure 6.5: Benzodiazepine overdose presentations to NSW emergency departments, 1997-2003.....	56
Figure 6.6: Number of suspected drug related deaths, NSW 1995-2003	57
Figure 6.7: Number of suspected drug related deaths where particular drugs were detected post mortem, 1995-2003.....	57
Figure 6.8: Number of heroin related deaths by gender, NSW 1995-2003.....	58
Figure 6.9: Number of heroin related deaths among those aged 15-34 years, NSW 1995-2003.....	58
Figure 6.10: Number of heroin related deaths among those aged 35 years and over, NSW 1995-2003.....	59
Figure 6.11: Proportion of drug related deaths involving different drug combinations at death, NSW 1995-2003.....	59
Figure 6.12: Heroin withdrawal/intoxication related visits to NSW emergency departments, 1997-2003.....	60
Figure 6.13: Drug related psychosis presentations to hospitals and emergency departments, NSW 1997-2003.....	61
Figure 6.14: Number of hospital separations for pregnant women where drug and alcohol problems were coded as complicating the pregnancy, NSW 1998-2002.....	64

Figure 7.1: Number of re-registrations for opioid pharmacotherapy, NSW 1997-2003.....70

Figure 7.2: Number of new registrations for opioid pharmacotherapy, NSW 1997-2003.....70

Figure 7.3: Number of new registrations for opioid pharmacotherapy by gender, NSW 1997-2003.....71

Figure 7.4: Number of new registrations for opioid pharmacotherapy by age, NSW 1997-2003.....71

Figure 7.5: Number of heroin treatment episodes by gender, NSW 2000-2003.....72

Figure 7.6: Number of heroin treatment episodes by age, NSW 2000-2003.....73

Figure 7.7: Number of heroin treatment episodes by treatment type, NSW 2000-2003.....73

Figure 7.8: Proportion of clients registering for pharmacotherapy treatment who did not commence treatment, NSW 1997-2002.....74

Figure 7.9: Proportion of clients re-registering for pharmacotherapy who ceased to attend, NSW 1997-2002.....75

Figure 7.10: Proportion of persons in treatment for heroin dependence/misuse who could be considered “early drop outs”, NSW 2000-2003.....76

Figure 7.11: Proportion of heroin treatment episodes where other drugs were noted as secondary problems, NSW 2000-2003.....77

Figure 7.12: Number of ATS treatment episodes by gender, NSW 2000-2003.....78

Figure 7.13: Number of ATS treatment episodes by age, NSW 2000-2003.....78

Figure 7.14: Number of ATS treatment episodes by treatment type, NSW 2000-2003.....79

Figure 7.15: Number of cocaine treatment episodes by gender, NSW 2000-2003.....79

Figure 7.16: Number of cocaine treatment episodes by age, NSW 2000-2003.....80

Figure 7.17: Number of cocaine treatment episodes by treatment type, NSW 2000-2003.....80

Figure 7.18: Number of benzodiazepine treatment episodes by treatment type, NSW 2000-2003.....81

Figure 7.19: Number of other drug treatment episodes by treatment type, NSW 2000-2003.....82

Figure 8.1: Incidents of dealing or trafficking illicit drugs, NSW 1997-2002.....87

Figure 8.2: Incidents of heroin possession/use in NSW, 1997-2002.....89

Figure 8.3: Incidents of heroin possession/use by gender, NSW 1997-2002.....90

Figure 8.4: Incidents of heroin possession/use by age, 1997-2002.....90

Figure 8.5: Incidents of heroin possession/use by geographic area, 1997-2002.....91

Figure 8.6: Incidents of methamphetamine possession/use in NSW, 1997-2002.....	92
Figure 8.7: Incidents of methamphetamine possession/use by geographic area, 1997-2002.....	92
Figure 8.8: Incidents of cocaine possession/use in NSW, 1997-2002.....	93
Figure 8.9: Incidents of cocaine possession/use in NSW by gender, 1997-2002.....	93
Figure 8.10: Incidents of cocaine possession/use by geographic area, 1997-2002.....	94
Figure 9.1: Proportion of those charged with a violent offence testing positive to drugs, Bankstown DUMA.....	101
Figure 9.2: Proportion of those charged with a violent offence testing positive to drugs, Parramatta DUMA.....	102
Figure 9.3: Incidents of robbery offences in NSW 1997-2002.....	102
Figure 9.4: Incidents of break & enter offences in NSW, 1997-2002.....	103
Figure 9.5: Incidents of motor vehicle theft, NSW 1997-2002.....	104
Figure 9.6: Incidents of stealing offences in NSW, 1997-2002.....	105
Figure 9.7: Incidents of fraud in NSW 1997-2002.....	105
Figure 9.8: Incidents of prostitution offences in NSW 1997-2002.....	106
Figure 9.9: Incidents of homicide in NSW, 1997-2002.....	107
Figure 9.10: Incidents of assault in NSW, 1997-2002.....	107
Figure 9.11: Incidents of weapons offences in NSW 1997-2002.....	108
Figure 9.12: Incidents of offences against justice procedures in NSW 1997-2002.....	109
Figure 9.13: Incidents of driving offences in NSW 1997-2002.....	110

List of Tables

Table 3.1: Heroin use among regular IDU samples, 1996-2002.....	21
Table 3.2: Methamphetamine use among regular IDU samples, 1996-2002.....	24
Table 3.3: Cocaine use among regular IDU samples, 1996-2002.....	26
Table 3.4: Benzodiazepine use among regular IDU samples, 1996-2002.....	28
Table 3.5: Cannabis use among regular IDU samples, 1996-2002.....	29
Table 10.1: Strategies potentially confounding the impact of the heroin shortage.....	119

Executive Summary

Chapter 1. The NSW heroin market in the 1990s

- The 1990s was a time of significant change in the heroin market in NSW.
- Sydney remained central to the importation and trafficking of heroin.
- The role of law enforcement in the heroin market was affected by inadequate funding, long standing corruption in NSW and the effects of enquiries into this corruption in the mid 1990s.
- South East Asian heroin trafficking groups obtained a significant share of the heroin market in Australia following disruption of the supply of South East Asian heroin to the United States.
- Rising heroin use was reflected in a steep increase in opioid overdose deaths and increasing numbers of people entering methadone maintenance treatment.
- Drug users reported heroin availability increased, purity was high and price decreased.
- There was an increase in the number of locations or “markets” from which heroin was distributed, to include Kings Cross, Redfern and Cabramatta. Heroin was easily available from all these locations.

Chapter 2. Documenting the heroin shortage

- In early 2001, heroin supply decreased as indexed by: an increase in time taken for regular drug users to purchase drugs; a decrease in the proportion of regular injecting drug users reporting heroin as ‘easy to obtain’; an increase in the price of heroin in 2001, having decreased steadily since 1996; and a reduction in purity as reported by drug users and NSW Police heroin seizures.
- The peak period of the shortage appears to have been January to April 2001.
- The market appears to have stabilised, though it has not returned to pre-2001 levels: heroin prices have decreased in NSW for street grams, but ‘caps’ remain high; and heroin purity in NSW has remained low, with perhaps a 10% increase above the lowest recorded levels.

Chapter 3. Changes in patterns of drug use

- A reduction in heroin supply was associated with a reduction in heroin use among regular IDU and probably in the extent of heroin use in the community.
- In the short term, drug substitution occurred, with some users clearly using other drugs in a risky manner.
- A shift by some IDU to cocaine injection was clearly documented and was reflected in community level data regarding calls about cocaine use.
- Methamphetamine use has been increasing in recent years but there was no clear shift at the time of the heroin shortage.

- Benzodiazepine use was mentioned by KI and users but not reflected in community level data, suggesting that although some groups may have switched to this drug use, they were small in number.

Chapter 4. Changes in injecting drug use

- A sustained, State wide reduction in distribution of needle/syringes followed the reduction in heroin supply.
- There appeared to be an overall reduction in the frequency of heroin injection and a concurrent increase in the frequency of injection of other drugs, particularly cocaine and benzodiazepines, among some groups in the months following the reduction in heroin supply.
- Increased injecting risk behaviour associated with cocaine use was reported, however, given the contraction in the heroin population, it is unclear if the prevalence of these behaviours increased during the heroin shortage.
- A range of injection related problems was reported among some groups, mainly associated with cocaine and benzodiazepine injection, concurrent with the reduction in heroin availability.
- The number of notifications of HIV and hepatitis B do not appear to have been affected by the heroin shortage in the short term.
- The number of hepatitis C notifications appears to have decreased, especially among younger age groups.

Chapter 5. Changes in the number of heroin users

- Making estimates of the number of regular heroin users is difficult, and particularly when there have been changes in the extent of drug supply, need to be viewed with caution.
- A range of indirect estimates from a range of data sources were used as part of work completed for another study.
- It was estimated that the number of regular heroin users in NSW decreased following the reduction in heroin supply.
- The extent of the reduction appeared to be similar for males and females, suggesting that both groups of heroin users may have been affected by the reduction in supply in a similar way.
- There appeared to be different changes according to age, with greater reductions occurring among younger age groups. This was consistent with key informants who reported that younger users may have reduced or ceased heroin use following the reduction in heroin supply.
- These estimates, although suggesting that the number of *regular heroin users* declined, do not imply anything about the number of *illicit drug users* in total. There was suggestive evidence that the extent of injecting drug use declined, but evidence also suggested that users probably switched to a range of other drug types including benzodiazepines, cocaine and methamphetamine (perhaps administering through non-injecting routes).

Chapter 6. Changes in health effects of drug use

- There was a large and persistent decrease in the number of non-fatal heroin overdoses in early 2001. There was also a significant decrease in the number of deaths in which heroin was detected. Lower rates of non-fatal and fatal heroin overdoses have been maintained since early 2001.
- The decreases in fatal and non-fatal heroin overdoses were of a similar magnitude for males and females, but varied among different age groups. The reduction in heroin availability did *not* have as much impact upon older heroin users' likelihood of overdose as it did upon younger users.
- Following the onset of the heroin shortage, many heroin users appeared to experience significant withdrawal symptoms. There was no observable increase, however, in attendances at health services, suggesting that most heroin users probably managed withdrawal without requesting formal medical assistance.
- There was an increase in emergency department presentations for cocaine overdose but no detectable change in the number of other non-fatal drug overdoses.
- There was a short term increase in drug induced psychosis. The transitory nature of this change was probably due to a decrease in the availability (and use) of cocaine.
- There was no detectable increase in the number of pregnant women with problematic drug use accessing health services, but some evidence that polydrug use among those pregnant women engaged with services may have increased.
- There were differences across the different drug markets, with suggestions that Kings Cross had higher increases in cocaine related harms and relatively greater decreases in heroin related overdoses than in other areas. This was consistent with other data suggesting that cocaine use was concentrated in this area.

Chapter 7. Changes in drug treatment

- The reduction in heroin supply had no observable effect on treatment seeking among persons who had previously been in opioid pharmacotherapy, possibly a more entrenched group of heroin users.
- There were *fewer* new treatment registrations (i.e. treatment seeking among treatment naive persons) for opioid pharmacotherapy among younger users following the reduction in heroin supply. This suggests that when heroin became less available, those who had not been enrolled in pharmacotherapy did not seek to enter it.
- Adherence to pharmacotherapy improved among those in treatment when heroin was less available, but retention in treatment did not change.
- Among younger users there were increases in the number of treatment episodes for cocaine and amphetamine type stimulant (ATS) problems. Treatment seeking among older users was unrelated to changes in heroin supply.
- These patterns of treatment seeking suggest two things: 1) that older, heroin dependent persons were less likely than younger persons to become problematic users of psychostimulant drug types when their primary drug (heroin) became less available; and 2) the motivation of younger heroin users to enter pharmacotherapy was decreased after a reduction in heroin supply, perhaps because they were more likely to switch using other, more available, illicit drugs.

- Treatment seeking among those with psychostimulant use problems is complicated by a lack of appropriate treatment options and a perception by users that psychostimulant use (and the subsequent development of problematic use) is fundamentally different to heroin use and dependence. This was often reported by key informants in this study and is consistent with previous research (Hando, Topp et al. 1997).
- There has been a gradual increase over time (following the shortage) in the small numbers of treatment episodes for problematic benzodiazepine use.

Chapter 8. Changes in drug crime

- Drug distribution in NSW appeared to change around the time of the heroin shortage. High level distribution of heroin, cocaine and methamphetamine may have remained somewhat discretely managed by different organised crime groups, but greater collaboration may have occurred between these groups.
- Among mid level distributors, there appeared to be a shift in emphasis from heroin to methamphetamine, ecstasy and cocaine distribution.
- Low level dealers may have made a short term shift from heroin to cocaine distribution.
- The nature of low level drug dealing also appeared to shift following the heroin shortage according to key informants in all drug market areas, with movement towards mobile, less overt methods of dealing.
- The heroin shortage had clear effects on street drug market visibility. In Kings Cross, Cabramatta and Redfern, key informants all reported short term increases in visibility but in the longer term key informants in all areas reported *decreased* visibility of the drug markets, as dealing became more covert.
- There were significant decreases in incidents of heroin possession/use reported by police. These decreases were more marked in Fairfield-Liverpool, among males and those aged 20-29 years. At the same time, increases were observed in incidents for cocaine possession/use, which primarily occurred among younger males, particularly in the Inner Sydney area. This was consistent with reports of some short term drug market displacement from Cabramatta to the inner city, particularly Redfern.

Chapter 9. Changes in crime associated with drugs

- It was difficult to document changes in the criminal activity of those involved in drug distribution, particularly organised crime groups. Nonetheless, information suggested that some groups diversified into, or increased their activity in, other crime types such as motor vehicle re-birthing, factory break-ins for saleable goods, credit card fraud and distribution of firearms. Examination of police data on these crime types suggested that although there was no detectable change attributable specifically to the heroin shortage, there have been increasing rates of crime types such as fraud in recent years, which supports the reports collected for this study.
- There were consistent KI reports of a short term increase in acquisitive crime committed by heroin users. Indicator data on these offences was equivocal in some instances and significant changes were not observed in some of these indicators.
- There appeared to be an increase in street based sex work among some heroin users, many of whom were reported to have used cocaine when heroin supply was reduced. A

statistically significant increase in police incidents for illicit sex work was noted and the number of illicit sex work incidents remained higher than before the reduction in heroin supply.

- The short term increase in some acquisitive crime types and illicit sex work may have been related to the increased use of cocaine by some heroin users, given the behavioural effects and more expensive costs associated with this drug.
- The lack of a sustained increase in acquisitive crime incidents was probably linked to two factors: a reduction in the number of heroin users (Chapter 5), and the relatively short length of time with which cocaine use appeared to be increased among this group (Chapter 3).
- There were reports that the nature of criminal acts changed immediately following the onset of the heroin shortage, with more impulsive and violent criminal acts. This is supported by a significant increase in the incidence of robbery offences at the time of the heroin shortage.
- The lack of effect on incidents of robbery with a firearm, weapons offences, assaults and homicides may reflect the limited access to guns in Australia.

Chapter 10. Impact upon law enforcement operations

- No fundamental change occurred in the aims of drug law enforcement at either the Local Area Command or State level.
- The understanding by law enforcement of the drug market increased as heroin availability declined, as other drugs became more available or apparent and as some criminal groups shifted activities to different commodities.
- There was some reallocation of resources previously committed to the policing of the heroin market to the investigation of other illicit drugs.
- New opportunities emerged to have an impact on illicit drug markets other than heroin.
- Drug Units in some Local Area Commands increased in number and personnel.
- Outcome and monitoring tools that were more indicative of the impact of law enforcement on the market than the traditional measures of seizures and arrests were developed.
- More emphasis was placed on research and multi-agency approaches to the drug market.

Chapter 11. Changes in health agency operations as a result of the shortage

- Increased numbers of clients presented for problems other than heroin withdrawal due to the increased use of drugs such as cocaine, methamphetamine and benzodiazepines.
- The consequences of the change in drug use included drug induced psychosis, increased levels of aggression and violence, increased staff stress and more support required from mental health services (drug induced psychosis) and law enforcement (violent incidents).
- Staff responded with training programs (including aggression management), protocol review, client education programs, staff debriefings, critical incident response training and modifications to buildings to improve safety.

- Decreased numbers of clients presented to needle/syringe program services.
- Health services were initially unprepared for the sudden and broad changes that occurred during the heroin shortage but were able to make modifications to the way they did practice in order to cope effectively.

Chapter 12. Conclusions

- The heroin shortage followed a period of unprecedented heroin availability in Australia. In early 2001 the price, purity and availability of heroin in NSW dramatically and unexpectedly decreased; this decrease was felt most strongly in the months January to April of that year. Although the market appears to have stabilised, it has not returned to pre-shortage levels.
- The shortage had a number of clear effects across a wide range of domains. Heroin use decreased – as did the estimated number of regular heroin users.
- According to the data available, there was a clear increase in the use of psychostimulants (particularly cocaine) associated with the shortage. There was a reported increase in the use of benzodiazepines but this increase was not apparent in any of the indicators examined. It may have occurred for a small number of users only and manifested as an increase in injecting and greater harms. The increased use of psychostimulants and benzodiazepines probably resulted in an increase in risky injecting among this group but it is unclear whether they form a large proportion of the injecting drug user population.
- Despite these increases, there was a marked *decrease* in the distribution of needles and syringes shortly following the heroin shortage. This decrease could be partially accounted for by an increase in the re-use of needles and syringes as is consistent with cocaine (e.g. van Beek, Dwyer et al. 2001) and benzodiazepine (e.g. Ross, Darke et al. 1997) injecting. But given the magnitude of the decrease in needle and syringe distribution, this explanation alone is considered unlikely, particularly given that the number of notifications of hepatitis C *decreased* following the heroin shortage, most markedly among younger age groups. These two findings (decreased NSP activity *and* decreased hepatitis C notifications) suggested a decrease in the extent and number of injecting drug users in NSW.
- Younger, novice heroin users probably (though not necessarily) fared better than older, more entrenched users. For example, heroin overdose deaths decreased dramatically during this period, with the largest decreases among younger people. This was accompanied by an overall increase in the number of admissions for cocaine overdose and a brief increase in the number of drug-induced psychoses, though not of the same magnitude as the decrease in heroin related deaths.
- Younger people were observed to have increased treatment episodes for psychostimulant use and there was a decrease in the number of treatment naive users seeking opioid pharmacotherapy. There was no observable change in the number of persons seeking treatment who had previously been in opioid pharmacotherapy, but although treatment retention did not improve, those enrolled in treatment showed greater treatment adherence.
- For those who continued to use heroin and other drugs, the heroin shortage was associated with increased levels of crime and aggression.

- Short-term increases in illicit sex work and acquisitive crime were also very likely related to the reduced availability. However, in the longer term, these reductions were likely to be offset by an apparent overall sustained decrease in acquisitive crime.
- These changes to drug use patterns, health and criminal activity of heroin users required health and police services to respond, often compromising their ability to deliver appropriate and necessary services. Responses were varied and reflected the dynamic nature and resourcefulness of many services. On the whole the skill bases of services increased and, while many of the acute/negative impacts of the shortage dissipated, many of the positive changes remained.
- Despite the many changes observed, as with any observational research, the findings detailed in this report reflect associations between the heroin shortage and the issue of interest.

Introduction

Louisa Degenhardt and Carolyn Day

In early 2001, Australia experienced a reduction in the availability of heroin. This reduction was widely reported across Australia, and much publicised (Rouen, Dolan et al. 2001). The reduction was notable because of the market conditions preceding it: heroin had for some years been available to an extent that had not occurred in Australia previously, with increasing harms, decreasing price, and high purity of the drug (Topp, Kaye et al. 2002).

There have been other occurrences of drug supply reduction in the 20th century. There seems to have been a shortage of illicit morphine and heroin in the US during World War II (Courtwright 1982; Courtwright, Joseph et al. 1990; Jonnes 1996; Massing 2000), and a heroin shortage in the US in the early 1970s (Jonnes 1996; Massing 2000). However, these events were documented through relatively loose historical accounts. The relative wealth of data collection and information amassed in drug monitoring systems in recent years in Australia provided an unprecedented opportunity to examine with objective, detailed data the impact of a marked reduction across an entire country in the availability of heroin – the preferred drug of the majority of participants in a contemporary western illicit drug market.

Researchers from the National Drug and Alcohol Research Centre (NDARC) were funded by the National Drug Law Enforcement Research Fund (NDLERF) to examine the causes, course and consequences of this reduction in heroin supply, in collaboration with researchers from Turning Point in Victoria and the Drug and Alcohol Services Council (DASC) in South Australia. This report contains the results of the NSW work conducted for the project. It is accompanied by a national report (Degenhardt, Day et al. 2004) and two additional jurisdictional reports (Dietze, Miller et al. 2004; Harrison, Christie et al. 2004). In addition to providing an overview of the jurisdictional reports, the national report includes research compiled on the history of the Australian heroin market and possible causes of the heroin shortage, and examines the policy implications for Australia and other countries.

In this study, we have looked across the different sources of data in all areas of investigation. This has been done to verify whether different data sources conveyed the same patterns of changes (or lack thereof) and to critically evaluate the implications of the similarities or differences across these data sources. In order to examine the shortage retrospectively, a number of data sources and methodological approaches were utilised – interviews with 51 heroin users who entered treatment either prior to or during the heroin shortage, interviews with 73 key informants from a range of health and law enforcement agencies, analysis of existing data systems, and a review of published literature, briefing papers and agency reports. Details regarding the recruitment of heroin users, selection of key informants, and analysis of qualitative information can be found in Appendix B of this report. Where possible, indicator data was analysed using time series analysis (TSA). A description of TSA and its application to the present study can be found in Appendix A. Details of the indicator datasets used and the TSA models for these datasets can be found in Appendix C. Chapter 1 of the national report also provides information on the methodologies used in the project including a discussion of the areas in which each of the data sources can provide valuable information and the limitations of this information.

Chapter 1 of this report gives a brief historical review of conditions in the NSW heroin market, as a backdrop against which the heroin shortage can be considered¹. Chapter 2 documents the heroin shortage in NSW, including an outline of the chronology of the shortage.

Chapters 3-11 document the domains across which potential changes were examined. Chapter 3 considers the effects of the heroin shortage in terms of patterns of drug use including changes to the types of drugs used and frequency of use. It was also of interest to examine changes in injecting drug use, including associated problems such as abscesses and thromboses and the transmission of blood borne viral infections; this was completed in Chapter 4. Chapter 5 is drawn from additional work estimating the number of heroin users in Australia² and assesses changes to these estimates in light of the shortage.

Changes in drug users' health were considered in Chapter 6. A range of drug related health problems were considered including non-fatal and fatal drug overdoses, drug induced psychosis, and changes in general physical and mental health. Chapter 7 follows with an examination of changes in the utilisation of treatment for heroin and other drug use problems, particularly psychostimulants.

Crime is the focus of Chapters 8 and 9. Chapter 8 examined drug crime, at the production, trafficking, distribution, and drug user level; Chapter 9 assessed crimes associated with drug use or groups involved in drug distribution. The final two chapters dealing with changes related to the heroin shortage assessed the impact of the shortage on law enforcement operations (Chapter 10) and health service delivery (Chapter 11).

¹ This draws upon other work completed at NDARC, which may be found in: Gibson, A., L. Degenhardt, et al. (2003). Global and Australian heroin markets. NDARC Technical Report No. 167. Sydney, National Drug and Alcohol Research Centre, University of NSW.

² The work conducted to produce estimates of the number of heroin users was completed for a two-part project funded by the NSW Government Cabinet Office of Drug Policy and the NSW Department of Health; the results are summarised here. For details of this work, please refer to: Degenhardt, L., V. Rendle, et al. (2004). Estimating the number of heroin users in NSW and Australia, 1997-2002. NDARC Technical Report No. Sydney, National Drug and Alcohol Research Centre, University of NSW.

Chapter 1. The NSW Heroin Market in the 1990s

Louisa Degenhardt, Wayne Hall and Linette Collins

Summary

- The 1990s was a time of significant change in the heroin market in NSW.
- Sydney remained central to the importation and trafficking of heroin.
- The role of law enforcement in the heroin market was affected by inadequate funding, long standing corruption in NSW and the effects of enquiries into this corruption in the mid 1990s.
- South East Asian heroin trafficking groups obtained a significant share of the heroin market in Australia following disruption of the supply of South East Asian heroin to the US.
- Rising heroin use was reflected in a steep increase in opioid overdose deaths and increasing numbers of people entering methadone maintenance treatment.
- Drug users reported heroin availability increased, purity was high and price decreased.
- There was an increase in the number of locations or “markets” from which heroin was distributed, to include Kings Cross, Redfern and Cabramatta. Heroin was easily available from all these locations.

1.1. Introduction

Heroin markets in NSW underwent significant changes in the 1990s. Public attention to the issue, however, lagged behind. During the first half of the decade, State Government departments were the major funders and the main audience for research on methadone maintenance treatment and opioid overdose. Their responses to the research findings included the changing of some policies (e.g. increasing average methadone dose and the accessibility of takeaway doses) and the development of new programs (e.g. peer education to reduce opioid overdose deaths) (e.g. McGregor, Ali et al. 2001). During the period 1991-1994, the degree of media attention devoted to heroin research findings remained low and stable (Hall 2004).

In 1995-6, NDARC researchers tentatively reported evidence of increasing heroin use to NSW Government officials. This information was apparently not welcomed by Government and colleagues in the addiction field who were concerned about creating a media panic regarding heroin use (Hall 2004). As late as 1997, research findings on new young heroin users in South West Sydney (Maher, Dixon et al. 1998) were discounted by influential figures in the addiction field. One commentator predicted that the reported decline in heroin price and increased purity were not cause for concern because it was more likely to *reduce* heroin overdose deaths and crime than to increase the number of heroin users (Wodak 1997). By mid 1997, however, media interest in heroin use was at its height.

In this Chapter, some of the major changes that occurred over this time are outlined. The significance of changes in both drug law enforcement, and in organised crime, which may have been instrumental in increases in importation, availability and use of heroin in NSW and eventually around the country, are also considered³. It is an historical account: such things are reconstructive.

To use a framework for this work, ideas proposed by McCoy (1980) were used. McCoy suggested that for illicit drug markets to flourish in a sustained manner, several things were required:

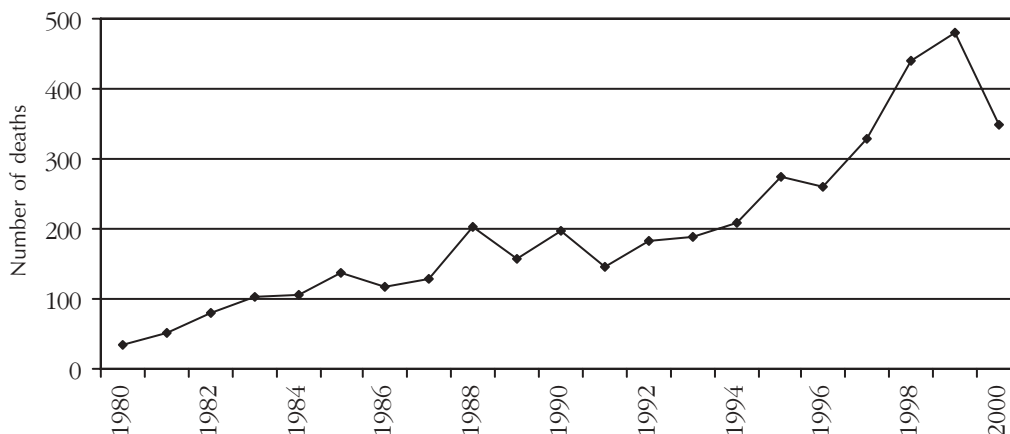
- “ (1) a reliable source of supply;*
- (2) a potential group of consumers;*
- (3) a tradition of political tolerance of some sort of organised crime;*
- (4) a modicum of police corruption; and*
- (5) an informal alliance between the drug syndicates and some influential leaders of established political parties, senior public servants and skilled professionals.” (p.22).*

1.2. The size of the NSW heroin market

There is good evidence that the size of the NSW heroin market increased substantially during the 1990s. One objective indicator of this market increase was the steep rise in opioid overdose deaths that began in the early 1990s, largely in Sydney (see Figure 1.1 Hall, Lynskey et al. 1999). Rising heroin use was also reflected in increasing numbers of persons entering methadone maintenance treatment during this period (Figure 1.2).

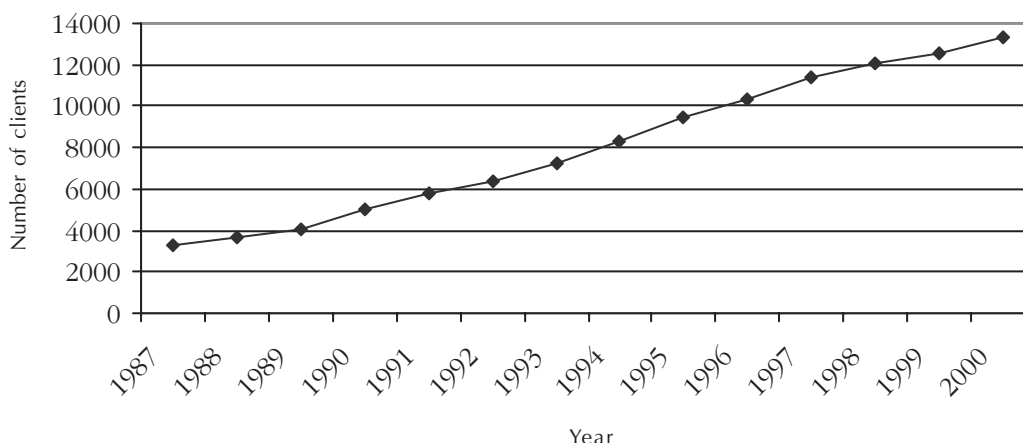
³ For information on the longer-term history of heroin and other illicit drug use in Australia, please see Gibson, A., L. Degenhardt, et al. (2003). Global and Australian heroin markets. NDARC Technical Report No. 167. Sydney, National Drug and Alcohol Research Centre, University of NSW.

Figure 1.1: Number of opioid deaths among those aged 15-44 years, NSW 1980–2000



Source: Australian Bureau of Statistics.

Figure 1.2: Number of methadone clients in NSW on 30 June by year, 1987-1999



Source: Pharmaceutical Services Branch database, NSW Health.

Data from illicit drug monitoring systems suggested that heroin was becoming increasingly available for use among injecting drug users (IDU) during this period (MacDonald, Robotin et al. 2001; Topp, Darke et al. 2001). IDU reports suggested that heroin dominated injecting drug markets in NSW; purity was relatively high; and the price of heroin either remained stable or decreased every year (Darke, Hall et al. 2000).

The increased availability of cheap and pure heroin in Australia did not guarantee that there would be an increase in heroin use in Australia. What was perhaps unique about Australia in the early 1990s was that heroin availability increased at a time when there was a large population of susceptible youth with limited exposure to heroin who were prepared to try the drug, often by non-injecting routes, in the absence of any organised effort to provide information about the risks of heroin dependence and overdose. It had been almost a decade since the previous heroin “epidemic”, in the early to mid 1980s, had produced concerted media publicity about the risks of heroin use.

The combined effect of an increased supply of heroin in the early 1990s and an increased demand for heroin among new users resulted in a steep increase in recruitment to heroin use among young Australians during this period. This increased recruitment was especially pronounced in new populations of young people who had no previous experience of heroin and lived in areas that were outside the traditional drug markets.

In 1997, NSW was estimated to account for around half of heroin dependent users in Australia (Hall, Ross et al. 2000). Law enforcement intelligence suggested that Sydney remained Australia's centre for heroin importation and trafficking during this time (Australian Bureau of Criminal Intelligence 2002).

1.3. NSW drug law enforcement and heroin markets

NSW has a long history of police corruption related to the illicit drug trade. This corruption may have been instrumental in shaping NSW heroin markets in the 1980s and early 1990s (McCoy 1980; Lintner 2002; Degenhardt, Hall et al. 2004; Degenhardt, Hall et al. in preparation) and have been shaped by those markets (Dixon 1999). This situation was disturbed from 1994 by the Royal Commission into the NSW Police Service, under Justice James Wood, whose terms of reference were to investigate "The nature and extent of corruption within the Police Service, particularly of any entrenched or systemic kind" (Wood 1997). Justice Wood found evidence of endemic and systematic corruption related to drug law enforcement including the following:

- Protection of drug dealers, 'licensing' of certain drug cartels and of 'shooting galleries', and of certain gaming establishments, by elimination of their competitors;
- Stealing of money, and of drugs found during the execution of search warrants, and the recycling of the latter usually to favoured dealers or informants;
- Leaking of confidential information to persons who were under investigation or otherwise interested in its reception and warnings of pending gaming, licensing and drug raids;
- Compromise of prosecutions by the gutting of police briefs, and loss of material evidence in return for payment (Wood 1997).

Justice Wood further commented on higher level corruption surrounding drug law enforcement in NSW:

"Perhaps the most disturbing disclosures related to the activities of an elite joint Commonwealth-State Task Force on Drug Trafficking. This was a Force comprised of detectives of supposedly high calibre, integrity and experience, hand chosen from the New South Wales Police Service and the Australian Federal Police, supported with the best available resources and tasked with targeting high level drug dealers. Although it achieved a high conviction rate it quickly became a hot bed of corruption, and there were strong suggestions that participation in corrupt practises became a rite of passage." (Wood 1997)

The evolution of such systemic corruption may have facilitated the establishment of heroin importation and distribution networks in NSW. The capacity and willingness of law enforcement to investigate new drug networks may not have improved following the Wood Royal Commission. A number of changes, such as the disbanding of specialist drug squads, were reported to have left a gap in the policing of mid to higher level drug trafficking.

1.4. Changes to criminal syndicates importing and distributing illicit drugs

In the early 1970s, cannabis became a symbol of rebellion against authority, and produced the first mass market for an illicit drug in Australia (Penington 1999). The demand for cannabis was efficiently exploited by organised criminals, who played a major role in the development of the market (McCoy 1980). Although no single group is thought to have dominated supply, cannabis distribution provided a welcome new business opportunity for criminal entrepreneurs, who between 1972-1977 lost a number of their profitable activities due to the end of the Vietnam War, and public pressure to address some of these issues⁴. Sydney's organised criminals active in the drug trade are thought to have used contacts with corrupt police and politicians acquired through a decade of involvement in the more 'acceptable' illegal industries of gambling, abortion and prostitution, and income generated from illegal drugs, to achieve a balance of power in relationships with corrupt police and politicians (McCoy 1980). This, according to McCoy, permitted Sydney's syndicates to move into drug trafficking with a high degree of protection from law enforcement.

In the mid-1980s, the Australian Federal Police, which replaced the discredited Australian Bureau of Narcotics, disrupted many of the criminal syndicates that had traditionally controlled Australia's heroin distribution, including those of Leonard 'Lenny' McPherson and Arthur 'Neddy' Smith (Lintner 2002). The success of these police campaigns, however, created a vacuum in heroin distribution in NSW.

The Golden Triangle has long been a centre of heroin production and distribution (Degenhardt, Hall et al. 2004). From the late 1980s to early 1990s, high purity South East Asian heroin dominated the east coast US market. In 1994, a joint Royal Thai Government and US DEA operation⁵ disrupted South East Asian heroin trafficking to the US (US Department of Justice Drug Enforcement Administration 2002).

This disruption, along with increased opium cultivation and heroin production in Columbia, allowed Columbian heroin traffickers to replace the supply of South East Asian heroin to the US (Degenhardt, Hall et al. 2004). It also meant that a new destination was required for South East Asian heroin previously trafficked to the US.

South East Asian trafficking groups are thought to have successfully targeted the Australian heroin market to attain significant market share, supplying cheaper, purer, heroin than had previously been supplied to Australia (law enforcement source). This was achieved through links with the increasingly influential and numerous members of Asian crime gangs in Australia, particularly in key areas in Sydney, namely Haymarket and Cabramatta (Lintner 2002).

The vacuum left by the disruption of the dominant syndicates of the 1980s appeared to have been filled in the early 1990s by South East Asian crime syndicates. The heroin market flourished further, but now with a wider range of nationalities involved in street level heroin dealing that had traditionally been controlled by Anglo-Australians (Lintner 2002).

1.5. The location of drug markets

Along with the expansion in the population of heroin users and in the diversity of crime groups involved in distribution, there was a shift in the 1990s in the location of the drug markets in which heroin was distributed.

⁴ The legalisation of abortion, the loss of 'standover' income from prostitutes who serviced American servicemen, and the closing of illegal casinos in December 1977.

⁵ Operation Tiger Trap.

1.5.1. Kings Cross

Kings Cross was long considered Australia's premier illicit drug market. American soldiers visiting Sydney on 'R & R' leave during the Vietnam War (1962-1972) introduced heroin use to prostitutes and bohemians. By the late 1960s, locals had access to heroin in Sydney's Haymarket area and Kings Cross from the market originally established to meet the demand from US soldiers (Rolls 1992).

In the early 1970s, the flourishing Kings Cross drug scene declined with the end of the Vietnam War. The number of drug users in Kings Cross diminished, and the market largely serviced those who lived in the area. During the same time, the heroin and cannabis markets expanded beyond Kings Cross. McCoy (1980) suggested that criminals from Sydney's Eastern suburbs, began to associate with "counter-culture trendies" who had travelled the world and used cannabis, hashish, LSD, opium and heroin. This may have led to the development of drug markets outside the Kings Cross area (McCoy 1980).

By the 1980s, Kings Cross was home to a thriving open air drug market, dealing in heroin, cannabis, amphetamine, and later, "party drugs" such as ecstasy and more recently cocaine and methamphetamine. The drug market offered opportunities for small time and large scale drug dealing (Southgate, Day et al. 2003). The district attracted local and out-of-town injecting drug users (IDU), sex workers, young people, a nightclub crowd, backpackers and an array of tourists and visitors (Southgate, Day et al. 2003). Public injecting was common: by 1998, 32% percent of residents surveyed in Kings Cross reported that they had witnessed at least one public injection episode in the prior month (MacDonald, Rutter et al. 1999). Commercial drug injecting rooms were present in Kings Cross from at least the early 1990s (Rutter, Dolan et al. 1997), and were brought to public attention during the Wood Royal Commission (Dolan, Kimber et al. 2000). The thriving red light district in Kings Cross also resulted in at least two 'safe houses' (rooms-for-rent that cater for brief sex work liaisons) where injecting was known to take place (Southgate, Day et al. 2003).

1.5.2. Cabramatta

In the early 1990s, there was a notable increase in heroin distribution and use in the South West Sydney suburb of Cabramatta, thought to be related to links between significant groups in the area and heroin traffickers in South East Asia (Lintner 2002). From the early 1990s, there were increasing reports of heroin in the area, thought to be "Chinese No. 4" heroin (Maher, Dixon et al. 1998). The establishment of a visible, street level heroin market in the area led to increases in heroin overdoses, heroin related arrests, other associated crimes. These developments were accompanied by substantial community concern, with numerous reports of public heroin injection, and of increasing numbers of young persons - many of Indo-Chinese descent - involved in the market as user/sellers (Maher, Dixon et al. 1998). Much of the lower level dealing was thought to be relatively freelance, but there was evidence that dealers were in some cases "taxed" by local gangs (Maher, Dixon et al. 1998).

In response to this increasingly visible market, there was a period of "high profile, intensive and sustained police intervention", with increases in the number of beat police, mobile patrols, officers on horseback and police dog teams (p.47; Maher, Dixon et al. 1998). These interventions did not appear to reduce the availability of heroin, but rather led to reports of more risky street based heroin injection, as users attempted to administer the drug before police apprehension (Maher, Dixon et al. 1998). These changes were reported to be particularly among younger users, who were more likely to use in groups and in public settings, and to share equipment, raising concerns about the risk of transmission of blood borne viral infections, particularly hepatitis C (Maher, Dixon et al. 1998).

1.5.3. Redfern

Little has been written about the history of the Redfern drug market. Residents of the Redfern area report heroin use first occurring there in the late 1970s and early 1980s. Heroin use in Redfern and inner city Sydney increased quite quickly from the early 1980s (Morgan and Sleigh 1986). It was reported that by the early to mid 1980s heroin was being brought into the Redfern area by a dealer and sold to around 80 drug users. The sale of heroin was reported to be mainly to regular users living in the area (Morgan and Sleigh 1986). Residents report that the sale and use occurred “in the lanes” of Redfern. Prior to that time, the few Aboriginal people in Redfern that used heroin, bought it from outside the community (Morgan and Sleigh 1986). Most users came from outside the area and passed through the community, without passing their habit onto the community (Redfern 1989). In 1985 Redfern Aboriginal Medical Service (AMS) established a sub-committee “Proposed program for users of Narcotics and Barbiturates” and a proposal was put forward to establish a drug treatment service (Munro 1986). Three drug counsellors were employed at that time. These positions ceased when Australian Government funding was not renewed.

A study in 1986 (Munro 1986) highlighted the urgency of the drug problem and the need for Koori controlled treatment and rehabilitation. In 1986 the Redfern AMS employed a person to investigate available drug services (Morgan and Sleigh 1986). A further study describing the extent of heroin use in the Aboriginal community and making recommendations regarding treatment and education services was completed in 1986 (Morgan and Sleigh 1986).

From early 1988 the availability of heroin in Redfern reportedly increased, as did the number of users (Morgan and Sleigh 1986). The Central Sydney Area Health Service (CSAHS) established a needle and syringe program (NSP) in the area in May 1989. Heroin use and supply were observed by NSP workers to be occurring in hotels in Redfern and Newtown at that time. A permanent NSP service to the Redfern area was established in 1991 (Manager 2003).

It has been argued by Lintner (Lintner 2002) that the drug market in Redfern was in part developed through links developed in prisons and juvenile detention. He argued that indigenous Australians in custody may have developed links with persons of Indochinese descent also detained, leading to the establishment of the drug market in Redfern (Lintner 2002).

Whatever the reason for the development, there has been a small, street based market in Redfern for around 20 years, which has involved the sale of heroin and cocaine in a small locale to injecting drug users of both indigenous and non-indigenous descent.

1.6. Conclusions

The heroin market in NSW expanded significantly during the 1990s. This was evidenced by increases in the health harms associated with heroin use, and increased numbers of persons in treatment for heroin dependence. The price of heroin decreased, purity at the street level increased, and heroin was the drug most commonly injected by injecting drug users in NSW.

The increase in the scale of the heroin market in NSW, as elsewhere in the country, was probably connected to a number of factors. This included the fact that there was a cohort of young persons willing to try the drug; an increase in the scale of heroin importation to Australia by organised crime groups from South East Asia; and an inability on the part of drug law enforcement (DLE) nationally particularly in the early to mid 1990s to effectively police the supply and distribution of heroin. This was as a result of reduced funding for DLE at the national level and of corruption (and a subsequent Royal Commission into this) in NSW Police particularly related to DLE.

Chapter 2. Documenting the Heroin Shortage

Carolyn Day

Summary

- In early 2001 heroin supply decreased as indexed by: an increase in time taken for regular drug users to purchase drugs, a decrease in the proportion of regular injecting drug users reporting heroin as 'very easy to obtain', and an increase in price.
- An increase in the price of heroin occurred in 2001, having decreased steadily since 1996.
- A reduction in purity also occurred, as reported by drug users and NSW Police heroin seizures.
- The peak period of the shortage appears to have been January to April 2001.
- The market appears to have stabilised since that time, though it has not returned to pre-2001 levels.
- Heroin prices have decreased in NSW for street grams, but the price of 'caps' remain high.
- Heroin purity in NSW has remained low, with perhaps a 10% increase above the lowest recorded levels.

2.1. Introduction

A change in the availability of heroin in NSW was first noted in January 2001 (Day, Topp et al. 2003). This chapter documents those changes by examining changes to the heroin market as measured by the price, purity and availability of heroin. The chapter draws on existing data from the initial research documenting the shortage and data obtained through the Illicit Drug Reporting System (IDRS). To establish the temporal parameters of the shortage, data from initial reports of the shortage and interviews with injecting drug users (IDU) and key informants (KI) are also used.

There are a number of valid indicators of change in illicit drug availability. Data on the availability, purity and price of drugs derived from self reported accounts of drug users and key informants and law enforcement drug seizures are more reliable than other indicators as they are not confounded by other factors. Such data may reflect in patterns of drug use, health outcomes of drug use, availability of treatment, and resources provided to target drug related crime, rather than changes in supply (for a detailed discussion see Degenhardt, Topp et al. 2002).

2.1.1. Data sources used in this analysis

Initial studies

In early 2001 anecdotal reports of a heroin shortage in NSW and Victoria arose from police, staff of drug treatment agencies and needle and syringe programs, as well as researchers in the field. In response to these reports, timely surveys of IDU were conducted in Sydney to examine their veracity (Weatherburn, Jones et al. 2001; Day, Topp et al. 2003). These surveys were small, independent cross sectional studies and relied on the retrospective recall of the previous six months. Their timeliness make them valuable sources of information for documenting the shortage.

The IDRS

The Illicit Drug Reporting System (IDRS), Australia's strategic early warning system has, since 1996, monitored the price, purity, availability and patterns of use of illicit drugs (Hando, Darke et al. 1998). The IDRS annually collects comparable and detailed information from a sentinel population of IDU regarding their history and patterns of drug use. Consistent with recommendations regarding best practice in the monitoring of drug trends (Griffiths, Vingoe et al. 2000), the IDRS also triangulates a number of data sources against the quantitative IDU survey to ensure the validity of its findings. More information regarding the capacity of the IDRS to validly and reliably monitor trends over time in illicit drug use can be found elsewhere (Darke, Kaye et al. 2002; Darke, Topp et al. 2002; Darke, Topp et al. 2002; Topp, Degenhardt et al. 2002).

The IDRS data provide a rigorous examination of changes in patterns of drug use because each year, a comparable sample of a sentinel population of IDU, recruited using the same methods and from the same geographical regions over time, are interviewed regarding their own recent behaviours. These data thus do not rely on retrospective recall to the extent of the studies cited above. The IDRS does, however, represent annual data only, routinely collected mid year, and thus after the peak period of the shortage (see Section 2.3).

The heroin shortage project

The current project also undertook to examine the context and parameters of the heroin shortage. However due to difficulties in obtaining retrospective data from drug users and key informants (Day, Topp et al. 2003), data obtained in the current research project were used only to describe the course of the shortage since it commenced.

2.2. Documenting the shortage

2.2.1. Availability of heroin

Initial research reports clearly indicated that heroin availability had reduced dramatically in early 2001, as indexed by IDU reports of significantly increased 'search time' (the time taken to successfully obtain drugs). Day et al (2003) surveyed 41 IDU in the Kings Cross area of inner city Sydney during mid February 2001, the period now considered to be the peak of the shortage (see Section 3.3). Almost all of these IDU reported that heroin was harder to obtain at the time of interview (mid-February) than it was before Christmas 2000. The length of time that heroin was reported to have been harder to obtain ranged from one to 25 weeks. The most frequently reported time was six weeks, suggesting that most users perceived that the shortage began shortly after Christmas 2000 or in early 2001. These initial reports of the shortage were corroborated by eight of the 10 KI interviewed as part of the study (Day, Topp et al. 2003).

Search time for heroin had increased significantly from a median of 10 minutes before Christmas to 90 minutes in mid-February 2001, though this was measured retrospectively. The longer search time appeared to produce a shift toward opportunistic purchases, with 42% of IDU reporting street purchases before Christmas, compared to 54% at the time of interview (Day, Topp et al. 2003).

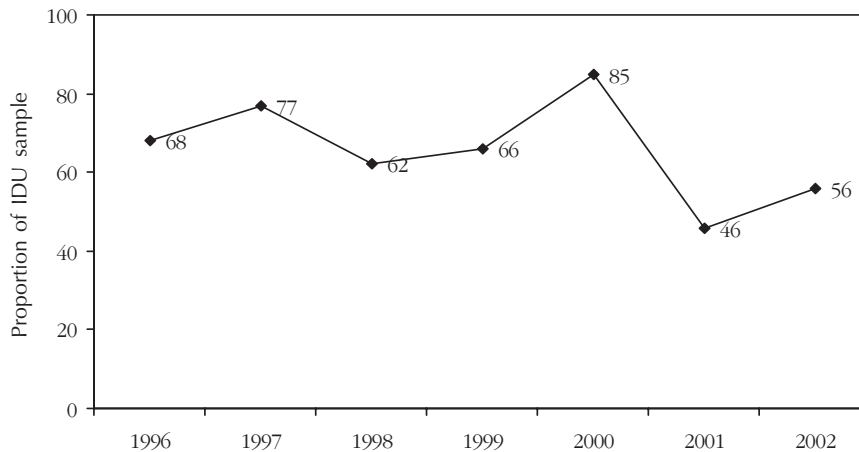
This finding was later supported by Weatherburn et al. (2001) who interviewed IDU about the shortage during mid 2001. Seventy one percent of their sample regarded heroin as more difficult to obtain compared to before Christmas. A significant increase in reported search time, from 11 minutes prior to Christmas 2000 compared to 15 minutes at the time of interview, was also reported (Weatherburn, Jones et al. 2001).

Data available for the IDRS further supported these claims. IDU recruited for the IDRS describe the availability of heroin⁶, and recent changes in availability⁷. Comparison of these results over time (Figure 2.1) demonstrates that, in NSW (as in all jurisdictions with a viable heroin market), the availability of heroin was dramatically reduced in 2001 relative to 2000 (Topp, Kaye et al. 2002). There was a marked decline in the proportion of IDU describing heroin as 'very easy' to obtain (85% to 46%), and a concomitant increase in the proportion of IDU that described heroin as 'difficult' or 'very difficult' to obtain, from 1% to 16%. Likewise, compared to 2000, in 2001 a far greater proportion of the IDU sample reported that heroin had recently been more difficult to obtain (7% versus 37%; Figure 2.2).

⁶ The question asked is: 'How easy is it to get heroin at the moment?' with the possible response options of Very easy, Easy, Difficult, Very difficult.

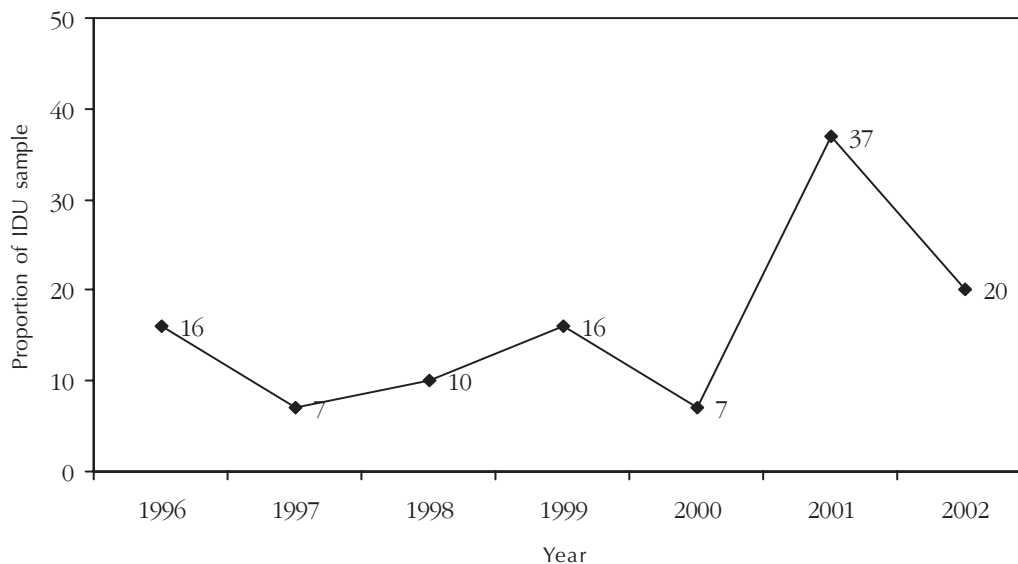
⁷ The question asked is: 'Has the availability of heroin changed in the last six months?' with the possible response options of Easier, Stable, More difficult, Fluctuates.

Figure 2.1 Proportion of IDU who described heroin as very easy to obtain, 1996 – 2002



Source: IDRS IDU Interviews.

Figure 2.2: Proportion of IDU who reported that heroin had recently been more difficult to obtain, 1996 – 2002



Source: IDRS IDU Interviews.

It should be noted, however, that the majority of IDU interviewed for the IDRS still considered that heroin had been 'very easy' or 'easy' to obtain in 2001, suggesting that the changes in the availability of heroin did not cause users great problems obtaining heroin in NSW. Rather, the changes in availability were relative to the pre-Christmas 2000 period, when heroin appeared to be remarkably freely available.

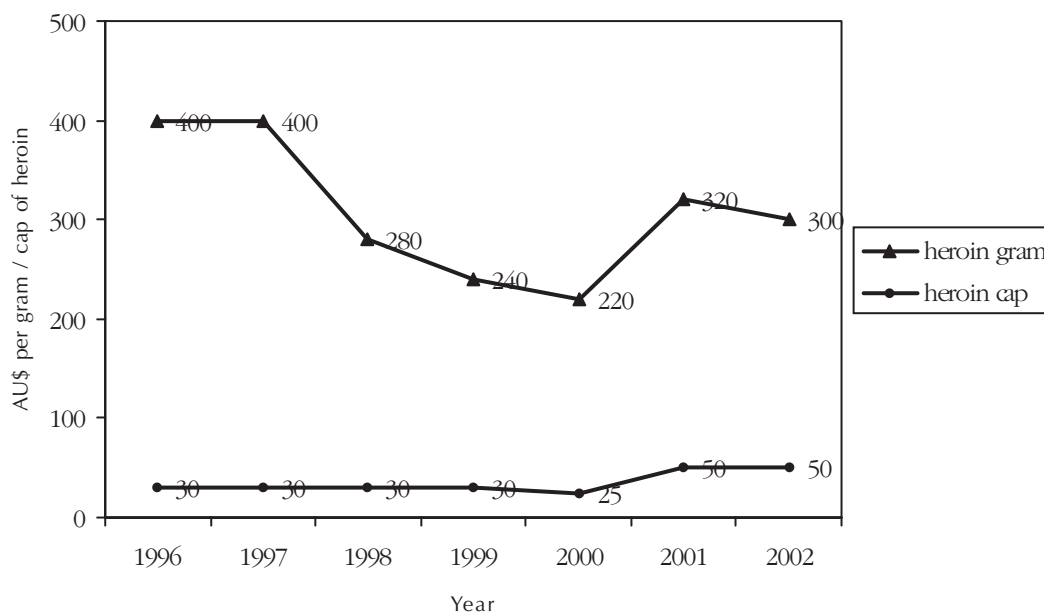
2.2.2. Heroin price

Assuming that demand is relatively stable, decreased availability should increase prices (MacCoun and Reuter 2001). Initial research reports provided evidence of a small increase in the price of heroin. Day et al (2003) found 41% of IDUs reported paying \$70 per quarter gram of heroin and 32% reported paying \$80 in February 2001 compared to 89% of IDUs who reported paying \$70 per quarter gram in 2000 (Topp, Darke et al. 2001). Similarly, research undertaken

during mid 2001 by Weatherburn and colleagues (2001) indicated that the average price per gram of heroin had risen by 75%, from \$218 before the shortage to \$381 after the shortage.

Data from the IDRS are consistent with IDU reports of a heroin shortage in 2001, when the first increases in price were recorded since 1996. Figure 2.3 displays the median price paid between 1996 and 2002 for the last purchase of a gram of heroin and a heroin 'cap' (smallest unit of purchase, usually for personal use) among IDU in NSW. Following stable or decreased prices every year, in 2001 the price of a gram of street heroin rose from \$220 to \$320. Conversely, the price of 'caps', the smallest unit of purchase, remained high (Figure 2.3).

Figure 2.3: IDU estimates of heroin price at street level in NSW, 1996 – 2002



Source: IDRS IDU Interviews.

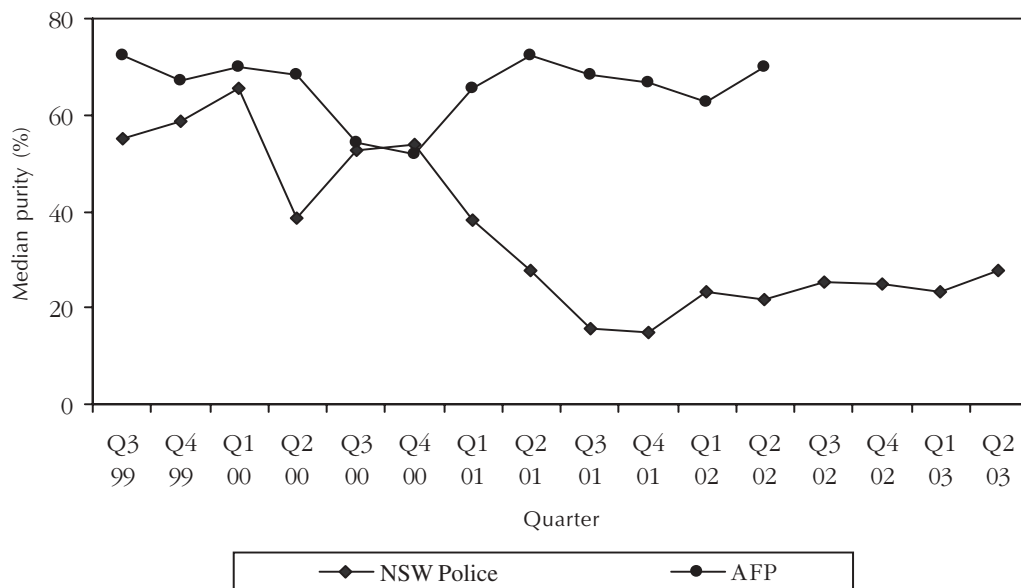
2.2.3. Heroin purity

As would be expected during a period of reduced drug availability, the street level purity of heroin declined around the time of the heroin shortage. Figure 2.4 shows the median purity of heroin seized in NSW, by NSW Police and the Australian Federal Police (AFP). Seizures made by NSW Police result from activities ranging from street level arrests of suspected users to hauls from targeted operations, whereas AFP seizures are more likely to be the result of higher level intercepts, often at the border. The median purity of analysed AFP heroin seizures in NSW has remained relatively stable over time at approximately 70% (Figure 2.4), although the September and December 2000 quarters recorded a decrease to approximately 50% (Australian Crime Commission 2003). The purity of analysed NSW Police seizures however, appears to be more variable with a decline from 65% in the March 2000 quarter to 38% in the June 2000 quarter, and dropping as low as 15% in the last quarter of 2001 (Figure 2.4).

In Sydney, both IDU and KI believed that the purity of heroin had decreased since Christmas (Day, Topp et al. 2003). None of the IDU participants reported heroin purity to be high, and 66% reported it to be low. There were also reports of a change in the type of heroin available since Christmas 2000. Specifically, 34% of IDU reported that the availability of "brown" heroin had increased while that of the usual white or off-white coloured heroin had decreased. Two KI mentioned users reporting that some heroin was more difficult to dissolve (Day, Topp et al. 2003).

These reports were supported by Weatherburn et al. (2001): 82% of their sample regarded heroin as less pure after Christmas 2000 than compared to that before.

Figure 2.4: Purity of heroin seizures analysed in NSW, by quarter, 1999 – 2002



Source: Australian Crime Commission, Division of Analytical Laboratories.

2.3. Chronology of the shortage

The initial reports documenting the heroin shortage clearly demonstrate a sudden reduction in the availability of heroin occurring at the beginning of 2001. Reports of a reduction in heroin availability began to emerge in January 2001 and by the commencement of the first research into the shortage in February 2001 (Day, Topp et al. 2003), it was apparent that supply had dramatically decreased. This time frame was supported by subsequent research investigating the shortage in Sydney (Weatherburn, Jones et al. 2001). Although supply remained fractured throughout 2001, based on these early reports, the peak period of the shortage (i.e. the period in which heroin was most difficult to obtain) appears to have been January to April 2001.

Both drug users and KI were interviewed retrospectively for the current project and asked about timing of the shortage. These data need to be interpreted with caution as the interviews were conducted between 18 and 24 months after the initial reports of the shortage.

The majority of drug users interviewed agreed with the onset of the heroin shortage occurring around Christmas 2000 to early 2001, though there were some differing views and some users noted that they were having problems recollecting the dates. Drug users interviewed noted that the shortage onset was sudden, and not many were prepared for it.

Drug users reported the length of the shortage ranged from three months to one year, with many users reporting the length as “about six months”. Some reported that the shortage was still in progress at the time of interview (pharmacotherapy client interviews).

Many KI were unsure or acknowledged difficulties in placing the exact chronology of the event. Health KI were typically more confident in their estimations than law enforcement KI, with many of the latter unable to comment. Reports from law enforcement and health KI, from the three drug

markets of interest (Kings Cross, Cabramatta and Redfern) and at the State level, also indicate that the shortage commenced somewhere in the period late 2000 to early 2001. Whilst KI in Redfern conceded the shortage commenced late 2000 or early in 2001, it was difficult for many to be precise as most noted fluctuations in availability continued through 2001 and 2002. A police officer involved in drug investigations in Redfern commented:

“We saw the effects, they weren’t immediate, like it didn’t just disappear, but I would have said mid to late 2000...we were buying heroin in August 2001 and it was only just a trickle then. So back in March 2001, it was just nowhere to be found.” (Non Commissioned Officer, Redfern)

Data from the IDRS presented in the preceding section of this Chapter clearly depict a sudden reduction in the availability of heroin in 2001, followed by an increase in 2002, concomitant with an increase in price in 2001, and then a slight reduction again in 2002. Despite some variation, KI and drug user interviews also support this time period.

Given these data, it is reasonable to assume that the ‘heroin shortage’ or, more precisely, a substantial and unexpected decrease in heroin supply, commenced in late 2000, but peaked in 2001. The market appears to have stabilized, though it has not returned to pre-shortage levels, and it is difficult to draw firm conclusions given the aberrant nature of the market.

2.4. Conclusions

In early 2001 Australia experienced a sudden and dramatic decrease in heroin availability. These reports were further validated by the 2001 IDRS: in 2001 illicit drug markets in NSW underwent a fundamental shift in which the availability of heroin, the most widely preferred injectable drug, decreased. Concomitant with the decrease in availability was an increase in price, the first recorded since 1996. Purity also decreased, but the available evidence indicates that this occurred only at the street level. The purity of imported heroin seized at the border remained stable.

Reports to date indicate that the shortage peaked in early 2001, more specifically, January to April of that year. The price and reported availability of the drug has since increased, but neither price nor availability appears to have returned to the level recorded before 2001. Ongoing surveillance is necessary to determine the full impact of the 2001 changes on the heroin market.

Chapter 3. Changes in Patterns of Drug Use

Louisa Degenhardt and Carolyn Day

Summary

- A reduction in heroin supply was associated with a reduction in heroin use among regular IDU, and probably in the extent of heroin use in the community. This will be considered in a more detailed fashion in Chapter 5, where estimates of the number of heroin users are reported.
- In the short term, drug substitution occurred, with some users clearly using other drugs in a risky manner.
- A shift by some IDU to cocaine injection was clearly documented, and was reflected in community level data regarding calls about cocaine use.
- Methamphetamine use has been increasing in recent years, but there was no clear shift at the time of the heroin shortage.
- Benzodiazepine use was mentioned by KI and users, but not reflected in community level data, suggesting that although some groups may have switched to this drug use, they were small in number.

3.1. Introduction

When considering the effects of the heroin shortage, potential changes in patterns of drug use were an important focus. This included the types of drugs used and the frequency of use. There was also an interest in the extent to which it was possible to examine changes in drug use in the general community, as well as among groups of regular injecting drug users (IDU). Examining these different populations required the use of different data sources.

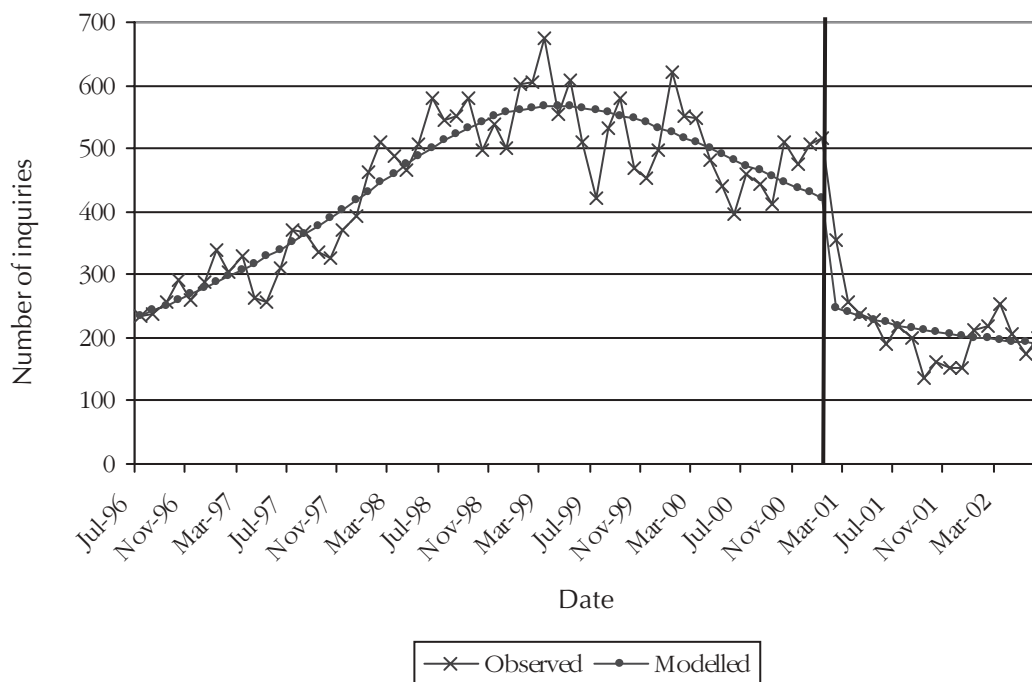
A range of data was used in this Chapter:

- Data from the NSW Alcohol and Drug Information Service (ADIS) on the number of persons calling (drug users or those close to them) about different drug types. This data was examined to see whether there was a change detectable at the community level in calls of concern about heroin, amphetamines, cocaine and cannabis. ADIS data has previously been shown to reflect trends in heroin use (Hall, Ross et al. 2000);
- Data from the General Practice Research Network (GPRN) on the number of prescriptions written for benzodiazepines (both tablets and capsules);
- Data from sentinel sites in Kings Cross on the number of IDU injecting different drug types (Medically Supervised Injecting Centre (MSIC) and the Kirketon Road Centre Needle Syringe Program (KRC NSP));
- Data on self reported drug use by IDU collected as part of the Illicit Drug Reporting System (IDRS) (Roxburgh, Degenhardt et al. 2003);
- Key informant (KI) interviews with both health and law enforcement about potential changes in drug use;
- Interviews with active heroin users and persons enrolled in pharmacotherapy treatment (NSW Pharmacotherapy Clients) about potential changes in their own and their peers' drug use.

3.2. Heroin

Figure 3.1 shows the number of calls to ADIS about heroin use between 1996 and 2002. As can be seen, there was a peak in March 1999 and a subsequent decline, which appeared to accelerate at the time of the heroin shortage. The change associated with the heroin shortage represented a drop of 40% from the immediate pre-shortage level, occurring one month after the shortage. This decrease was highly statistically significant ($p < .001$; see Appendix C for details). Heroin enquiries have since remained at this lower level.

Figure 3.1: Number of inquiries to ADIS regarding heroin, NSW July 1996-June 2002



Data from IDU interviewed as part of the Illicit Drug Reporting System (IDRS) suggested that although the proportion of IDU reporting heroin use (in the six months preceding interview) did not decrease, the median number of days of heroin use (in the preceding six months) decreased from daily use (180 days) in 2000 to 158 days in 2001 (Table 3.1). The frequency of heroin use increased again in 2002 to the levels seen prior to the heroin shortage, as did the proportion of IDU who reported daily heroin use.

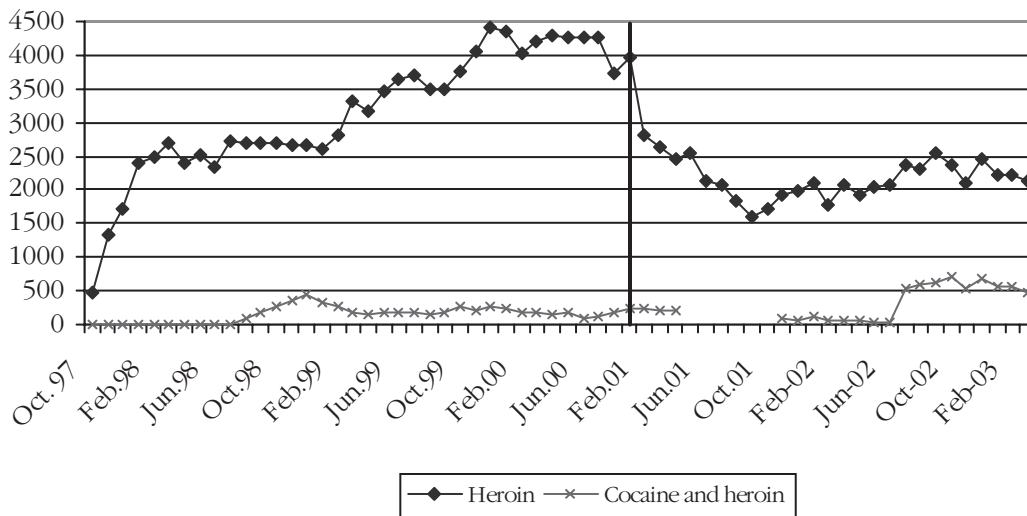
Table 3.1: Heroin use among regular IDU samples, 1996-2002

	1996	1997	1998	1999	2000	2001	2002
	n=152	n=154	n=176	n=156	n=150	n=163	n=158
% used last 6 months	93	93	94	99	93	96	96
Median days used	120	120	180	180	180	158	180
% daily users	36	26	56	58	49	42	53
% last drug injected	n/a	n/a	n/a	n/a	78	57	74
% drug injected most in last month	n/a	n/a	n/a	n/a	79	58	73

Source: NSW Illicit Drug Reporting System IDU interviews.

The IDRS data suggest that among IDU *who remained active in the market*, the frequency of heroin use returned in 2002 to the frequency prior to the shortage. However, data from the sentinel NSP site in Kings Cross suggested that overall, the number of clients who reported heroin as the last drug injected remained at lower levels (Figure 3.2).

Figure 3.2: Number of visits to a Kings Cross NSP where heroin was reported as the last drug injected, 1997-2003



Source: Kings Cross NSP.

The continuation of lower numbers of calls to ADIS about heroin, and lower overall numbers of persons reporting heroin as the last drug used, is consistent with the possibility that although some regular IDU who stayed in the market may have increased their heroin use since the peak period of the heroin shortage, there may be fewer such users. The possibility of a change in the number of regular heroin users is considered in Chapter 5.

3.2.1. Substitution of other drugs for heroin

Reports from both KI and heroin users suggested that in the short term, heroin users turned to other drugs when heroin became less available. As one client remarked: "each found their own distraction" (NSW Pharmacotherapy Client). Although substitution was described by some KI as indiscriminate, drug users could generally provide a rationale for the drugs they used. Cocaine and benzodiazepines were reported by KI and NSW Pharmacotherapy Clients as the drugs most commonly substituted.

Drug users reported that benzodiazepines were used to manage withdrawal symptoms as well as mixed with low purity heroin or methadone to achieve a level of intoxication similar to heroin.

"Now they mix it [heroin] with tablets, Normison... That's not so new [using benzodiazepines and heroin] but now the heroin is more expensive, cut, so people take the Normison to get more effect. There has been an increase in the market for methadone over the past few years. People get takeaways and sell them for \$1 a mil [millilitre]. It helps people control their habit with a cheaper alternative [to heroin], pills and methadone". (NSW Pharmacotherapy Client, Cabramatta)

A drug user in Kings Cross described her reasons for injecting benzodiazepines during the shortage:

"Then I got sick [withdrawals] and now physically I'm suffering really badly now due to going to the pills. Like it was substituting, I was substituting the heroin that I couldn't get with injecting pills.

[So pills have a sort of similar effect [to heroin] do they?]

"The Normison did on top of the methadone. It had the same effect. On top of the

methadone it had the same effect as heroin would of by itself if I wasn't on the 'done.'
(NSW Pharmacotherapy Client, Kings Cross)

The injection of cocaine by heroin users was the most frequently reported first sign of the heroin shortage by law enforcement KI. Drug users explicitly informed police that they were using cocaine because they could not obtain heroin.

The substitution of other drugs for heroin, in particular cocaine and benzodiazepines, was also noted in Redfern:

"There was definitely a more chaotic usage, meaning people were taking benzos intravenously, or previously had only swallowed them, and people were injecting speed where perhaps previously they might have swallowed it. And certainly opiates, people were injecting crushed up tablets, where previously they'd take a long acting pill...Australians inject, Australians inject and inject and inject. But certainly there was a move to injecting other drugs that previously they wouldn't have dreamt of injecting."
(General Practitioner, Redfern)

A drug user described drug substitution among her associates in the Cabramatta market:

"My friend started to use coke and speed. Everyone started to use speed, Es [ecstasy] and amphetamines. Guys in their 30s and 40s are becoming more interested in it [ecstasy] usually it's just the 18-20s. People were getting street methadone and tablets." (NSW Pharmacotherapy Client)

This substitution was thought by some KI to be rather indiscriminate. The primary aim for some drug users appeared to be not how to find drugs with a similar effect, but how to find drugs which would achieve a desired level of intoxication and to relieve symptoms of withdrawal:

"... they were using other drugs with heroin as it was very hard to get and they couldn't get wasted." (General Practitioner, Redfern)

"It changed the pattern of drug use to, as I say, people transferred over to stimulant drugs which sounds really strange because most people stick to their other drug, you know, depressants or stimulants, but it's what was available so that's what they used. Bad thing really." (Manager Drug Health Service, Cabramatta)

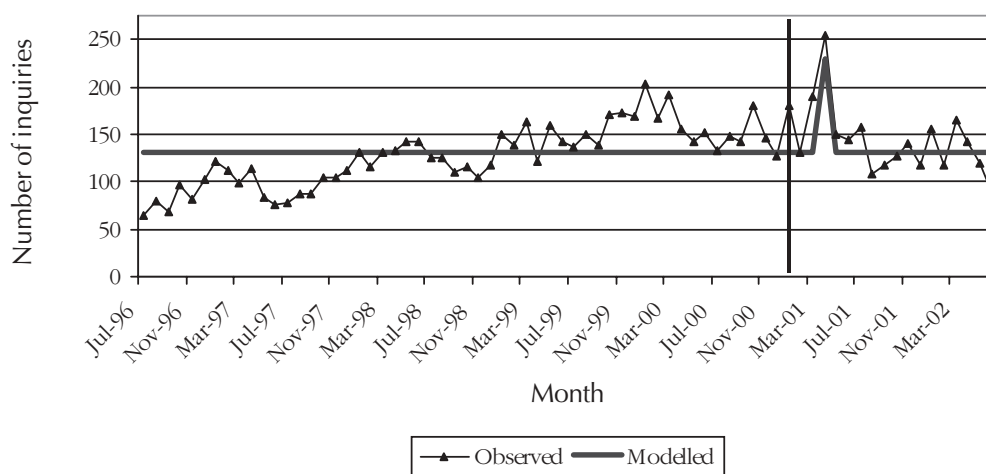
"I think the bottom line is just that people turn to alternative substances, psychostimulants and alcohol and cannabis, anything to supplement." (Manager Drug Health Service, Redfern)

"... what drug they used next was largely dictated by whatever was being supplied. So it was very supply driven. So if there was a coke dealer on the street, then coke would be used, if there was a heroin dealer on the street, then heroin would be used. And rarely were both on the street such that people could choose ... they wouldn't even know what it was, they were just using a drug, and any drug was good enough." (Medical Professional/Manager Drug Health Services, Kings Cross)

3.3. Methamphetamine

The number of methamphetamine⁸ related calls to ADIS is shown in Figure 3.3. The modelled series produced by the time series analysis is also shown in this graph (see Appendix C for details). The overall mean of the modelled series was around 131 calls per month, whereas during March-June 2001, the average was around 157, a significant change ($p < .001$). The change following the onset of the heroin shortage thus represented a 63% increase in the number of methamphetamine related calls to ADIS. This effect occurred three months after the onset of the shortage, and then subsided to pre-shortage levels.

Figure 3.3: Number of inquiries to ADIS regarding methamphetamine, NSW July 1996- June 2002



Source: Alcohol and Drug Information Service.

Consistent with this change, there were some reports by KI of increased use of methamphetamine, and the reported availability of these drugs increased in 2001 and 2002 (Topp, Degenhardt et al. 2002; Roxburgh, Degenhardt et al. 2003). These trends were supported by KI in all drug markets. Data from the IDRS suggested that the proportion of IDU who had used methamphetamine in the previous six months might have increased slightly in 2001 compared to 2000 (51%, compared to 40%), and remained at 48% in 2002 (Table 3.2).

Table 3.2: Methamphetamine use among regular IDU samples, 1996-2002

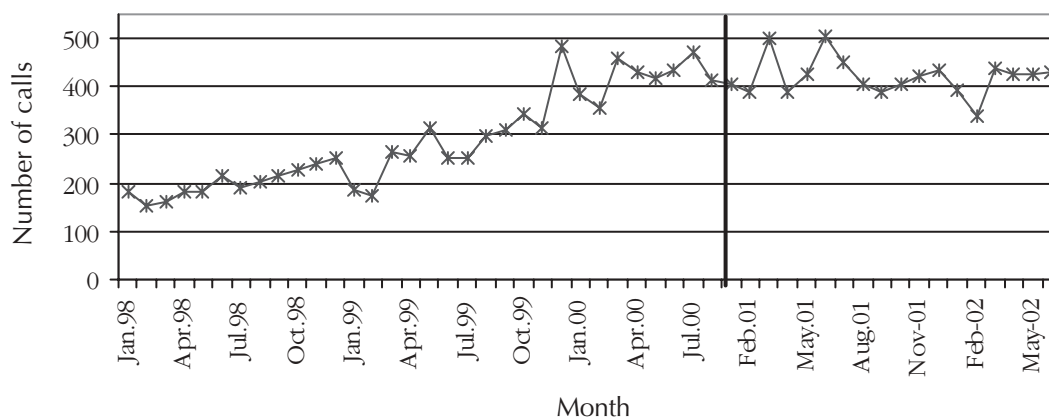
	1996 n=152	1997 n=154	1998 n=176	1999 n=156	2000 n=150	2001 n=163	2002 n=158
% used past 6 months	48	55	35	37	40	51	48
Median days used	-	10	9	5	6	7	8
% daily users	-	0	1	1	<1	1	1

Source: NSW Illicit Drug Reporting System IDU interviews.

⁸ It must be noted that ADIS calls about methamphetamine are classified as "amphetamine", but the overwhelming majority of amphetamines in Australia are methamphetamine (Australian Crime Commission (2003). Australian Illicit Drug Report 2001/02. Canberra, Australian Crime Commission) so it will be assumed that these calls refer to methamphetamine.

Data from a sentinel site in the area, which collects data on the last drug injected by clients (Figure 3.4), suggested that in the two years prior to the heroin shortage, there was a steady increase in the number of persons reporting that methamphetamine was the last drug injected. The number appeared to stabilise prior to the onset of the shortage, with 400-500 persons per month reporting methamphetamine injection from mid-2000 onwards.

Figure 3.4: Number of visits to a Kings Cross NSP where methamphetamine was reported as the last drug injected, 1997-2003



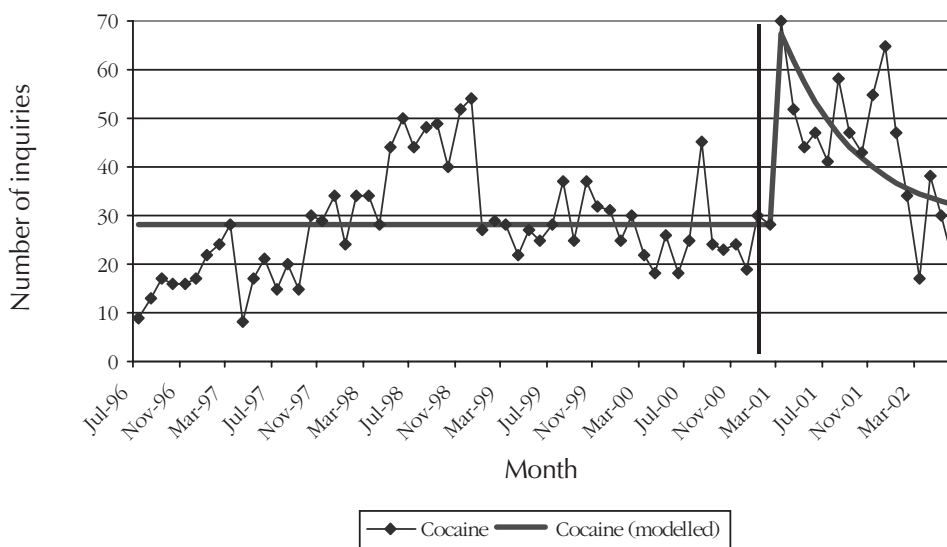
Source: Kings Cross NSP.

In summary, it would appear that there were no marked increases in methamphetamine use that were *strongly* associated with the reduction in heroin supply, but potentially a short term increase in ADIS calls in the months following the shortage. Rather, there appears to have been a trend over past years towards more common methamphetamine use among regular IDU.

3.4. Cocaine

There was a significant increase (138%, $p < 0.0001$) in cocaine related calls to ADIS at the time of the shortage that took some time to decay (see Appendix C for details). Figure 3.5 shows the observed and modelled series for this indicator.

Figure 3.5: Number of inquiries to ADIS regarding cocaine, NSW July 1996- June 2002



Source: Alcohol and Drug Information Service.

IDRS data suggested that between 2000 and 2001, there was an increase in the prevalence of recent cocaine injection by regular IDU, from 63% to 84% (Table 3.3), remaining at 79% in 2002. Frequency of recent cocaine injection increased dramatically in NSW. In 2000 the median number of days of injection in the preceding six months was 12. In 2001, IDU reported a median of 90 days of injection in the preceding six months. There was a marked increase in the proportion of IDU that reported daily cocaine injection, rising from 5% in 2000 to 29% in 2001.

Cocaine use among this group appeared to continue after some return of heroin availability (in 2002), as reflected by the prevalence of cocaine injection in the past six months from 2001 to 2002. However, the frequency of cocaine use among this group decreased, with the median number of days' use in the preceding six months dropping from 90 days in 2001 to 24 days in 2002. This was associated with a higher proportion of IDU reporting that cocaine was more difficult to obtain (Roxburgh, Degenhardt et al. 2003).

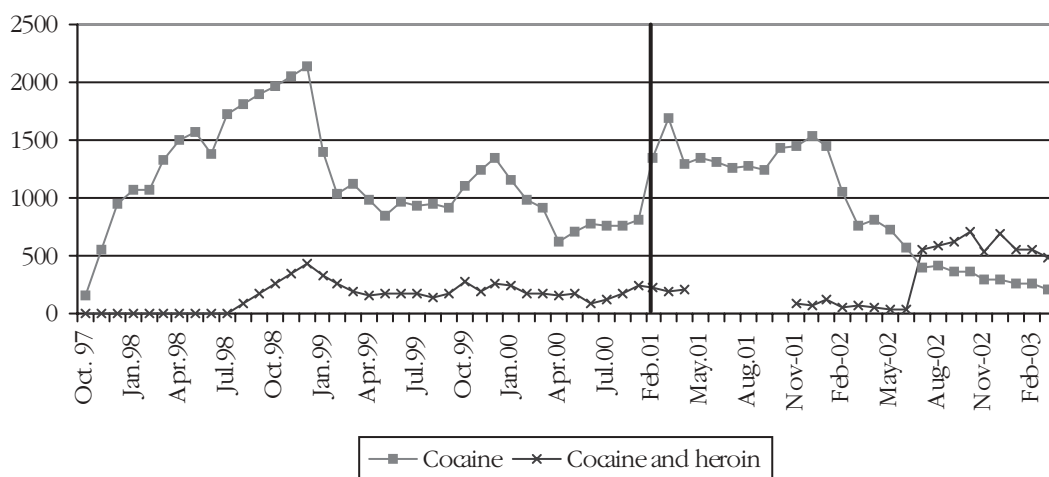
Table 3.3: Cocaine use among regular IDU samples, 1996-2002

	1996 n=152	1997 n=154	1998 n=176	1999 n=156	2000 n=150	2001 n=163	2002 n=158
% used past 6 months	41	34	59	67	63	84	79
Median days used	3	4	24	12	12	90	24
% daily users	0	0	10	9	5	29	10

Source: NSW Illicit Drug Reporting System IDU interviews.

All police KI in Kings Cross reported many more people using cocaine in the area during the heroin shortage. This was consistent with data from a sentinel site in the area, which collects data on the last drug injected by clients (Figure 3.6). The data showed a large increase in cocaine injection by clients following the onset of the heroin shortage. IDRS data also shows an increase in cocaine as the last drug injected in 2001 (36% compared to 8% in 2000 and 16% in 2002).

Figure 3.6: Number of visits to a Kings Cross NSP where cocaine was reported as the last drug injected, 1997-2003



Source: Kings Cross NSP.

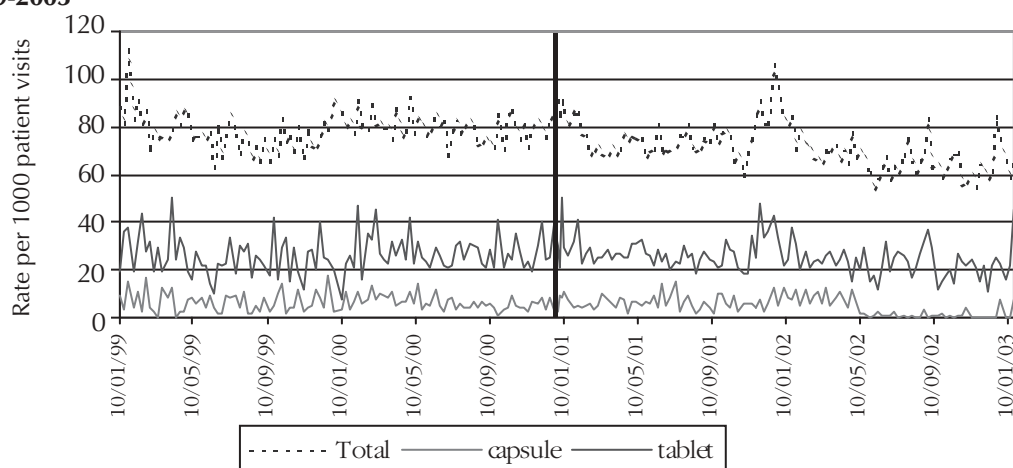
An increase in the use and availability of cocaine was the most frequently reported change in Redfern.

“... they’d say, ‘I’m a heroin addict, about 20 years, but I’ve been using a whole lot of coke recently, I don’t even know why’. I knew why, or if they thought about it [they would have known too]: the heroin wasn’t available or wasn’t strong enough and they ended up using another drug.” (General Practitioner, Redfern)

3.5. Benzodiazepines

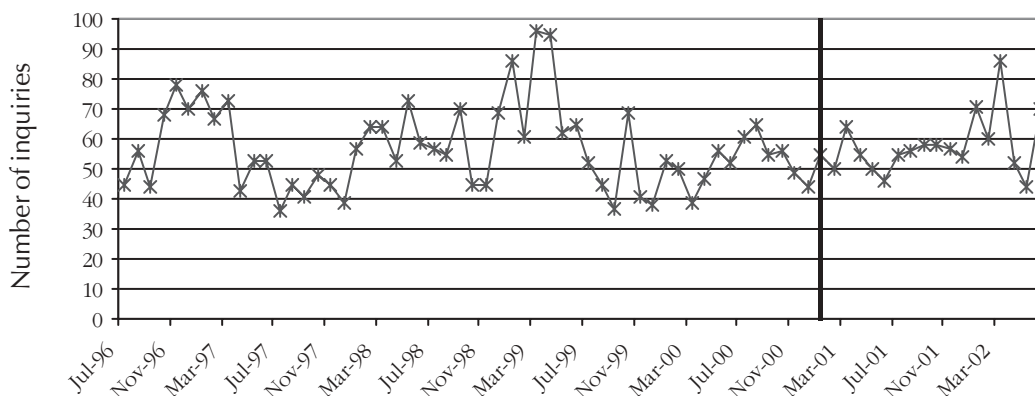
There was no evidence of any increase in prescriptions written by general practitioners (GPs) for benzodiazepines in NSW concomitant with the reduction in heroin supply (Figure 3.7). There was also no significant change in the number of calls to ADIS regarding benzodiazepines associated with the onset of the heroin shortage (Figure 3.8). Data from the IDU interviewed as part of the IDRS suggested that the use of benzodiazepines has remained fairly consistent across the years 1996-2002 (Table 3.4).

Figure 3.7: Rate of benzodiazepine prescriptions per 1000 patient visits per week in NSW, 1999-2003



Source: General Practice Research Network (GPRN) database.

Figure 3.8: Number of inquiries to ADIS regarding benzodiazepines, July 1996- June 2002



Source: Alcohol and Drug Information Service.

Table 3.4: Benzodiazepine use among regular IDU samples, 1996-2002

	1996 n=152	1997 n=154	1998 n=176	1999 n=156	2000 n=150	2001 n=163	2002 n=158
% used past 6 months	70	74	60	61	61	56	58
Median days used	8	16	17	20	20	20	13
% daily users	4	11	8	11	10	9	6

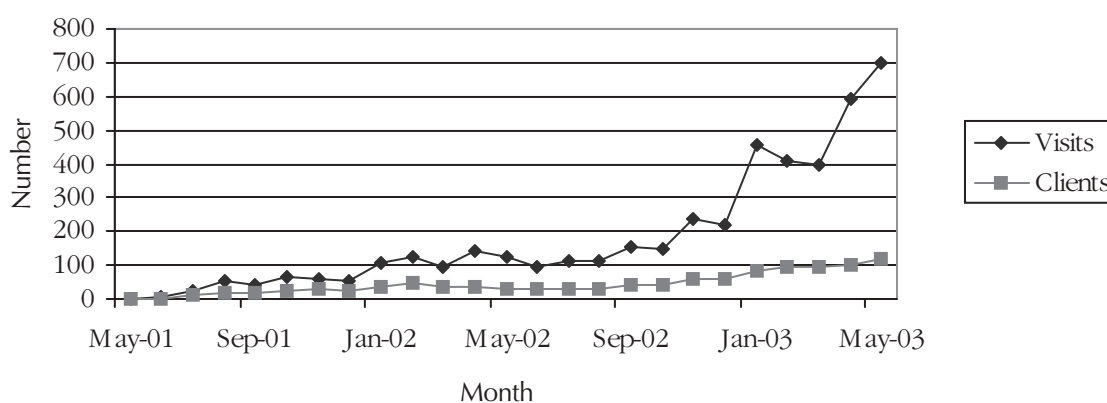
Source: NSW Illicit Drug Reporting System IDU interviews.

Despite the lack of change noted in these routine data collections, KI and users interviewed for this study reported that benzodiazepines were substituted by some IDU for heroin when it was less available. Users commonly reported increased use and injection of Valium®, Temazepam®, Normison® and Rohypnol® (NSW Pharmacotherapy client interviews).

“ ... there were [many people] injecting benzodiazepines at the time [the height of the heroin shortage] – a lot of injected Temazepam ... they were using stacks orally [as well], whatever they could get their hands on. Temazepam was a big one. A lot of Serepax. Those were the biggest two ... People were hanging out and using the benzodiazepines to treat their heroin withdrawals” (Medical Professional Drug Health Service, Redfern)

“... they were using other prescription drugs such as Normison ... quite often I would see them sitting in the gutter inserting a needle into the actual Normison capsule and injecting that into themselves.” (Commissioned Officer, Redfern)

There were increased reports of benzodiazepine injection (e.g. Temazepam) by some KI interviewed in Kings Cross. Data from the Kings Cross Medically Supervised Injecting Centre (MSIC), which began operation in May 2001, shows increasing numbers of IDU injecting benzodiazepines, reported by staff to be Temazepam capsules, in the MSIC (Figure 3.9).

Figure 3.9: Number of visits and clients involving benzodiazepines in the Kings Cross MSIC, May 2002-June 2003

Source: Kings Cross Medically Supervised Injecting Centre.

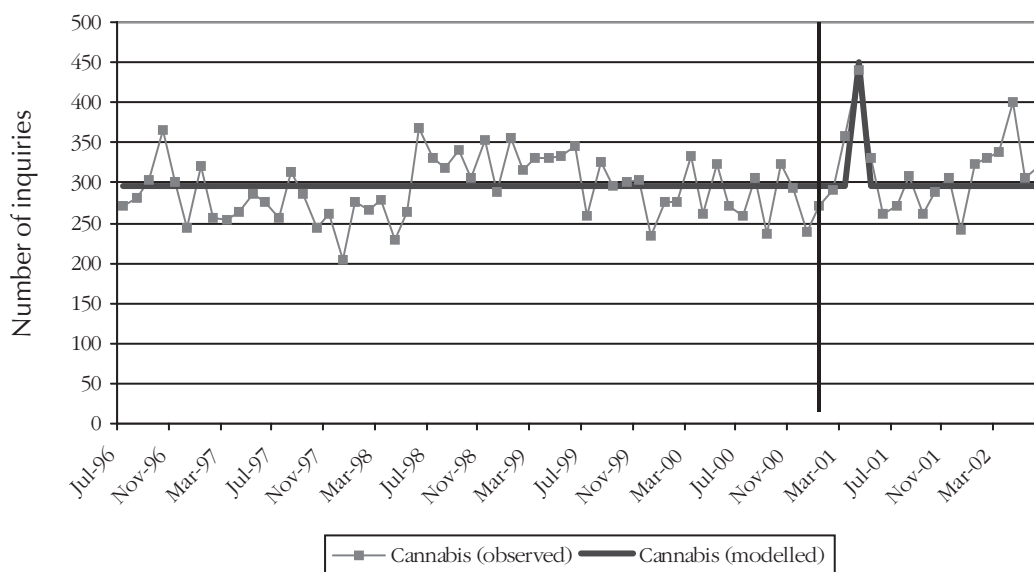
These findings suggest that although there was no detectable change noted in these community level data sources, there may have been increases in benzodiazepine use among certain groups of IDU. Given that these changes were not detectable using other community level data sources, the change among these groups was either relatively small (e.g. an increase in amount, or change

in route of administration among those already using benzodiazepines), or the number of IDU in these groups was small and therefore would not affect community level trends.

3.6. Cannabis

Figure 3.10 shows the number of calls to ADIS regarding cannabis. The modelled series showed an increase of 52% on the mean level of calls, for one month, occurring three months after the onset of the heroin shortage and dropping rapidly back to pre-shortage levels ($p < 0.0001$; see Appendix C). Data from the IDRS suggested that the proportion of regular IDU using cannabis recently, and on a daily basis, remained consistent following the reduction in heroin supply (Table 3.5).

Figure 3.10: Number of inquiries to ADIS regarding cannabis, July 1996 - June 2002



Source: NSW Alcohol and Drug Information Service.

Table 3.5: Cannabis use among regular IDU samples, 1996-2002

	1996 n=152	1997 n=154	1998 n=176	1999 n=156	2000 n=150	2001 n=163	2002 n=158
% used past 6 months	85	85	69	83	72	83	80
Median days used	51	100	60	90	120	90	81
% daily users	26	27	20	30	33	33	33

Source: NSW Illicit Drug Reporting System IDU interviews.

3.7. Other drug use

3.7.1. Diversion of pharmaceutical opioids

Heroin users reported that the market for “street” (diverted) methadone increased following the onset of the shortage, and a few users reported that the prices went up accordingly (NSW Pharmacotherapy Clients). Those users who entered methadone treatment programs found they were being approached to sell their takeaway doses more than usual (NSW Pharmacotherapy Clients).

3.7.2. Polydrug use

Many KI reported an increase in polydrug use among heavy, long term heroin users, particularly the use of cocaine and benzodiazepines, which was seen as a negative outcome of the heroin shortage for drug users. Some respondents reported that the use of alcohol increased alone and in combination with other substances.

All health KI in Redfern reported a change in the drugs used by heroin users during the shortage, both alone and in combination with each other. For some drug users this was a new behaviour.

“People were suddenly finding themselves using speed and benzos, quite anti-social things, and of course suffering the consequences ... true polydrug use, meaning abusing drugs from different drug classes, became much more common.” (General Practitioner, Redfern)

There were reports that the use of ecstasy with other “party drugs” increased in place of heroin among young people in Cabramatta

3.8. Conclusions

- A reduction in heroin supply was associated with a reduction in heroin use among regular IDU, and probably in the extent of heroin use in the community. This will be considered in a more detailed fashion in Chapter 5, where estimates of the number of heroin users are reported;
- In the short term, drug substitution occurred, with some users clearly using other drugs in a risky manner;
- A shift by some IDU to cocaine injection was clearly documented, and was reflected in community level data regarding calls about cocaine use;
- Methamphetamine use has been increasing in recent years, but there was no clear shift at the time of the heroin shortage;
- Benzodiazepine use was mentioned by KI and users, but not reflected in community level data, suggesting that although some groups may have switched to this drug use, they were small in number.

Chapter 4. Changes in Injecting Drug Use

Louisa Degenhardt, Carolyn Day, Linette Collins and Amy Gibson

Summary

- A sustained, State wide reduction in distribution of needle/syringes followed the reduction in heroin supply.
- There appeared to be an overall reduction in the frequency of heroin injection and a concurrent increase in frequency of injection of other drugs, particularly cocaine and benzodiazepines, among some groups in the months following the reduction in heroin supply.
- Injecting risk behaviour associated with cocaine use was reported, however, it is unclear if the frequency of injecting risk increased during the heroin shortage.
- A range of problems was reported among some groups, mainly associated with cocaine and benzodiazepine injection, concurrent with the reduction in heroin availability.
- The number of notifications of HIV and hepatitis B do not appear to have been affected by the heroin shortage in the short term.
- The number of hepatitis C notifications appears to have decreased, especially among younger age groups (15-19, 20-24 years).

4.1. Introduction

As with changes in the use of drug types (considered in Chapter 3), it was also of interest to examine changes in injecting drug use (IDU). Injecting drug use has been linked to a number of health related problems such as abscesses and thromboses (Haverkos and Langer 1990; Binswanger, Kral et al. 2000) and the transmission of blood borne viral infections (BBVI) through the use of risky injecting practices such as sharing injection equipment (Crofts, Hopper et al. 1994; Levine, Vlahov et al. 1994; MacDonald, Crofts et al. 1996; MacDonald, Wodak et al. 1997; Dore, Law et al. 2003).

To this end, an investigation was conducted to detect changes (or otherwise) in:

- the extent of injecting drug use; the frequency of injecting drug use among those who continued to inject drugs;
- potential changes in injecting practices, risky injecting and injection related problems; and
- possible changes in the number of cases of transmission of BBVIs including the hepatitis B virus (HBV), hepatitis C virus (HCV) and HIV.

The extent of injecting drug use was examined using data on needle/syringes distributed by public needle and syringe programs (NSP), and purchases of “fitpacks” by pharmacies under the Pharmacy Fitpack Scheme (PFS). Such data must be interpreted with caution: for example, a reduction in the number of needle/syringes distributed by an NSP may reflect the fact that it was closed for some period of time; that operating practices may have changed (e.g. bulk distribution was ceased). Conversely, a *lack* of a change may reflect, for example, more frequent use of needle/syringes by a smaller group of people who inject other drugs such as cocaine or methamphetamine. Nevertheless, it is possible to triangulate these data across geographical areas and against the reports of key informants (KI) to assess the validity of the trends observed.

Information from a range of sources was also examined to identify possible changes to the frequency of, and possible problems related to, injecting drug use that may have occurred as a result of the reduction in supply of heroin. These data included:

- NSW Emergency Department (ED) data and NSW hospital separations data regarding injecting related presentations;
- Data from NSW Health on the number of notifications of HBV, HCV and HIV;
- Reports of KI in health and law enforcement about possible changes in injecting drug use and related harms; and
- Reports of heroin users regarding possible changes among themselves and their peers in injecting practices and related harms.

4.2. Extent of injecting drug use

4.2.1. New South Wales

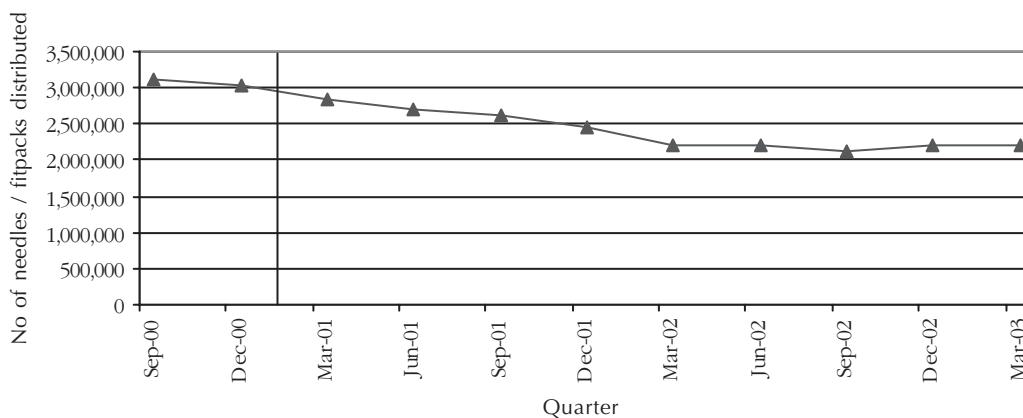
Figure 4.1 shows the number of needles/syringes distributed in NSW between 2000 and 2003. Two data sources have been used in these analyses: the number of “fitpacks” (contains 1 ml needle/syringes) purchased by pharmacists under the NSW Pharmacy Fitpack Scheme (PFS), and the number of 1 ml needle/syringes distributed through public needle/syringe programs (NSP)⁹. The two data sources have been summed, as advice suggested that quarterly reporting allowed the

two sources to be comparable to needle/syringe distribution (Westcott and Iversen, personal communication).

Needle/syringe distribution in NSW decreased at around the time of the onset of the heroin shortage (Figure 4.1). The reduction in activity was sustained until the end of the period for which data were available. The number of needles distributed in NSW decreased from around 3.25 million per quarter immediately prior to the heroin shortage, to just under 2.5 million in mid-2002 – a decrease of around 25%.

KI reports supported this finding, describing a reduction in NSW in the demand for needle/syringes, which was not attributed to any change in the NSP operations. Indeed, this occurred when funding for NSP was increasing in order to assist NSP to conduct case management and refer drug users to drug treatment.

Figure 4.1: Number of needles distributed in NSW, 2000-2003



Source: AIDS & Infectious Diseases Branch, NSW Department of Health.

A decrease in the number of complaints received regarding needle/syringe activity (usually related to unsafe disposal of injecting equipment) was also reported by State level KI:

“... in retrospect the years of calm do correspond to the period of reduced heroin supply. We have noticed a hell of a lot less complaints.” (Policy Officer, NSW)

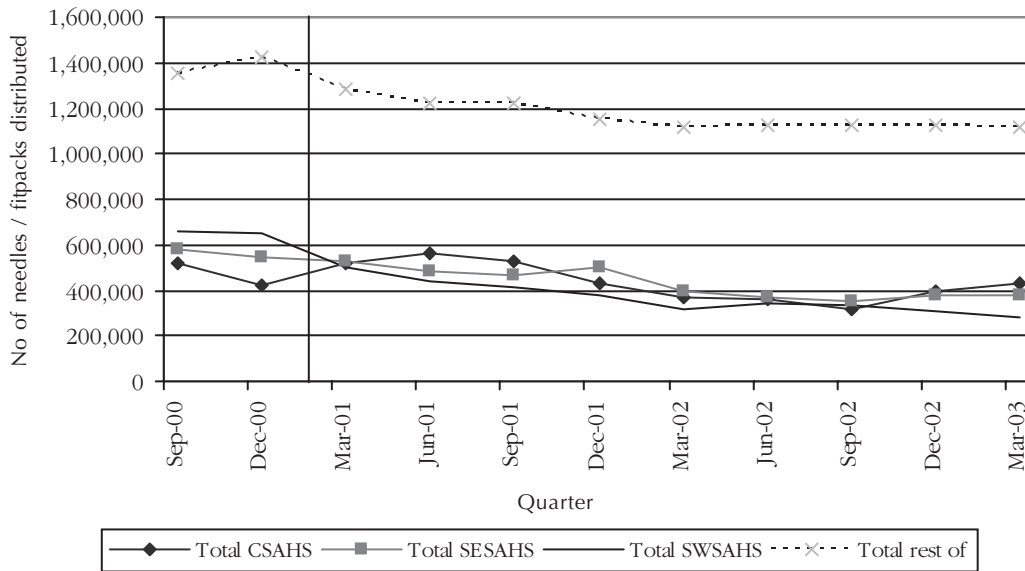
Figure 4.2 shows the number of needle/syringes distributed according to geographic area. It is clear that the number of needle/syringes decreased in the Area Health Services (AHS) containing the three drug markets¹⁰, as well as across the remainder of NSW. More detailed discussion of the drug markets occurs below.

These data and KI reports show a reduction in needle/syringe distribution through PFS and NSP in NSW, which occurred independently of Redfern, Kings Cross and Cabramatta drug markets and of the AHS in which they lie. These reductions commenced at, or close to, the point of the heroin shortage and were sustained into early 2003.

⁹ Needle and Syringe Programs (NSP) are a public health measure to reduce the spread of blood borne viral infections among injecting drug users (IDU). The NSP is delivered primarily within the public sector through Area Health Services, and in the private sector through the government-subsidised Pharmacy Fitpack Scheme (PFS). The PFS is administered through the Pharmacy Guild of Australia (NSW Branch). It is a scheme where IDU are able to purchase fitpacks containing new injecting equipment or exchange fitpacks containing used injecting equipment for new fitpacks. Fitpacks are available in over 300 pharmacies in NSW (Source: AIDS and Infectious Diseases Branch, NSW Health)

¹⁰ Central Sydney AHS (CSAHS) contains the Redfern drug market; South Eastern Sydney AHS (SESAHS) contains the Kings Cross drug market; and South Western Sydney AHS (SWSAHS) contains the Cabramatta drug market.

Figure 4.2: Number of needle/syringes distributed by geographical location, NSW 2000-2003

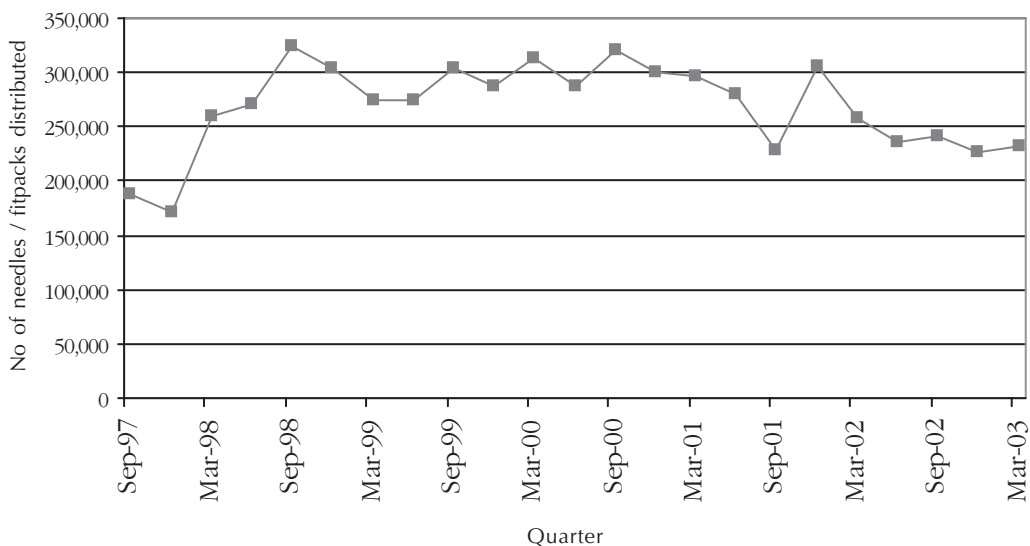


Source: AIDS & Infectious Diseases Branch, NSW Department of Health.

4.2.2. Kings Cross market

The number of 1 ml needles/syringes distributed in Kings Cross appeared to decline following the onset of the shortage (Figure 4.3), and the reduction in activity continued into 2003. The timing and extent of the reduction was similar to that seen in the remainder of NSW. The number of needle/syringes distributed through PFS and NSP reduced from around 300,000 per quarter prior to the reduction in heroin supply, to around 225,000 in early 2003, a decrease of approximately 25% in the number of needle/syringes distributed.

Figure 4.3: Number of needle/syringes distributed in the Kings Cross area, 1997-2003



Source: AIDS & Infectious Diseases Branch, NSW Department of Health.

The opening of the Medically Supervised Injecting Centre (MSIC) in May 2001 in the Kings Cross area is unlikely to have had an impact on the distribution of needle/syringes. The evaluation of the MSIC did not find an increase in the number of injectors going to Kings Cross to use the centre

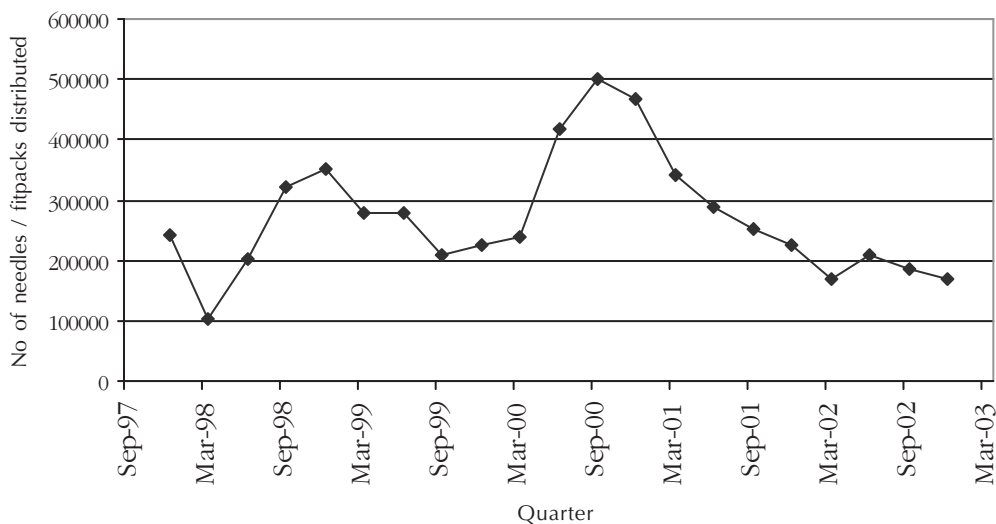
(MSIC Evaluation Committee 2003). Moreover, the comparatively small number of injections occurring in the MSIC was unlikely to have an impact on the total NSP figures for the Kings Cross area (MSIC Evaluation Committee 2003).

These data and KI reports demonstrate a reduction in the distribution of needle/syringes. This reduction was possibly the result of reduced injecting.

4.2.3. Cabramatta market

A slight reduction in needle/syringe distribution appeared to have occurred shortly *before* the point of the heroin shortage (i.e. in the October-December 2000 quarter; Figure 4.4). Dramatic decreases in needle/syringes distributed were observed from 2001 onwards, consistent with all other areas in NSW. In the final quarter of 2002, the number of needle/syringes distributed was 67% fewer than in the July-August 2000 quarter, a level similar to 1997 (the earliest period for which data were available).

Figure 4.4: Number of needle/syringes distributed in the Cabramatta area, 1997-2003



Source: AIDS & Infectious Diseases Branch, NSW Department of Health.

The decrease in needle/syringe distribution in Cabramatta may in part have reflected changes to the law enforcement strategies employed in the Cabramatta drug market, commencing in September 2000. These were followed in January and February 2001 by further changes to law enforcement strategies with the key objective of the removal of drug users from the market area. The introduction of the Cabramatta Anti-Drug Strategy followed in July 2001, which also aimed to remove drug dealers and users.

These initiatives may have displaced users from the Cabramatta market, a possibility that has been considered by Maher and colleagues (Coupland, Maher et al. 2001; Maher and Dixon 2001; Dixon and Maher in press) and was also reported by KI. Law enforcement and health KI at both area and State levels reported some displacement of the market away from Cabramatta as a result of the new law enforcement strategies. However, a reduction in the number of 1 ml needle/syringes distributed across the *entire* SWSAHS, which includes the Cabramatta drug market, was also observed (Figure 4.2). This overall decline in NSP activity in the SWSAHS suggests that the extent of injecting drug use declined in the Cabramatta market following the onset of the heroin shortage, even when some market displacement is taken into account.

Police and health KI reported that after an initial increase in the visibility and apparent numbers of drug users in the Cabramatta drug market at the start of the shortage, in the longer term, the extent of drug use and number of IDU decreased.

Not all KI saw the heroin shortage as the reason NSP distribution decreased in the Cabramatta market. Some health KI in Cabramatta attributed the decline in NSP activity to a combination of the shortage and greater police presence in the area. One directly linked the use by police of the “Move On” legislation (Summary Offences Act) and “Drug Houses” legislation with the inability of IDU to get clean equipment:

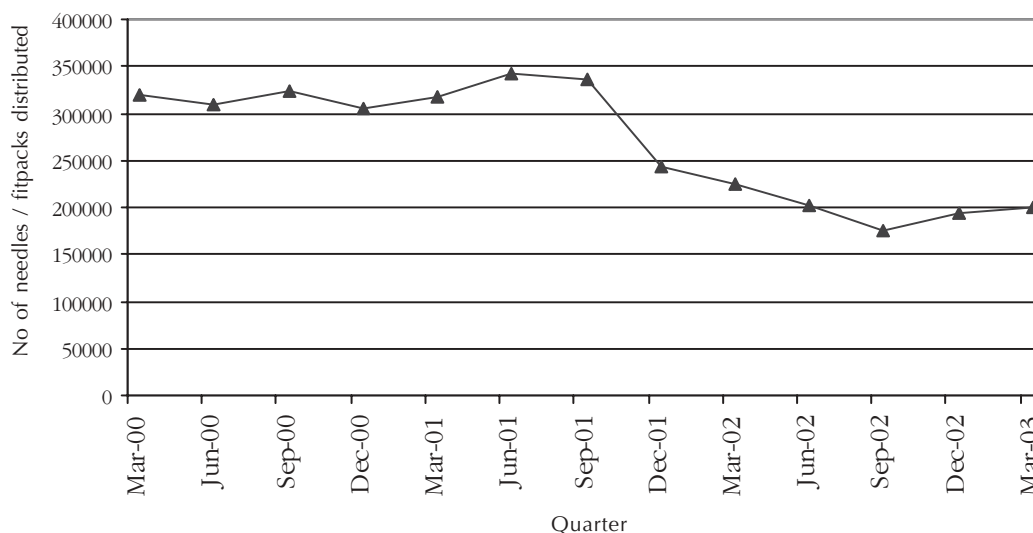
“... we did lots of interviews with people about how their practices changed because of the drought and what they told us was ... it wasn't only the drought, it was the fact that there were these changes in the policing at the same time. It kind of increased the harm associated with drug use.” (Academic, South Western Sydney)

It is possible that although there was a decrease in the prevalence of injecting drug use and in the number of injecting drug users in the Cabramatta area, that the frequency of injecting risk behaviour and harms associated with injecting drug use increased (Maher 2002). This is discussed in Section 4.4.

4.2.4. Redfern market

The Redfern market showed a different trend to those observed in Cabramatta and Kings Cross (Figure 4.5). An *increase* in the number of needle/syringes distributed was observed at the onset of the heroin shortage, which was sustained until September 2001. The increase in distribution at the onset of the heroin shortage did not coincide with changes in health or law enforcement policy or operations in the area.

Figure 4.5: Number of needle/syringes distributed in the Redfern area, 2000-2003



Source: AIDS & Infectious Diseases Branch, NSW Department of Health.

During the heroin shortage, some displacement of drug users to Redfern, and the emergence of new drug markets in the CSAHS, was reported by a number of law enforcement and health KI. This displacement may have increased the needles distributed. An increase in cocaine use was also reported in the Redfern market by both health and law enforcement KI (Chapter 3).

According to NSP KI, people continued to procure needle/syringes from the fixed site NSP located outside the Redfern drug market area.

A steep decline occurred in the number of 1 ml needle/syringes distributed in the Redfern area following August 2001, continuing until the end of the period for which data were available (Figure 4.5). This was similar to the pattern of changes in the CSAHS (which contains the Redfern drug market; Figure 4.2).

In summary, needle/syringe distribution data in the Redfern drug market area suggested that effects of the reduction in supply of heroin may have been delayed until around September 2001. The impact of the shortage on NSP activity may have been confounded by the movement of drug users to Redfern from other drug markets, and increased use of cocaine in the Redfern drug market area, during the heroin shortage.

4.3. Injecting frequency

Data on needle/syringe distribution showed a decrease in the number of needle/syringes distributed across NSW, suggesting an overall decrease in the extent of injecting drug use. However, these data are limited in their ability to provide information about changes in injection frequency among those who continued to inject drugs.

NSP and other health workers in all sites reported that the reduction in heroin supply had led to changes in the frequency of injecting, which differed across time. An initial *increase* in injection frequency was reported in all areas at the onset of the heroin shortage, mainly associated with an uptake of cocaine use:

“They [IDU] were coming in saying ‘I’m still using’, but they’re using fourteen times a day. They’re injecting fourteen times a day. I’d say ‘what are you using?’ They’d say ‘I’m using heroin and coke’ ... some people were having twenty shots a day. And that was just cocaine. And that was when the drought was on ... we’re looking at 2001 and the first few months of 2002.” (Drug and alcohol worker, Redfern)

Cocaine injecting is particularly problematic, as it is associated with increased and frenetic injecting behaviours, increased BBVI risk behaviours and increased levels of violence. Psychosis and ‘skin picking’ are also associated with intensive use (van Beek, Dwyer et al. 2001).

In the Redfern area, the increase in cocaine injecting was reported to have occurred primarily among younger users, and lasted around five to six months.

“... they’d be up all hours with the cocaine ... They’d have their hit, they’d have their high, as soon as they hit their low they’d be finding out where to get some more money to get the next hit..” (Non Commissioned Officer, Redfern LAC)

Some users were reported by KI to have changed their route of administration from smoking to injecting to increase the effect of the lower purity heroin. These reports are supported by independent research, such as that by Maher (2002), who reported changes in the route of administration from non-parenteral routes such as smoking to injecting. A small number of clients in pharmacotherapy also reported that they changed their route of administration of heroin and/or methadone during the heroin shortage.

Increased benzodiazepine injecting was reported by KI in all areas. The harms associated with benzodiazepine injecting are well documented, including vascular problems, increased poly drug

use, increased risk of overdose and blood borne virus risk behaviours (Ross, Darke et al. 1997); and the injection of Temazepam gel capsules has been associated with amputations (Dupont 1998; Eddey 2000). IDU reported a similar increase:

“The best thing I could do at the time was get onto the pills, like Valium, to stop me from hanging out. It was a new thing so I got pretty hooked on those. A lot of people starting using [injecting] Normison when they only used heroin before.” (NSW Pharmacotherapy client)

“... benzos, some people in the unemployed, indigenous sort of setting, it seems to have suited them.” (General Practitioner, Redfern)

One KI in Redfern reported observing IDU in the street injecting directly from a temazepam gel capsule:

“... And also it was brought to my attention that they were using other prescription drugs such as Normison. Normison is a sleeping capsule and quite often I would see them sitting in the gutter inserting a needle into the actual Normison capsule and injecting that into themselves ...” (Commissioned Officer (Acting) Redfern LAC)

In the longer term, however, reports generally suggested that the changes in drug use were not sustained (Chapter 3), and the implication was that high frequency injecting was not sustained. The Illicit Drug Reporting System (IDRS) clearly documented a decrease in the frequency of cocaine injecting, which was consistent with the reports of KI in this study. Benzodiazepine injecting appeared to be concentrated among small, perhaps more disadvantaged groups (Chapter 3).

4.4. Injecting risk behaviour

Health and law enforcement KI working at the drug market level reported injecting risk behaviour associated with reduced heroin availability and related drug substitution. Most involved sharing or reuse of injecting equipment. It was not clear how frequently this occurred or whether it had increased specifically during the shortage.

Police in Kings Cross and Cabramatta reported concerns that some IDU were reusing and sharing injecting equipment, particularly cocaine injectors. Many workers were concerned that the reduction in NSP activity reflected increased BBVI risk (due to re-use or sharing of injecting equipment).

Two KI reported IDU injecting leftover drug residue from used syringes by drawing water up into the syringe and injecting it ('washouts'). This was described by one KI below, however it was unclear whether this activity had increased during the shortage.

“... they had a washout, which is obviously the most dangerous kind of way of getting an infection. It means ... when somebody's used a needle ... there might be a tiny amount of something left in the needle, of drug, and so ... he will draw it up with water and ... inject that into the vein ... there's people down there ... who were doing this. And you can imagine the level of disregard that people have for their health. But also the level of urgency and desperation they have.” (D&A worker, Redfern)

One KI reported that people engaged in rushed and interrupted public injecting in Cabramatta due to heightened police presence. Rushed injecting can increase BBVI risk behaviours, vein

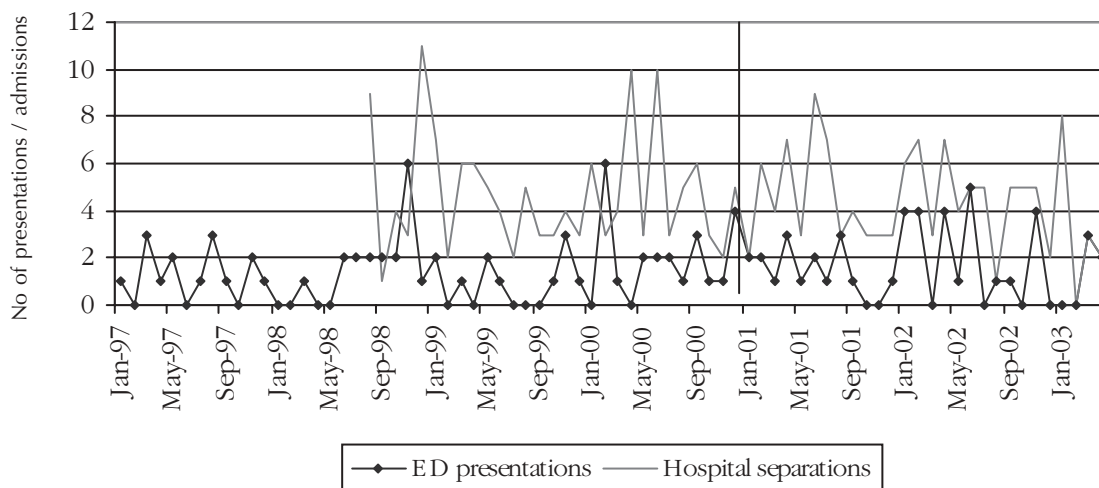
damage, and potential for environmental contamination and public disposal of syringes (Maher, Dixon et al. 1998; Maher and Dixon 1999; Maher and Dixon 2001; Aitken, Moore et al. 2002; Dixon and Maher in press).

Changes in risk behaviour prompted some services to respond. A Kings Cross health service was reported to increase client education about safe injection practices and benzodiazepine injecting. Risky injection practices were reported to decrease as the shortage eased.

4.5. Injection related problems

Data collected by NSW emergency departments (ED) and all NSW hospitals were obtained to consider possible State wide effects of changes in the number of injection related problems. Figure 4.6 shows the number of ED admissions and hospital separations where injection related problems were noted, from 1997-2003. Small numbers of such admissions were noted each month, with no detectable increase following the onset of the shortage.

Figure 4.6: Number of drug related ED admissions and hospital separations for injection related problems, NSW 1997 - 2003



Source: Emergency Department Information System, NSW Department of Health; and NSW Department of Health. For a list of the conditions included in these groups, please see Appendix C.

It must be noted that IDU could also present to general practitioners (GPs) or drug treatment agencies with injecting related problems. No data are available on the number of presentations to GPs for such problems. Hence, while no change was observable using ED or hospital admissions, it is possible that an increase in injection related problems occurred, but either a) IDU sought help from other services; and/or b) that they did not seek or receive any medical treatment for these problems.

These possibilities were borne out by the reports of both KI and IDU across all areas who reported increased injection related problems following the shortage. These were mainly associated with injection of cocaine and benzodiazepines. Problems included vascular damage, skin lesions and a general deterioration in the physical health of drug users. Mental health problems were also reported. These harms were described by treatment KI in Cabramatta:

“Certainly the cocaine did [increase harm], people who used cocaine seemed to inject more frequently, more dangerously and we were seeing people coming into the emergency department, for example, with terrible harms from injecting cocaine. Even when the heroin supply was high we saw people with lots of vascular problems from injecting, but cocaine sort of increased that by degrees. People who used cocaine, although that wasn’t all that many people, but we did see that to some degree. There were those changes in injecting behaviour and risk taking behaviour.” (Clinical Director, Drug Treatment Service, Cabramatta)

Kings Cross and Cabramatta KI reported a plethora of injection related problems, such as: reckless injection, including increased number of injections; taking less time and care with injections; vascular damage and, in some cases, surgery for vascular complications; abscesses and cellulitis; infection, including specific concern about HCV infections in Cabramatta; and reduced NSP use and concomitant needle/syringe reuse.

Many of these problems were linked to drug substitution during the shortage, as explained by a drug and alcohol worker in Cabramatta:

“So I suppose the risk or harm would have elevated in the time, in the sense that they were injecting a lot more frequently and using perhaps at times that they were desperate, they would have used the same, their own needle. The safety I think did drop because I do know that clients used to say to me do you think I might have got hep C because I bleached the syringe or washed it but it hadn’t been used ... so there were quite a few people that indicated could they have caught hep C when they were hep C negative prior.” (Drug and alcohol service worker, Cabramatta)

An increase in obstetric complications and pregnant women injecting into breast tissue was reported, as described below. These reports reduced after the heroin shortage eased.

“Oh, we did see an increase in injecting into the breast tissue. The veins are more prominent when you’re pregnant and they found that to be an easy access site ... No it hasn’t been sustained and that could be because of education in terms of the impact on lactation now. It was something we didn’t think about prior to that being disclosed.” (Clinical Nurse Consultant, Kings Cross)

One police officer in contact with drug users expressed concern for the health of police as many offenders had lesions on their skin associated with cocaine use. Police in all sites reported that offenders (including those in custody) had face and skin lesions from injecting cocaine. In Redfern, this was reported to last five to six months. KI indicated that the lesions cleared and people looked healthier once some level of heroin supply returned.

Several clients receiving methadone maintenance treatment reported increased levels of injection related problems, particularly related to benzodiazepine injection, as relayed by one IDU who had suffered a stroke and loss of a finger related to benzodiazepine use:

“I know another person that’s lost their finger now and I know ... a lot of people with a lot of physical ... problems due to injecting Normison. Heaps of ‘em, heaps of missing fingers. There’s like one, two, three, four people I know without their fingers ... there’s other people I know they inject in their groin. I know one guy who said his groin had blown up really badly and his balls went black and everything. Like really full on infections and really swollen like deep holes and really gross stuff.” (NSW pharmacotherapy client)

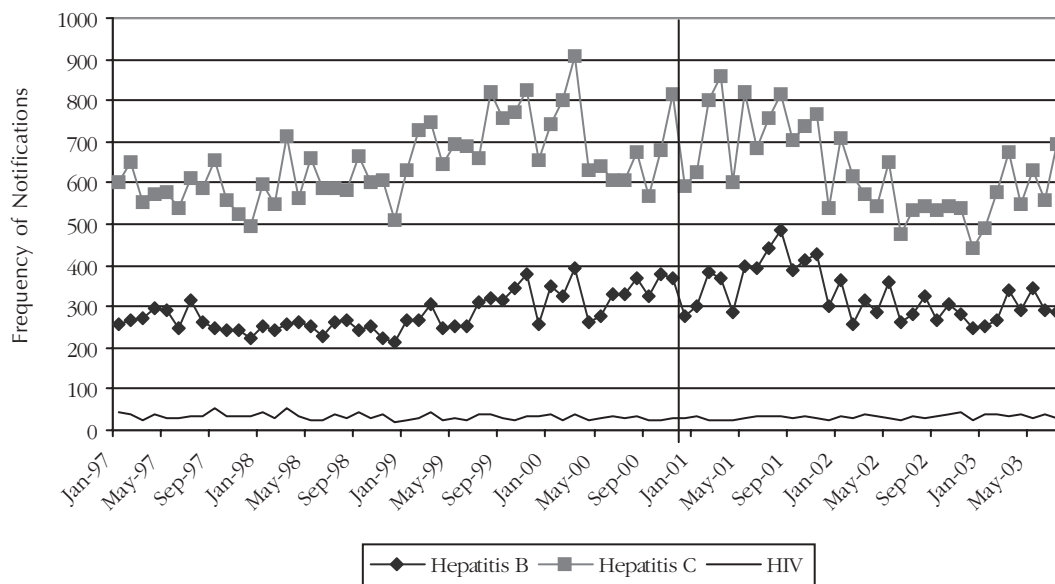
Apart from those instances where drug users had sustained permanent damage, KI reported that harms related to injection were generally not sustained. Although in some areas, such as Redfern, IDU were reported to have continued using cocaine as well as heroin once heroin returned. Generally, where the injection of drugs other than heroin continued, it did so at a lower level than that during the shortage.

4.6. Blood borne viral infections

A number of risks associated with injecting drug use have increased with the reduction in heroin supply. This change might have led to an increase in the transmission of BBVI. This was also suggested by previous discussants of the issue (Maher 2002). The possibility of increased BBVIs was examined using data on NSW notifications of HBV, HCV and HIV infection.

Figure 4.7 shows that there was no immediate change in the number of notifications for hepatitis B or hepatitis C following the reduction in heroin supply. This lack of clear increase in notifications could reflect a number of factors. Firstly, there are problems in detecting small changes in the number of notifications, particularly since most of the BBVI risk associated with the heroin shortage occurred during the ‘peak’ period, a relatively brief period of approximately four months. Secondly, there are time lags to notification of incident cases of these BBVI (Kaldor and McDonald 2003; MSIC Evaluation Committee 2003). Thirdly, the changes are compounded by both “ceiling” effects (in the case of hepatitis C) and “floor” effects (in the case of HIV), whereby the rates of infection are either already too high to be increased significantly, or too low for the behaviour of some individuals to result in dramatic increases in the number of infections.

Figure 4.7: Number of HIV, Hepatitis B and C notifications, NSW 1997 - 2003



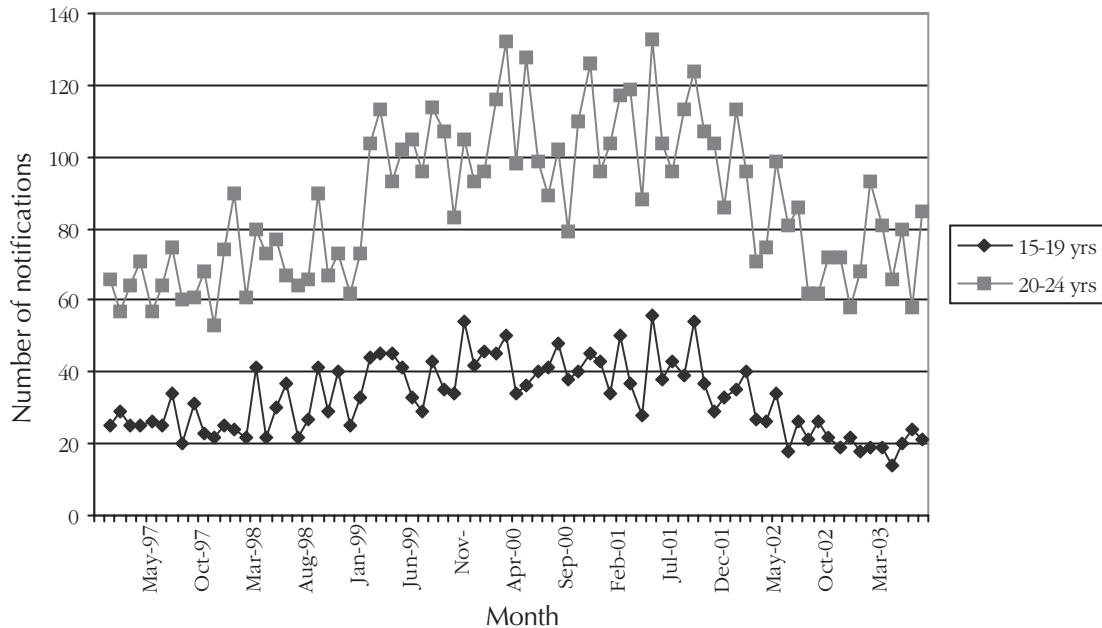
Source: NDD and HIV/AIDS databases, Communicable Diseases Branch, NSW Health Department.

It could also be the case that more complex effects were manifest. Figure 4.7 suggests that, over time, *both* hepatitis B and C notifications have reduced. If it were the case that the extent of injecting drug use was reduced over time (as suggested in previous sections), then it could be that *fewer* persons were at risk of BBVIs. This could particularly be the case if there was a reduction in the number of younger drug injectors, the group most at risk of new infection (van Beek, Dwyer et al. 1998; Zhou, MacDonald et al. 2002).

To examine this possibility the number of hepatitis C and hepatitis B notifications for two different groups of young people were examined. Hepatitis C notifications appear to reduce post-heroin shortage for young people aged 15-19 and 20-24 years (Figure 4.8). The reduction in notifications was less obvious in Hepatitis B (Figure 4.9). Notifications for all age groups are included in Appendix C; the changes were less clear for older age groups.

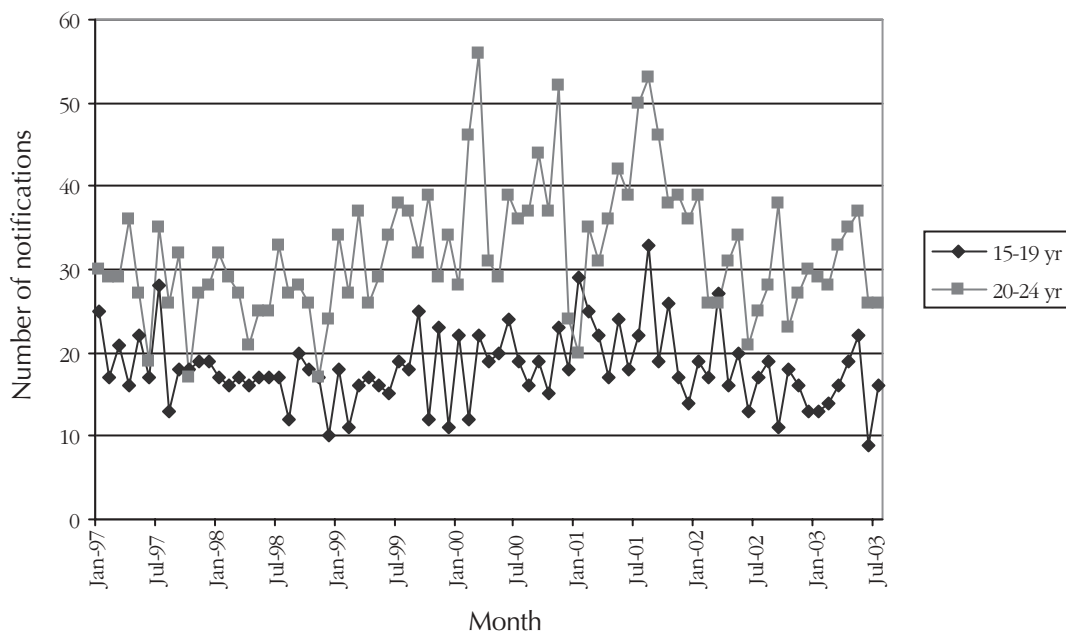
The apparent reduction in hepatitis C notifications among young people could suggest a reduction in the number of young people who start injecting. This issue is explored further in Chapter 5.

Figure 4.8: Hepatitis C notifications, by age group, NSW 1997-2003



Source: NDD and HIV/AIDS databases, Communicable Diseases Branch, NSW Health Department.

Figure 4.9: Hepatitis B notifications, by age group, NSW 1997-2003



Source: NDD and HIV/AIDS databases, Communicable Diseases Branch, NSW Health Department.

4.7. Conclusions

- Indicator data and KI reports showed a reduction in the number of needle/syringes distributed in NSW, occurring in Redfern, Kings Cross and Cabramatta drug markets, independent of the AHS in which they lie. This reduction commenced at, or close to, the point of the heroin shortage and was sustained into 2003. It is difficult to make strong statements about changes in the number of IDU following the onset of the heroin shortage, but a decline in the number of injectors would be consistent with these indirect measures of injecting drug use.
- KI and drug user reports suggest there was a reduction in the frequency of heroin injection during the shortage. They also suggest that the injection of other drug types increased during this time. Injection of cocaine was most commonly reported, occurring in all sites but particularly frequent in the Redfern drug market. Injection of benzodiazepines was also widely reported. A range of other drugs including stimulants and methadone were reported by KI to have been injected more frequently. Health KI and drug users also reported changes in the route of drug administration from smoking and oral routes to injection. Given that the use of psychostimulant drugs did not appear to be sustained at these initial high levels (See Chapter 3), these higher frequency levels were probably not sustained.
- Health and law enforcement KI at drug market level reported injecting risk behaviour. Most involved sharing or reuse of injecting equipment. It was not clear how frequently this occurred or whether it had increased during the shortage. It was reported that risky injection practices decreased as the shortage eased.
- A range of injection related problems were reported across all drug markets. These were mainly associated with injection of cocaine and benzodiazepines. They included vascular damage, skin lesions and a general deterioration in the physical health of drug users. Mental health problems were also reported.
- Apart from those instances where drug users had suffered permanent damage these harms were generally not sustained. However, there was some continuation of the injection of drugs other than heroin such as cocaine; although this occurred at a lower rate than during the shortage.
- Data on notifications of the HIV, hepatitis C and hepatitis B viruses are unable to provide information on *transmission* of the viruses. The data do, however, indicate an overall decrease in the number of hepatitis C notifications (and perhaps the number of infections), following the reduction in heroin supply, particularly among young people.

Chapter 5. Changes in the Number of Heroin Users

Louisa Degenhardt and Valerie Rendle

Summary

- Making estimates of the number of regular heroin users is difficult, and particularly when there have been changes in the extent of drug supply, need to be viewed with caution.
- The results from a range of indirect estimates with a range of data sources are presented in this Chapter, and result from work completed for another study.
- It was estimated that the number of regular heroin users in NSW decreased following the reduction in heroin supply.
- The extent of the reduction appeared to be similar for males and females, suggesting that both groups of heroin users may have been affected by the reduction in supply in a similar way.
- There appeared to be different changes according to age, with greater reductions occurring among younger age groups. This was consistent with key informants that younger users may have reduced or ceased heroin use following the reduction in heroin supply.
- These estimates, although suggesting that the number of regular heroin users declined, do not imply anything about the number of illicit drug users in total. There was suggestive evidence that the extent of injecting drug use declined (Chapter 4), but the evidence suggested that users probably switched to a range of other drug types including benzodiazepines, cocaine and methamphetamine (Chapter 3).

5.1. Introduction

One of the most commonly asked questions related to the reduction in heroin supply, however, has been: “Has there been a change in the number of heroin users in Australia?”

The answer to this question is not simple. As will be outlined below, making estimates of a hidden population, such as heroin users, is difficult for a range of reasons. Added to this difficulty, however, are some more conceptual issues that need to be addressed, most importantly that of “which group of heroin users”?

The work presented in this Chapter is a summary of the work conducted for two related projects which were funded by the NSW Cabinet Office of Drug Policy (Degenhardt, Rendle et al. 2004) and the NSW Department of Health (Degenhardt, Rendle et al. 2004). The reader is strongly encouraged to refer to these reports for details of the work summarised here.

In this Chapter, we present estimates of the number of active, regular heroin users in NSW. This group of users is likely to contribute much of the public health burden attributable to heroin use, including such negative outcomes as heroin overdose (fatal and non-fatal), hospital stays for morbidity related to heroin use, and acquisitive crime. These estimates do not refer to those opioid dependent persons who may have ceased heroin use but remain on opioid replacement therapies such as methadone.

5.2. Populations of heroin users

Before we begin attempting to make estimates of the number of heroin users, it is necessary to ask to which group of heroin users we are referring.

1. Which “population” of heroin users are we making estimates of?
2. Is a change in this “population” likely (or conceptually possible) in the face of reduced heroin supply?
3. Is it reasonable to assume that different populations of heroin users would change in the same way?

5.2.1. Dependent heroin users

Given that drug dependence is both defined *and* documented as: a) a recurring disorder; b) that persists in the absence of use of a drug (Vaillant 1973; American Psychiatric Association 1994; Goldstein and Herrera 1995; Hser, Hoffman et al. 2001), it seems invalid to expect that the number of *dependent* heroin users would decrease *even if they had ceased heroin use completely*. In other words, the population of dependent heroin users might remain largely the same even if the number of active users of the drug changed. In a context of a change in the scale of current heroin use, there may be some data that reflect this *underlying level of dependence* better than others. This is likely to be total numbers in methadone maintenance treatment.

5.2.2. Regular heroin users

Perhaps somewhat obviously, the number of current regular heroin users is much more likely to be affected by changes in drug supply. It is also likely to be more easily affected by changes in waves of initiation to heroin use.

In this way, indicators that reflect *current, active heroin use* as opposed to dependence may be better able to demonstrate changes over time, especially if it is hypothesised that the number of persons currently using the drug may have decreased. Indicators that are good reflections (almost by definition) of current use are a) fatal overdoses; b) non-fatal heroin overdoses; c) arrests for heroin offences; d) *registrations* for heroin treatment (such as pharmacotherapy); and e) calls about concerns about heroin use to telephone help lines.

5.2.3. Occasional heroin users

The obstacles to making estimates of the number of regular or dependent heroin users are considerable, but those facing accurate estimates of the number of occasional heroin users are even more difficult. Because their use is not frequent, these persons are highly unlikely to come into contact with treatment or law enforcement agencies.

It is therefore necessary to make some assumptions about the ratio of regular to occasional heroin users. This can be done to some extent through examining previous research that assessed persons who used heroin, and who did and did not meet criteria for dependence. Details of these estimates may be found in (Degenhardt, Rendle et al. 2004).

5.3. Methods of estimating the number of heroin users

There are substantial technical difficulties in estimating the number of heroin users in Australia or in any other population. In most developed societies, heroin use is illegal and a stigmatised activity that is practised in private by consenting adults who prefer others not to know about their behaviour. For this and a range of others, survey data are *not* good methods to examine the prevalence of heroin use.

There are no well tested and widely accepted “gold standard” methods for producing credible estimates of the number of people who make up the “hidden population” of dependent heroin users (Hartnoll 1997). The preferred strategy is to look for convergence in estimates produced by a variety of different methods of estimation (European Monitoring Centre for Drugs and Drug Addiction 1997; European Monitoring Centre for Drugs and Drug Addiction 1999). In the study recently completed, we have used a range of indirect methods that attempt to use information from known populations of heroin users (such as those who have died of opioid overdoses, and those who are in treatment or the criminal justice system) to estimate the size of the hidden population of heroin users.

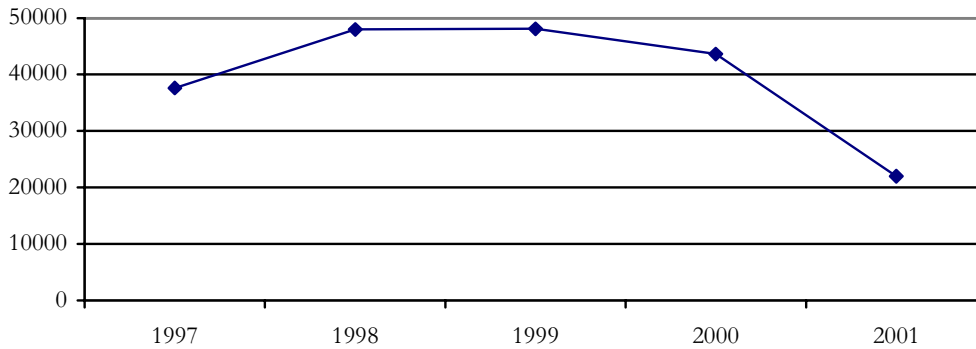
For details of the methods used, please refer to the full report.

5.4. Estimates of the number of regular heroin users

Figure 5.1 shows the median produced from the various methods employed in the study¹¹. As can be seen, it was estimated that the number of active, regular heroin users increased from around 35,000 in 1997, to just less than 50,000 in 1999 and was around 43,000 in 2000. In the year in which heroin supply reduced, the number of regular heroin users in NSW was estimated to have decreased to around 22,000 – in other words, decreased by around 50%.

¹¹ These estimates are the result of several indirect estimation exercises conducted, which each provide an imperfect estimate of the size of the population. The numbers produced are not to be taken as exact or precise. Please see Degenhardt et al for more detail of the methods used and caveats to consider.

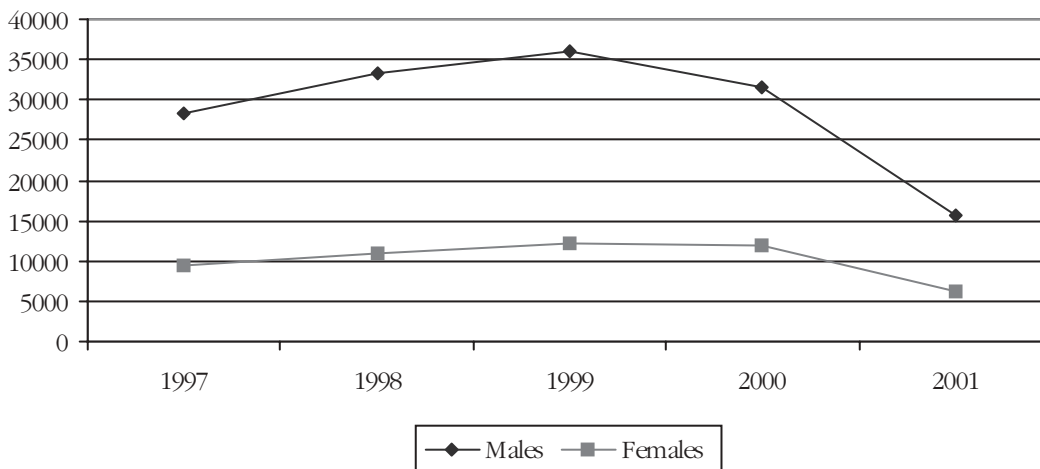
Figure 5.1: Median estimate of the number of active regular heroin users in NSW, 1997-2001



Source: Degenhardt, Rendle et al. 2004.

The number of both male and female regular heroin users was estimated to have declined (Figure 5.2). The extent of decline appeared to have been of a similar magnitude among males and females, suggesting that the decrease in heroin availability was associated with declines of a similar magnitude for both sexes.

Figure 5.2: Median estimates of the number of active regular heroin users in NSW by gender, 1997-2001



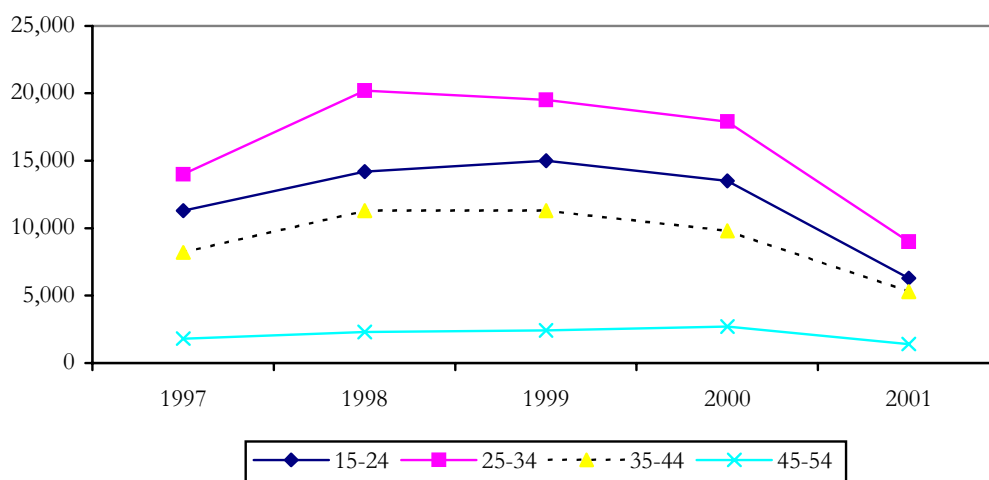
Source: Degenhardt, Rendle et al. 2004.

Figure 5.3 shows the estimates produced by age. Clearly, reductions in the number of current, active heroin users were estimated to have occurred across all age groups. Two things were notable: the 25-34 year age group was estimated to account for the largest proportion of regular heroin users across all years; and the reductions were greater among younger age groups. The greatest reduction was estimated to have occurred among the 15-24 year age group, and the smallest among those aged 45-54 years. This was completely consistent with other sources of data such as key informant reports:

“... you get despondent seeing young people being recruited into heroin dependence. You think, how am I going to alter this life pattern, maybe jail is all that can help you? Now I only see 55 yr old heroin dependant people. I think it was really good.” (Clinical Director Drug Treatment Service CSAHS)

These results do not imply that the reductions led to fewer *illicit drug users* – on the contrary, reports consistently suggested that those who reduced or ceased heroin use began or increased using a range of other drug types (Chapter 3). Figures have shown increased numbers in opioid replacement therapy, suggesting that the number of opioid dependent persons in total may not have changed in the same way as current heroin use did (see chapter 7 for detail).

Figure 5.3: Median estimate of the number of regular heroin users in NSW by age, 1997-2001



Source: Degenhardt, Rendle et al. 2004.

5.5. Conclusions

- Using a variety of sources of data, it was estimated that the number of regular heroin users in NSW decreased following the reduction in heroin supply.
- The extent of the reduction appeared to be similar for males and females, suggesting that both groups of heroin users may have been affected by the reduction in supply in a similar way.
- In contrast, there appeared to be different changes according to age, with greater reductions occurring among younger age groups. This was consistent with key informants that younger users may have reduced or ceased heroin use following the reduction in heroin supply.
- These estimates, although suggesting that the number of regular heroin users declined, do not imply anything about the number of illicit drug users in total, nor about the number of *opioid dependent* persons. There was suggestive evidence that the extent of injecting drug use declined (Chapter 4), but the evidence suggested that users probably switched to a range of other drug types including benzodiazepines, cocaine and methamphetamine (Chapter 3).

Chapter 6. Changes in the Health Effects of Drug Use

Louisa Degenhardt, Elizabeth Conroy, and Stuart Gilmour

Summary

- There was a large and persistent decrease in the number of non-fatal heroin overdoses in early 2001. There was also a significant decrease in the number of deaths in which heroin was detected. Lower rates of non-fatal and fatal heroin overdoses have been maintained since early 2001.
- The decreases in fatal and non-fatal heroin overdoses were of a similar magnitude for males and females, but varied among different age groups. The reduction in heroin availability did *not* have as much impact upon older heroin users' likelihood of overdose as it did upon younger users.
- Following the onset of the heroin shortage, many heroin users appeared to experience significant withdrawal symptoms. There was no observable increase, however, in attendances at health services, suggesting that most heroin users probably managed withdrawal without requesting formal medical assistance.
- There was an increase in emergency department (ED) presentations for cocaine overdose but no detectable change in the number of other non-fatal drug overdoses.
- There was a short term increase in drug induced psychosis. The transitory nature of this change was probably due to a decrease in the availability (and use) of cocaine.
- There was no detectable increase in the number of pregnant women with problematic drug use accessing health services, but some evidence that polydrug use among those pregnant women engaged with services may have increased.
- There were differences across the different drug markets, with suggestions that Kings Cross had higher increases in cocaine related harms and relatively greater decreases in heroin related overdoses than in other areas. This was consistent with other data suggesting that cocaine use was concentrated in this area.

6.1. Introduction

There are many possible health consequences of the use of heroin and other drugs (Hall, Lynskey et al. 1999). The harms that are perhaps most often discussed with regard to heroin use are non-fatal and fatal heroin overdose (Darke, Ross et al. 1996; Darke and Zador 1996; Hall, Degenhardt et al. 1999; Darke, Ross et al. 2000; Degenhardt, Hall et al. 2001; Warner-Smith, Darke et al. 2001). Indeed, it was probably media attention given to dramatic increases in both these heroin related harms that sparked considerable community concern about increases in heroin use in the Australian community in the late 1990s (e.g. Melbourne Age July 1997). It was therefore of interest to examine whether there were potential changes in fatal and non-fatal heroin overdoses that coincided with the reduction in availability of heroin. Furthermore, given that some users reported heroin was more difficult to obtain (Chapter 2), it was also of interest to examine whether there were changes in the number of persons who presented to services seeking assistance in withdrawing from heroin use.

Given the evidence that some (if not many) drug users used other illicit drugs when heroin became less available, it was also important to consider changes in the harms associated with the use of other types of illicit drugs. There has been increased concern in recent years about the incidence of methamphetamine psychosis (Methamphetamine Interagency Task Force 2000; Matsumoto, Kamijo et al. 2002). Problems related to cocaine induced psychosis have been of considerable concern in the United States since the 1980s (Ellison 1994; Kovasznay, Fleischer et al. 1997; Bowers, Boutros et al. 2001).

The harms that we considered in this chapter are: non-fatal and fatal drug overdoses (involving heroin as well as other drugs); changes in the number of persons presenting to emergency departments in heroin withdrawal; drug induced psychosis; and changes in general physical and mental health of illicit drug users. Problems related to aggression were also examined, as were those related to drug use during pregnancy.

Problems associated with development of *dependence* upon other drugs will be indirectly considered in Chapter 7, which examines treatment for heroin and other drug dependence. The possible problems associated with the *injection* of drugs have been discussed in Chapter 4.

The following sources of data were used in this Chapter:

- Data on ambulance calls to suspected heroin overdoses;
- ED presentations for heroin, cocaine, amphetamine and benzodiazepine overdoses;
- Data on drug related deaths;
- ED data on persons treated for heroin withdrawal;
- ED presentations and hospital separations for drug induced psychosis;
- Hospital separations data on hospital stays by pregnant women where drugs or alcohol were considered to be a primary or additional complicating factor in the pregnancy;
- Key informant (KI) interviews with both health and law enforcement on any potential changes in the health status of illicit drug users, and in the extent or nature of harms associated with drug use; and
- Interviews with active heroin users and persons enrolled in pharmacotherapy treatment about any changes in the extent and/or nature of harms they or their peers experienced related to their drug use.

The indicator data included in this Chapter were analysed (where appropriate) using time series analysis (TSA). The reader is referred to Appendix C for the results of any TSA conducted. For an explanation of TSA see Appendix A.

6.2. Non-fatal overdose

6.2.1. Heroin

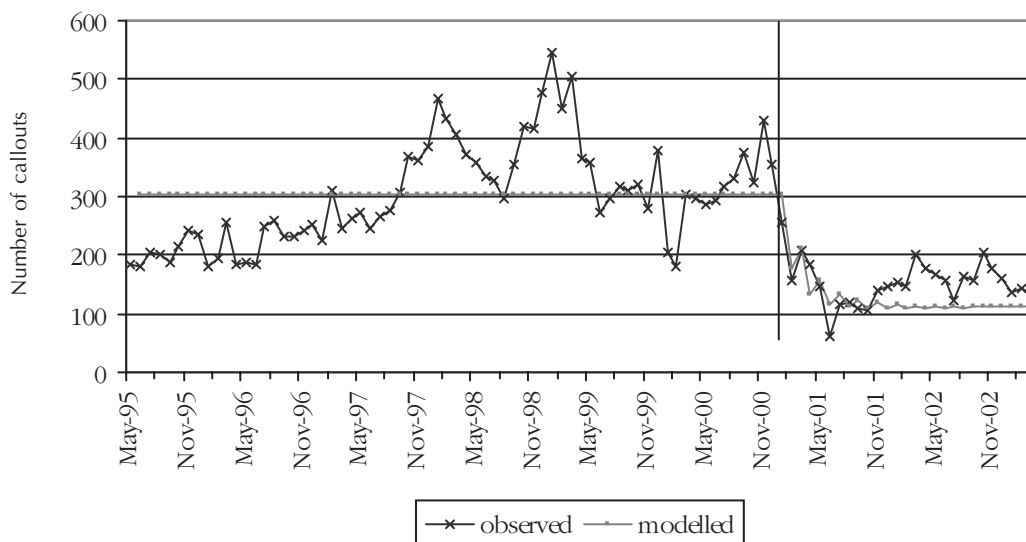
Non-fatal heroin overdoses were assessed in two ways: through callouts by the NSW Ambulance Service to suspected heroin overdoses¹², and through emergency department (ED) data on presentations for heroin overdoses.

Overdoses related to heroin decreased substantially, whether measured by callouts to ambulances or ED admissions. These decreases were consistent with the reports of KI, some of whom noted that a reduction in the number of overdoses was the first indicator of a change in the heroin market. Differences were noted in the degree of change across age groups and geographic locations. There were some KI reports of an initial increase in the incidence of polydrug overdose—heroin with benzodiazepines, methadone and/or alcohol. Some of these incidents were managed in-house (without the need for ambulatory services); in other cases, people presented to ED.

Ambulance callouts to suspected heroin overdoses

Figure 6.1 shows the number of ambulance callouts to suspected heroin overdoses between 1995 and 2003¹³ and the modelled series. There was an immediate 40% decrease following the shortage (pulse term, $p=0.0009$) from a mean of 302.7 callouts per month, which decayed further over time to a final stable mean of 111.6. This represents an overall decrease of 63% (step term, $p = 0.02$).

Figure 6.1: Ambulance callouts to suspected heroin overdoses, 1995- 2003



Source: Ambulance Service of NSW case sheet database.

¹² It must be noted that this data does not allow an examination of the outcome of the ambulance attendance. Some persons may subsequently have died despite receiving assistance from the ambulance officers.

¹³ These data are based on cases where ambulance officers have used the Ambulance Service protocol for drug overdose/poisoning and where naloxone was administered. Cases where naloxone was not used for persons are not included. The drug overdose/poisoning protocol includes all drug overdoses and does not distinguish between the drugs used by the patient; and naloxone may be administered to unconscious patients who have not responded to other treatment. The data are based on attendances at incidents rather than persons, which means that the same person may have accounted for several ambulance calls. Nonetheless, if we assume that these sources of error remain relatively constant over time and area, these data provide potentially useful information on trends in non-fatal overdose.

Similar declines were noted for males and females (see Appendix C). There were age differences however, with the largest decrease seen in the younger age groups. Calls to overdoses of persons aged 15-34 years decreased much more markedly than among those aged 35-44 years. Among those aged 45 years and over, there appeared to be no lasting effect of a reduction in heroin supply (Appendix C). Due to missing data, age and gender trends were not examined in detail.

Across the three drug markets, Cabramatta and Kings Cross showed similar declines in the number of ambulance callouts to heroin overdoses; incidence across the remainder of NSW (excluding the Sydney drug markets) similarly declined (Appendix C). These changes were not analysed in the current report (Appendix C). However, analyses on ambulance attendance at overdoses in Kings Cross, Cabramatta and the remainder of NSW were conducted for the Medically Supervised Injecting Centre (MSIC) evaluation where significant decreases were reported for all three geographic regions (MSIC Evaluation Committee 2003).

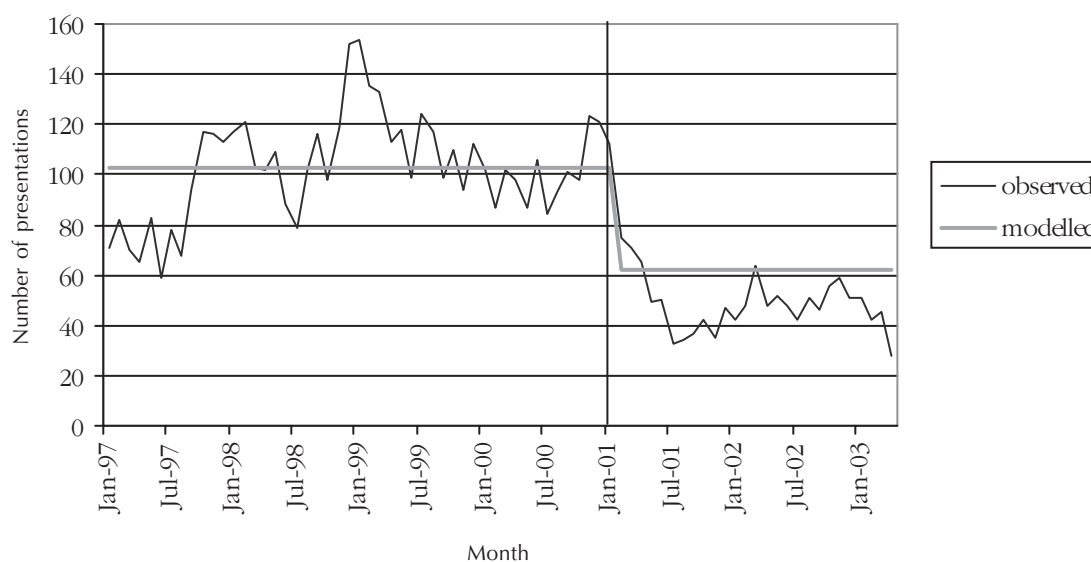
Heroin related emergency department admissions

KI in Redfern and Kings Cross¹⁴ reported a decrease in the number of people presenting to emergency departments for heroin overdose since the onset of the shortage:

“... we’re seeing much less; we used to be ‘overdose city’, everyday – part of the furniture – a handful of overdoses. This doesn’t happen anymore. We can go many days and not see a heroin overdose.” (Medical Professional Emergency Health Service, Kings Cross).

Across NSW the number of ED presentations for heroin overdose decreased from a pre-shortage mean of 102.8 to 50.8 post-shortage (Figure 6.2). This represents a 40% decrease in the mean number of overdose presentations per month ($p < 0.0001$).

Figure 6.2: Heroin overdose presentations to NSW emergency departments, 1997-2003



It is difficult to determine any effect of the shortage on heroin overdose presentations to emergency departments beyond the State level. Whilst the data suggests a decrease for males, for the younger age groups and for Kings Cross and Cabramatta, the high variability in the time series for gender, age and geographic area precludes analysis by TSA (see Appendix C).

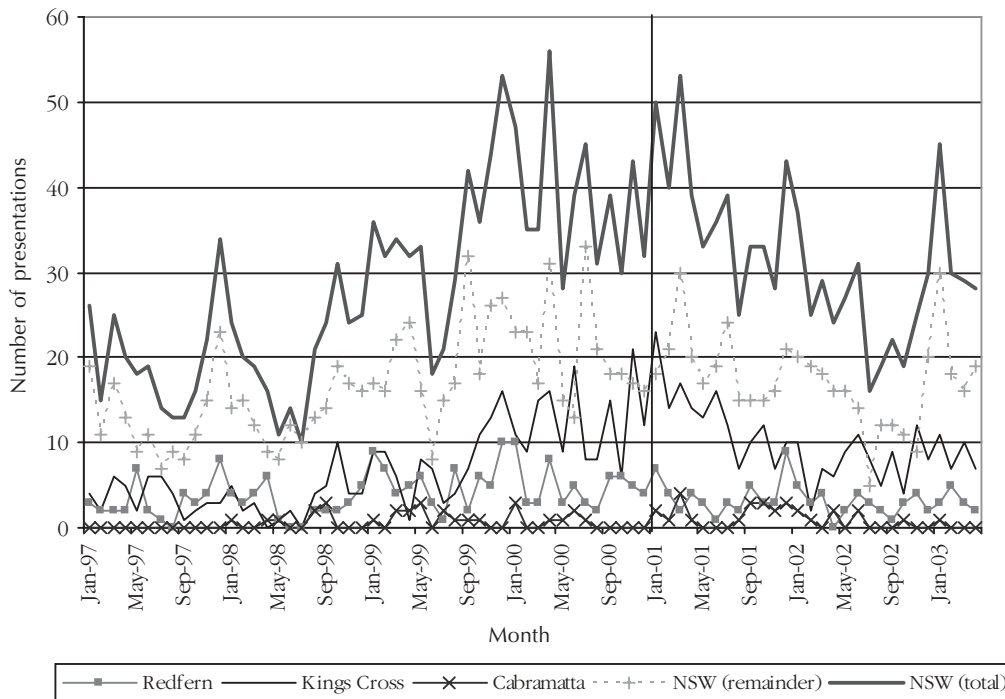
¹⁴ It was not possible to interview KI of similar position in Cabramatta (see Appendix B).

6.2.2. Methamphetamine

In contrast to the strong effect observed for heroin overdoses, there was no significant change in methamphetamine overdoses associated with the reduction in heroin supply. Figure 6.3 shows that there was no apparent increase in methamphetamine related (overdose) presentations to emergency departments across NSW after the onset of the shortage. This did not differ between gender or age groups (Appendix C).

There were some apparent differences in trends over time across the geographic areas (Figure 6.3). The trend observed in Kings Cross was a steady increase in methamphetamine related (overdose) presentations that began to *decline* with the onset of the shortage. There appeared to be little change in Redfern or Cabramatta, where the number of presentations is small. The number of methamphetamine overdose presentations to hospitals across the rest of NSW also did not appear to change in relation to the reduction of heroin supply.

Figure 6.3: Methamphetamine overdose presentations to NSW emergency departments, 1997-2003

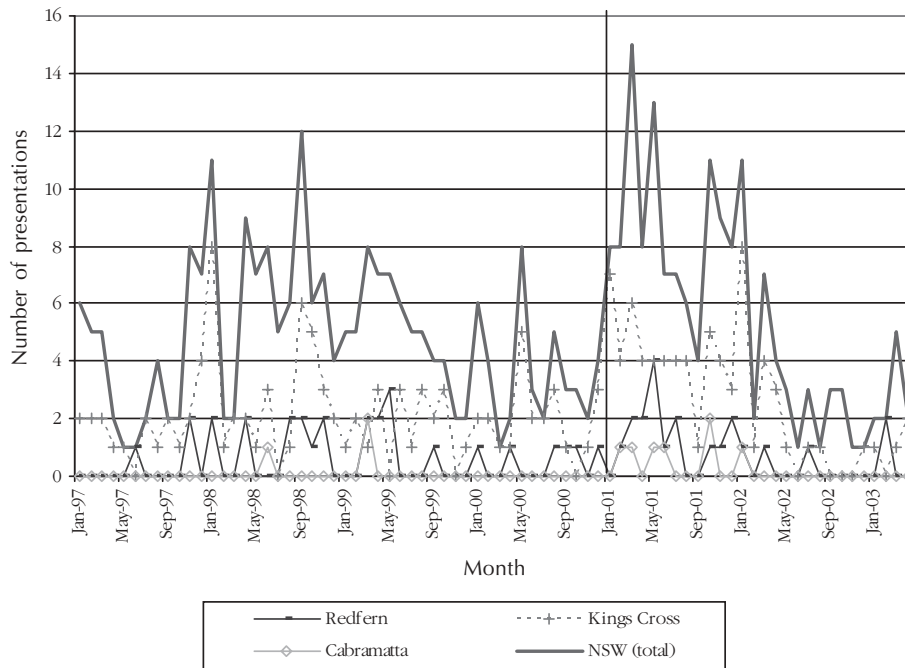


Source: Emergency Department Data Collection, NSW Department of Health.

6.2.3. Cocaine

There was a sharp increase in cocaine overdose presentations to emergency departments across NSW at the time of the shortage (Figure 6.4). This increase was apparent for both males and females, and for all age groups except the older age group of 45 years and over (Appendix C). Due to the small numbers, however, statistical analyses were not possible. ED admissions for cocaine related problems occurred almost exclusively in Kings Cross (Figure 6.4); this is consistent with recent work conducted on cocaine related fatalities (Darke, Kaye et al. in press).

Figure 6.4: Cocaine overdose presentations to NSW emergency departments, 1997-2003

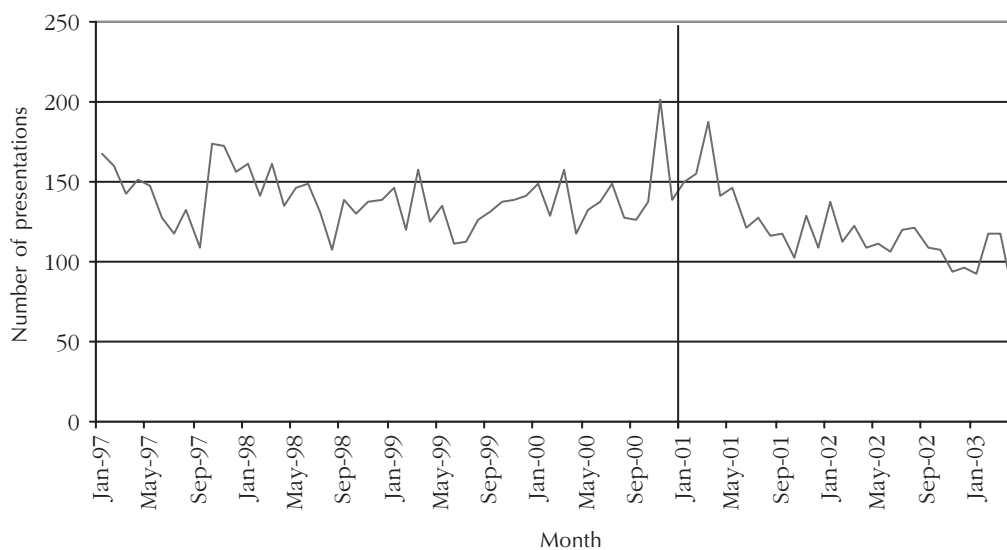


Source: Emergency Department Data Collection, NSW Department of Health.

6.2.4. Benzodiazepines

There did not appear to be a change, associated with the heroin shortage, in the number of benzodiazepine (overdose) presentations to emergency departments across the State (Figure 6.5). There were also no apparent changes according to age, gender or geographic groupings. It is quite likely that the majority of these presentations involved suicide attempts, rather than accidental overdoses (Barker and Degenhardt 2003).

Figure 6.5: Benzodiazepine overdose presentations to NSW emergency departments, 1997-2003

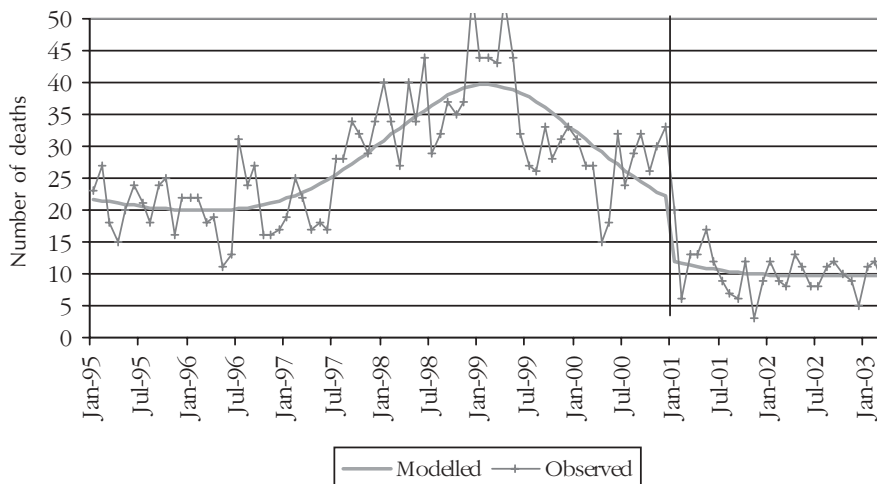


Source: Emergency Department Data Collection, NSW Department of Health.

6.3. Drug related deaths

Data on drug related deaths from the Division of Analytical Laboratories¹⁵ show the number of drug related deaths between January 1995 and June 2003. Figure 6.6 shows a 43% ($p < 0.0001$) decrease in the number of drug related deaths associated with the reduced supply of heroin.

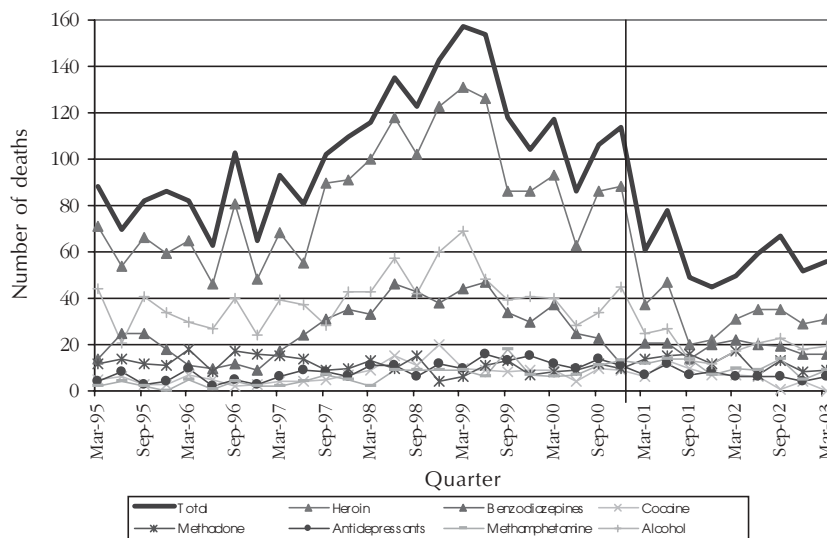
Figure 6.6: Number of suspected drug related deaths, NSW 1995-2003



Source: Division of Analytical Laboratories.

Changes in the number of deaths where heroin was involved accounted for most of the steep drop in the total number of drug related deaths (Figure 6.7). Following the reduction in heroin supply, there was a decrease in the number of deaths where heroin was detected and a corresponding decrease in the *total* number of drug related deaths in NSW.

Figure 6.7: Number of suspected drug related deaths where particular drugs were detected post mortem, 1995-2003



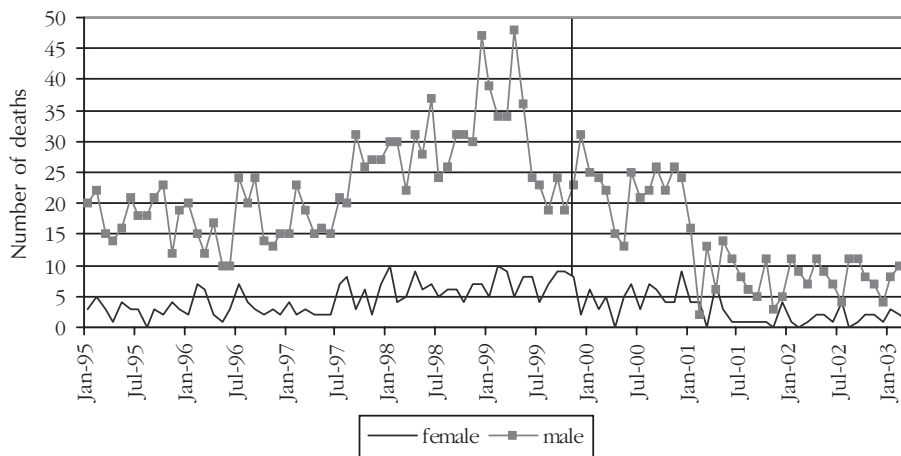
Source: Division of Analytical Laboratories.

¹⁵ The DAL/ICMPR conducts pathology tests upon all cases in which post mortem examinations are conducted. All suspected drug-related deaths have post mortems and toxicology analyses performed. The place of death, age and gender of the subjects are recorded. The DAL data included in these analyses include all cases in which the deceased was identified by either police or pathologists as an illicit drug user or “known drug taker”. For the purposes of these analyses, deaths where a drug was detected at death where defined as deaths related to that drug.

Drug related deaths involving alcohol and benzodiazepines changed along with the shifts in the number of heroin related deaths (Figure 6.7). In contrast, deaths involving cocaine, methadone, methamphetamine, and antidepressants remained stable and consequently accounted for *proportionally* more drug related deaths after the reduction in heroin supply as the total *number* of drug related deaths decreased.

As noted above, the number of heroin related deaths decreased following the onset of the heroin shortage (Figure 6.7), with decreases of a similar magnitude for males and females (Figure 6.8). The number of deaths among males decreased from around 25 per month immediately prior to the shortage, to around 10 after the onset of the shortage while the number of deaths among females decreased from around five to seven per month, to around two per month. These lower levels appear to have been maintained since that time.

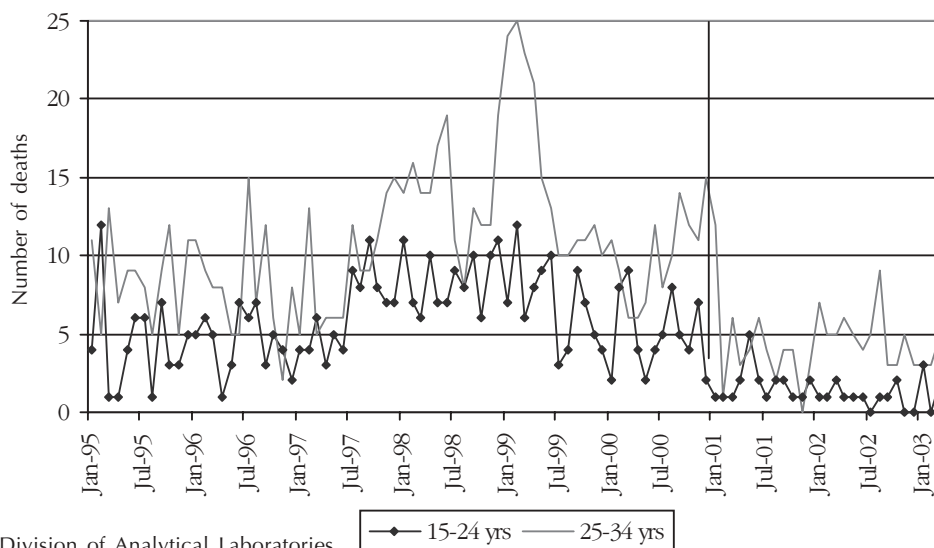
Figure 6.8: Number of heroin related deaths by gender, NSW 1995-2003



Source: Division of Analytical Laboratories.

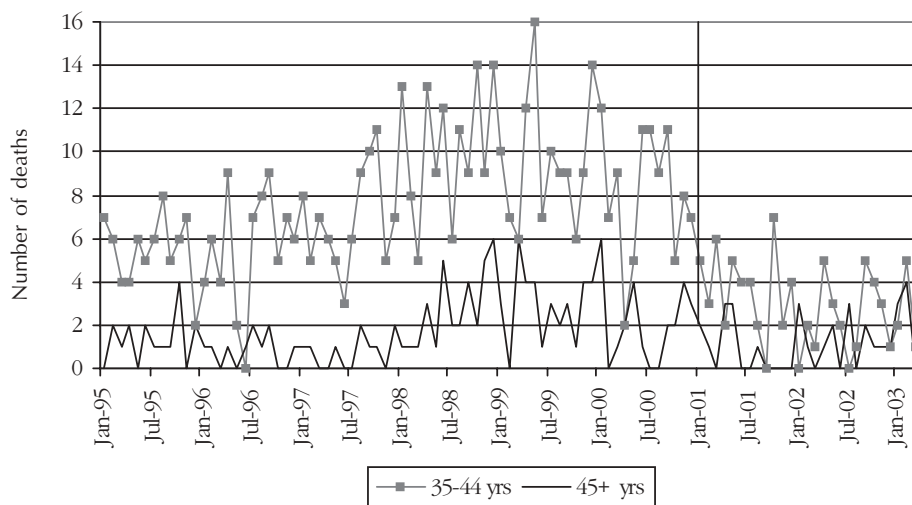
There were marked age differences in the trends in heroin related deaths (Figure 6.9, 6.10). There was a 65% decrease in heroin related deaths among 15-24 year olds ($p < 0.0001$), a 39% decrease in those aged 25-34 ($p = 0.01$) and a 42% decrease in those aged 35-44 ($p = 0.008$). There was no significant decrease in heroin related deaths amongst people aged over 45 (see Appendix C for TSA results).

Figure 6.9: Number of heroin related deaths among those aged 15-34 years, NSW 1995-2003



Source: Division of Analytical Laboratories.

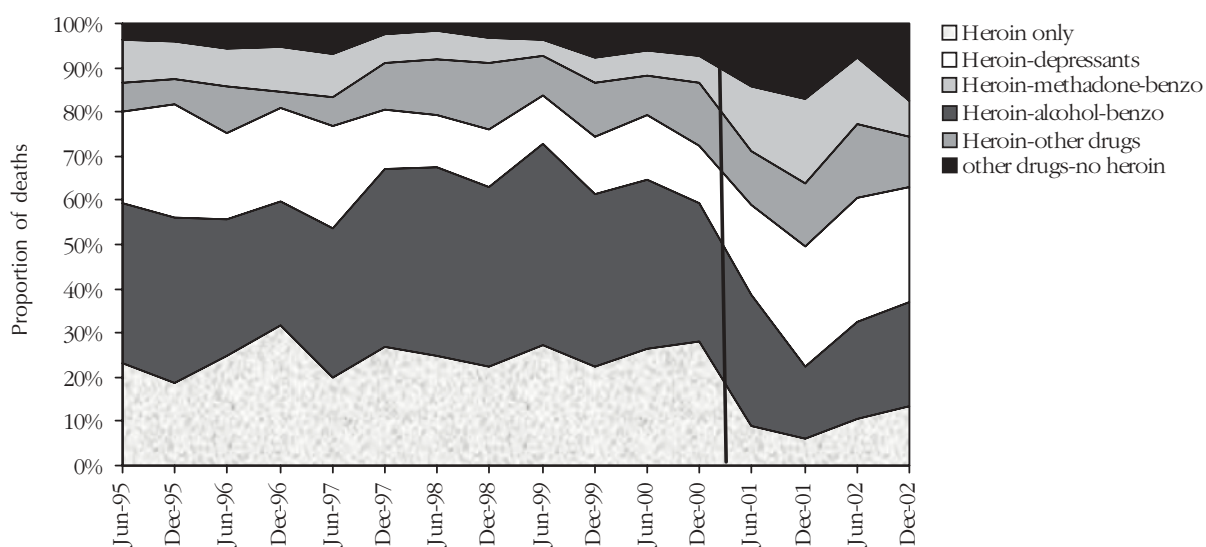
Figure 6.10: Number of heroin related deaths among those aged 35 years and over, NSW 1995-2003



Source: Division of Analytical Laboratories.

Figure 6.11 shows the drug combinations detected among persons who were suspected of dying from drug related causes. The proportion of drug related deaths in which heroin was detected decreased markedly after the reduction in heroin supply, from approximately 90% of deaths to 70-75% of deaths. The proportion of drug related deaths in which *only* heroin was detected also decreased, from around 25% to 10% of deaths. The proportion of deaths involving heroin with *only* alcohol or heroin with *only* benzodiazepines or heroin with alcohol *and* benzodiazepines (key: heroin-alcohol-benzo) also appeared to decrease. In contrast, the proportion of drug related deaths where heroin was detected along with the full range of depressant drugs (methadone, alcohol, benzodiazepines) *increased*, from around 10% in December 2000 to 25% in December 2001 of all drug related deaths. Furthermore, the proportion of heroin related deaths involving methadone with or without benzodiazepines (heroin-methadone-benzo) also increased, as did the proportion of deaths where heroin was *not* detected, but a range of other drugs were (other drugs-no heroin). These findings were consistent with KI reports of greater polydrug use among users who remained in the illicit drug market.

Figure 6.11: Proportion of drug related deaths involving different drug combinations at death, NSW 1995-2003



Source: Division of Analytical Laboratories.

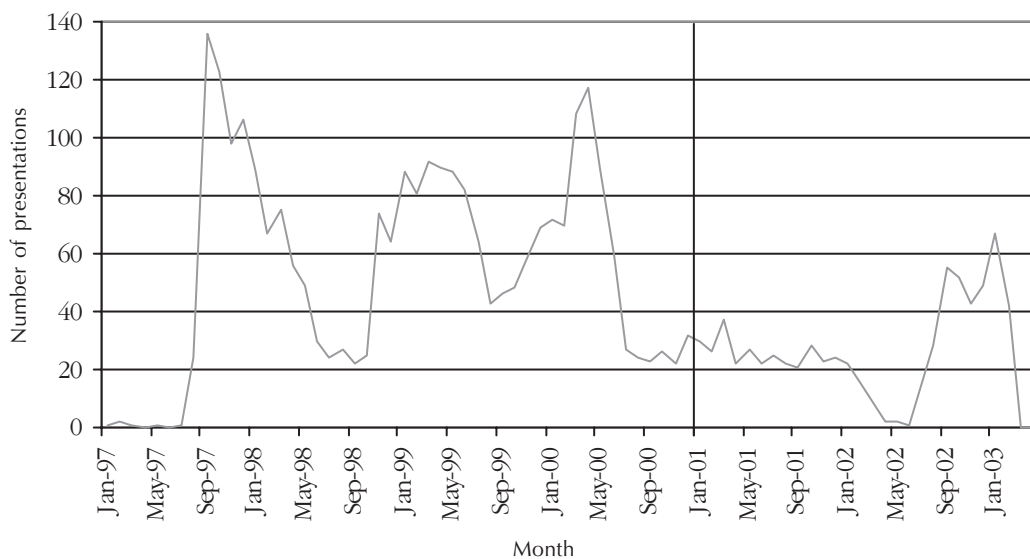
6.4. Heroin withdrawal

Interviews with heroin users suggested that the most common effect on their general health was the occurrence of heroin withdrawal symptoms. Some families became aware of a user's heroin use for the first time during the heroin shortage because the user experienced withdrawal symptoms so frequently (NSW Pharmacotherapy Clients). This was borne out by KI in all areas:

“For a lot of clients it highlighted their dependence on heroin. Whereas perhaps in times previous to that it was easy to get and it was fairly cheap, so you know, their dependence issues possibly weren't as high. So when that supply was withdrawn I think they realised, oh, I am actually dependent on this.” (Manager Drug Health Service, Kings Cross)

KI from emergency health services reported an increase in the number of people seeking assistance with heroin withdrawal but this is not borne out in the statistics for ED presentations (Figure 6.12). One KI reported during the shortage the sheer volume of these presentations meant they were often referred to drug health services without necessarily being triaged by ED staff. Chapter 7 considers changes in the number of treatment episodes where management of heroin withdrawal occurred. These episodes appeared to *decrease* after the reduction in heroin supply. Hence, it was probably the case that most users managed their withdrawal without explicitly seeking assistance from health agencies – either because the withdrawal was not severe enough to warrant treatment or because the symptoms resolved before treatment places became available. These possibilities are consistent with other indicator data showing that it was the younger, less experienced user who left the market (Chapter 3).

Figure 6.12: Heroin withdrawal/intoxication related visits to NSW emergency departments, 1997-2003



Source: Emergency Department Data Collection, NSW Department of Health.

6.5. General physical health

This section is based on KI and user reports only, but gives some qualitative information about trends.

KI across all markets reported that the shortage had both positive and negative effects on drug users' physical health. It was generally agreed that the physical health of those people who entered treatment during the shortage improved concomitantly with their decreasing illicit drug use.

For those who remained in the drug market, the general appearance and physical health of users reportedly declined (KI, NSW Pharmacotherapy Clients). Some KI attributed this to more acute withdrawal symptoms experienced by many users. A number of KI also reported that the increased cost of heroin during the shortage and the more expensive cost of cocaine meant that users diverted income to drugs that otherwise would have been spent on food. This was also reported by users themselves (NSW Pharmacotherapy Clients).

Also reported were harms specific to the use of cocaine, such as the suppressant effect cocaine has on appetite and 'cocaine bugs' – continual scratching and picking of the skin which was associated with paranoid and deluded thinking.

Both KI and pharmacotherapy clients reported increased numbers of people with injection related problems associated with the injection of cocaine and benzodiazepines. These health concerns are discussed in detail in Chapter 4.

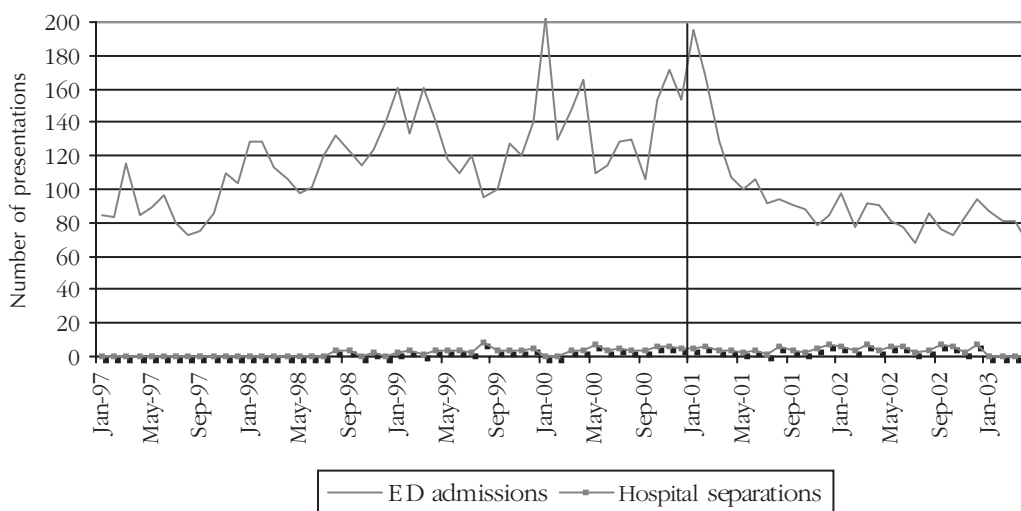
A few KI commented that perhaps the level of physical harm for users had not deteriorated, but instead those users with the poorest health became more visible because of the reduction in the size of the drug user market.

After the heroin shortage eased, there was some agreement that there was a reduction in physical health problems. The improvements were thought to have been due to decreases in cocaine use and increases in heroin use.

6.6. Drug induced psychosis

Many key informants reported changes in the incidence of drug induced psychosis associated with increased psychostimulant use, particularly cocaine. Indicator data on drug induced psychosis showed that by far the majority of drug induced psychosis presentations were treated at emergency departments – few hospital stays were recorded for the treatment of drug induced psychosis (Figure 6.13). This is consistent with KI reports that the greater proportion of users who experienced psychosis did so transiently; a small proportion experienced more severe psychosis requiring hospitalization.

Figure 6.13: Drug related psychosis presentations to hospitals and emergency departments, NSW 1997-2003



Source: Emergency Department Data Collection & Inpatient Statistics Collection, NSW Department of Health.

There did not appear to be a State level change in the number of persons receiving emergency help for drug induced psychosis (Figure 6.13). There *did* appear, however, to be a spike in the number of drug induced psychosis presentations in Kings Cross following the onset of the shortage (from 12 presentations in December 2000 to 31 in January 2001) although the small numbers involved precluded formal statistical analysis (Appendix C). There were no differences in the number of drug psychosis presentations for particular age or gender groups (Appendix C).

6.7. General mental health and psychosocial functioning

KI reported that users' mental health deteriorated during the shortage. This was initially attributed to their inability to obtain heroin but as the shortage progressed, it was more generally attributed to the increased use of cocaine and methamphetamine.

The reduced availability, poor quality and higher cost of heroin increased the pressure on users in maintaining a heroin habit, thereby increasing their general stress and anxiety levels. This was mentioned by some KI and was also a commonly reported reason that users gave for leaving the drug market and/or entering treatment (NSW Pharmacotherapy Clients).

Both KI and NSW Pharmacotherapy Clients reported that the increased use of cocaine and methamphetamine by those users who remained in the illicit drug market exacerbated underlying mental health problems and contributed to new mental health problems in clients who had previously not experienced such problems. The behaviour of users became increasingly erratic and unpredictable, with more paranoid, irrational and agitated behaviour. A small number of clients reportedly became delusional and thought disordered. Users reported becoming unstable while using psychostimulants, and at times were unprepared for the effects of these drugs. As one user commented:

"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." (NSW Pharmacotherapy Client)

Some KI also reported an increase in the number of clients who presented with depressed mood. This was typically associated with the post-intoxication effects of cocaine but some KI commented that it was also a reaction to the upheaval in users' lives such as increasing personal debt, loss of significant relationships and loss of accommodation. The increasing resources required to sustain a cocaine habit, and the adverse effects of cocaine use on mental health, significantly impacted on other aspects of users' lives. KI commented on the 'erosion of compassion and support for each other' and increased aggressive and erratic behaviour taking its toll on relationships with partners and families. Sometimes the disintegration of significant relationships left people homeless. Aggressive, agitated behaviour and diversion of rent money to cover the increased cost of drug use were other reasons given by KI for the increased homelessness of users during the shortage.

Although unemployment was generally reported to be high among heroin users seen by the KI, a number of KI reported that the physical and mental health problems associated with cocaine use made it difficult for sex workers to sustain employment.

"... one young woman ... she was working in a brothel up at the Cross and she was so disordered the pimps up there rang her parents who live down the road [to come and get her]. They would give her some speed at the start of a shift but because she was having a paranoid reaction to it she could not work with her customers. So she was unable to work and had time off work for a while." (Manager Mental Health Service, Kings Cross)

There were some reports of increased child protection concerns because of the time involved in maintaining a cocaine habit – the increased cost of the drug and the much shorter psychoactive life of the drug driving an almost continual cycle of crime and drug use that left little time for the care of children. A few KI also expressed concern for the children involved in relationship breakdowns, particularly where this resulted in loss of accommodation. There was little comment on the incidence of domestic violence per se.

Most KI commented that the psychosocial problems associated with cocaine and amphetamine use dissipated over time, sometimes associated with a return to heroin use and sometimes associated with better management of cocaine and amphetamine use. However this did not seem to be true for all users, particularly more marginalized users:

“... there was a big loss of jobs, or they lost their house, lost relationships. You know, things went wrong, as with any drug addict or alcoholic who’s unstable. Whether it suddenly doubled or increased by 10% I couldn’t really say, but we certainly had more people who were falling apart [associated with cocaine use] ... I’m sure there are people still carrying the scars from that and others who still haven’t got their acts back together.” (Medical Professional, Redfern)”

6.8. Aggression

State level KI from both health and law enforcement noted an increased incidence of violence among psychostimulant users. One KI reported increased violence between sex workers competing to work on their ‘spot’ 24 hours a day, where previously these spots were shared between workers at different times.

One respondent in Kings Cross said that users were transformed from “mild mannered” to aggressive people. Violence was commonly reported in emergency departments and clinic settings across all drug markets. This was attributed by KI to increased cocaine and/or benzodiazepine use¹⁶. Levels of general aggression reduced as the heroin shortage eased and people were able to use heroin instead of cocaine.

Law enforcement KI reported an increase in the use of violence to commit crimes and that the victims of crime were more severely injured in the attacks. Most police attributed this increase to the effects of cocaine on the drug users committing the crimes (Chapter 9).

“... people changed, the demeanour of the place changed, it was very oppressive of a very violent nature at that time.” (Non Commissioned Officer, Redfern)

¹⁶ Benzodiazepines have a disinhibitory effect on users (similar to that of alcohol) which can result in aggressive behaviour in some users.

6.9. Drug use in pregnancy

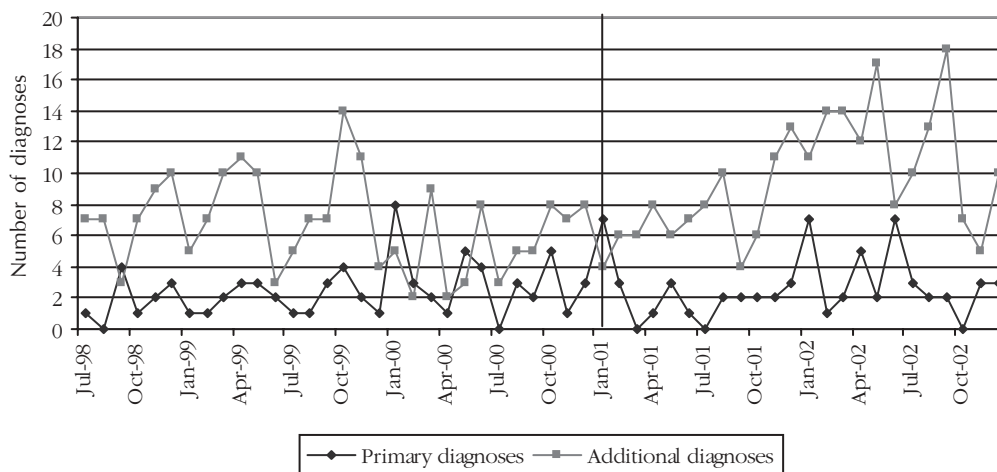
Two sources of data were used to assess the extent of any problems among pregnant women associated with drug use: data on hospital visits where drug and alcohol problems were noted as complicating the pregnancy, and KI reports from services targeting substance using pregnant women. The service in Kings Cross was well positioned to detect an impact of the shortage, whereas KI comment in Cabramatta was somewhat limited and KI in Redfern were unable to provide much comment¹⁷.

There was no effect of the shortage on the number of hospital separations for substance using pregnant women (Figure 6.14¹⁸), nor was there a change in the number of women referred to substance use in pregnancy services (Health Professionals Drug Health Services, Kings Cross and Cabramatta). This suggests that the number of substance using pregnant women remained constant.

Opiates remained the primary reason for presentation across all three services but both Cabramatta and Kings Cross reported an increase in the number of women presenting with concomitant cocaine use because of the reduced availability of heroin. Additionally, Kings Cross also reported a slight increase in the use of benzodiazepines and a noticeable use of antipsychotics and antidepressants; these drugs were sometimes used to manage withdrawal symptoms and sometimes used in conjunction with other drugs like benzodiazepines and methadone.

The substitution of cocaine for heroin raised similar psychosocial concerns as those reported by KI working with other client groups, such as increased homelessness and personal debt. Cabramatta also reported an increase in prostitution to support cocaine use. There was no report of psychosis or other mental health problems.

Figure 6.14: Number of hospital separations for pregnant women where drug and alcohol problems were coded as complicating the pregnancy, NSW 1998-2002



¹⁷ Differences in awareness of the shortage across the three sites most probably relate to differences in service configuration. Kings Cross had a dedicated team and therefore greater resources to enable monitoring of the service by way of data collection and team meetings. Limited resources in Cabramatta were, at the time of the shortage, directed towards clinical activity that was to a large extent, crisis driven (see Chapter 11 for a discussion of health agency changes associated with the reduction in heroin supply). Changes in Redfern might have been more visible than what was reported but for the fact that the role with the most direct and comprehensive involvement with the client population had changed hands since the shortage.

¹⁸ It was not possible to separate alcohol from drug-related maternal conditions; hence this data possibly overestimates the incidence of drug-related hospital separations for pregnant women.

Increased cocaine use had implications for neonate withdrawal management and obstetric complications and was reported in Kings Cross to be of concern, however:

“We didn’t see a huge impact on obstetric complications. We only had one neonate that was born with a cardiac condition that we could say was related to substance use. We didn’t have an increase in neonatal deaths or anything like that.” (Health Professional Drug Health Service, Kings Cross)

The Kings Cross service also reported that women were injecting into the breast tissue because of the predominance of veins during pregnancy. This was related to cocaine and benzodiazepine use and had not been seen prior to the heroin shortage. There were no significant acute health problems arising from this practice generally, except for one case of an abscess.

The impact of the shortage for this client group appears to be limited. This may reflect an inability to detect changes as noted above or it may be because the configuration of these services was highly flexible and responsive to the needs of the client group. In addition, the characteristics of this client group differ in regard to: (a) reason for presentation – a proportion of the client group might not otherwise present for treatment because they do not consider their drug use to be problematic; and (b) pregnancy can be a strong motivator for reducing drug use.

6.10. Conclusions

- There was a large and persistent decrease in the number of non-fatal heroin overdoses in early 2001. There was also a significant decrease in the number of deaths where heroin was detected. The lower numbers of non-fatal and fatal heroin overdoses have continued since that time.
- Decreases in heroin overdoses were of a similar magnitude for males and females, but there were bigger decreases among younger age groups and no detectable change among those aged 45 years and older. This suggests that a reduction in heroin availability had a bigger impact upon younger than older heroin users’ likelihood of overdose. This age effect was also noted for heroin treatment (see Chapter 7), suggesting that older users remained in the market, whereas younger users may have ceased or reduced the use of heroin.
- Following the onset of the heroin shortage, there were reports from both KI and users (NSW Pharmacotherapy Clients) of many heroin users experiencing withdrawal symptoms. There was no observable increase, however, in attendances at health services (Chapter 7), suggesting that most heroin users managed withdrawal without formal medical assistance.
- There was no detectable change in ED admissions for cocaine overdose, although there was some suggestion of an increase in the Kings Cross area. There was no detectable change associated with the heroin shortage in the number of other non-fatal drug overdoses.
- An increase in drug induced psychosis was recorded in the short term, but did not persist. This limited impact was probably not due to better management of use by users, but rather, to a decrease in the availability (and use) of cocaine.
- There was no detectable increase in the number of pregnant women coming to the attention of treatment services with problematic drug use, but some evidence that polydrug use among pregnant women may have increased, consistent with reports regarding other groups of drug users.

- There were some differences across the Sydney drug markets, with suggestions that Kings Cross had larger increases in cocaine related harms and greater decreases in heroin related overdoses than the other areas. This was consistent with other data suggesting that cocaine use was concentrated in this area of Sydney.

Chapter 7. Changes in Drug Treatment

Elizabeth Conroy, Louisa Degenhardt and Stuart Gilmour

Summary

- The reduction in heroin supply had no observable effect on treatment seeking among persons who had previously been in opioid pharmacotherapy.
- There were *fewer* new treatment registrations (i.e. treatment seeking among treatment naive persons) for opioid pharmacotherapy among younger users following the reduction in heroin supply. This suggests that when heroin became less available, those who had not been enrolled in pharmacotherapy did not seek to enter it.
- Adherence to pharmacotherapy improved among those in treatment when heroin was less available, but retention in treatment did not change.
- Among younger users there were increases in the number of treatment episodes for cocaine and amphetamine type stimulant (ATS) problems. Treatment seeking among older users was unrelated to changes in heroin supply.
- These patterns of treatment seeking suggest two things: 1) that older, heroin dependent persons were less likely than younger persons to become problematic users of psychostimulant drug types when their primary drug (heroin) became less available; and 2) the motivation of younger heroin users to enter pharmacotherapy was decreased after a reduction in heroin supply, perhaps because they were more likely to switch to using other, more available, illicit drugs.
- Treatment seeking among those with psychostimulant use problems is complicated by a lack of appropriate treatment options and a perception by users that psychostimulant use (and the subsequent development of problematic use) is fundamentally different to heroin use and dependence. This was often reported by KI in this study and is consistent with previous research (Hando, Topp et al. 1997).
- There has been a gradual increase over time (following the shortage) in the small numbers of treatment episodes for problematic benzodiazepine use.

7.1. Introduction

A range of effective treatment options is available for the treatment of problematic heroin use in NSW. These include: pharmacotherapies such as methadone and buprenorphine, detoxification, counselling, rehabilitation, and residential therapeutic communities (TC).

A more limited range of options is available for the treatment of psychostimulant drugs. Despite decades of research into potential pharmacotherapies for both methamphetamine and cocaine dependence, no effective medications have been developed for the treatment of either (Elkashaf and Vocci 2003). Treatment for the problematic use of methamphetamine and cocaine is largely through psychological therapy and assistance with withdrawal (Nathan, Bresnick et al. 1998). Given apparent increases in the use of cocaine and methamphetamine in a number of countries in the last decade (Klee and Morris 1994; Methamphetamine Interagency Task Force 2000; Matsumoto, Kamijo et al. 2002), there has been considerable debate about the need for effective treatments (Mattick and Darke 1995; Methamphetamine Interagency Task Force 2000; Farrell, Marsden et al. 2002).

Benzodiazepine dependence and misuse are problems commonly identified among injecting drug users (IDU) who use benzodiazepines (Ross and Darke 1997). Some of the treatment possibilities for this problem include the introduction of “benzodiazepine withdrawal regimes” with supervised, limited and reducing doses. Others include counselling, rehabilitation, and residential TC.

A range of data was used in the current Chapter:

- data from the Pharmaceutical Services Branch, NSW Department of Health, on persons receiving opioid pharmacotherapy;
- data from the National Minimum Data Set for Alcohol and Other Drug Treatment Services (NMDS-AODTS), NSW Department of Health, on all closed (i.e. completed) treatment episodes for drug treatment;
- interviews with pharmacotherapy clients regarding their experiences and motivations in treatment; and
- interviews with key informants (KI) on changes observed in the numbers and characteristics of persons entering drug treatment.

Some series from the Pharmaceutical Services Branch dataset were analysed using time series analysis (TSA); the results are presented in Appendix C. For an explanation of TSA see Appendix A.

Data from the NMDS-AODTS was not analysed because of the short length of the time series; this data collection commenced July 2000, only six months prior to the onset of the heroin shortage.

7.2. Treatment for problematic heroin use

Opioid pharmacotherapy for the treatment of heroin dependence will be discussed in the first section of this chapter, with other forms of treatment examined as a group in the second. Adherence to and retention in treatment will be evaluated using data on involvement with both pharmacotherapies and other forms of treatment for heroin dependence.

7.2.1. Entry into opioid pharmacotherapy

Persons entering pharmacotherapy in NSW are first assessed and then registered with the Pharmaceutical Services Branch (NSW Department of Health). Not all persons, once registered, subsequently attend for dosing. Information is collected on methadone or buprenorphine dose, along with the duration of treatment episode on all registered clients, regardless of whether they attend for dosing. The total number of registrations for pharmacotherapy, regardless of program attendance, provides one measure of treatment seeking behaviour and of initial engagement in the treatment system.

The following graphs examine the number of new registrations – i.e. persons who had never previously been registered for pharmacotherapy in NSW, or “treatment naive” persons – and the number of re-registrations – i.e. persons who had previously been registered but had left pharmacotherapy treatment to later re-enter.

In NSW, the majority of entrants to pharmacotherapy have previously been registered for this form of treatment at some time. Prior to the reduction in heroin supply (1997-2000), 77% of all registrations for pharmacotherapy were re-registrations. During and following the heroin shortage (2001-2003), 84% of registrations were re-registrations (Figure 7.1), reflecting a reduction in the number of new clients over this time (this reduction is discussed in the following sections). As a consequence, a greater proportion of pharmacotherapy clients were *not* treatment naive following the reduction in heroin supply. Of interest is the fact that the availability of places *increased* around the time of the reduction in heroin supply, so these changes were unlikely to reflect (limited) treatment availability in any way¹⁹.

Re-entry into opioid pharmacotherapy

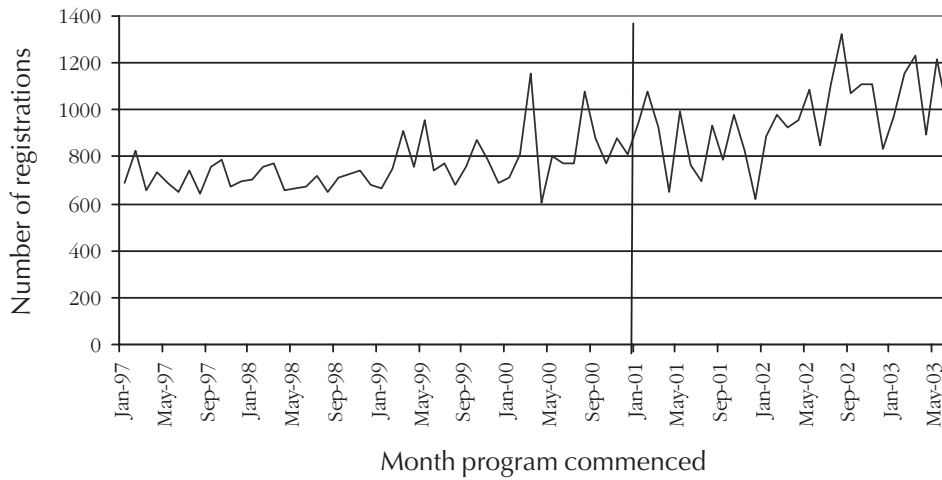
The number of persons re-registering for pharmacotherapy treatment did not appear to change with the onset of the reduction in heroin supply (Figure 7.1). The trend did not alter, suggesting a relatively steady rate of re-engagement with pharmacotherapy for heroin dependence during the shortage.

This lack of effect suggests that changes in heroin supply did not have an observable impact upon active heroin users who had been previously engaged in pharmacotherapy treatment for heroin dependence (i.e. the reduction in heroin supply neither increased nor decreased the overall numbers re-entering treatment). However, over time there has been a general increase in the number of re-registrations per month²⁰, from around 750 per month in early 1997, to around 1100 per month in early 2003 (Figure 7.1).

¹⁹Although the number of places for pharmacotherapy were increasing across the state, this may not have translated into ‘real’ places if clinics were understaffed (for reasons other than funding). However, there was no mention by KI of having to deny people entry into treatment because of a lack of places.

²⁰ The introduction of buprenorphine (as an alternative pharmacotherapy to methadone) after the shortage might have impacted on the upward trend in re-registrations.

Figure 7.1: Number of re-registrations for opioid pharmacotherapy, NSW 1997-2003

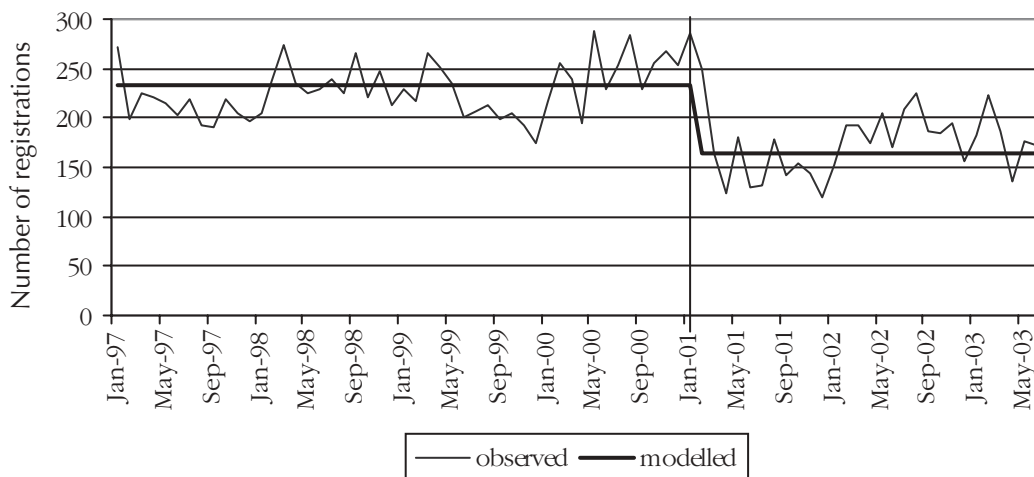


Source: Pharmaceutical Services Branch, NSW Department of Health.

First entry into opioid pharmacotherapy

Analysis of data on the number of persons registering for pharmacotherapy for the first time shows that the number of new registrations – i.e. treatment episodes among heroin dependent persons who had never before been engaged in opioid pharmacotherapy – declined after heroin became less available (Figure 7.2). In January 2001, 285 new registrations were recorded; by April 2001, this number had decreased to 123. The modelled time series in Figure 7.2 represents a 29% drop in the mean number of new registrations per month ($p < 0.0001$); from a mean of 232.8 prior to the shortage to a mean of 163.8 after the shortage. This decrease in the number of new registrations suggests that when heroin supply was reduced, fewer treatment naive individuals chose to enter opioid pharmacotherapy in NSW.

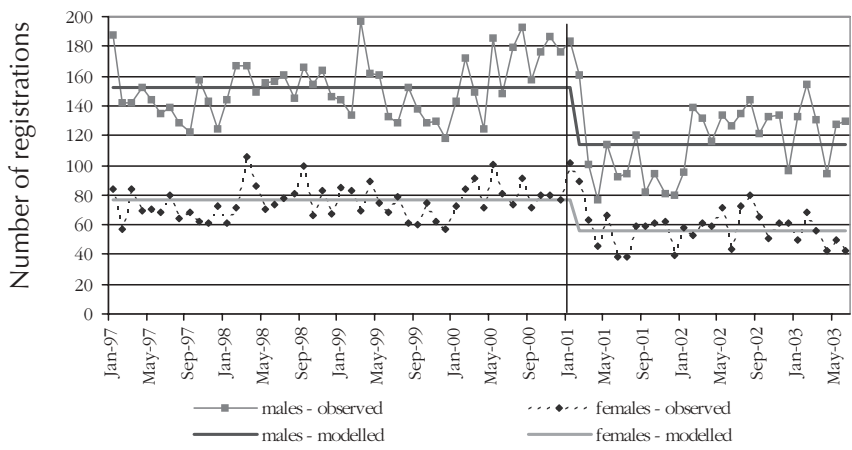
Figure 7.2: Number of new registrations for opioid pharmacotherapy, NSW 1997-2003



Source: Pharmaceutical Services Branch, NSW Department of Health.

The magnitude of the reduction in the number of new registrations was similar among males and females, with decreases of 25% ($p = 0.0003$) and 26% ($p < 0.0001$) respectively (Figure 7.3). Among males, the mean number of new registrations decreased from 152.8 prior to the shortage to 114.2 after the shortage; among females, the mean number decreased from 76.5 to 56.3 new registrations.

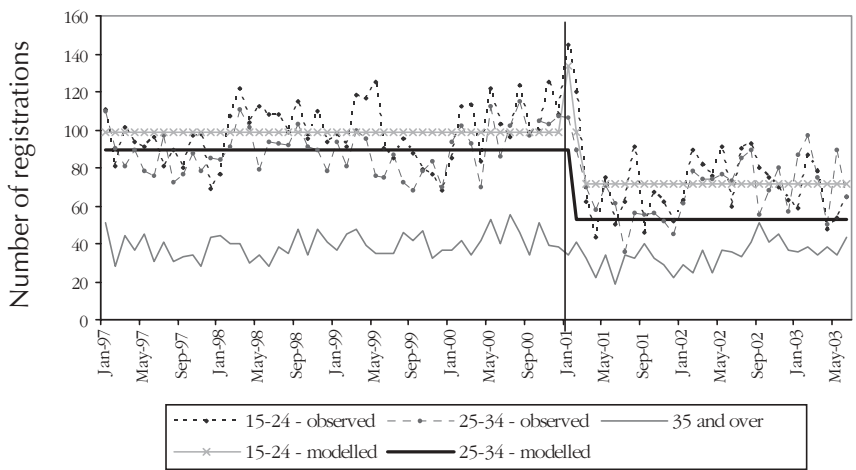
Figure 7.3: Number of new registrations for opioid pharmacotherapy by gender, NSW 1997-2003



Source: Pharmaceutical Services Branch, NSW Department of Health.

Figure 7.4 shows the number of new registrations in each age group. The heroin shortage was associated with a reduction in new registrations among younger age groups. Among those aged 15-24 years, there was an increase from an average of 98 registrations per month to 134 in January 2001. This subsequently decreased, on average, by 26% ($p < 0.0001$) after the onset of the shortage. There was a 41% ($p < 0.0001$) decrease in the mean number of new registrations per month among those aged 25-34 years. These age effects were noted by health KI in both Kings Cross and Cabramatta who reported that fewer younger people were presenting to their services.

Figure 7.4: Number of new registrations for opioid pharmacotherapy by age, NSW 1997-2003



Source: Pharmaceutical Services Branch, NSW Department of Health.

The same pattern was seen in two of the three NSW drug markets (the exception being Redfern) and in the remainder of NSW (Appendix C). KI in Redfern reported there was no real change in the number of people seeking pharmacotherapy. In Kings Cross and Cabramatta, there were reports of an initial increase in enquiries regarding pharmacotherapy that preceded the sustained decrease in the number of people commencing treatment. A few KI reported that many users seeking pharmacotherapy were inappropriate for the program.

“And we would get quite a lot of people coming into triage asking to go on methadone. It was incredible. All you were doing in triage was trying to talk to people about that because a lot of people were quite inappropriate for our program. I think it was often just

to get them by. Long term users really, ... their intention was to use the methadone to stop them hanging out.” (Health Professional Drug Health Service, Kings Cross)

Those people who did commence pharmacotherapy were reported by KI to be more marginalised users with more complex drug dependence problems. This was supported by KI in both Kings Cross and Cabramatta:

“In the early stages of it [the heroin shortage] we definitely got an increase of people coming in saying they wanted to come off and get onto the ‘done [methadone] program. They’d come in, they would have been shopping around, they were sort of the unfortunate creatures who probably had been given the program and had fallen off it; they were alley cats and they just couldn’t score.” (Manager Emergency Health Service, Kings Cross)

And:

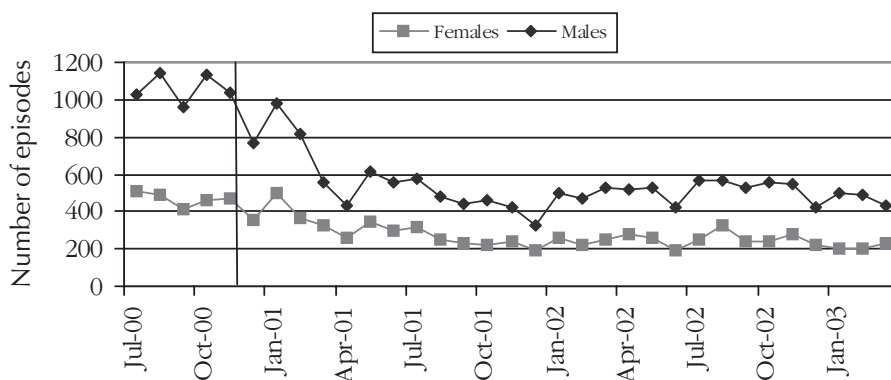
“So the people we actually had come into treatment during that period – there was still a few – they were generally still the tapering off of people who couldn’t get heroin who wanted to come into treatment or old clients who wanted to return to treatment. But we were seeing very few new cases of people who were heroin dependent or opiate dependent who wanted to come in and actually start on a methadone treatment program.” (Manager Drug Health Service, Cabramatta)

7.2.2. Entry into other forms of heroin treatment

NSW Health collects data on all treatment episodes for drug treatment that does not involve pharmacotherapy, as part of the National Minimum Data Set for Alcohol and Other Drug Treatment Services (NMDS-AODTS)²¹. This includes people completing detoxification, counselling, assessment and residential rehabilitation. These data include closed treatment episodes. This means that those who are still *currently* in drug treatment will not be included in the data presented here.

Overall, there was a reduction in the number of treatment episodes in which heroin was the primary drug of concern to the person after the onset of the heroin shortage (Figure 7.5). As observed for pharmacotherapy, the magnitude of the reduction was similar for males and females (from around 1000 episodes per month for males prior to the shortage, to 500 following the onset of the shortage; and from around 500 to 250 for females).

Figure 7.5: Number of heroin treatment episodes by gender, NSW 2000-2003

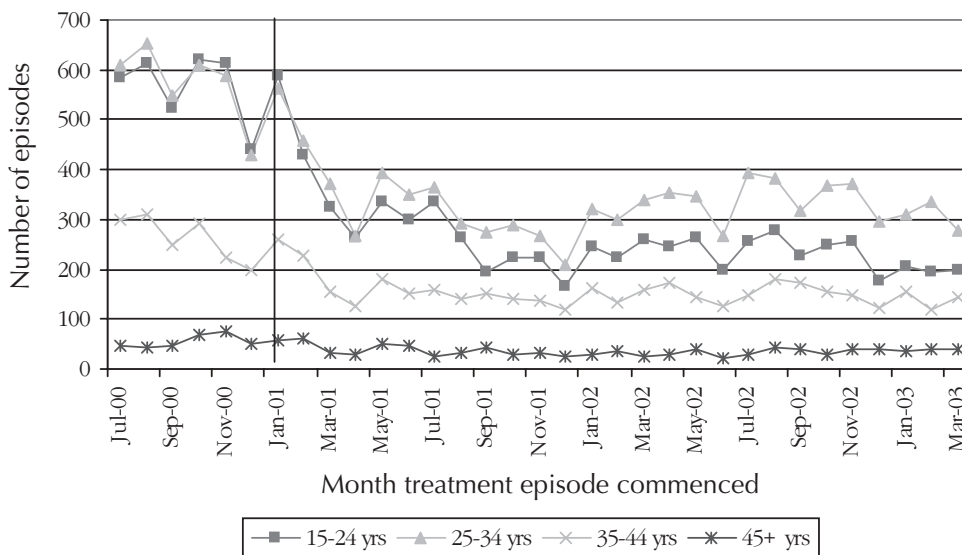


Source: National Minimum Data Set for Alcohol and Other Drug Treatment Services (NMDS-AODTS), NSW Department of Health. These data refer to closed treatment episodes.

²¹ This dataset began in 2000, so no formal time series analysis was possible; data prior to 2000 are therefore not available.

Figure 7.6 shows the number of heroin treatment episodes by age. As with pharmacotherapy, there were greater reductions observed among younger age groups (those aged 15-34) than the older age groups (35 years and older). There was no apparent change in the number of treatment episodes among those over 45 years.

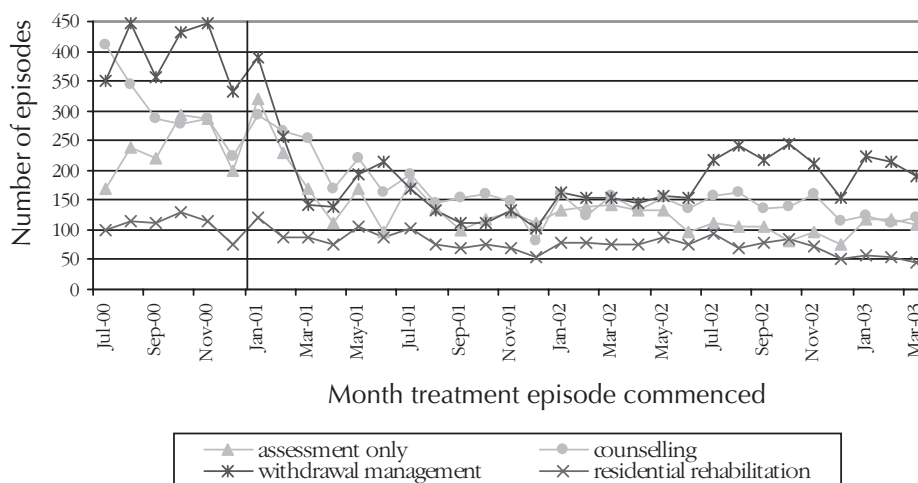
Figure 7.6: Number of heroin treatment episodes by age, NSW 2000-2003



Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

Figure 7.7 shows the types of treatment provided to persons whose primary drug problem was heroin. The clearest trend was a large decrease in the number of episodes involving detoxification that occurred during the first half of 2001. Large decreases were also observed in the number of episodes where counselling and “assessment only” were provided.

Figure 7.7: Number of heroin treatment episodes by treatment type, NSW 2000-2003



Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

The downward trend in treatment presentations for heroin problems is consistent with a constricting heroin market (Chapters 3 and 5). KI reports also conferred with this:

“There was talk at the time of people racing for treatment. We really didn’t ever see that and ... probably over those six to twelve months we would have had a reduction in demand for services ... because people were finding it harder and not using heroin as much.” (Medical Professional Drug Health Service, Cabramatta)

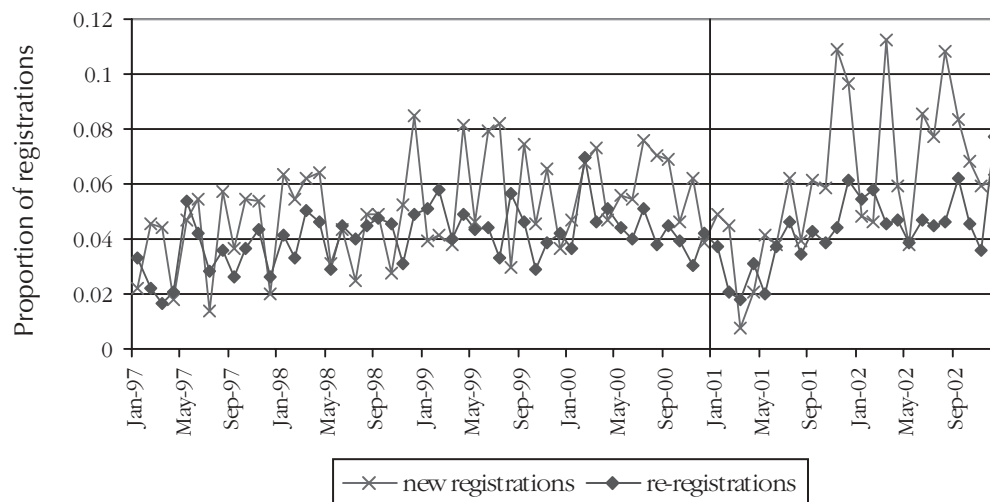
Alternatively, adherence to and retention in treatment may have improved with the reduction in heroin supply and therefore users were no longer cycling in and out of treatment. This possibility is discussed in the following two sections.

7.2.3. Adherence to treatment for heroin dependence

Persons who entered drug treatment during the heroin shortage may have improved their adherence to treatment. This was assessed by examining trends in reasons for ending pharmacotherapy (as noted by clinicians on the NSW Health Pharmaceutical Services Branch database), and from interviews with pharmacotherapy clients and KI involved in pharmacotherapy.

Data on registrations for pharmacotherapy indicate that the proportion of clients who registered for treatment but did not commence treatment²², decreased during the heroin shortage (Figure 7.8). This occurred for both new and re-registrations. This trend suggests that once persons decided to enrol for treatment, the likelihood that they then went on to pick up their medication was higher when heroin was less available.

Figure 7.8: Proportion of clients registering for pharmacotherapy treatment who did not commence treatment, NSW 1997-2002



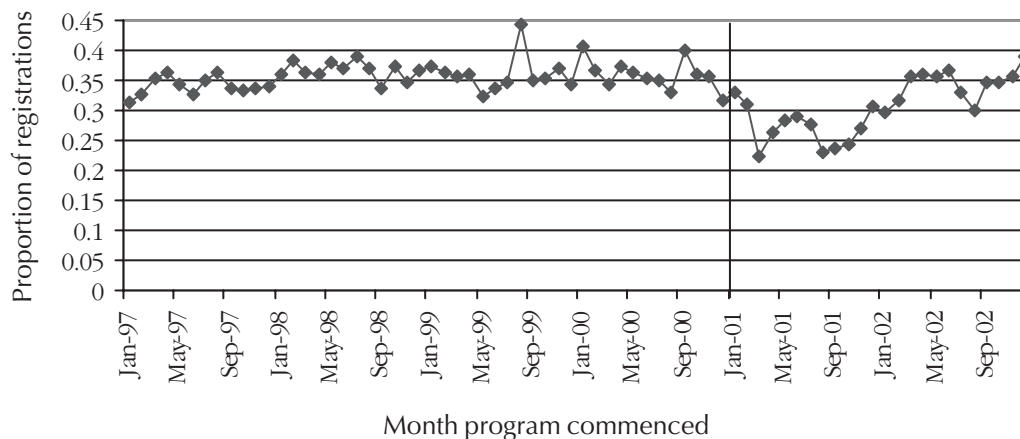
Source: Pharmaceutical Services Branch, NSW Department of Health.

Figure 7.9 shows the proportion of clients re-registering for pharmacotherapy treatment who ceased to pick up their dose (i.e. they “dropped out” of treatment). Fewer of those who re-registered for pharmacotherapy during the heroin shortage ceased to attend treatment. There was no change among new registrations (Appendix C). This change was sustained until around March 2002. This pattern suggests that among those who had previously been in pharmacotherapy,

²² This data reflects clients who attend for assessment and are registered for treatment, but do not subsequently attend for dosing.

ceasing to attend for dosing became a less common reason for ceasing treatment when heroin was less available.

Figure 7.9: Proportion of clients re-registering for pharmacotherapy who ceased to attend, NSW 1997-2002



Source: Pharmaceutical Services Branch, NSW Department of Health.

These findings were consistent with the views of KI and pharmacotherapy clients, both of whom reported that users' adherence to treatment was better when the supply of heroin was reduced.

"We also saw those people who were on our methadone program, their attendance rates jumped up to 100%. (Manager Drug Health Service, Kings Cross)

"Achieving goals in treatment was probably better ... the lack of availability made it easier for them to just stick with treatment." (Medical Professional, Cabramatta)

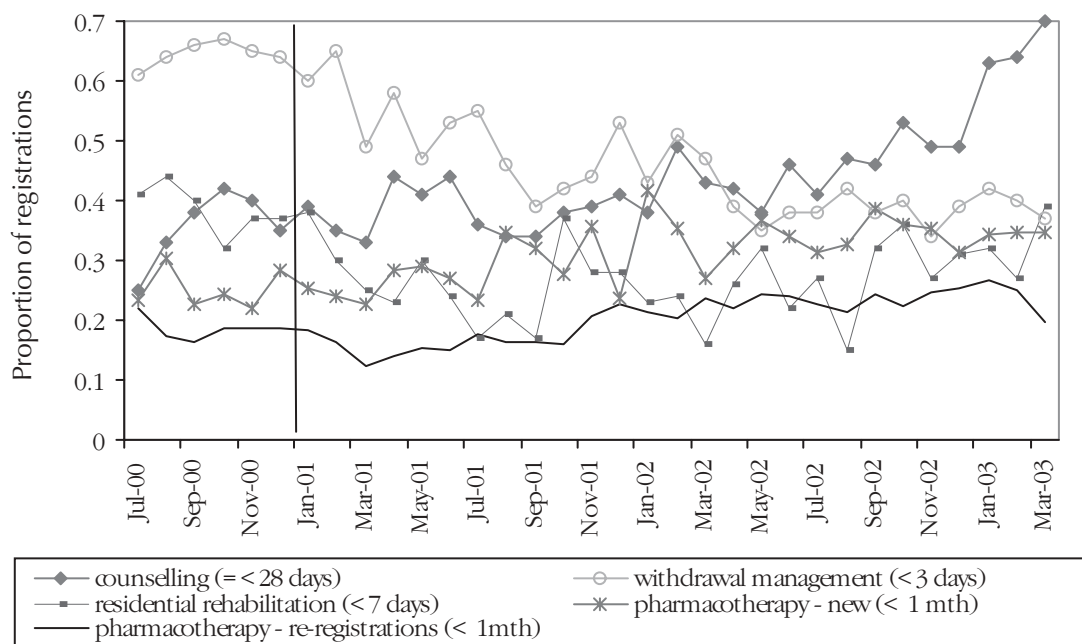
"Yeah, I think some people actually just got sick of the whole scene and started to do better in treatment ... the fact that the supply of heroin is inconsistent quality and it's remained a bit that way, whenever they have a little relapse or fall back into using, it's less attractive." (Health Professional Drug Health Service, Redfern)

Some clients in treatment cited the heroin shortage as a positive thing, because it made their attempts at abstinence easier. Some said that it gave them a chance to reconsider aspects of their lives and mentioned positive improvements while on methadone treatment, such as gaining employment, improving relationships with family or friends and cutting down on heroin use (NSW Pharmacotherapy Clients).

7.2.4. Retention in treatment for heroin dependence/misuse

We assessed whether persons who entered treatment during the heroin shortage changed their length of stay in treatment by examining data on length of stay in pharmacotherapy and other forms of treatment for heroin dependence/misuse. Early drop out is defined as less than three days for withdrawal management, less than seven days for residential rehabilitation, less than 28 days for counselling and less than one month for pharmacotherapy. Figure 7.10 shows that there did not appear to be a change in the proportion of those entering treatment who ceased treatment early. This suggests that a change in heroin availability did not affect the likelihood that those in treatment remained there.

Figure 7.10: Proportion of persons in treatment for heroin dependence/misuse who could be considered “early drop outs”, NSW 2000-2003



Source: Pharmaceutical Services Branch and NMDS-AODTS, NSW Department of Health.

Consistent with this finding, KI working in both treatment and community settings across all drug markets reported that retention in treatment for some clients (including young people) was only temporary. When heroin availability improved, a proportion of these patients returned to heroin use.

“Methadone was used temporarily as a fill in until the heroin came back. Giving up drug use is part of a long process and the absence of one drug isn’t enough. Five to six percent of clients found the heroin shortage positive, decided to give up using. Often young people would go on methadone for a short time and then go back to heroin or use both heroin and methadone.” (Allied Health Professional Community Service, Redfern)

7.2.5. Concurrent treatment for other drug problems

KI frequently noted that drug users presenting to treatment were identifying other drug problems in addition to heroin dependence:

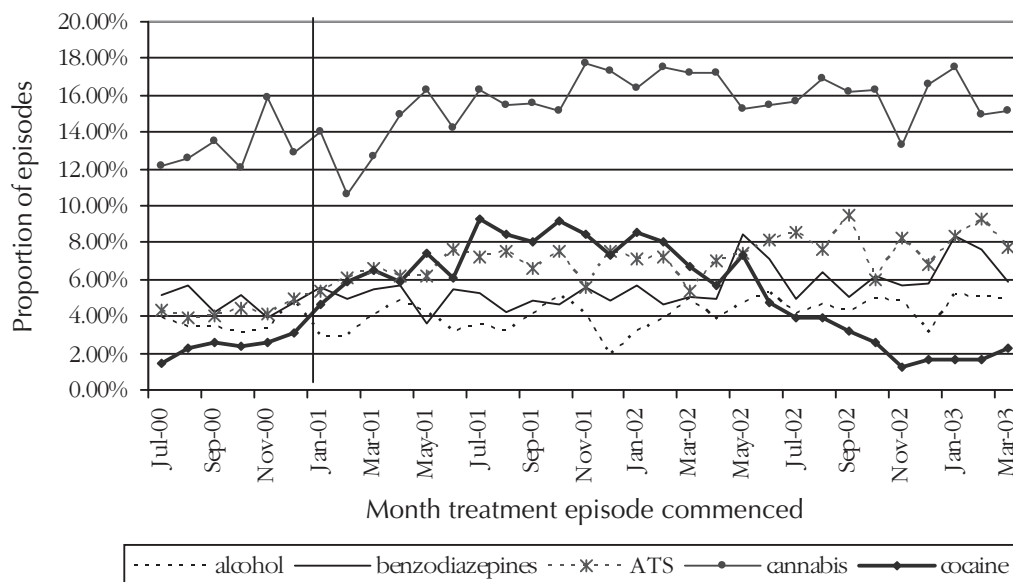
“People who were presenting for treatment who normally would be maybe presenting for an outpatient detox from opiates were coming in a bit messed up and were wanting assistance with maybe detox from amphetamines or cocaine as well or instead of opiates.” (Manager Drug Health Service, Cabramatta)

Figure 7.11 shows the proportion of persons receiving treatment for heroin dependence reporting other drugs as a secondary concern²³. The proportion of persons receiving treatment for heroin dependence, who also reported cocaine as a problem, appeared to increase with the reduction in supply of heroin. It has since decreased again, consistent with increased availability of heroin and decreased availability of cocaine (Chapter 3).

²³ These data include NMDS-AODTS clients only, not those in pharmacotherapy for heroin dependence.

There did not appear to be an increase in the proportion of heroin dependent clients presenting with misuse of amphetamine type stimulants (ATS) or other drug types after the reduction in heroin supply (Figure 7.11). Any increase in the proportion of persons for whom ATS were also noted as a problem appears to have begun before the reduction in the availability of heroin and continued thereafter.

Figure 7.11: Proportion of heroin treatment episodes where other drugs were noted as secondary problems, NSW 2000-2003



Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

In summary, there is evidence to suggest that some people developed problematic use of other drugs in conjunction with their heroin use, and that these people sought help for these problems. Cocaine was the drug for which the shift was marked around the time of the heroin shortage. Overall, there may be a trend over time for increasing proportions of clients in treatment for heroin use to have other drugs noted as problems.

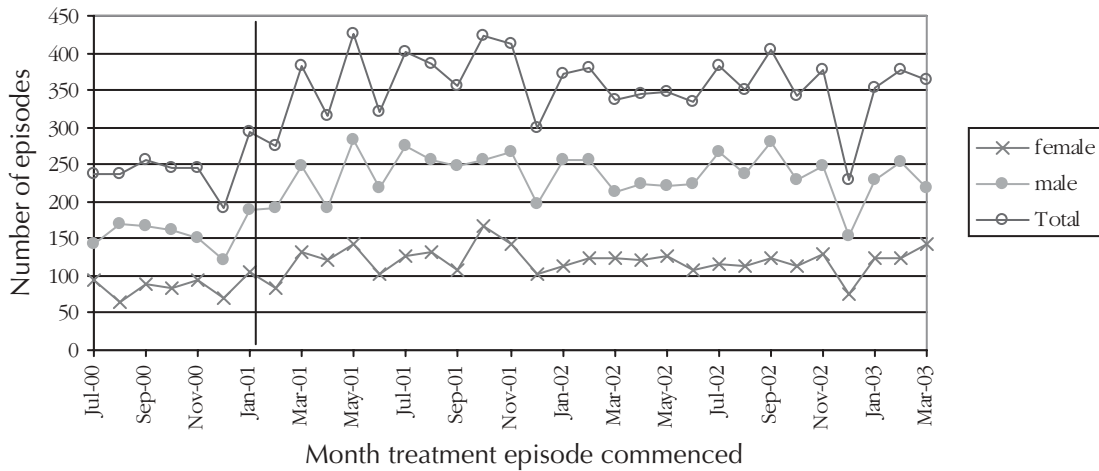
7.3. Treatment for problematic psychostimulant use

Given the changes noted in the use of other drugs (Chapter 3) we examined whether there were any changes were noted in the numbers of persons presenting for treatment primarily for these other drug types. The following two sections examine treatment for ATS and cocaine problems.

7.3.1. ATS

Many KI reported an increase in the number of people presenting for treatment with a primary drug problem with ATS. This was consistent with NSW data on the number of treatment episodes where ATS were the primary drug of concern (Figure 7.12). There was an increase in the number of persons treated for ATS problems following the onset of the heroin shortage, from around 250 episodes per month prior to the reduction in heroin availability, to almost 400 per month between March-November 2001. Increases of a similar magnitude were observed for females and males (Figure 7.12). It is difficult to state how much of this increase was related to the heroin shortage, given that increases began before the reduction in heroin supply and that ATS use as a secondary problem for heroin users was also increasing before the reduction in heroin supply (Figure 7.11).

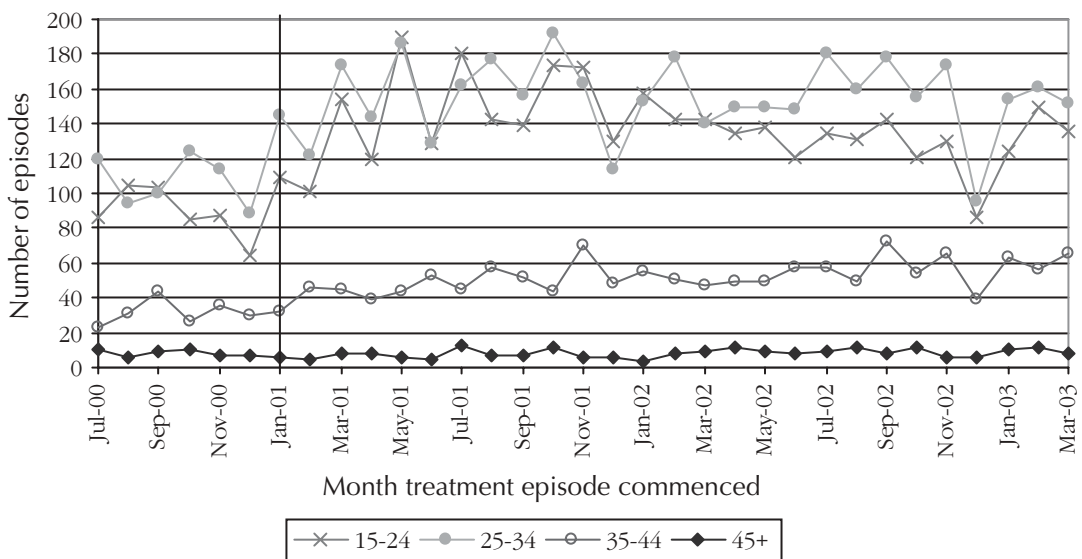
Figure 7.12: Number of ATS treatment episodes by gender, NSW 2000-2003



Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

Figure 7.13 shows a marked difference in the age of persons receiving treatment for an ATS problem. The increase almost exclusively occurred between those aged 15-34 years. For the 15-24 and 25-34 year age groups there were increases of around 50% per month in the number of episodes compared with before the onset of the heroin shortage. There was very little change in the 35 and over age groups.

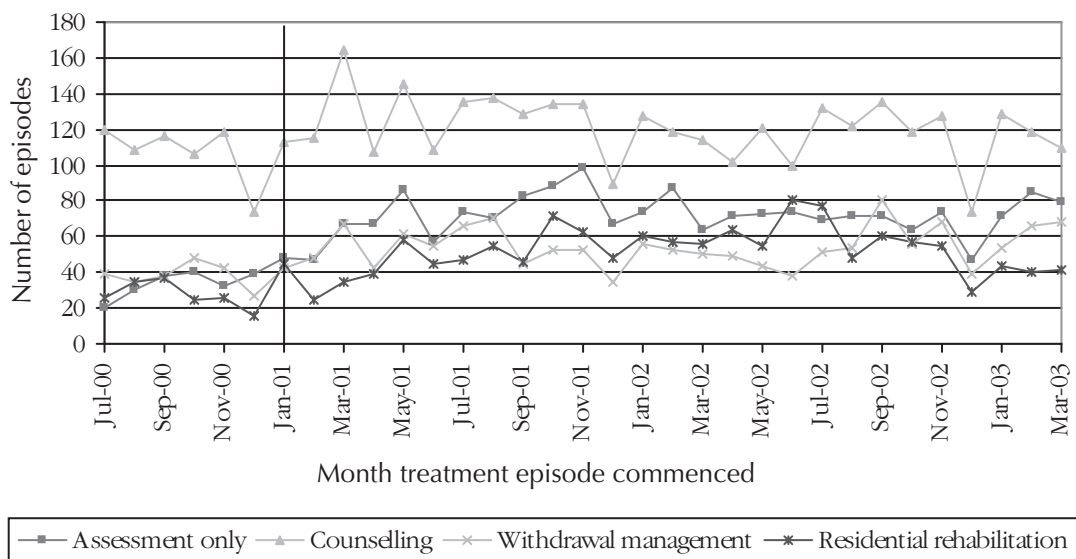
Figure 7.13: Number of ATS treatment episodes by age, NSW 2000-2003



Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

Figure 7.14 shows that across NSW, the major increase in interventions provided for ATS problems were primarily “assessment” and counselling. A smaller increase was noted for withdrawal management and residential rehabilitation. The change noted in “assessment only” episodes was consistent with KI reports that clients with ATS problems often received little more than assessment. This reflected: a) a lack of effective treatments to offer them; b) a lack of training to deal with ATS problems among those working in drug treatment agencies and c) the chaotic nature of the clientele.

Figure 7.14: Number of ATS treatment episodes by treatment type, NSW 2000-2003

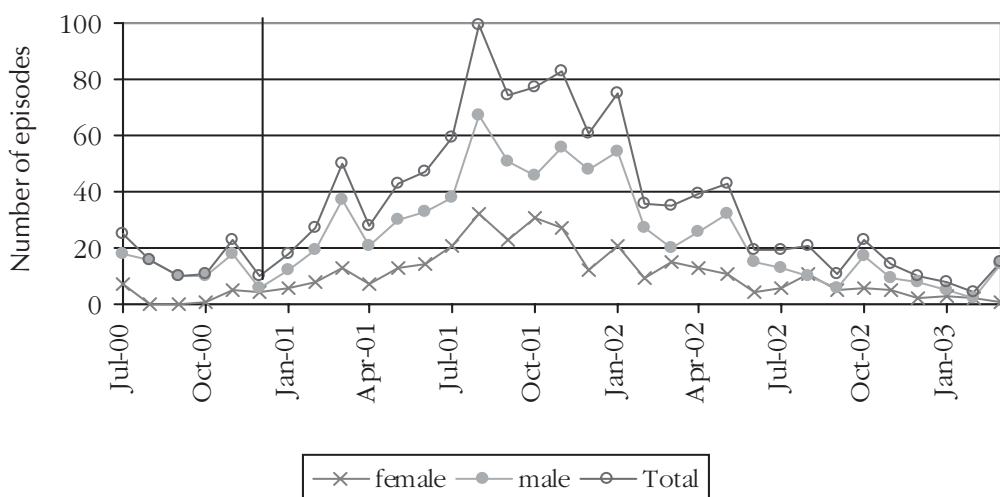


Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

7.3.2. Cocaine

Figure 7.15 shows an increase in the number of treatment episodes in which cocaine was recorded as the primary drug problem. The increase was of a similar magnitude for males and females: the number of treatment episodes for males increased from 12 in January 2001 to 67 in August 2001 (the highest level reached), and from 6 to 32 among females. Since that time, the number of treatment episodes has decreased, with around 10 per month recorded in the later months of the period for which data were available.

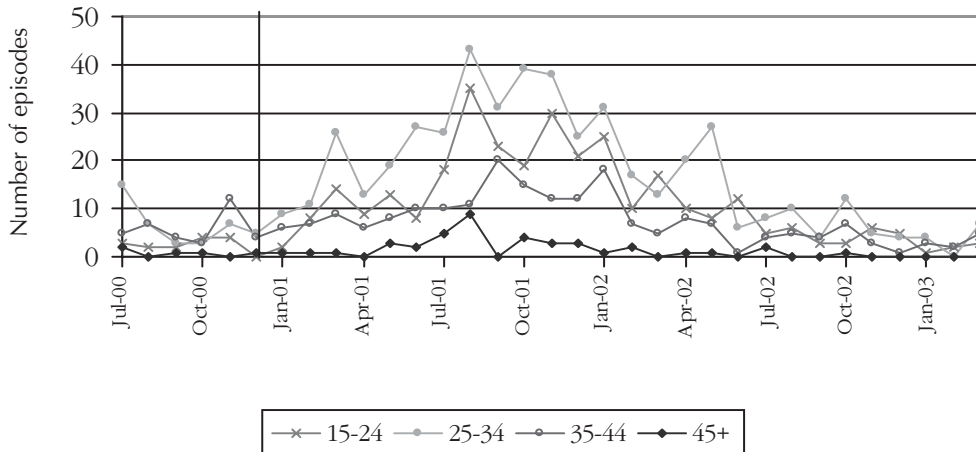
Figure 7.15: Number of cocaine treatment episodes by gender, NSW 2000-2003



Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

As with the trend in ATS treatment, there was a clear difference in trends for cocaine treatment across age groups (Figure 7.16). The 15-24 and 25-34 year age groups showed the largest increases in numbers entering treatment following the onset of the shortage, peaking in August 2001; there was little change among those over 45 years.

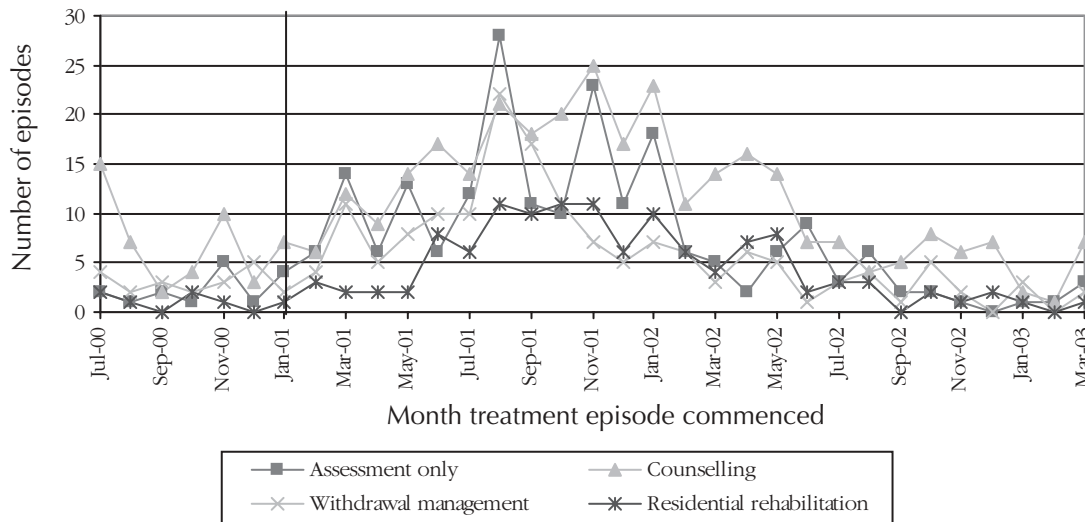
Figure 7.16: Number of cocaine treatment episodes by age, NSW 2000-2003



Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

As with ATS problems, the largest increases in interventions provided for problem cocaine users were in “assessment only” and counselling (Figure 7.17). Again, this reflects a lack of other treatment options and perhaps the motivation of drug users themselves.

Figure 7.17: Number of cocaine treatment episodes by treatment type, NSW 2000-2003



Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

Treatment for clients who were using cocaine was reportedly very difficult to provide. KI reported that clients were very difficult to engage or develop rapport with, referrals to other services were crisis in nature and very temporary in effect. Young people in particular were reported to have short inpatient stays, often with early discharge.

“... referrals to detox, to doctors, to Langton etc. were very temporary in effect, even though the referrals were crisis in nature, people only lasted a few days and we had lots of people coming back ... Interaction between staff and drug users was very poor. We were working in crisis mode rather than a long term intervention focus.” (Policy Officer Drug Health Service, Redfern)

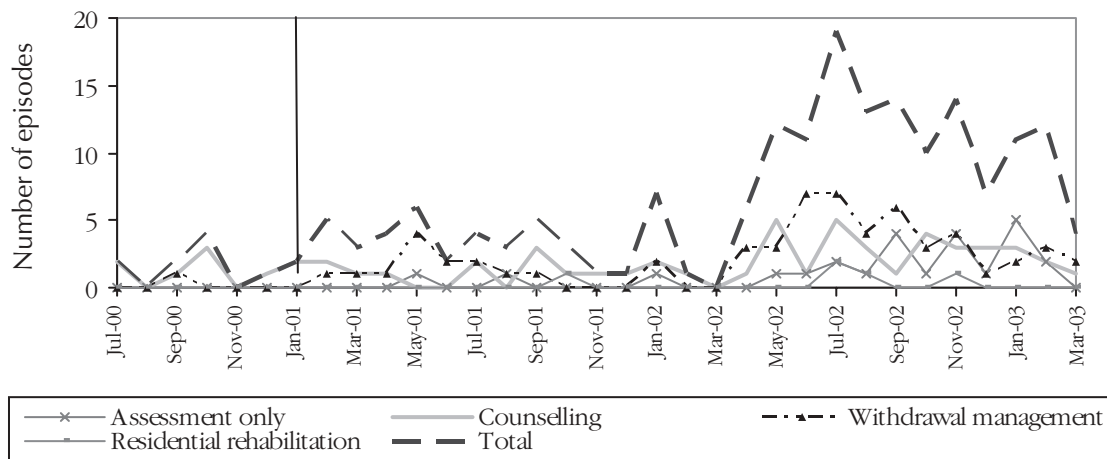
7.4. Treatment for problematic use of other drugs

7.4.1. Benzodiazepines

There was no immediate increase in the number of persons receiving treatment for benzodiazepine use immediately after the onset of the heroin shortage (Figure 7.18). However, consistent with the findings of changes in benzodiazepine use, particularly among IDU in 2002 (Chapter 3), there were increases in the number of persons receiving treatment for benzodiazepines after mid 2002. The lack of a marked immediate effect was consistent with findings (Chapter 3) that a switch to regular benzodiazepine use occurred among a relatively small group and perhaps took some time to develop. This was borne out by KI, who suggested that among heroin users who switched to benzodiazepines, clients who developed *problematic* benzodiazepine use were generally from more disadvantaged backgrounds:

“... the housing commission people, they’re the people with no jobs or limited employment ... my A type personality, get-up-and-go, employed patients were also taking benzos but I can usually shame them into stopping, or they shame themselves ... they’ve got more resources and by definition, more to lose.” (General Practitioner, Redfern)

Figure 7.18: Number of benzodiazepine treatment episodes by treatment type, NSW 2000-2003

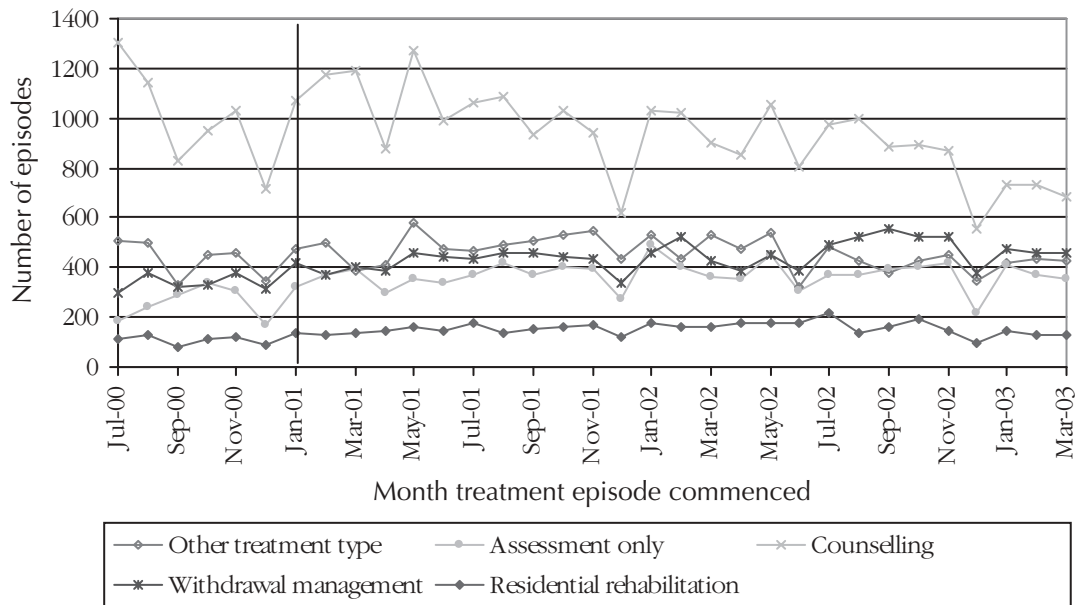


Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

7.4.2. Other drugs

Figure 7.19 shows the number of treatment episodes for other drug problems. In this case, “other drugs” include other drug presentations including cannabis, hallucinogens, steroids, anti-depressants, and volatile solvents (but excluding alcohol and tobacco). As can be seen, there were no major changes in the number or type of treatments provided for the problematic use of these other drug types at the time of the heroin shortage (Jan-Apr 2001).

Figure 7.19: Number of other drug treatment episodes by treatment type, NSW 2000-2003



Source: NMDS-AODTS, NSW Department of Health. These data refer to closed treatment episodes.

7.5. Conclusions

- During a protracted period of reduced heroin supply, there was no observable impact upon treatment seeking among persons who had previously engaged in opioid pharmacotherapy. This suggested that changes in heroin availability did not have an effect upon treatment seeking behaviour among this group.
- The reduction in heroin supply *did* affect treatment seeking among treatment naive persons. There were fewer new registrations for opioid pharmacotherapy after the reduction in heroin supply. This suggests that when heroin became less available, those who had never before been enrolled in pharmacotherapy did not enter it at that time. This group was likely to be younger than those with previous experience of pharmacotherapy.
- The reduction in opioid pharmacotherapy registrations among this younger group may have been related to subsequent increases in the number of treatment episodes for younger persons for cocaine and ATS problems.
- These patterns of treatment seeking suggest two things: 1) that older, heroin dependent persons are less likely than younger persons to switch to problematic use of psychostimulant drug types if their primary drug becomes less available; and 2) the motivation of younger persons to enter pharmacotherapy may be reduced during a period of reduced heroin supply, in favour of switching to the use of other, more available, drugs.
- Adherence to pharmacotherapy improved when heroin was less available but retention in any form of heroin treatment did not change.
- Older persons entered drug treatment regardless of changes in heroin supply.

- Some increases were noted in treatment for cocaine and ATS, but this may have been underestimated by a lack of treatment options for problem psychostimulant users.
- Small but increasing numbers of treatment episodes were noted for problem benzodiazepine users. This is an issue of considerable concern, particularly among users who are injecting these drugs. KI suggested that these persons might be more socially disadvantaged, which is consistent with previous research (Darke, Ross et al. 1995; Breen, Degenhardt et al. 2002; Darke, Topp et al. 2002). Further restrictions upon the availability of benzodiazepines may be warranted.

Chapter 8. Changes in Drug Crime

Louisa Degenhardt, Linette Collins and Elizabeth Conroy

Summary

- Drug distribution in NSW appeared to change around the time of the heroin shortage. High-level distribution of heroin, cocaine and methamphetamine may have remained somewhat discretely managed by different organised crime groups, but greater collaboration may have occurred between these groups.
- Among mid-level (NSW) distributors, there appeared to be a shift in emphasis from heroin to methamphetamine, ecstasy and cocaine distribution.
- Low-level dealers may have made a short-term shift from heroin to cocaine distribution.
- The nature of low-level drug dealing also appeared to shift following the heroin shortage according to KI in all drug market areas, with movement towards mobile, less overt methods of dealing.
- The heroin shortage had clear effects on street drug market visibility. In Kings Cross, Cabramatta and Redfern, KI all reported short term increases in visibility but in the longer term KI in all areas reported *decreased* visibility of the drug markets, as dealing became more covert.
- There were significant decreases in incidents of heroin possession/use reported by police. These decreases were more marked in Fairfield-Liverpool, among males and those aged 20-29 years. At the same time, increases were observed in incidents for cocaine possession/use, which primarily occurred among younger males, particularly in the Inner Sydney area. This was consistent with reports of some short term drug market displacement from Cabramatta to the inner city, particularly Redfern.

8.1. Introduction

This Chapter examines the impact of the heroin shortage on drug crime from the level of mid-level distribution to police apprehension of illicit drug users or dealers for drug possession/ use. As with any complex market, there is a wide range of factors that could affect these elements. In considering potential changes observed in these, the following sources of data were used:

- Interviews with representatives of the following Australian Government agencies:
 - Australian Federal Police;
 - Australian Customs Service;
- The use of documents from NSW Police, which were jointly written up by NDARC and NSW Police representatives in a document summarising NSW Police documentation of illicit drug market trends, 1999-2002 (Collins, Degenhardt et al. 2003); available upon request);
- Reports of key informants (KI) from health and law enforcement agencies in NSW;
- Reports from NSW pharmacotherapy clients on the drug market;
- Indicator data from NSW Police on recorded incidents of importing, dealing or trafficking illicit drugs, and of possession or use of illicit drugs.

8.2. NSW drug distribution

8.2.1. Heroin

As discussed in Chapter 1, heroin was largely distributed in Sydney in the late 1990s through street based markets. There appears to have been marked changes in the way in which heroin was distributed at street level since that time. In particular, there appeared to be a reduction in the number of street level user/dealers, and a move by middle level dealers from overt dealing, to mobile methods of delivery and dealing from “drug houses”. This reflected a shrinking drug market and may have led to middle level dealers playing a greater role in retailing at the user level.

A move away from street level heroin dealing, to dealing from 24 hour fortified “drug houses”, was first reported in 1999 and increased after the heroin shortage in early 2001 in Cabramatta (Collins, Degenhardt et al. 2003). There was a reported reduction in the number of street level ‘runners’²⁴ involved in the sale of heroin. This made it easier for police to obtain information about higher level heroin dealers.

“It made it easier to identify who was actually controlling the heroin; they had to cut back on their runners as they didn’t have enough gear.” (Non Commissioned Officer, Redfern)

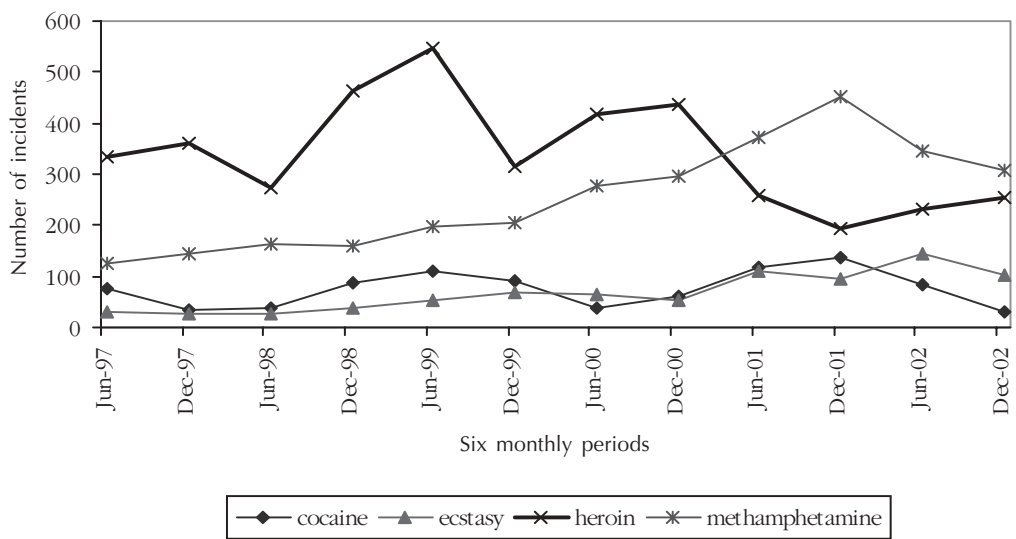
Heroin users reported changing heroin dealers during the course of the heroin shortage because some lower level dealers ceased selling (NSW Pharmacotherapy Clients).

Reports by KI and heroin users that fewer dealers were operating were supported by the fact that the number of recorded police incidents for heroin dealing or trafficking fell in the first half of 2001²⁵ (Figure 8.1). The number fell from 436 in July-December 2000 to 259 in January-June 2001, remaining at this level until the end of 2002.

²⁴ A person at street level who transfers drugs and money between lower level drug suppliers and individual customers.

²⁵ Such data may also reflect the targeting (and success) of NSW Police operations. However, the consistency of these data with other reports suggests that the change may have reflected a changing drug distribution network.

Figure 8.1: Incidents of dealing or trafficking illicit drugs, NSW 1997-2002



Source: NSW Bureau of Crime Statistics and Research.

The method of heroin dealing also appeared to change, from overt, street level dealing to more mobile, pre-arranged purchases in back streets or houses. This phenomenon has been previously documented in shrinking illicit drug markets (Bowling 1999). Dealers reportedly attempted to limit their customer bases by changing their telephone numbers, leaving their phones off, only working restricted hours and only selling to known customers. Some dealers would only sell to those users who wanted a large purchase, so groups of users (sometimes 10 to 15 people) would team up to make purchases. Overall, the number of lower level dealers appeared to decrease (NSW Pharmacotherapy Clients).

By early 2003, NSW Police reported that heroin had returned to some degree in traditional markets at street level (Commissioned Officer, State Command; NSW Pharmacotherapy Clients). A Cabramatta police KI summarised the changes observed:

“... the metamorphosis [was as follows:] ... street dealing, then the fortified houses, then we went to dial-a-deal, which was have a contact and now [early 2003] we are seeing a combination of street dealing again and phone numbers.” (Commissioned Officer, Cabramatta)

There were also numerous reports that the overall number of drug market locations in Sydney increased following the heroin shortage:

“... dealers move[d] to different areas in Sydney. Before only Kings Cross and Cabramatta, now Fairfield, Bonnyrigg, Bankstown, Campbelltown. They are not hard to find as drug users tend to know each other so they ask and get a mobile number.” (NSW Pharmacotherapy Client, Cabramatta)

In summary, it would appear that the reduced supply of heroin led to less pronounced street level drug markets, the development of smaller, hidden markets across Sydney, fewer lower level heroin dealers, and the development of more mobile methods of dealing in a drug for which there was a less consistent supply.

8.2.2. Methamphetamine

Increases in both the sophistication and extent of amphetamine type stimulants (ATS)²⁶ distribution have reportedly occurred since the mid 1990s (Collins, Degenhardt et al. 2003). In the late 1990s, a number of NSW Police operations reported that some South East Asian crime groups were involved in mid to upper level distribution of ATS. A number of NSW Police operations also reported associations between South East Asian crime groups and other ethnic groups involved in the distribution of ATS in NSW (Collins, Degenhardt et al. 2003).

Following the onset of the heroin shortage, some South East Asian crime groups that previously imported and distributed heroin also reportedly diversified into ATS distribution (Collins, Degenhardt et al. 2003). These changes were attributed to an inability or unwillingness to import large quantities of heroin. The ethnicity of people involved in ATS distribution also diversified (Collins, Degenhardt et al. 2003).

These reported increases in the extent of dealing were consistent with data on the number of dealing/trafficking incidents recorded by NSW Police (Figure 8.1), which has increased relatively consistently over time, in a manner unrelated to trends in heroin incidents; this was consistent with trends in seizures of the drugs (Section 8.3). No reports were sighted in this study that street level heroin dealers are now dealing ATS, but this may have occurred.

8.2.3. Cocaine

In 1999, mid level cocaine distribution was reportedly dominated by Lebanese-Australian organised crime groups, and dealing was largely limited to the “club scene” (Collins, Degenhardt et al. 2003). In 2000-2001 the extent of involvement of some crime groups in cocaine distribution reportedly increased, as did NSW Police seizures. Some South East Asian crime groups, previously involved in heroin trafficking, were reported to have moved into the importation and distribution of cocaine (Collins, Degenhardt et al. 2003). This was supported by the reports of clients in pharmacotherapy (NSW Pharmacotherapy Clients).

From 2001, NSW Police information suggested increased collaboration between cocaine cartels and South East Asian crime groups previously involved in heroin trafficking, with a change to conducting cocaine importation and distribution (Collins, Degenhardt et al. 2003). The involvement of Lebanese organised crime groups in cocaine distribution increased in 2001 as the cocaine supply increased.

In contrast to an apparent separation of groups involved in higher level supply of cocaine and heroin, some heroin dealers appeared to switch to cocaine:

“... the people that were supplying heroin, obviously had contacts for cocaine as well. I think the people that we dealt with were on such a low rung on the supply trade ... they just sort of rolled with the punches and just moved into the cocaine. They were obviously selling a lot more of the cocaine [than previously].” (Non Commissioned Officer, Redfern)

The increase in cocaine availability was noted by users and KI, and supported by NSW drug monitoring systems (Roxburgh, Degenhardt et al. 2003). According to all sources, this increased availability of cocaine was not sustained. A reduction in its availability was documented in the 2003 Illicit Drug Reporting System (IDRS; Courtney Breen, personal communication).

²⁶ This includes methamphetamine and “ecstasy” (MDMA).

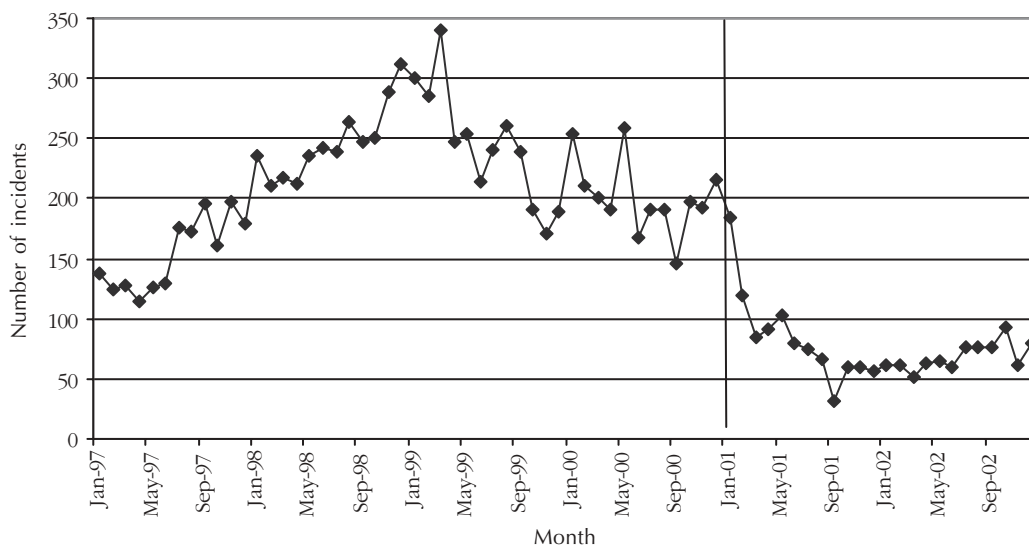
8.3. Drug use offences

The following section discusses trends in recorded incidents by NSW Police for possession or use of heroin, methamphetamine and cocaine. While such data are potentially affected by police operations and legislative changes, the consistency of these data with the trends in use and health effects reported in earlier Chapters (Chapters 3 and 6) lends greater confidence to the patterns observed in these data. In order to avoid making erroneous conclusions about trends in the time series data, a conservative approach was taken in analyses of NSW Police incident data, so some data were not analysed statistically. We are accordingly more cautious in drawing conclusions from these data.

8.3.1. Heroin

Figure 8.2 shows that the number of incidents recorded for heroin possession/use have steadily declined from 216 per month in December 2000 to a low of 32 in September 2001, with low levels being maintained until the end of the period for which data were available.

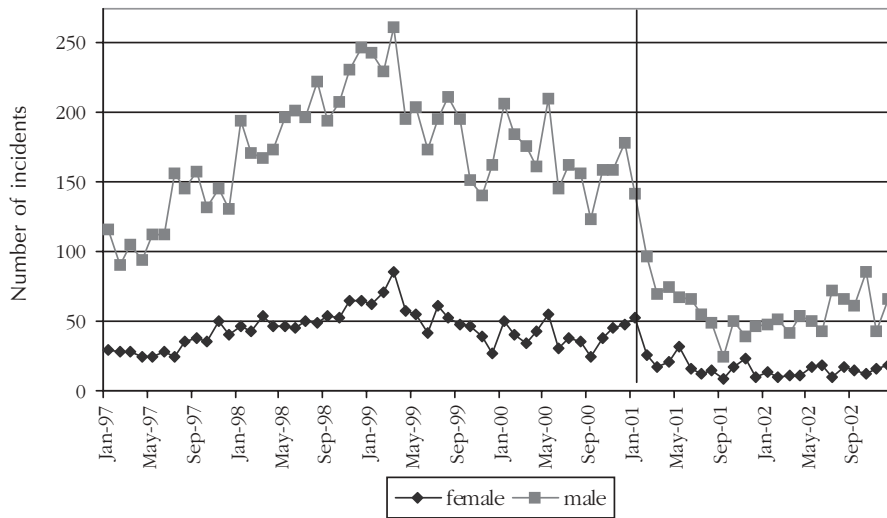
Figure 8.2: Incidents of heroin possession/use in NSW, 1997- 2002



Source: NSW Bureau of Crime Statistics and Research.

The changes differed according to age and gender. The decline seen among males appeared to be larger than that observed for females so that by the end of 2002, there was a much smaller difference in the number of males and females who had a recorded police incident for heroin possession or use. This is in contrast to the large excess of males among this group seen before the onset of the shortage (Figure 8.3). While the average of 50 females per month prior to the shortage decreased to around 20 per month following the onset of the shortage, among males the levels decreased from 150-200 prior to the shortage to 50 per month following the shortage.

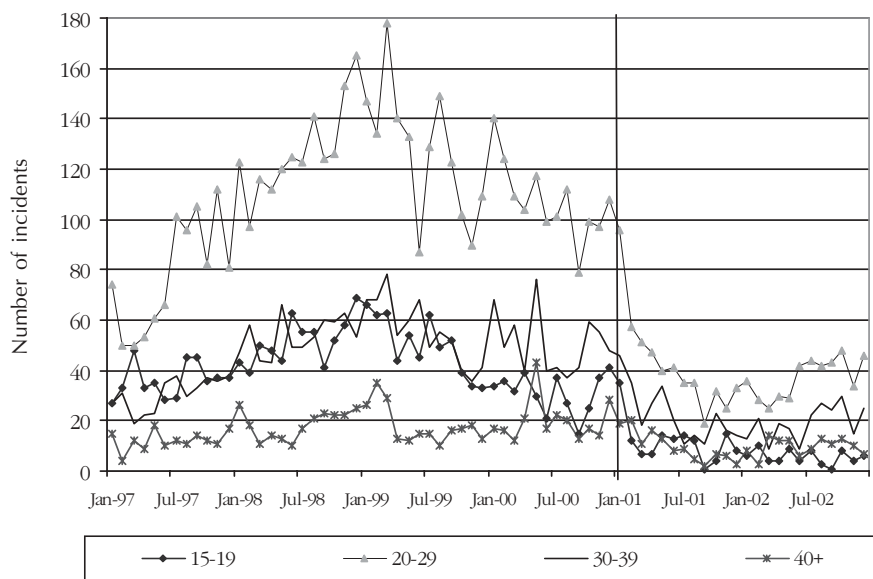
Figure 8.3: Incidents of heroin possession/use by gender, NSW 1997- 2002



Source: NSW Bureau of Crime Statistics and Research.

Figure 8.4 shows the number of recorded incidents for heroin possession/use by age group. A clear difference can immediately be seen in the trends observed for those aged 40 years and over, for whom the number of recorded incidents appears to have remained stable over the five years for which data were available. In contrast, the number of incidents for younger age groups increased dramatically from 1997 until 1999, with gradual decreases occurring prior to the reduction in heroin supply. For these younger age groups, however, there were marked reductions in the number of recorded incidents for heroin possession/use following January 2001, such that all age groups had similar numbers of recorded incidents for heroin possession/use from January 2001 to December 2002. This apparent reduction in the number of young people involved in heroin use was reported by health KI working in drug treatment and youth services in Cabramatta and Redfern.

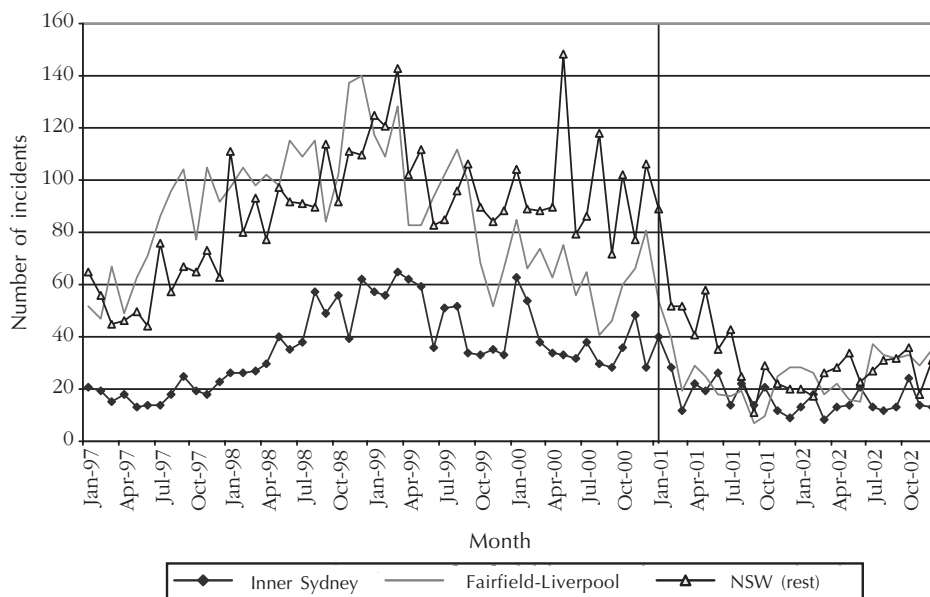
Figure 8.4: Incidents of heroin possession/use by age, 1997- 2002



Source: NSW Bureau of Crime Statistics and Research.

The geographic trends in incidents for heroin possession/use are shown in Figure 8.5. There were more marked decreases in the number of incidents can be seen for the Fairfield-Liverpool SSD and the rest of NSW than in Kings Cross and Redfern. According to KI, heroin markets in Cabramatta initially were more visible during the shortage, with the market decreasing in visibility over time. Heroin was now thought to be the drug of choice again, although its availability fluctuates and it takes longer to obtain heroin than it did before the shortage. The marketplace was thought to have changed significantly with suggestions by police, health and drug user KI that heroin markets were emerging in other Sydney suburbs.

Figure 8.5: Incidents of heroin possession/use by geographic area, 1997-2002

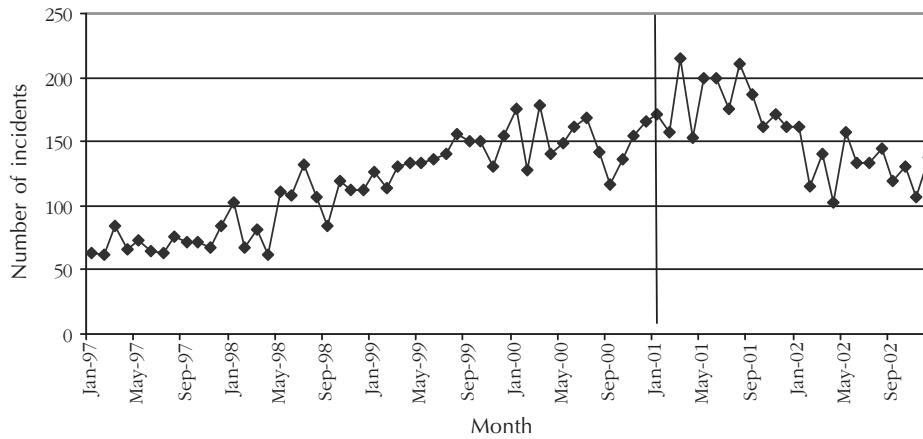


Source: NSW Bureau of Crime Statistics and Research.

8.3.2. Methamphetamine

Figure 8.6 shows that although there may have been an increase in the number of incidents recorded for possession/use of methamphetamine early in 2001; this did coincide with the onset of the heroin shortage. This lack of a clear increase was consistent with the conflicting views of KI about whether there had been a change in methamphetamine use. Rather, it seems likely that the trend seen was independent of changes in the availability of heroin. In keeping with this possibility, one health KI reported that they were not sure whether methamphetamine had become more available or if it had just become the main drug used when the availability of heroin declined. Most police in Redfern (with the exception of one commissioned officer) reported no increase in the use of methamphetamine during the shortage. Police involved in drug investigations reported that the reduction in heroin and ultimately the use of other drugs such as cocaine, afforded them more time to investigate other drug types. Through this work they became aware of the manufacture of methamphetamine in the area.

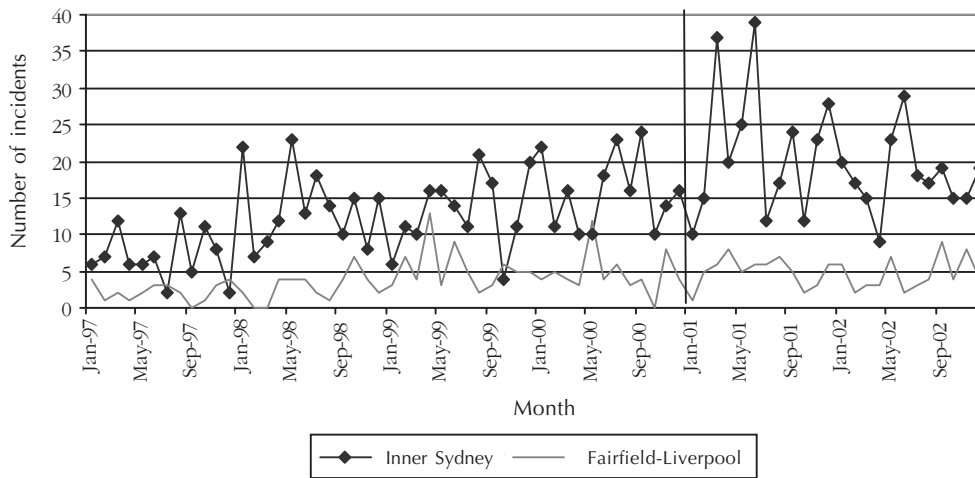
Figure 8.6: Incidents of methamphetamine possession/use in NSW, 1997-2002



Source: NSW Bureau of Crime Statistics and Research.

KI reported an increase in the size of ATS markets in Kings Cross, although these were not as visible as the heroin or cocaine markets. A small increase can be seen somewhat in the number of incidents for methamphetamine possession/use in Inner Sydney SSD (Figure 8.7). No changes were observed in incidents of possess/use methamphetamine in other areas in NSW (Appendix C).

Figure 8.7: Incidents of methamphetamine possession/use by geographic area, 1997-2002

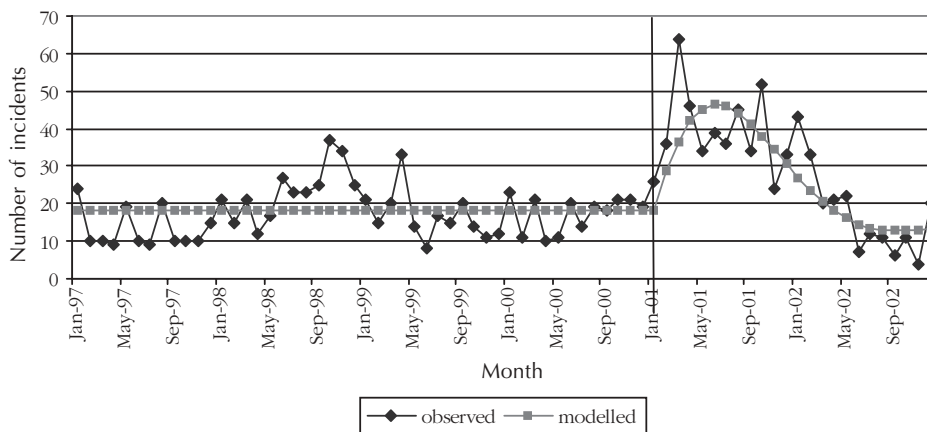


Source: NSW Bureau of Crime Statistics and Research.

8.3.3. Cocaine

Figure 8.8 shows the number of incidents recorded for cocaine possession/use in NSW. This peaked at 64 in March 2001 and remained high throughout the year but declined in 2002. The modelled series (Figure 8.8) showed that while police incidents for cocaine possession or use were at a steady level prior to the reduction in heroin supply, they increased significantly over the six months following the reduced heroin supply before later returning to the levels seen prior to the heroin shortage.

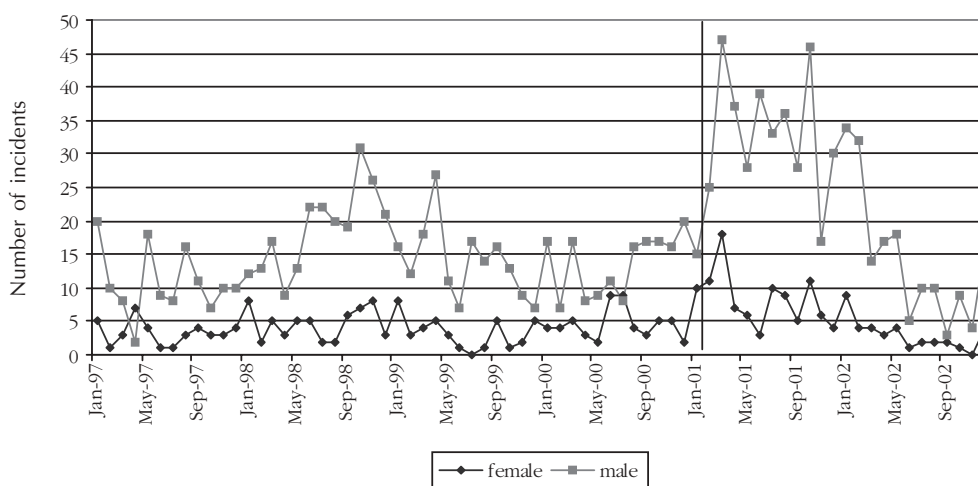
Figure 8.8: Incidents of cocaine possession/use in NSW, 1997-2002



Source: NSW Bureau of Crime Statistics and Research.

The changes in incidents of cocaine possession/use were clearly dominated by males (Figure 8.9). The increase in recorded incidents was marked for males, with only an apparently short spike of one month for females.

Figure 8.9: Incidents of cocaine possession/use in NSW by gender, 1997 - 2002



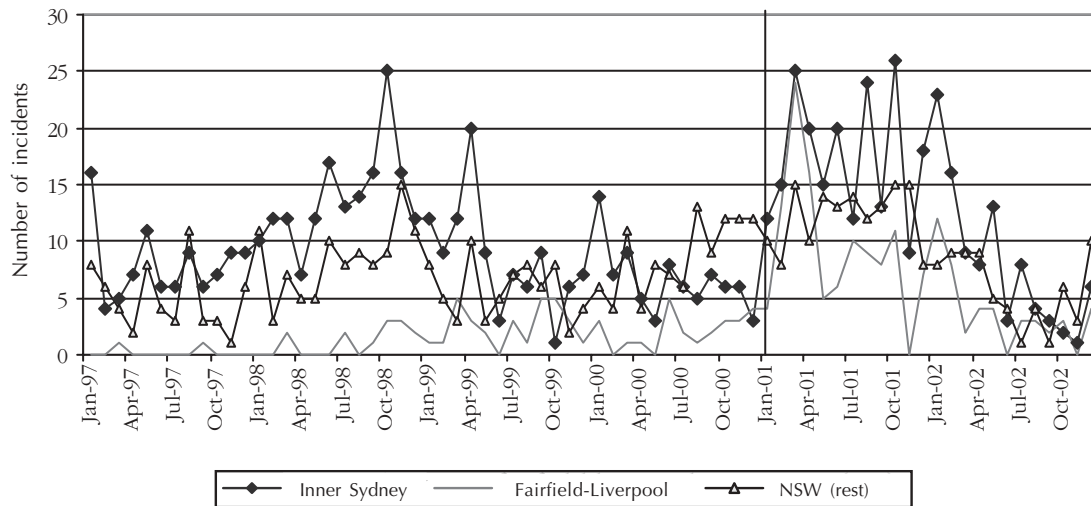
Source: NSW Bureau of Crime Statistics and Research.

There were also differences in the areas where cocaine related incidents were noted. Figure 8.10 shows an increase in the Inner Sydney Statistical Sub-Division (SSD), with recorded incidents in this area higher than those in the rest of NSW. This trend was consistent with KI reports of an increase in the availability of cocaine in Redfern and Kings Cross following the onset of the heroin shortage. One police officer involved in undercover work reported that the cocaine market became much more visible during the shortage due to the “sort of people” who were using cocaine

An increase was also noted in use offences in the Fairfield-Liverpool SSD (which contains the Cabramatta market). This appeared to be more shortlived than that observed in the Inner Sydney SSD (Figure 8.10). There was some disagreement between KI about whether this reflected increased visibility of cocaine markets, or increased size of the user market.

It was notable that in all areas the number of incidents for cocaine possession/use returned to levels at or below those seen prior to the reduction in heroin supply. This was consistent with KI reports that the cocaine market was greatly reduced as some heroin supply returned.

Figure 8.10: Incidents of cocaine possession/use by geographic area, 1997-2002



Source: NSW Bureau of Crime Statistics and Research.

8.3.4. Other drugs

Data on police incidents for cannabis possession or use were not examined for two reasons: first, the market for cannabis is a large one, and extends far beyond the small markets in Sydney where heroin had been concentrated; and second, the introduction of the Cannabis Cautioning Scheme in April 2000 meant that changes in the number of recorded incidents would be largely attributable to this change. KI reported that the availability of cannabis was reasonable throughout the study period.

8.4. Market visibility

Knowledge of potential changes in market visibility associated with the shortage was derived from interviews with KI in health and law enforcement and heroin users. In general, the reported changes were consistent across drug markets.

In the short term (around six months), the drug markets reportedly became *more* visible, as heroin users remained longer in the area attempting to obtain heroin. KI reported that the increased visibility of users searching for drug supplies made them aware of the heroin shortage. There were more drug users on the street searching for heroin; some were agitated and in withdrawal, and they remained in the area longer. According to one respondent (Commissioned Officer, Greater Hume Region), this created a 'negative perception' of the changes occurring in the market place among police and the community.

"These people were coming and could not get on [obtain heroin] and would wander aimlessly for hours and hours and hours and become quite aggressive so the cost to the community was quite high." (Commissioned Officer, State Command)

“It [drug market visibility] was altered in that people were more overt about sourcing their gear. People would come up, even to plain clothes police and say ‘do you know where I can get on?’ People were that desperate to find out where they could get heroin...people would walk into shops and ask the shop keepers.” (Non Commissioned Officer, Redfern)

In Redfern, there were a number of KI reports that the increased visibility of the drug market was even greater due to displacement of heroin users from Cabramatta and Kings Cross. For a short period, users from other areas reportedly came into Redfern to purchase heroin when supplies in their local areas became scarce. This was reported to have also increased criminal activity in the LAC.

“... before [the shortage] we’d just get the usual trade of the Housing Commission junkies, when the shortage was on you could see who was coming in from other places, which caused a lot more robberies and things, so as people were coming in they were being ripped off.” (Commissioned Officer (Acting), Redfern)

The increased market visibility was sustained following increases in the use of cocaine and methamphetamine by some drug users. This led to community reports to police about increased drug market activity. This change was reported to be very significant.

“... our retail community ... detected [the heroin shortage] ... They’d have meetings and talk about it. And the Aboriginal community knew it [the heroin shortage] was on because it had such an impact on their way of life ... groups frequently had meetings. So many people were heroin addicted and were saying it [heroin] was nowhere to be found. And the switch to cocaine was having such a bad effect on the health of users, that they [the community] were raising it.” (Non Commissioned Officer, Redfern)

Police reported that the increased visibility of the cocaine market allowed them to increase their use of undercover operatives and increased their knowledge of cocaine supply in the area (see Chapter 10 for a discussion of impacts on law enforcement operations).

The initial increases in market visibility were not reportedly sustained. Overall, there was agreement that as time progressed, visibility of drug dealing and use decreased, and there had been sustained improvements for the community at large.

“In the wider community I think a lot of people would consider it [the heroin shortage] a blessing, it was good that all these things happened. A lot of people ... are grateful because at some stage they want to sell [real estate]. Now the price has increased, the market is starting to boom again. A lot of people are coming on the weekend, everything’s started to boom, they love it.” (Manager, Youth and Family Service, Cabramatta)

8.5. Conclusions

- No significant changes were observed in South East Asian heroin production around the time of the heroin shortage. Over recent years, consistent increases in methamphetamine production have been observed both in South East Asia and Australia. There did not appear to be a significant change in this trend around the time of the Australian heroin shortage.
- There appeared to have been changes in the method of heroin importation since 2001, with apparent changes in importation methods and reductions in the size of importations. Large methamphetamine and cocaine shipments appear to have continued to be imported during that time.

- Drug distribution appeared to change around the time of the heroin shortage. High level distribution of heroin, cocaine and methamphetamine may have been discretely managed by different organised crime groups, but greater collaboration may have occurred between these groups. Among mid level (NSW) distribution, there appeared to be a shift in emphasis from heroin to methamphetamine, ecstasy and cocaine distribution. Low level dealers may have shifted from heroin to cocaine distribution around the time of the heroin shortage, a shift that lasted for some months but was not sustained.
- The nature of low level drug dealing also appeared to shift following the heroin shortage according to KI in all drug markets.
- The heroin shortage had clear effects upon street drug market visibility. In Kings Cross, Cabramatta and Redfern, KI all reported short term increases in visibility. In the longer term, KI in all areas reported *decreased* visibility of the drug markets, as dealing appeared to shift to more covert methods.
- Significant decreases were observed in police incidents of heroin possession/use. These decreases appeared to be more marked in Fairfield-Liverpool, among males and those aged 20-29 years. At the same time, increases were observed in police incidents for cocaine possession/use, which appeared to be largely driven by younger males and occurring particularly in the Inner Sydney area. This was consistent with reports of some drug market displacement from Cabramatta to the inner city, particularly Redfern, in the short term.

Chapter 9. Criminal Activity Associated with Drugs

Elizabeth Conroy and Louisa Degenhardt

Summary

- It was difficult to document changes in the criminal activity of those involved in drug distribution, particularly organised crime groups. Some groups may have diversified into, or increased their activity in, other crime types such as motor vehicle re-birthing, factory break-ins for saleable goods, credit card fraud and distribution of firearms. Examination of police data suggested that although there was no detectable change attributable specifically to the heroin shortage, there have been increasing rates of crime types such as fraud in recent years.
- There were consistent KI reports of a short term increase in acquisitive crime committed by heroin users. Indicator data on these offences was equivocal in some instances, and significant changes were not observed in some of these indicators.
- There appeared to be an increase in street based sex work among some heroin users, many of whom were reported to have used cocaine when heroin supply was reduced. A statistically significant increase in police incidents for illicit sex work was noted, and the number of illicit sex work incidents remained higher.
- The short term increase in some acquisitive crime types and illicit sex work may have been related to the increased use of cocaine by some heroin users, given the behavioural effects and the more expensive costs associated with this drug.
- The lack of a sustained increase in acquisitive crime incidents was probably linked to two factors: a reduction in the number of heroin users (Chapter 5), and the relatively short length of time with which cocaine use appeared to be increased among this group (Chapter 3).
- There were reports that the nature of criminal acts changed immediately following the onset of the heroin shortage, with more impulsive and violent criminal acts. This is supported by a significant increase in the incidence of robbery offences at the time of the shortage.

9.1. Introduction

Research has consistently suggested that there is an association between drug crime and other criminal activities (“associated crime”) (Kleiman 1992; Weatherburn, Topp et al. 2000). By “drug crime” we refer to any activity associated with illicit drugs, be it the manufacture, trafficking, distribution, possession or use of illicit drugs; all of these activities are illegal. A detailed examination of potential changes in drug crime was conducted in the previous Chapter (Chapter 8).

In this Chapter, we examine potential changes in criminal activity associated with drug crime that may have occurred following the reduction in heroin supply. A link between involvement in drug crime and the commission of other crime might occur both at the level of individual drug user, and at the level of organised crime groups who may be involved in drug distribution; differences tend to exist in both the type of crime and motivation for crime between these two levels (Weatherburn, Topp et al. 2000).

The types of crime associated with drug use and distribution include robbery, theft and assaults. However, drug distribution networks are involved in these crimes at a more sophisticated level (e.g. credit card fraud, motor vehicle re-birthing, theft of large saleable goods) whereas the level of crime engaged in by users tends to be opportunistic and acquisitive in nature (steal from person/motor vehicle, break and enter dwelling).

In considering potential changes observed in these, the following sources of data were used:

- Reports of key informants (KI) from health and law enforcement agencies in NSW;
- Reports from NSW Pharmacotherapy Clients about criminal activity they and their peers were involved in;
- Indicator data from NSW Police on recorded incidents of theft, robbery, illicit sex work, assault, homicide, weapons offences, driving offences, and against justice procedures.

Time series analysis (TSA) was conducted on some crime types and the modelled series arising from these analyses are recorded alongside the raw data in the same graph. The results of each TSA are described in Appendix C. For a detailed explanation of TSA see Appendix A.

Where an effect was similar across both State and geographic levels, only the State level graph is included in the Chapter. The reader is referred to Appendix C for graphs depicting geographic level changes.

9.2. Association between drug crime and other crime

9.2.1. Crimes committed by those involved in drug distribution

It is less easy to document changes in the criminal activity of those involved in drug distribution, particularly among organised crime groups, than it is to document changes in crimes committed by drug users. Documentation of such activities may be more affected by policing strategies and targeted operations, whereas “lower level” crimes such as acquisitive crime may be more easily identifiable and reported.

Nevertheless, there was general consensus that organised crime groups diversified into, or increased their activity in, crime types other than drug distribution including motor vehicle re-birthing, factory break-ins for saleable goods, credit card fraud and distribution of firearms (Commissioned Officers, State Command). KI were consistent in reporting that this diversification was a natural extension of the groups’ criminal activity and the need for these organisations to

maintain their cash flow and secure their business. As one KI commented:

“... as far as moving into other fields and other ... drugs, yes that was directly attributable to the lack of heroin at the time. And while the drug dealers are just clear criminals, they will always look ... further, always be in the market for an opportunity. And that’s why you see the drug entrepreneurs, they’ve always got their fingers in something else ... So if you take away their ability to distribute heroin and make money from that, they’re not going to go, ‘oh, well, at last I’m going to get a legit job.’ ... that doesn’t happen; they’ll move into another field.” (Commissioned Officer, State Command)

Gang related violence among those involved in drug distribution was thought to be occasionally related to drug market disputes. In Cabramatta, this was reported to have peaked *prior* to the reduction in heroin supply, and was associated with issues of power rather than territorial defence. Changes in gang related violence were not obviously associated with the reduction in heroin supply.

9.2.2. Crimes committed by drug users

There was general agreement among KI across all markets of a significant relationship between drug use and other crime, which was typically acquisitive in nature: break and enter, robbery and stealing offences. KI commented that drug users committed these crimes in order to finance their drug use and that changes in the cost of drugs therefore had an impact on the involvement of users in criminal activity.

There were differences across markets in the reported incidence of crime as the shortage progressed, with the increase in heroin price, the exit of users from the market, the substitution of cocaine for heroin by those users remaining in the market and the slow return of heroin availability, each variably impacting on the incidence of crime.

One of the key features related to changes in the incidence of crime across all markets was the transient nature of the drug using population. One commissioned officer in Redfern commented that the majority of offenders committing crimes (other than drug crimes) were not residents of Redfern and this appeared to be associated with the changing drug market during the shortage:

“... a lot of addicts would come from Penrith and from other areas specifically to purchase heroin at Redfern, because it was cheaper than buying in Cabramatta.” (Commissioned Officer, Redfern)

Two KI were explicit in this regard, reporting an increase in the number of people coming into Redfern during the shortage to purchase drugs, ‘which caused a lot more robberies and things’ (Non Commissioned Officer, Redfern).

The location of crime reported by KI in Redfern offers further support for the existence of a transient drug using population, with KI reporting the type of crime committed by users was generally acquisitive and opportunistic and typically along pedestrian routes into the drug market.

“Especially around [one] street area, you could see it was just all [drug supply], that was it, but all around the centre was all the violent crimes, and the break and enters were all walking distance to the ... heroin.” (Non Commissioned Officer, Redfern)

“It always seemed to be in similar locations. ... The crimes seemed to happen in the vicinity of the railway area, at bus stops and also at traffic lights and in the shops. It was normally in the same geographical area, never seemed to vary.” (Commissioned Officer, Redfern)

A similar sentiment was echoed by a regional Commissioned Officer (with a focus on Cabramatta), who commented that during the peak of Cabramatta's heroin market 'a very large fraction' of drug users would have been visitors to the area. In contrast, following the disruption to heroin supply in Cabramatta, users in the area were more likely to be local residents.

Although KI reported an initial increase in the incidence of crime in Cabramatta associated with the increased cost of heroin, they also reported a subsequent, sustained decline in the incidence of crime, which in part appears to be related to the decline in the number of people coming into Cabramatta to purchase drugs. One KI suggested that this had to do with the nature of the drug market in Cabramatta:

"There is a high relationship between high heroin use and high rates of crime. ... Cabramatta was a very active heroin market and it really didn't have much of a market for any other drug, it was purely heroin, almost exclusively heroin focused. And if you look at the change in the crime levels of property and theft generally that's occurred in that area, as a result of the disruption of the markets, what you will actually see I think, is that Cabramatta for two years now has led the State in the reduction of crime."
(Commissioned Officer, regional/State/Cabramatta)

This was not true for the other Sydney drug markets, suggesting that there was a temporary displacement of the drug using population from Cabramatta to other drug markets as the heroin shortage progressed, accompanied by a displacement of associated crime. This does not appear to simply be related to the decrease in availability of heroin but also to the increased availability of cocaine and other psychostimulant drugs in these other drug markets. A large number of KI commented on an increase in the incidence of crime associated with the substitution of cocaine for heroin:

"So they were using more, paying more per day and therefore criminals on the whole, who were addicts on the whole, had to find more money and if they didn't have a source of income they were committing more crime. ... when we were interviewing people, that's basically what they were saying, 'I need four times the amount of money, I need four times the hits.'" (Non Commissioned Officer, Redfern)

These reports are consistent with those of the users themselves. Pharmacotherapy clients reported that immediately following the onset of the heroin shortage, the amount of crime committed by users *increased*. In a few cases, people commenced criminal activity when they had not previously engaged in crime.

A second key feature of the changes to the incidence of crime was the exit of some users from the drug market.

"It certainly appears from the drug users' perspective that some just found the whole thing too hard and left the market. ... The crime rate is dropping. This would suggest that a lot of people whose lives revolved around drugs and crime are better off. To that extent, you could say it has been sustained." (Commissioned Officer, regional/State/Cabramatta)

This was a theme echoed by a number of KI; the shortage created a crisis in some drug users' lives, either because of the increased difficulty associated with obtaining heroin (increased cost, increased search time, poor quality) or the increased problems associated with cocaine use.

"We are not seeing the return of the same faces that we used to see day in, day out. And when you do see some of the old ones ... they say, 'it was way too expensive and it was poor quality and then I have got to deal with the hassles of the cops turning me over in five minutes, it's just not worth it.'" (Commissioned Officer, Cabramatta)

Following the reduction in the supply of heroin, KI often reported that the type of crime engaged in by individual users was out of character and that users were less careful in the commission of crime. Overall, the “tone” of the offences changed: KI and NSW Pharmacotherapy Clients in all markets reported that drug-related crime became more desperate, violent and impulsive. KI reported that users’ stepped up their involvement in crime, moving from non-violent acquisitive crime (i.e. theft) to violent acquisitive crime (i.e. robbery). This was directly associated by a number of KI with the use of cocaine, both because of the cost associated with cocaine use and the behavioural effects of the drug:

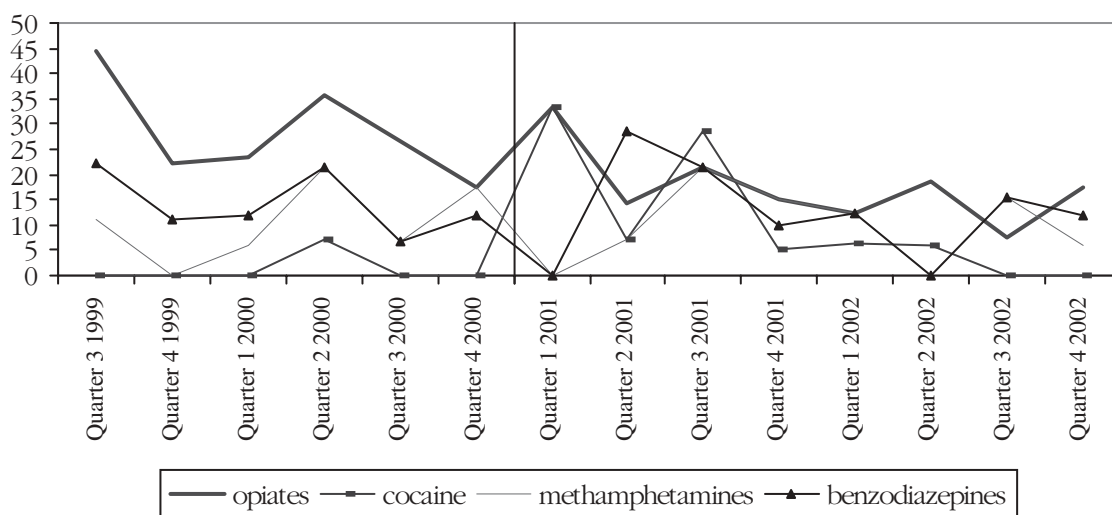
“So, more likely to commit crime or for violence to be included in the crime and that seems to be likely given that people would be more desperate and presumably also, you know, if they are using cocaine in association with their crimes, more reckless and more aggressive, abusive, volatile.” (Manager Drug Health Service, Kings Cross)

And:

“... quite often I would see the consequences of it [cocaine, amphetamine related violence] because they’d come out of gaol and they’d tell me that’s how they got there; because they have some benzos and then some coke and they don’t remember punching this policeman but they must have; or trying to steal the police car, even more ridiculous. You know, quite ludicrous crimes.” (Medical Professional, Redfern)

Data from the Drug Use Monitoring in Australia (DUMA) project was somewhat reflective of the trends found in the current study. In NSW, DUMA involves the (voluntary) interviewing and (voluntary) urine testing of persons arrested in Bankstown and Parramatta²⁷. In 2001, a decrease was noted in the proportion of those committing violent offences who tested positive for opioid drugs, and some increase in the proportions testing positive for methamphetamine and cocaine (Figures 9.1 and 9.2).

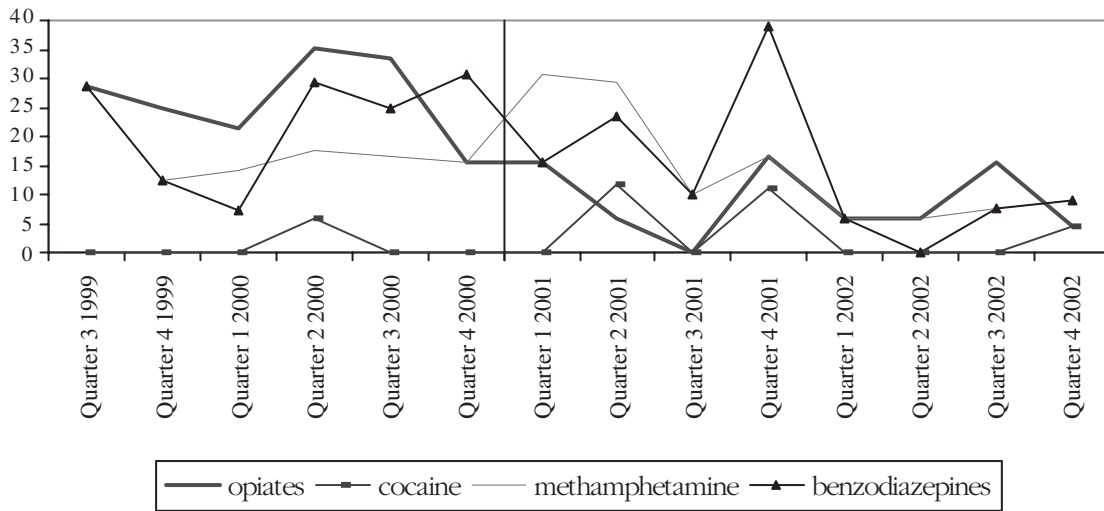
Figure 9.1: Proportion of those charged with a violent offence testing positive to drugs, Bankstown DUMA



Source: Drug Use Monitoring in Australia (DUMA).

²⁷ Not all arrestees in the period of study agree to be interviewed, and not all those interviewed agree to submit to a urine sample. These samples therefore refer to a subpopulation of all those arrested and detained in Parramatta or Bankstown police cells. Makkai, T. and K. McGregor (2002). Research and Public Policy Series Report No. 41: Drug Use Monitoring in Australia: 2001 annual report on drug use among police detainees. Canberra, Australian Institute of Criminology.

Figure 9.2: Proportion of those charged with a violent offence testing positive to drugs, Parramatta DUMA

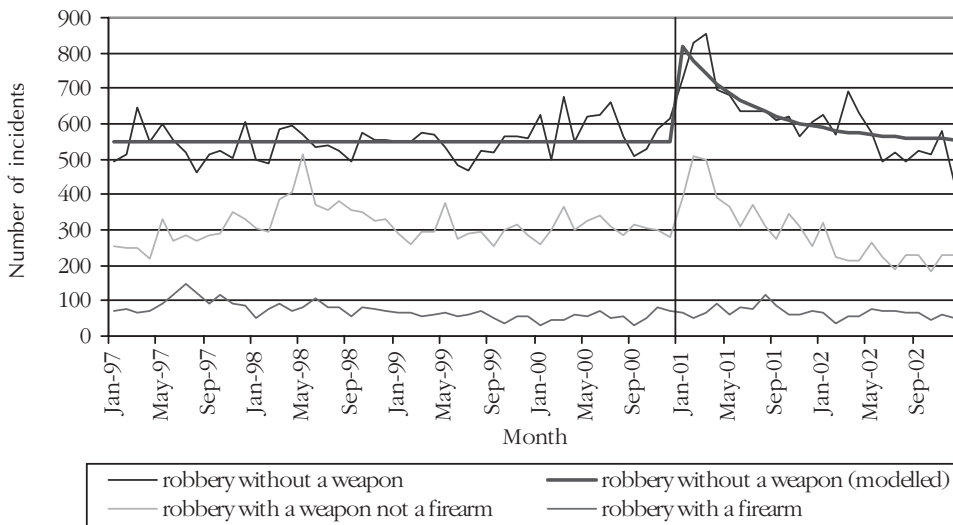


Source: Drug Use Monitoring in Australia (DUMA).

9.3. Robbery

Figure 9.3 shows the number of incidents of robbery offences in NSW for the period January 1997 to December 2002. The onset of the reduction in heroin supply was associated with a 33% ($p < 0.0001$) increase in the incidence of robbery without a weapon. The trend seen in incidents of robbery with a weapon not a firearm followed a similar pattern but was not analysed because the behaviour of the time series prior to the heroin shortage required additional information which was not readily available (a non-random shock occurred – see Appendix A). This effect is also apparent for both Inner Sydney and Fairfield-Liverpool statistical subdivisions (SSD) (see Appendix C). There was no apparent effect for robbery with a firearm.

Figure 9.3: Incidents of robbery offences in NSW 1997-2002



Source: NSW Bureau of Crime Statistics & Research.

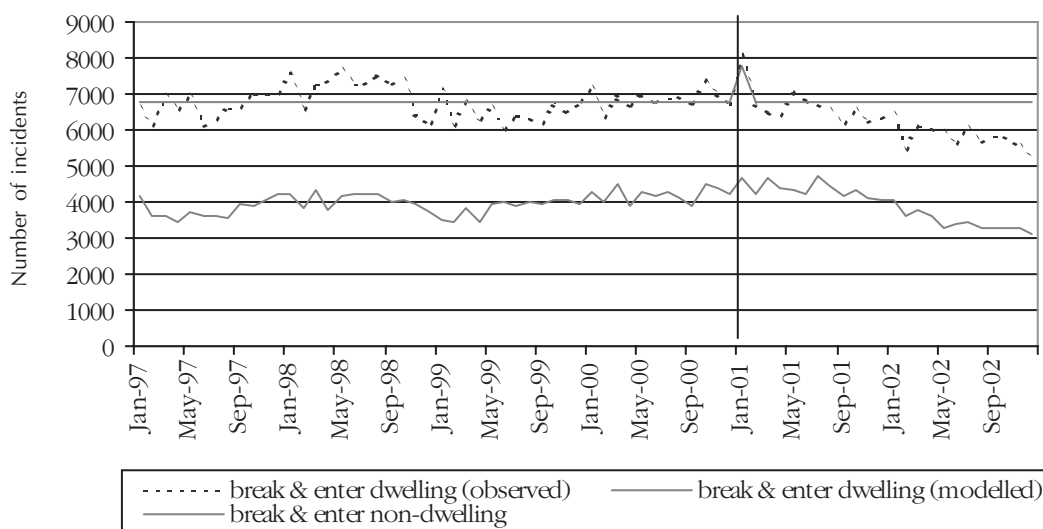
These results concur with the qualitative information previously discussed (Section 9.2.2). An increase in the incidence of robberies was the single most reported change in criminal activity reported by KI and consistently associated by KI with the behavioural effects of cocaine (not simply associated with the increased cost of cocaine). KI reports described thefts ‘gone wrong’ – the use of excessive force and opportunistic use of crude implements. This was consistent with reports of drug users, some of whom reported that while in heroin withdrawal, they attempted ill-planned armed robberies and were caught by the police in the process (NSW Pharmacotherapy Clients).

9.4. Theft

9.4.1. Break and enter offences

Figure 9.4 shows break and enter offences across NSW for the period January 1997 to December 2002. Although no change is evident for break and enter non-dwelling (which includes factories and warehouses), there is a small, short-term spike (14%, $p < 0.001$) in the time series for break and enter dwelling (i.e. houses, apartments) at the time of the shortage (Jan-Apr 2001). This is consistent with reports from drug users, who reported committing more break and enter offences following the onset of the shortage (NSW Pharmacotherapy Clients).

Figure 9.4: Incidents of break & enter offences in NSW, 1997-2002



Source: NSW Bureau of Crime Statistics & Research.

The increase in break and enter dwelling evident at the State level was replicated at the local level for both Inner Sydney and Fairfield-Liverpool SSD but there was no apparent change in the time series for the rest of NSW, suggesting that the change at the State level is primarily driven by the increases seen in Inner Sydney and Fairfield-Liverpool SSD (see Appendix C).

Although there was no change evident at a State level for break and enter non-dwelling (Figure 9.4), there were geographic differences in the trends observed. At a local level, there was evidence of an increase in break and enter non-dwelling in the Inner Sydney SSD only (see Appendix C). There was no apparent change in the time series for Fairfield-Liverpool SSD or for the remainder of the State when these two SSD were excluded (see Appendix C). This might possibly reflect a clustering of factories and warehouses in the Inner Sydney SSD.

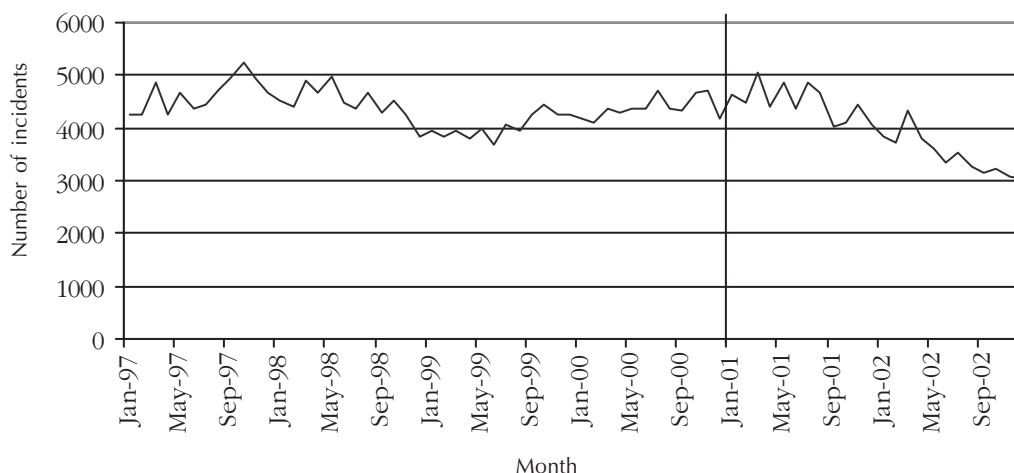
9.4.2. Motor vehicle theft

In addition to the mention of motor vehicle re-birthing associated with organised crime groups (Commissioned Officers, State Command), one KI suggested that motor vehicle theft was associated with the transit of illicit drug users into and out of drug markets:

“There’s also, I think, a lot of car theft – not the theft of motor vehicles permanently but the theft of vehicles as a means of conveyance that’s related to drugs. ... And I think Cabramatta’s a classic example of this. If you look at their car theft, both in and out, and how that’s changed with the change in the heroin scene out there, it’s down extremely low at the moment.” (Commissioned Officer, Regional Command)

However, it is difficult to examine such a change without knowing the incidence of recovered vehicles within the drug markets; no change was detected in the overall incidence of motor vehicle theft – at either the NSW or local SSD level – at the time of the shortage (Figure 9.5).

Figure 9.5: Incidents of motor vehicle theft, NSW 1997-2002



Source: NSW Bureau of Crime Statistics & Research.

9.4.3. Stealing

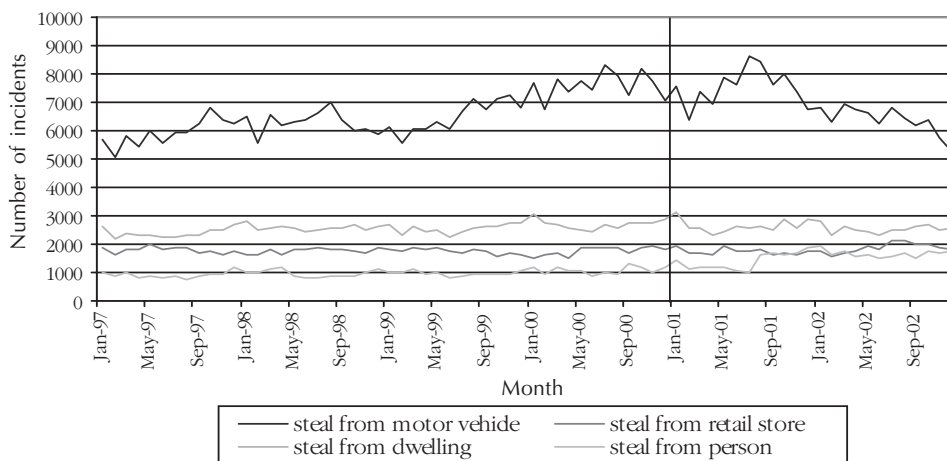
There was mention by some KI and NSW Pharmacotherapy Clients of increased incidence of stealing from public utilities such as telephones and parking meters, and the stealing of mobile phones and bag snatches from people in public spaces. In Kings Cross, these crimes were predominantly committed by young people. Mention was also made of an increase in stealing from motor vehicles, particularly along the pedestrian routes into and out of the drug markets (Welfare Worker Community Service, State; Policy Officer Drug Health Service, State).

A few KI and NSW Pharmacotherapy Clients reported an increase in shoplifting following the reduction in heroin supply, with one KI reporting an increase in pharmacy thefts of benzodiazepines (Commissioned Officer, State Command). “Rorting” was also commonly mentioned by NSW Pharmacotherapy Clients: this involved one user offering to obtain heroin for another user and failing to return with either the money or the drug.

Despite these specific references to an increase in stealing offences and the general consensus among KIs of an association between drug use and stealing, there was no change detected in the incidence of stealing offences at the time of the heroin shortage (Jan–Apr 2001) at either the State or local level (Figure 9.6)²⁸. This discrepancy between KI reports and police incident data might

be because the degree of force used in the commission of these crimes at the time of the heroin shortage meant that the more serious charge of robbery was applied. It is likely that this distinction was not made by those in the health sector who predominantly reported the increase in stealing offences.

Figure 9.6: Incidents of stealing offences in NSW, 1997-2002



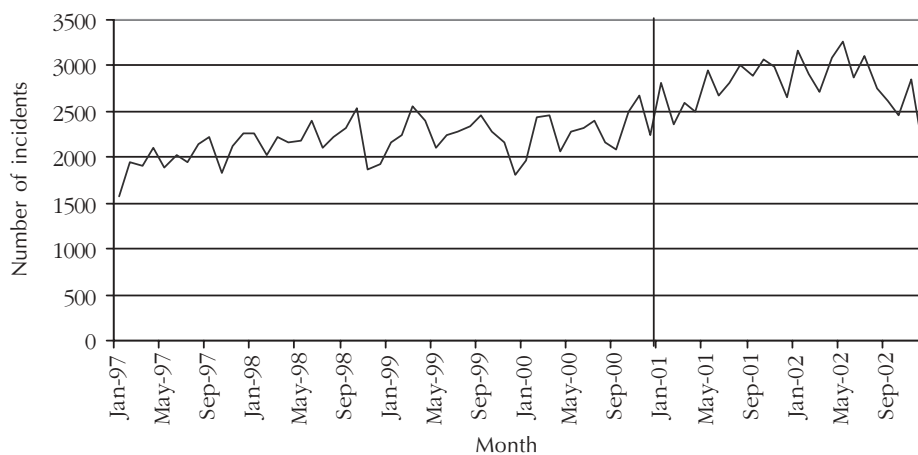
Source: NSW Bureau of Crime Statistics & Research.

9.4.4. Fraud

Two KI reported there was ‘some crossover with involvement in counterfeit credit card fraud’ (Commissioned Officer, State Command) by South East Asian crime groups to cover the loss of income from the reduced heroin supply. In addition, it was also suggested that members of groups involved in heroin distribution were moved across to these other activities while heroin supply was reduced.

There was, however, no change seen in the incidence of fraud at the onset of the heroin shortage, at either the State or local level (Figure 9.7). Nevertheless, a clear upward trend can be seen in the number of fraud incidents over time, which is consistent with KI reports that organised crime groups have diversified into this form of crime over recent years.

Figure 9.7: Incidents of fraud in NSW 1997-2002



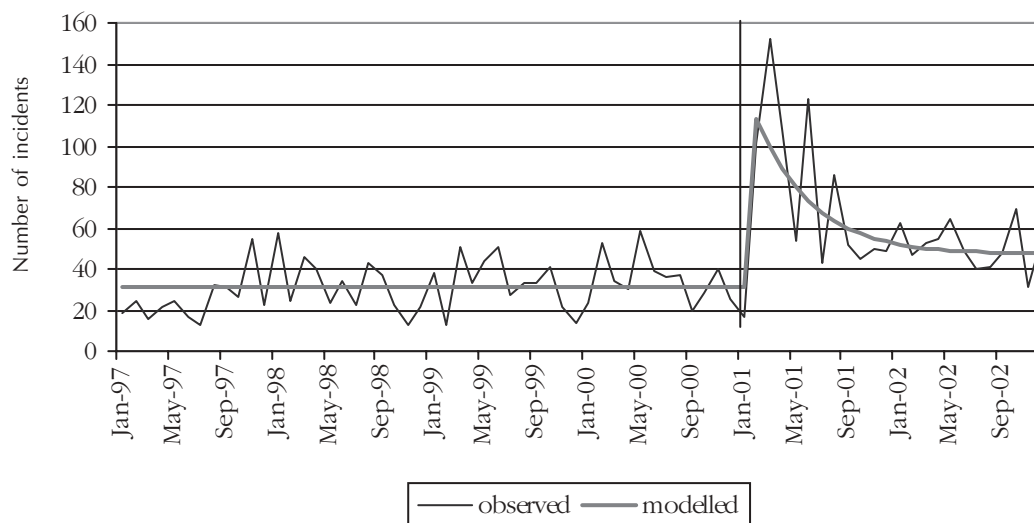
Source: NSW Bureau of Crime Statistics & Research.

²⁸ Due to a change in recording practice by NSW Police, there is a break in the series for the offence of Steal from Person resulting in a sharp increase in the incidence of this offence type in August 2001.

9.5. Illicit sex work

There was a rapid increase in the incidence of prostitution offences (from a mean of 31.5 offences per month to a peak of 113.6 ($p < 0.0001$)), which occurred across NSW at the onset of the shortage. The incidence of prostitution offences decayed to a permanent new mean of 47.1 per month, representing a 49.5% increase on pre-shortage levels. Figure 9.8 shows both the observed and modelled series for this offence category.

Figure 9.8: Incidents of prostitution offences in NSW 1997-2002



Source: NSW Bureau of Crime Statistics & Research.

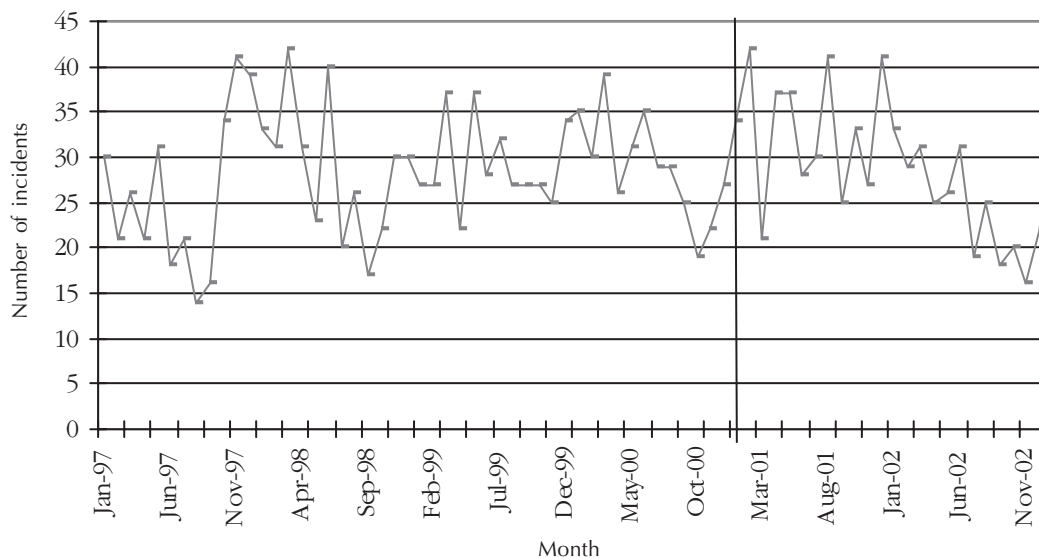
There were reports from both KI and NSW Pharmacotherapy Clients that some women felt they had been forced into sex work as a way to meet the increasing financial demands associated with cocaine use. In Cabramatta, where prostitution had not previously been an issue, this increase was thought by one KI (Commissioned Officer, Cabramatta) to be due to an increase in the number of sex workers coming in from outside the Cabramatta area, because they believed that Cabramatta would be the first market to be supplied when the supply of heroin returned.

KI also noted that women were working longer hours as a consequence of the behavioural effects of cocaine and in doing so, became more visible to Police. This was particularly evident in the Kings Cross market, and with the younger sex workers.

9.6. Homicide and assault

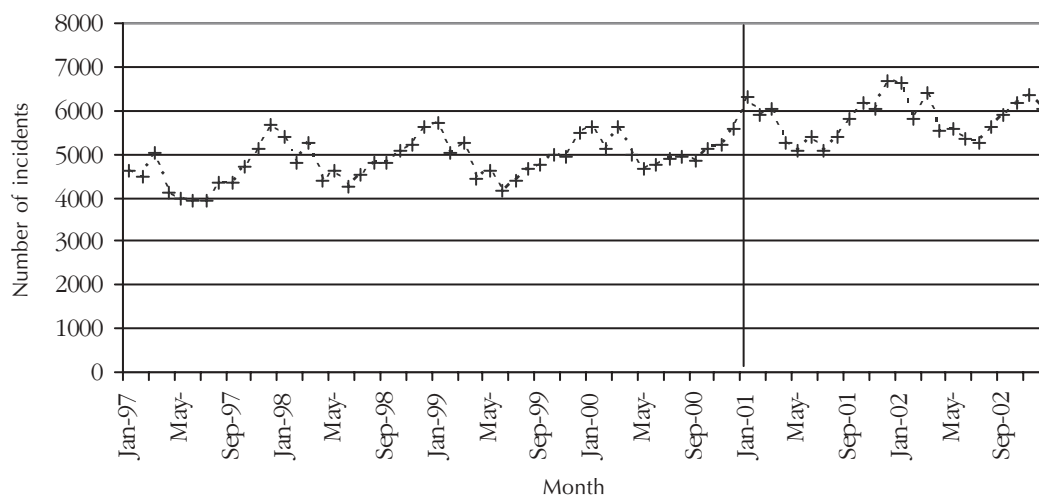
Figures 9.9 and 9.10 show the incidence of homicide and assault between 1997 and 2002. There does not appear to be an effect of the shortage on either time series.

Figure 9.9: Incidents of homicide in NSW, 1997-2002



Source: NSW Bureau of Crime Statistics and Research.

Figure 9.10: Incidents of assault in NSW, 1997-2002



Source: NSW Bureau of Crime Statistics and Research.

Apart from the general increase in violence commonly reported by KI, there was little comment from KI of a change in the incidence of homicides and assaults. One KI reported an increase in violent crime in Cabramatta at the onset of the heroin shortage associated with increased cocaine use:

“... [we] saw a lot of violence with the cocaine. I think a lot of our murders involving girls – there was at least two murders and a lot of assaults – they were lured into areas. So there was a lot more violence relating to that period with cocaine. Our murder rate went up and so did our serious assaults and ... that is a direct link to the cocaine increase.”
 (Commissioned Officer, Cabramatta)

The victims of these violent crimes were perhaps other drug users:

“... they turned on each other ... most of the violent crime we saw was against each other. They are all up the street hanging around and then they end up in a fight ... One of our murders was a case where he went around the corner to have a hit with them and blew it in them and it started a brawl and they killed him.” (Commissioned Officer, Cabramatta)

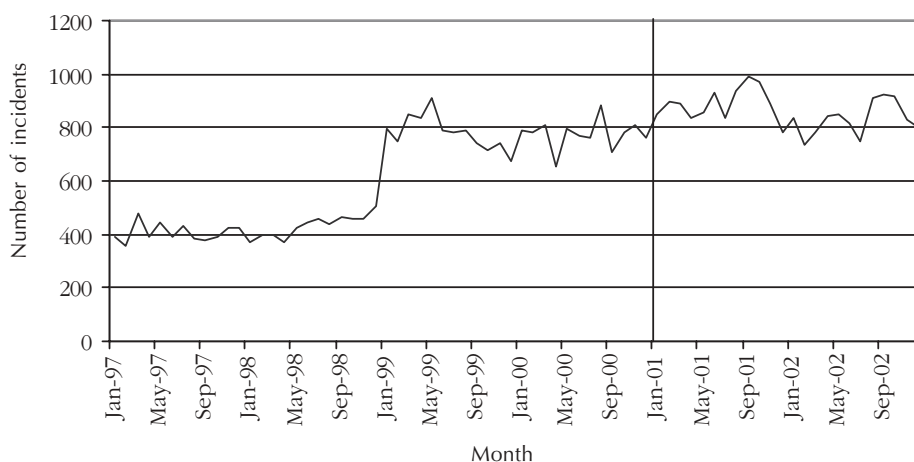
KI in Redfern also reported an increase in the number of homicides but suggested these were the outcomes of ill-planned robberies:

“I think there was an estimated four homicides that year and they were all violent offences using crude weapons, knives mainly. ... we didn’t have that before; we had the shootings and things like that, but they had a clear purpose and the intention was murder. We had one particular woman that murdered her de facto and just sort of didn’t know it happened.” (Non-Commissioned Officer, Redfern)

9.7. Weapons offences

Figure 9.11 shows the incidence of weapons offences in NSW. This offence category includes charges relating to the illegal possession, sale and discharge of firearms and offences regarding explosive/dangerous articles or threats. There was no change in the incidence of weapons offences at the time of the shortage (Jan-Apr 2001), either at a State or local level²⁹. Weapons were mentioned by KI typically in relation to the increased level of violence involved in acquisitive crimes (Section 9.3). Some mention was made of organised crime groups being involved in the distribution of firearms as part of their criminal repertoire, however there was no comment regarding changes in the incidence of this crime type with the reduction in heroin supply.

Figure 9.11: Incidents of weapons offences in NSW 1997-2002



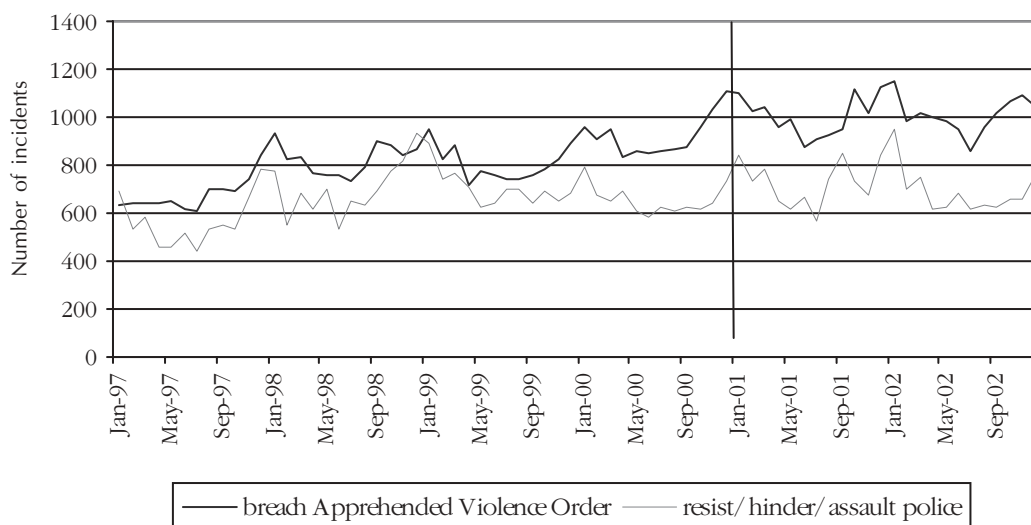
Source: NSW Bureau of Crime Statistics & Research.

²⁹ The sharp increase in the series at the beginning of 1999 reflects a change in the legislation that gave NSW Police the power to conduct knife searches.

9.8. Against justice procedures

There was no change in the incidence of either breach Apprehended Violence Order (AVO) or resist/hinder/assault police at the time of the shortage (Figure 9.12), despite KI reports of a general increase in the level of aggression and violence associated with psychostimulant use. There was some mention by law enforcement KI of police detainees becoming aggressive where previously they had not been, however this is not reflected in the indicator data at a local level. There was also mention made of the level of violence directed at the partners of outlaw motorcycle gang members, but it was acknowledged that this population was unlikely to apply for AVOs in response to such aggression.

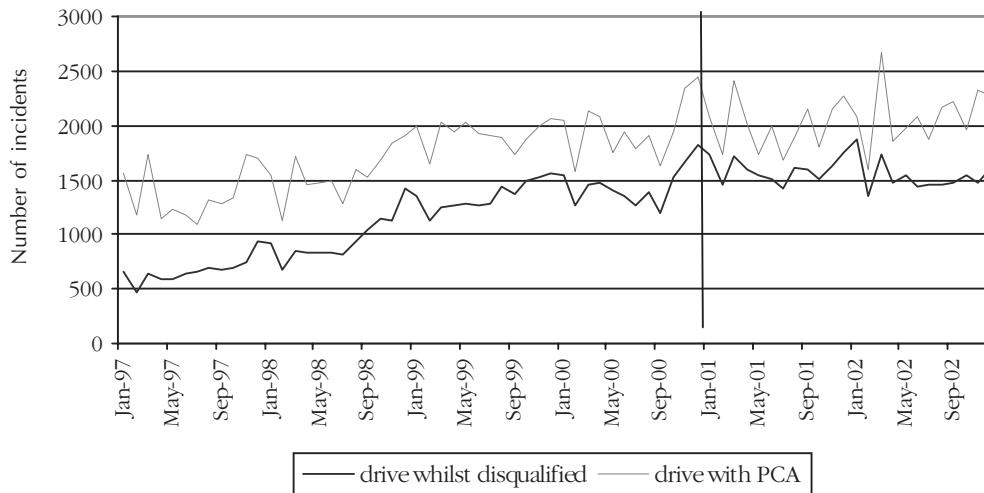
Figure 9.12: Incidents of offences against justice procedures in NSW 1997-2002



Source: NSW Bureau of Crime Statistics & Research.

9.9. Driving offences

There was no change in the incidence of drive while disqualified or drive with prescribed content of alcohol (PCA) at the time of the shortage (Figure 9.13). This was true for both the State and local SSD level. It was more difficult to gather evidence reflecting *illicit* drug use while driving, however previous research has suggested that a sizeable proportion of heroin users drive while under the influence of both heroin and other drug types (Darke, Kelly et al. in press). There was no mention of the incidence of driving offences by KI or NSW Pharmacotherapy Clients.

Figure 9.13: Incidents of driving offences in NSW 1997-2002

Source: NSW Bureau of Crime Statistics & Research.

9.10. Conclusions

- It was difficult to document changes in the criminal activity of those involved in drug distribution, particularly among organised crime groups. Nonetheless, the available information suggested that some groups diversified into, or increased their activity in, other crime types such as motor vehicle re-birthing, factory break-ins for saleable goods, credit card fraud and distribution of firearms. Examination of police data on these crime types suggested that although there was no detectable change attributable specifically to the heroin shortage, there have been consistently increasing rates of crime types such as fraud in recent years, which supports the reports collected for this study.
- There were consistent KI reports of a short term increase in acquisitive crime committed by heroin users. Indicator data on these offences was equivocal in some instances, and significant changes were not observed in some of these indicators.
- There appeared to be an increase in street based sex work among some heroin users, many of whom were reported to have used cocaine when heroin supply was reduced. A statistically significant increase in police incidents for illicit sex work was noted, and the number of illicit sex work incidents remained higher than before the reduction in heroin supply.
- The short term increase in some acquisitive crime types and illicit sex work may have been related to the increased use of cocaine by some heroin users, given the behavioural effects and the more expensive costs associated with this drug.
- The lack of a sustained increase in acquisitive crime incidents was probably linked to two factors: a reduction in the number of heroin users (Chapter 5), and the relatively short length of time with which cocaine use appeared to be increased among this group (Chapter 3).
- There were reports that the nature of criminal acts changed immediately following the onset of the heroin shortage, with more impulsive and violent criminal acts. This is supported by a significant increase in the incidence of robbery offences at the time of the shortage.

Chapter 10. Impact upon Law Enforcement Operations

Linette Collins, Carolyn Day and Louisa Degenhardt

Summary

- No fundamental change occurred in the aims of drug law enforcement at a Local Area Command (LAC) or State level.
- The understanding by law enforcement of the drug market increased as heroin availability declined, other drugs became more available or apparent and some criminal groups shifted activities to different commodities.
- There was some reallocation of resources previously committed to heroin to other illicit drugs.
- New opportunities emerged to have an impact on illicit drug markets other than heroin.
- Drug Units in some LACs increased in number and personnel.
- Outcome and monitoring tools, more indicative of impact of law enforcement on the market than the traditional measures of seizures and arrests were developed.
- More emphasis was placed on research and multi-agency approaches to the drug market.

10.1. Introduction

The impact of the heroin shortage on law enforcement agencies was examined at local, State and Federal levels. This issue was assessed primarily in relation to organisational responses to changes in the patterns of drug use. Changes in the areas of inter- and intra-agency communications were also addressed. Changes to initiatives at State and Federal agencies are reported independently of local area policing. These factors were examined primarily through interviews with key law enforcement personnel from Federal and State law enforcement agencies (including NSW Police working in Local Area Commands). Some information was also obtained from law enforcement documents and briefings and via interviews with pharmacotherapy clients involved in drug supply prior to and during the shortage.

Where changes in focus and operations were reported, they varied in accordance with factors such as:

- The level of the heroin market targeted by the law enforcement key informants interviewed. The work of some KI focused on higher level drug importation and distribution, others on the crimes and activities of drug users/dealers;
- The extent and nature of the law enforcement respondent's involvement in drug law enforcement including drug types targeted;
- The rank and position in the chain of command of the law enforcement KI. This had a bearing on the measures used by KI to assess changes to the policing environment; and
- The level of resources available to key informants to respond to such changes.

It was often difficult for police to identify whether the changes observed during the shortage were a result of the reduction in supply of heroin, concurrent policing and other government strategies or a combination of factors. Several new law enforcement strategies, which were implemented at or around the time of the shortage, but unrelated to the shortage, may also have influenced law enforcement operations. The chapter concludes with an examination of these confounding factors.

10.2. NSW Police

The impact of changes in patterns of drug use on NSW Police operations was variable. While the shortage did not change the aims with regard to illicit drugs, it was reported, in some cases, to have enhanced existing strategies. The changes in patterns of drug use impacted on the difficulty and volume of work undertaken by law enforcement agencies, resulting in some organisational changes. The extent of these effects differed across time as well as drug markets.

10.2.1. Changes in aims of drug law enforcement

Police at the NSW State level and in LACs typically reported that they remained focused on reducing drug supply. To this end, their aims were not changed by the heroin shortage:

"I wouldn't say it would have made it [policing] more difficult or easier because we don't just specifically target the supply of heroin. There was still equally as much supply of drugs happening in the area to keep us busy enough looking at that." (Non Commissioned Officer, Kings Cross)

Nevertheless, the shortage was reported by some law enforcement personnel to enhance existing strategies. Indeed, in the Cabramatta area, some police reported a boost in morale. Senior Cabramatta police also reported that the heroin shortage provided them with an opportunity to maximise the disruption to the market that the new policing strategies, introduced from late 2000, were designed to achieve. The shortage did not lead to any change in these new approaches. This was highlighted by one officer working in Cabramatta at the time:

“... so the heroin shortage didn’t actually alter any of our plans, it just reinforced the need for us to get on with the job ... of the strategy of disrupting the market place, what little was left of it.” (Commissioned Officer, Cabramatta)

10.2.2. Changes in the volume and difficulty of work

Although police did not report that the shortage had any substantial impact on policing aims, some did report that it impacted on the difficulty and volume of their work, and that this resulted in organisational changes. The extent of these effects differed across time as well as drug markets, and appeared to be related to the changes in patterns and types of drug use.

General duties police reported that their workload increased at the start of the shortage. In Kings Cross and Cabramatta areas, many heroin users were agitated, in withdrawal, and some remained in the area longer searching for heroin. Police in some areas reported an increase in people coming into the area to source drugs:

“... [we] saw a lot more people on the street looking for it [heroin], this was when we wrestled with the drug house stuff, when we closed them [drug houses] down. In times gone by when it [heroin] was freely available, people would arrive and be gone in five minutes, get on the same train almost, where now they were wandering around, hanging around, running into people, making a nuisance of themselves, they were there much longer, creating social disharmony, than they might otherwise have done, which really got people offside.” (Commissioned Officer, State Command)

An increase in workload was also reported in response to an increase in crime by drug users coming into the area to buy heroin, and then also related to psychostimulant use. KI in all drug markets reported an increase in community complaint in relation to this. Following the initial increase in market visibility, some general duties KI reported that their workload declined as the number of people coming into the LAC to buy heroin declined. Police involved in drug investigations also reported this change:

“It [heroin shortage] gave us more time to do controlled operations ... It allowed us that time, because there were less actual suppliers, we were picking them off with search warrants and shutting them down, so it gave us time to experiment with controlled operations. And things you didn’t have time to do before like using listening devices and tracking drug runners. It was good for us; we had a lot more time for painstaking information [gathering].” (Non Commissioned Officer, Redfern)

General duties police reported that in all drug markets relevant to the study the crimes committed by psychostimulant users were more violent, serious, desperate, and brazen; these crimes took more time to investigate:

“I think it [heroin shortage] did [increase work load], because that [violent crime] requires more investigation and it’s more time consuming, so therefore our staff were tied up, and detectives, investigating crimes that were more violent in their nature. So it did have an effect on our resources.” (Commissioned Officer [Acting] Redfern)

Furthermore, KI reported that people intoxicated with benzodiazepines and cocaine tended to cause more trouble in custody, with higher levels of aggression:

“... a lot of the offenders were more difficult to deal with in that they were a lot more violent and harder to reason with. And usually a bit more force, which was unfortunate, was needed when making arrests ...” (Commissioned Officer [Acting], Redfern)

“... heroin creates less problems for us in a custody sense than Normison in particular and cocaine. Cocaine people become very aggressive ...” (Commissioned Officer, Kings Cross)

In one LAC, the custody areas were altered to reduce the potential for prisoners to harm themselves. This included installation of plastic screens and surveillance cameras. Police were reported seeking help with the management of this violent behaviour from outside agencies. Police were also concerned about the occupational health and safety risk associated with the skin lesions, related to cocaine use, observed on drug users. Some police, particularly the younger and less experienced police, had not seen such conditions before and felt the strain more acutely. This was reported to manifest in an increase in the number and frequency of sick reports and of severe stress among the police officers.

Some State Commands involved in high level drug investigations had experienced very high heroin seizure rates in 1999-2000. These KI reported that at the time of the heroin shortage, heroin became difficult to seize, and low activity made it difficult to monitor the heroin market. However, their performance was still being measured through the numbers of arrests and seizures, and some senior police interpreted low arrest and seizure levels as indicative of reduced effectiveness. At the LAC level, similar effects were reported:

“You could once upon a time walk out onto the street and you’d be able to arrest dealers doing deals in front of you. The heroin shortage I think just made people more wiser, they’d only deal with people they’d know, they’d deal at certain locations ...” (Non Commissioned Officer, Kings Cross)

10.2.3. Changes in drug law enforcement resource distribution

One officer from a State Command reported that the policing of heroin had traditionally attracted greater resources than other illicit drug types. This KI attributed this to the relatively greater harms associated with heroin, including the visibility of the heroin market.

The shortage allowed for some redistribution of these resources toward investigation of other drug types. Police managers also reported being able to use resources previously assigned to heroin related law enforcement for other purposes. One officer involved in investigation of high level drug distribution commented:

“... our investigations are influenced by how easily we can get into a particular syndicate... We’ve only got a certain amount of resources, so if an opportunity comes up to get into a particular drug, we’ll take that as opposed to trying to keep a balanced quota on fairly dividing our resources into all different drug areas.” (Commissioned Officer, State Command)

For police whose focus was on drug markets other than heroin, such as cocaine and ecstasy, the heroin shortage allowed more resources to go into their area of work; as reported by one KI:

“... from my area, the most distinctive side effect [of the heroin shortage] would be an increase in the availability of informants that led us into cocaine investigations. For the past couple of years we have been able to get into more high level cocaine investigations than we ever have.” (Commissioned Officer, State Command)

A number of KI reported a shift during the shortage by drug suppliers to trading in other commodities in addition to drugs. As a result, police shifted their focus not only to other drugs, but other criminal activity such as fraud:

“... they just changed commodities you know, they either went into ecstasy, cocaine or they were into credit card fraud and the like.” (Commissioned Officer, State Command)

One KI suggested that if heroin returned to previous levels, police would have to adjust by reallocation of resources to heroin related work.

“I think the crucial thing from a corporate perspective, is that we need to be very vigilant as to how we use our resources. And we need to have the capacity to respond to this when it [heroin] comes back. And places like this command and Cabramatta and Redfern, people just need to bite the bullet at high level and give us the resources to do that.” (Commissioned Officer, Kings Cross)

10.2.4. Increases in drug units

An increase in the size and number of drug units in LACs in NSW was widely reported. These changes were variously attributed to the movement of drug users and dealers to new locations (market decentralisation) as well as awareness in LACs of an actual or apparent increase in the use of other drugs such as methamphetamine and an increase in the crime associated with these drugs.³⁰ One State Command officer suggested that the need for drug units existed before the shortage but has become more evident to Commanders in its wake.

Some existing drug units reported a shift in focus from heroin to other illicit drugs. For example, the drug unit at Kings Cross doubled in number to 10 staff in 2002, and the focus was shifted to synthetic drugs such as ecstasy (MDMA). Other drug units such as Cabramatta reportedly remained focused on the heroin market, but were able to receive increased education about other drug related issues such as ‘clan labs’³¹.

Associated with these changes to drug units was an increase in emphasis, by a State level unit responsible for assisting LACs with the management of crime, on building skills at a LAC level in drug investigation:

“Field intelligence was an area that was revved up and pushed. That involved turning little pieces of information into actionable packages by looking at targets, it’s a target profile role ... One of the things that was noted that inevitably a lot of it revolved around drug work, and generalising here, a lot of LACs across the board were generally not particularly good at ... So one of the things we revved up was this field intelligence role, to be able to target profile properly and say places like Kings Cross have vamped up a drugs unit and the same at Redfern.” (Commissioned Officer, State Command)

³⁰ Police reported that ATS were generally sold through pubs and clubs across the State, unlike heroin which was largely sold through the centralised drug markets.

³¹ Clandestine laboratories in which illicit drugs such as methamphetamine are manufactured.

10.2.5. Changes in the outcome of drug investigations

As the reduction in the supply of heroin was sustained, police KI reported gaining new knowledge of the mechanics of drug supply in the LACs.

“It made it easier to identify who was actually controlling the heroin; they had to cut back on their runners as they didn’t have enough gear [heroin].” (Non Commissioned Officer, Redfern)

In the Redfern market, this was attributed to the attrition of smaller quantity heroin dealers, and a switch by others to the sale of cocaine during the heroin shortage. It appears that a number of smaller quantity heroin dealers left the market, as they could not source heroin to sell and/or were arrested by police. This allowed police to ‘get closer’ to people who supply larger quantities of heroin. Police also report they were able to observe the activities of cocaine suppliers, as under cover police could make frequent purchases of cocaine due to the continuous use and purchase of the drug by drug users in the Redfern market. One officer involved in drug investigations described the impact of these changes on his work:

“It’s fairly significant ... you could see exactly who was running what. They [the dealers] were easy to catch. They were showing us what other drugs were available in the community, what other drugs were coming into Australia, what other drugs were being manufactured here. So from that, after the shortage, I was able to say okay, I know the drug prices for, you know, an ounce of amphetamines, or you know, a bit of Ice or, you know, some Fanta [GHB] or something like that ... things that I would never have been exposed to, if the heroin hadn’t dropped, because it would have just stayed as heroin, because it’s the drug of the choice here.” (Non Commissioned Officer, Redfern)

Police involved with mid to upper levels of drug distribution also reported gaining a greater understanding of drug markets other than heroin. Some of the groups and individuals of interest to police changed their activities from the distribution of heroin to the importation of heroin or distribution and sale of other drugs, such as cocaine and methamphetamine or to criminal activities such as credit card fraud.

Police could not always take advantage of these gains in intelligence and operations. For example, a senior police officer reported that LACs did not have the resources to target the higher level dealers they identified. This apparent failure to take full advantage of opportunities to disrupt heroin distribution was also noted by other law enforcement personnel, as commented on by one State level KI:

“I think that we haven’t yet taken maximum advantage of the shortage, as what we should be doing is actually increasing the focus on the remaining markets to increase the disruption ... we should be really focusing on the disruption of those markets so that if the heroin returns, the markets actually have to start almost from scratch to establish themselves again”. (Commissioned Officer, Greater Hume Region)

10.2.6. Changes in intra-agency communication

The shortage was reported by State level KI to have stimulated a strategic review of drug law enforcement, including the way in which drug markets were monitored and drug law enforcement activity and outcomes were measured.

Nevertheless, there were differences across markets in knowledge about drug market changes, and there appeared to be a lack of communication to some officers policing drug markets about changes in heroin supply. Officers were not always (officially) aware of the heroin shortage and

therefore its impact on their work. One officer involved in high level drug investigations reported that they were unaware at the time that the heroin shortage was the reason they were involved in less heroin and more cocaine investigations. One commissioned officer suggested that official notification to LAC police of the shortage might have resulted in improved handling of the situation:

“I think as police generally it would have been beneficial for us to know that there was a heroin shortage. It may have affected the amount of staff, human resources at least at the time, because of the violent crimes and for our own health and welfare in dealing with prisoners or persons that might have been perhaps a bit more violent ... if anyone was aware that there was a shortage it should have been relayed to the organisation in total.”
(Commissioned Officer [Acting], Redfern)

Before and during the heroin shortage, NSW Police reported that their activities were primarily measured against the volume of drug seizures and arrests. KI felt these provided limited information regarding the impact of drug law enforcement. Police reported their knowledge regarding heroin markets and policing activity was obtained primarily from the use of informants, observation and community sources including community complaints. Some police monitored the significance of the arrests they made. A number of KI at the LAC level reported a general lack of ‘networks’ and other support from within NSW police to assist them in their drug work at the time of the shortage. This resulted in insufficient information regarding drug supply in the LACs.

Operational Crime Reviews (OCRs) were the key internal formal performance mechanism at the time of the shortage. Police KI reported that drug crime was not a focus of the OCRs. OCRs were reported to provide little impetus for LACs to focus on drug law enforcement or drug markets. One officer also reported that OCRs provided little information of use in State level drug related operations:

“... our reporting system (OCRs) or what the local area commands were sort of measured against was their success on different types of crime, and there was no measure for their success in drug investigations ... I'd look at ambulance data regarding overdoses rates, admissions to hospitals, offences we link to being drug related, other health programs, needle exchange, methadone, not only how many people we are locking up.”
(Commissioned Officer, State Command)

The heroin shortage also revealed the deficits in performance measurement. KI reported that it was clear that they needed performance indicators based on a better understanding of the market. A need for more proactive monitoring of drug market activity was also expressed. NSW Police introduced a new system of monitoring of drug market activity in January 2002, the Heroin Early Warning Indicators (EWI). The aim of EWI was continuous monitoring by the State Crime Command Drug Squad initially of six key LACs, to enable early identification and appropriate response to a return of heroin supply, should this occur. State level squads were also involved.

In Kings Cross, the shortage was the impetus for one officer to organise regular meetings between the Surry Hills, Redfern, Cabramatta and Kings Cross LACs to discuss drug market and drug related crime issues. The purpose of these groups was described as follows:

“I initiated it in response to my fear that if heroin came back we would need to be supersensitive to it coming back. And we needed to respond and we need to get corporate attention on that issue and that was the purpose of SHARCKX [Surry Hills, Redfern, Cabramatta, Kings Cross], to say, look guys, we've got a problem here and I need a hand.” (Commissioned Officer, Kings Cross)

This lack of support for LACs in the area of drug law enforcement was common to all drug markets except Cabramatta. Not all police were optimistic about the capacity of the State level approaches (including a restructure of the drugs areas) to assist with drug law enforcement at the LAC level in the future.

“... the other thing I’m not happy about is that at a strategic level ... we’re lacking a level of drug enforcement ... we really need a regional drug unit specialist, a group of specialists.” (Commissioned Officer, Kings Cross)

The same officer reported that recruitment for the new State Crime Command Drug Squad³² had taken the best officers and corporate knowledge from his command with no indication that the squad would contribute to drug law enforcement in his LAC.

10.2.7. Changes in inter-agency communication

The appreciation of a need for a broader understanding of drug markets as a result of the shortage was reported by some KI to have increased the emphasis at both a State Command and LAC level for police to work with both government and non-government organisations. This included Community Drug Action Teams (CDAT) and “Community Solutions”, a multi-agency approach to local issues coordinated by NSW Premier’s Department.

One officer suggested that the current use of multi-agency strategies might be in some part a response to the heroin shortage. This was similar to the approach in Cabramatta LAC of using multi-agency strategies that were reported by KI to have maximised the gains in the area achieved during the shortage.

“... so the shortage didn’t actually alter any of our plans it just reinforced the need for us to get on with the job, I suppose, of the strategy of disrupting the market place, what little was left of it.” (Commissioned Officer, Cabramatta)

There was also collaboration between police and health agencies during the shortage; this is discussed in Chapter 11.

10.3. NSW government agencies

At a central level, the NSW Government reported a number of policy initiatives associated with the shortage that involved law enforcement. The aim of these was described by one KI:

“The shortage provided us with an opportunity to ensure that government programs in this area reinforce the impact of a downturn in supply, by sustaining current programs that focus on drug supply, demand and harm, enhance the benefits, build in protective factors, and so that should supply increase in the future we have the resilience to the effects”.
(Senior Officer, NSW Government)

The NSW Cabinet Office of Drug Policy (ODP) reported increasing their interest in global and local heroin market dynamics. A report by the ODP proposed improvements to the monitoring of the drug problem in NSW (ODP 2002).

³² Following the Royal Commission into the NSW Police Service (1997) a central investigation group, Crime Agencies and a central intelligence branch, the Information and Intelligence Centre, were formed. In September 2002 the Information and Intelligence Centre and Crime Agencies were amalgamated to become the State Crime Command. The Command polices serious crime or incidents and major and organised crime that require specialist investigation and intelligence. The Drug Squad investigates the production and distribution of illegal and illicit drugs.

One approach cited in the document was described as ‘Strategic Oversight’. To this end, the ODP reported forming the Illicit Drugs Monitoring Committee to monitor data reflecting illicit drug use and related harms. This was in part due to the heroin shortage. Included in the group were NSW Police, the Bureau of Crime Statistics and Research, ODP, NSW Health and NDARC.

ODP also reported overseeing the use of improved police intelligence mechanisms such as Drug Law Enforcement Performance Indicators and the heroin Early Warning Indicators.

10.4. Confounding factors

Changes in law enforcement operations attributed by police to the heroin shortage may have been confounded by the effect of a number of law enforcement and other government strategies in place at, or around, the time of the shortage. The effects of some of these strategies may have been similar to those of the shortage and were reported by law enforcement KI to have compounded the effects of the shortage, though it is not possible to determine how much each strategy was likely to impact on law enforcement operations, independent of the shortage. Strategies and operations in Cabramatta were also likely to have had a substantial impact on the market in that area (Maher 2002), but not on the overall NSW drug market. These strategies and their potential impact are listed in Table 10.1.

Table 10.1: Strategies potentially confounding the impact of the heroin shortage

Year	Strategy	Potential impact
Early 2000 (and 2002)	Operation Visibility – aimed to increase police visibility in NSW	Displacement of drug users
Jan 2001	Commencement of a new approach aimed at disrupting drug supply and coercing drug users into treatment	Supply reduction, displacement of drug users and markets
May 2001	Opening of the Medically Supervised Injecting Centre (MSIC)	Reduction in public injecting ²
Mid 2001	Operation Street Safe – focused on anti-social behaviour, including gangs and street level dealing	Displacement of drug market and users
July 2001 onward	Use by police of the Summary Offences and Crimes Act Amendment (Police and Public Safety) Act 1998, known as the ‘Move Along’ powers	Displacement of drug users
July 2001 onward	Use by police of the Police Powers (Drug Premises) Act 2001 known as the ‘Drug House’ legislation	Supply reduction, displacement of drug users and markets
July 2001 onward	Use by police and others of the Magistrates Early Referral into Treatment (MERIT) scheme	Increased entry to drug treatment ¹
July 2001	The Cabramatta anti-drug strategy commenced	Supply reduction, displacement of drug users and markets

¹This strategy took time to be fully operational and was unlikely to have had an impact on the number of drug users entering treatment during the shortage.

²Much of the reduction is likely to be due to the heroin shortage (MSIC Evaluation Committee 2003).

10.5. Conclusions

- The heroin shortage impacted on police operations in a variety of ways. A number of acute negative impacts were reported, especially by officers dealing with drug users in custody who were agitated and sometimes violent. In addition to this was the increased effort required to investigate the increased violent crime associated with the shortage. A number of neutral or positive effects were also reported.
- Although the impact of the shortage on police operations was confounded by a number of concurrent strategies, these are likely to have affected only specific areas such as Cabramatta.
- The aims or methods of drug law enforcement at either a State or Federal level were not reported to have fundamentally changed. There was, however, an increased understanding by law enforcement agencies of the drug market, as heroin availability decreased and other drugs became more available and/or apparent.
- The reduction in heroin supply also resulted in new opportunities emerging, which impacted on markets other than heroin, as resources previously committed to heroin were reallocated to deal with other illicit drugs. Similarly, the heroin shortage provided the impetus for Drug Units to increase in number and personnel.
- The shortage resulted in the development of outcome measures and monitoring tools that were reported to be more indicative of impact of law enforcement on the market than the traditional measures of volume seizures and arrests. An increase in emphasis on research and multi agency approaches to the heroin and other drug market was another impact of the shortage.
- Finally, many of the acute/negative impacts of the shortage have since dissipated. Conversely, many of the positive structural changes to police operations have remained, although whether these changes will be sustained is yet to be seen.

Chapter 11. Changes in Health Agency Operations as a result of the Heroin Shortage

Amy Gibson and Carolyn Day

Summary

- Increased numbers of clients presented for problems other than heroin withdrawal, due to the increased use of drugs such as cocaine, methamphetamines and benzodiazepines.
- The consequences of the change in drug use included drug induced psychosis, increased levels of aggression and violence, increased staff stress, and more support was required from mental health services (drug induced psychosis) and law enforcement (violent incidents).
- Staff responded with training programs (including aggression management), protocol review, client education programs, staff debriefings, critical incident response training and modifications to buildings to improve safety.
- Decreased numbers of clients presented to Needle and Syringe Program (NSP) services.
- Health services were initially unprepared for the sudden and broad changes that occurred during the heroin shortage, but were able to make modifications to the way they did practice in order to cope effectively.

11.1. Introduction

This chapter outlines changes that occurred to the operations of health agencies dealing with drug users at the time of and following the peak of the shortage. The impact of changes in patterns of drug use and the agencies' response to the concomitant aggression and violence at both the staff and agency level are discussed. Changes to links between agencies, such as mental health services, law enforcement and other health services are outlined. The chapter also highlights changes to treatment protocols and staffing which occurred as a result of the shortage.

The information obtained for this Chapter is drawn from in depth interviews with key informants (KI) who worked in drug and alcohol and other health services during the shortage. The KI typically have many years of experience in the field and readily identified changes to their service operations.

11.2. Changes in drug use

The change in heroin supply was associated with an increase in psychostimulant use (see Chapter 3). As a result, health organisations in NSW had to respond to clients with different needs. Education strategies were introduced, including information on psychostimulant overdose prevention strategies, injection related health problems as well as other issues. One State level KI reported the need for a broader focus in staff knowledge and expertise from heroin to other drugs, a theme repeated by other KI.

At the State level, the response to the shortage was one of becoming more flexible and developing systems to cope with the changed nature of drug use. There was also a shift in focus to drugs other than opiate – an attempt to 'get out of an opiate mindset'. The treatment of psychostimulant use became a focus, and case management was introduced for all drug types, not just heroin. This demonstrated a shift in focus from drug type and route of administration to meet the needs of the client and their family.

In Central Sydney Area Health Service (CSAHS), where the Redfern drug market is located, KI reported the focus shifted from tertiary interventions to primary interventions, including marketing services more effectively via pamphlets, producing educational materials about psychostimulants, supporting the general practitioner program and providing information to general practitioners about new issues in drug use.

The great majority of change in health agency operations was driven by the changes in drug use by their clients. In the three Sydney drug markets on which this research focused, it was reported that clients accessing treatment engaged in increased use of drugs other than heroin (Chapter 3).

11.2.1. Staff knowledge and adaptability

Decisions about treatment were more difficult during the shortage as clients were presenting with heavy use of more than one substance:

"It's been much more complicated ... it's certainly been more difficult to tease out whether people are in withdrawal from opiates, or they're intoxicated with benzos or if they're just depressed and miserable and had a crisis in their life, or a panic attack and they think they need more benzos ..." (General Practitioner, Health Service, Redfern)

Many respondents reported that the heroin shortage constituted a learning experience for staff members. Staff learnt to be more flexible and responsive to changing client needs and there were

reports of increased liaison and case conferencing between different treatment services. A Kings Cross health service increased the number of home visits to their clients, and a Redfern service needed to reallocate staff resources.

Staff in all areas reported they had to increase their skill base to manage drugs apart from heroin. Services increased their understanding of the newer 'street' drugs, in terms of treatment and general health matters. In addition, Kings Cross and Redfern services reported improving their triage and crisis intervention skills and Cabramatta services reported providing other health agencies and police with harm minimisation information. After the shortage eased, staff in Redfern felt they had developed strategies to handle presentations of clients under the influence of cocaine. As described by one KI from Kings Cross:

"People were finding themselves very quickly in psychosis because they had no idea of how to limit themselves and what to use to come down with, and we'd see them here after crashing and we'd have difficulty in trying to communicate with them at that point because they were in the peak of depression. We couldn't work with them when they were at that point. So we had to learn as they learnt." (Manager, Accommodation Service, Kings Cross)

KI in the Redfern area reported doing more court work and advocacy during the heroin shortage, related to the increased levels of crime among clients (Chapter 8).

11.2.2. Treatment

Treatment services in the Sydney drug markets examined in this study experienced increased numbers of clients presenting for withdrawal management for drugs other than heroin, particularly psychostimulants such as methamphetamine and cocaine (Chapter 7). As a result, some treatment services in the Cabramatta area reduced treatment places for heroin detoxification. A treatment service in Redfern saw proportionally more clients for alcohol withdrawal, who were filling beds previously allocated to heroin users. Services in all areas developed new policies and procedures, including treatments for methamphetamine, cocaine and delirium management.

Some KI in Redfern commented that clients presenting with benzodiazepine dependence were more labour intensive and challenging to manage safely. KI reported that it was more difficult to retain clients in treatment and develop rapport, partially due to the types of drugs being used and partially because large numbers of people were admitted for short periods of time.

11.2.3. Medical complications

The most commonly reported complication associated with other drug use was drug induced psychosis, particularly methamphetamine induced psychosis. This was strongly related to client aggression and violence in health services (Section 11.3). Drug treatment workers expressed concern about psychostimulant related psychological problems and the lack of treatment options for these substances and their sequelae:

"We have very few treatment options for other drugs like cocaine and amphetamines. I know there are treatment options but we have no substitution therapy and the outcomes, well, do we want a Lexington hospital filled with amphetamine users? Are we going to fill our psych wards up with substance users who have psychoses? Do we want to do that?" (Manager, Drug Health Service, Cabramatta)

"Well it [amphetamines] produces a different illness. It produces an illness indistinguishable from schizophrenia that lasts for a few days, they're violent or disturbed, lacking in insight,

need to be [sedated] and nursing care and then a few days time it all resolves. It is a much shorter length of stay but with all the work up front in those first few days, it is a high turn over.” (Medical Officer, Mental Health Service, Kings Cross)

Staff needed to manage a greater number of infection related complications and, as a result, services introduced client education programs about safe injection practices and benzodiazepine injecting in the Kings Cross and Redfern areas. General levels of health education for clients were also increased in some Cabramatta services.

Although the number of deaths from heroin overdose decreased during the heroin shortage (Chapter 6), staff members in the Redfern area were still exposed to a number of overdoses involving multiple drugs and as a result, developed a health promotion campaign highlighting the risks of reduced tolerance and heroin overdose.

11.2.4. Other complications

Services in both Kings Cross and Cabramatta reported an increase in drug dealing on the premises. In response, the Kings Cross service changed the opening hours of the group room.

A Cabramatta service reported an increase in clients intoxicated with alcohol. The service responded by developing stricter client entry criteria and established “alcohol free zones” to limit the number of intoxicated persons on the premises. To better cope with the levels of methamphetamine intoxication, a Kings Cross service limited the treatment quota of methamphetamine users.

11.3. Aggression and violence

The great majority of health services in all areas experienced significant disruptions during the heroin shortage due to increased client agitation and aggression, largely related to increased psychostimulant use. The increase in benzodiazepine use also resulted in a number of stressful situations experienced by staff in one Redfern service. For some health care workers, these increases in aggression and violence were one of the most salient features of the heroin shortage.

The Redfern outreach program experienced considerable aggression including a shooting near the location of the outreach bus. As a result, the bus was moved to a different location and staff noticed fewer incidents of violence in the area after the move. In some services, client assessments had to be left incomplete because of the increased aggression. In the majority of health services the number of critical incidents increased and on occasion the incident involved possession of a weapon in the clinic.

“... we felt like we were a crisis service in that time rather than a treatment service... I seem to remember being held hostage in the assessment unit once.” (Health Professional, Drug Health Service, Kings Cross)

Redfern KI reported that the increased levels of aggression and violence were not sustained once the shortage eased. This was consistent with data suggesting that the increase in drug induced psychosis was short lived (Chapter 6).

11.3.1. Staff response

Staff became more alert to the threat of violence and developed new skills in managing aggressive and volatile behaviour. In Kings Cross services staff began to make more comprehensive assessments to attempt to reduce aggression. In Cabramatta, staff members were

spending more of their time “soothing” clients and in Redfern, staff had to spend more time managing behaviours and containing clients. When aggressive incidents did occur, Kings Cross services reported greater levels of staff debriefing and discussions and some Cabramatta services held urgent staff meetings to address violent behaviour among clients. Redfern KI reported banning clients from the treatment service in some cases and on one extreme occasion an Apprehended Violence Order (AVO) was taken out against a client. One Kings Cross service reported making greater use of the Mental Health Act to have clients committed.

11.3.2. Agency level response

The agency level response to the increased aggression and violence levels was comprehensive. Across all areas, there were reviews of policy and procedures concerning aggression management and critical incident response. In Kings Cross and Redfern services, staff received training in aggression management:

“So that process [policy and procedure review] was put in place to try and get a more uniform and consistent response. Now of course that’s been finalised it’s no longer as necessary, but I suppose we’re at least geared for, you know, what to do should the problem recur. So I think the lesson once again is that services like this need to be ready to move and adapt to new situations. Certainly again our aggression management training and support of staff and debriefing procedures, again they were all cranked up and tweaked and so on, that should also stand us in good stead. So I suppose we feel better prepared for the next onslaught, should that happen.” (Manager, Drug Health Service, Kings Cross)

In a Kings Cross service, where staff had been “held hostage” (prevented from leaving a dosing area by an aggressive client), modifications were made to the building including the installation of an emergency exit. Other services in the Kings Cross area installed security locks, added an extra room and began to close the front doors of the service to deter aggressive clients. A Redfern agency initiated an analysis of performance data and was alerted to staff having increased exposure to stress and anxiety during this time.

11.4. Inter-agency links

The heroin shortage was commonly reported as a time where services required greater levels of assistance and advice from other agencies. In some cases this resulted in strained relations, but many health respondents reported that their agencies developed better inter-agency links and collaborative relations.

Redfern KI reported that CSAHS developed better links with government and non-government organisations to improve referrals and inpatient consultation and liaison. This was particularly noted in ambulatory detoxification services at Canterbury Hospital.

11.4.1. Mental health services

Since increased use of psychostimulants was associated with an increased level of drug induced psychoses, drug and alcohol services in all areas reported a greater need for mental health support.

“... staff here hadn’t been used to that level of aggression that amphetamines presented and also they weren’t necessarily skilled enough to deal with the issues of psychosis and that impact for us had huge ramifications in terms of mental health support.” (Manager, Accommodation Service, Kings Cross)

Many of the services in the Kings Cross area did not have the staff trained in mental health and relied on outside agencies to provide assistance. A KI from the Kings Cross area described considerable reluctance on behalf of the mental health services to become involved since the psychoses were commonly drug induced.

Redfern staff reported always having worked with mental health services in a very coordinated way to manage different types of psychoses. Thus, cooperation with the mental health services increased, and mental health staff gave training in critical incidents relating to psychostimulant use. In turn, drug and alcohol services provided increased liaison and consultative roles to mental health. In contrast, Kings Cross and Cabramatta KI did not report such collaboration between drug and alcohol and mental health services.

11.4.2. Law enforcement

KI in all areas uniformly reported that the increased levels of aggression and violence resulted in increased calls for police attendance at treatment services. In Cabramatta, this initially resulted in strained relations between health services and police, but over time, relations improved.

11.4.3. Other health services

Residential services in the Kings Cross area, particularly those with non-medically trained staff, attempted to obtain guidance from other health services regarding erratic behaviour among clients. These residential services reported difficulties in acquiring such guidance.

*“So you know, we’ve got this person acting erratically, endangering, maybe endangering their own safety, or the safety of other staff or residents, and there was this refusal from different health agencies to look at what was, look at assisting, because it sort of fell outside of, you know, no one was really clear as to what was driving the behaviour.”
(Manager, Youth Service, Kings Cross)*

Conversely, Cabramatta health services reported the development of better relations with other agencies. Consultation and liaison to the hospital emergency ward was introduced and staff improved their referral strategy to other services. One Kings Cross organisation realised that they had knowledge about other drug use that could help other services.

11.5. Staff issues and treatment demand

One State level KI reported that the decrease in numbers of people entering treatment provided an opportunity to review and reform treatment services. A Redfern KI discussed how they responded to the changes:

“Really interesting, you get despondent seeing young people being recruited into heroin dependence. You think, how am I going to alter this life pattern, maybe jail is all that can help you? Now I only see 55 year old heroin dependent people. I think it was really good. I don’t think ATS [amphetamine type stimulant] dependence is really the same. It’s made us think about supply side issues as they impact on us. As a service we can alter, we’ve learnt to alter and respond to these changes. I hope if it [heroin] returns and the issues return we can respond. It’s offered a light and a bit of spark to us.” (Medical Officer, Residential Drug Health Service, Redfern)

11.5.1. Changes in clients attending treatment services

Many health services experienced changes in the numbers of clients accessing their services.

Three State level KI reported that demand for welfare and treatment referral services increased and this demand created a level of work over and above that usually required.

In Kings Cross, a KI reported that drug and alcohol services had to cope with increased client numbers with limited funding and a workforce untrained for the issues they experienced. This KI said there was a general sense that the sector was ill prepared, and some other respondents described the atmosphere in their service as “chaotic”.

One private methadone clinic in the Cabramatta area began to have difficulties meeting costs because of the reduced number of clients. In Redfern, KI reported a marked reduction in clients presenting for heroin withdrawal treatment in the first quarter of 2001, particularly in the younger age groups of both sexes. By May 2001, an older group of heroin users started to return for treatment. Staff in the Redfern area received fewer calls to assist at overdoses during the shortage.

11.5.2. Changes in service delivery

Some KI from the Cabramatta area reported that their services modified their practices by introducing more group work and case management. There was greater resource allocation into new projects, health promotion and relapse prevention programs. The Redfern outreach program placed greater emphasis on health promotion and referral.

One Redfern KI reported that the shortage did not affect their service’s approach to treatment as they thought the heroin shortage would end. A Redfern health service originally offered more benzodiazepine detoxifications than prior to the shortage, but this ceased following staffing cuts.

11.5.3. Effect on staff members

Staff in the Kings Cross and Cabramatta areas reported increased levels of stress, anger and frustration during the heroin shortage. Case workers had heavier workloads, correct policies were not in place, and there were some staff changes. Some Kings Cross services employed additional staff members in response and treatment services underwent significant changes.

“We’ve built special rooms, there’s a special protocol, we’ve employed extra staff, when these people are off their skins we have to either special them, make sure they don’t run away, or we have to knock them out, when they become a high dependency ICU [Intensive Care Unit] type patient because they’re knocked out and they’ve got to be nursed on a ... one to two ratio, so it is killing us ... Because you can imagine how destructive these patients who are on cocaine, amphetamines, plus a bit of psychiatric inner city schizophrenia, all that sort of stuff. Mix it all up, and we have lots of them. The resources that are needed to sort this patient out and then keep that patient safe to themselves and to others is massive ...” (Manager, Emergency Health Service, Kings Cross)

11.6. Confounding factors

At the time of the heroin shortage, Drug Programs Bureau, NSW Department of Health, already had in place a strategy for expanding treatment services arising from the 1999 Drug Summit. This expansion included an increase in methadone maintenance from 12,000 to 15,500 places, an increase of 70 or more residential rehabilitation beds, expanded home detoxification services across the State, the introduction of centralised intake across area health services and the employment of an additional 200-300 staff.

In accordance with NSW Health Department policy, longer term maintenance pharmacotherapy clients were moved to pharmacies for dosing, leading to reductions in numbers of methadone clients and a general reduction in staff stress. Staff also began to case manage these clients at pharmacies.

At the time of the heroin shortage, CSAHS was creating a new Drug Health Plan, so changes arising from the shortage were factored into the plan.

11.7. Conclusions

The majority of KI reported that their agencies experienced significant changes during the period of reduced heroin supply. These changes included changed patterns of drug use among their clients, increased aggression and critical incidents at health agencies, changes in the numbers of clients accessing treatment services, and the need for greater interagency cooperation between drug and alcohol services, mental health services and law enforcement.

Despite health services reporting initial feelings of “unprepared-ness” or “chaos” during the heroin shortage, many services were able to make rapid alterations to their practice. By responding to the changed needs of the clients and the drug market, health services demonstrated their adaptability and resourcefulness in a period of dramatic change.

Chapter 12. Conclusions

Carolyn Day and Louisa Degenhardt

The heroin shortage followed a period of rapid and dramatic growth in heroin availability in Australia. In early 2001 the price, purity and availability of heroin in NSW dramatically and unexpectedly decreased; this decrease was felt most strongly in the months January to April of that year. Although the market appears to have stabilised, it has not returned to pre-shortage levels.

In NSW, the shortage had a number of clear effects across a wide range of domains. Heroin use decreased – as did the estimated number of regular heroin users – and according to the data available, there was a clear increase in the use of psychostimulants associated with the shortage. There was a reported increase in the use of benzodiazepines, but this increase was not apparent in any of the indicators examined, and may have occurred for a small number of users only and manifested as increase in injecting and greater harms. The increased use of psychostimulants and benzodiazepines probably resulted in an increase in risky injecting among this group, but it is unclear whether they form a large proportion of the IDU population.

Despite these increases, there was a marked decrease in the distribution of needles and syringes shortly following the heroin shortage. This decrease could be partially accounted for by an increase in the reuse of needles and syringes as is consistent with cocaine (e.g. van Beek, Dwyer et al. 2001) and benzodiazepine injecting (e.g. Ross, Darke et al. 1997), but given the magnitude of the decrease in needle and syringe distribution, this explanation alone is considered unlikely, particularly in the light of data on the number of notifications of blood-borne viral infections (BBVI), which suggested a *decrease* following the heroin shortage, most markedly among younger age groups. These two findings (decreased NSP activity *and* decreased hepatitis C notifications) suggested a decrease in both the extent and number of injecting drug users in NSW. The results presented in Chapter 6 (which estimated a decrease in the number of regular heroin users, particularly among younger age groups) were consistent with this conclusion.

The heroin shortage affected heroin users both positively and negatively. Younger, novice users probably (though not necessarily) faring better than older, more entrenched users. For example, heroin overdose deaths decreased dramatically during this period, with the largest decreases among younger people. This was accompanied by an overall increase in the number of admissions for cocaine overdose and a brief increase in the number of drug-induced psychoses, though not of the same magnitude as the decrease in heroin related deaths.

Younger people were observed to have increased treatment episodes for psychostimulant use and there was a decrease in the number of treatment naive seeking opioid pharmacotherapy. There was no observable change in the number of persons seeking treatment who had previously been in opioid pharmacotherapy, but although treatment retention did not improve, those enrolled in treatment showed greater treatment adherence.

For those who continued to use heroin and other drugs, the heroin shortage was associated with increased levels of crime and aggression among users themselves. Short-term increases in the illicit sex work and acquisitive crime occurring concurrently with reduced heroin supply were also very likely related to the reduced availability. Though at the community level, these

reductions were likely to be offset by an apparent overall sustained decrease in acquisitive crime, in addition to reductions in the number of heroin users and associated health problems.

These changes to drug use patterns, health and criminal activity of heroin users required health and police services to respond, often compromising their ability to deliver appropriate and necessary services. Responses were varied and reflected the dynamic nature and resourcefulness of many services. On the whole the skill bases of services increased and, while many of the acute/negative impacts of the shortage dissipated, many of the positive changes remained.

Despite the many changes observed, as with any observational research, the findings detailed in this report reflect associations between the heroin shortage and the issue of interest. Other events might account for some of the changes observed throughout the report. As set out in earlier chapters many of the changes attributed to the shortage can be inferred only: there are no definitive answers, only probable ones.

In sum, there were a number of changes in drug related behaviour and the outcomes of such behaviour of heroin users. This behaviour impacted on the community differently, severely compromising the welfare, mental and physical health of older more entrenched users, which manifested in a number of ways. Conversely, although some younger, novice users were no doubt also adversely affected by the shortage, not least through increased psychostimulant use, apparent declines in the number of new heroin users entering the market has no doubt improved the overall well being of this group, through reduced associated harms and mortality.

References

- Aitken, C., D. Moore, et al. (2002). "The impact of a police crackdown on a street scene: evidence from the street." *International Journal of Drug Policy* **13**: 193-2002.
- American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition)*. Washington, DC, American Psychiatric Association.
- Australian Bureau of Criminal Intelligence (2002). *Australian Illicit Drug Report 2000/01*. Canberra, Commonwealth of Australia.
- Australian Crime Commission (2003). *Australian Illicit Drug Report 2001/02*. Canberra, Australian Crime Commission.
- Australian Customs Service (2003). Excerpt from "A study of the mechanics of cross-border heroin trafficking". Canberra, Australian Customs Service.
- Barker, B. and L. Degenhardt (2003). *Accidental and suicidal drug-induced deaths in Australia 1997-2001*. NDARC Technical Report No. 164. Sydney, National Drug and Alcohol Research Centre, UNSW.
- Beyer (unpublished research). Excerpt from "A study of the mechanics of cross-border heroin trafficking", Research funded by the National Drug Law Enforcement Research Fund.
- Binswanger, I. A., A. H. Kral, et al. (2000). "High prevalence of abscesses and cellulitis among community recruited injection drug users in San Francisco." *Clinical Infectious Diseases* **30**: 579-581.
- Bowers, M., Jr., N. Boutros, et al. (2001). "Substance abuse as a risk factor for schizophrenia and related disorders." *International Journal of Mental Health* **30**(1): 33-57.
- Bowling, B. (1999). "The rise and fall of New York murder: zero tolerance or crack's decline?" *British Journal of Criminology* **39**(4): 531-554.
- Breen, C., L. Degenhardt, et al. (2002). *The impact of a change in the availability of publicly subsidised temazepam gel capsules in Australia*. Sydney, National Drug and Alcohol Research Centre, University of New South Wales.
- Collins, L., L. Degenhardt, et al. (2003). *Drug supply and distribution in NSW, January 1999 to September 2002*. Sydney, National Drug and Alcohol Research Centre, UNSW.
- Coupland, H., L. Maher, et al. (2001). *Every day's the same: Youth homelessness in Cabramatta (final report)*. Sydney, NSW Premier's Department, Fairfield City Council and NSW Department of Youth and Community Services.
- Courtwright, D. (1982). *Dark Paradise: Opiate Addiction in America before 1940*. Cambridge, Mass., Harvard University Press.
- Courtwright, D., H. Joseph, et al. (1990). *Addicts Who Survived: An Oral History of Narcotic Addiction in America 1923-1965*. Knoxville, University of Tennessee.

- Crofts, N., J. L. Hopper, et al. (1994). "Blood-borne virus infections among Australian injecting drug users: implications for the spread of HIV." *European Journal of Epidemiology* **10**: 687-694.
- Darke, S., W. Hall, et al. (2000). *The Illicit Drug Reporting System (IDRS) 1996-2000*. NDARC Technical Report 101. Sydney, National Drug and Alcohol Research Centre, University of NSW.
- Darke, S., S. Kaye, et al. (in press). *Cocaine-related fatalities in NSW 1993-2002*. NDARC Technical Report. Sydney, National Drug and Alcohol Research Centre, UNSW.
- Darke, S., S. Kaye, et al. (2002). "Cocaine use in New South Wales, Australia, 1996-2000: 5 year monitoring of trends in price, purity, availability and use from the Illicit Drug Reporting System." *Drug and Alcohol Dependence* **67**: 81-88.
- Darke, S., E. Kelly, et al. (in press). "Drug driving among injecting drug users in Sydney, Australia: prevalence, risk factors and risk perceptions." *Addiction*.
- Darke, S., J. Ross, et al. (1995). "Benzodiazepine use among injecting heroin users." *Medical Journal of Australia* **162**: 645-647.
- Darke, S., J. Ross, et al. (1996). "Overdose among heroin users in Sydney, Australia. I. Prevalence and correlates of non-fatal overdose." *Addiction* **91**(3): 405-411.
- Darke, S., J. Ross, et al. (2000). "Heroin-related deaths in New South Wales, Australia 1992-1996." *Drug and Alcohol Dependence* **60**: 141-150.
- Darke, S., L. Topp, et al. (2002). "Heroin use in New South Wales, Australia, 1996-2000: 5 year monitoring of trends in price, purity, availability and use from the Illicit Drug Reporting System." *Addiction* **97**: 179-186.
- Darke, S., L. Topp, et al. (2002). "The injection of methadone and benzodiazepines among Sydney IDU 1996-2000: 5 year monitoring of trends from the Illicit Drug Reporting System (IDRS)." *Drug and Alcohol Review* **21**(1): 27-32.
- Darke, S., L. Topp, et al. (2002). "The injection of methadone and benzodiazepines among Sydney injecting drug users 1996-2000: 5-year monitoring of trends from the Illicit Drug Reporting System." *Drug & Alcohol Review* **21**(1): 27-32.
- Darke, S. and D. Zador (1996). "Fatal heroin 'overdose': A review." *Addiction* **91**: 1765-1772.
- Day, C., L. Topp, et al. (2003). "Decreased heroin availability in Sydney in early 2001." *Addiction* **98**: 93-95.
- Degenhardt, L., C. Day, et al., Eds. (2004). *The causes, course and consequences of the heroin shortage in New South Wales, South Australia and Victoria*. Adelaide, Australasian Centre for Policing Research.
- Degenhardt, L., W. Hall, et al. (2001). "Ambulance calls to suspected drug overdoses: New South Wales patterns July 1997 to June 1999." *Australian and New Zealand Journal of Public Health* **25**(5): 447-450.
- Degenhardt, L., W. Hall, et al. (2004). Australian heroin markets. *The course and consequences of the heroin shortage in Australia*. L. Degenhardt and C. Day. Adelaide, Australasian Centre for Policing Research.

- Degenhardt, L., W. Hall, et al. (in preparation). Australian heroin markets. The course and consequences of the heroin shortage in Australia. C. Day. Sydney, National Drug and Alcohol Research Centre, UNSW.
- Degenhardt, L., V. Rendle, et al. (2004). Estimating the number of heroin users in NSW and Australia, 1997-2002. NDARC Technical Report No. Sydney, National Drug and Alcohol Research Centre, University of NSW.
- Degenhardt, L., V. Rendle, et al. (2004). Estimating the size of a drug using population after a marked reduction in drug supply. NDARC Technical Report No. Sydney, National Drug and Alcohol Research Centre, University of NSW.
- Degenhardt, L., L. Topp, et al. (2002). "Issues surrounding the detection of a reduction in drug supply: The case of the heroin shortage in Australia, 2001." Bulletin on Narcotics **LIV**(2).
- Dietze, P., P. Miller, et al. (2004). The course and consequences of the heroin shortage in Victoria. Sydney, National Drug and Alcohol Research Centre, UNSW.
- Dixon, D. (1999). A Culture of Corruption; Changing an Australian Police Service, Hawkins Press.
- Dixon, D. and L. Maher (in press). Containment, quality of life and crime reduction: Policy transfers in the policing of a heroin market. Criminal justice and political culture: National and international dimensions of crime control. T. Newburn and R. Sparks. London, Willan.
- Dolan, K., J. Kimber, et al. (2000). "Drug consumption facilities in Europe and the establishment of supervised injecting centre in Australia." Drug and Alcohol Review **19**: 337-346.
- Dore, G., M. Law, et al. (2003). "Epidemiology of hepatitis C virus infection in Australia." Journal of Clinical Virology **26**: 171-184.
- Dupont, R. L. (1998). "Abuse of benzodiazepines: the problems and the solutions." American Journal of Drug and Alcohol Abuse **14**(Supplement 1): 1-69.
- Edey, D. P., and M. J. Westcott, (2000). "'The needle and the damage done': Inter-arterial temazepam." Emergency Medicine **12**: 248-252.
- Elkashef, A. and F. Vocci (2003). "Biological markers of cocaine addiction: implications for medications development." Addiction Biology **8**: 123-139.
- Ellison, G. (1994). "Stimulant-induced psychosis, the dopamine theory of schizophrenia, and the habenula." Brain Research Reviews **19**(2): 223-239.
- European Monitoring Centre for Drugs and Drug Addiction (1997). Estimating the Prevalence of Problem Drug Use in Europe. EMCDDA Scientific Monograph No. 1. Luxembourg, Office for Official Publications of the European Communities.
- European Monitoring Centre for Drugs and Drug Addiction (1999). Study to obtain comparable estimates of problem drug use prevalence for all EU Member States. Lisbon, EMCDDA.
- Farrell, M., J. Marsden, et al. (2002). "Methamphetamine: drug use and psychoses becomes a major public health issue in the Asia Pacific region." Addiction **97**(7): 771-772.
- Gibson, A., L. Degenhardt, et al. (2003). Global and Australian heroin markets. NDARC Technical Report No. 167. Sydney, National Drug and Alcohol Research Centre, University of NSW.

- Goldstein, A. and J. Herrera (1995). "Heroin addicts and methadone treatment in Albuquerque: A 22 year follow-up." *Drug and Alcohol Dependence* **40**: 139-150.
- Griffiths, P., L. Vingoe, et al. (2000). "Drug information systems, early warning and new trends: Can drug monitoring systems become more sensitive to emerging trends in drug consumption?" *Substance Use and Misuse* **35**: 811-844.
- Hall, W. (2004). "The contribution of research to Australian heroin policy 1990-2001: A personal retrospection." *Addiction* **99**: 560-569.
- Hall, W., L. Degenhardt, et al. (1999). "Opioid overdose mortality in Australia: 1964-1997: birth-cohort trends." *Medical Journal of Australia* **171**: 34-37.
- Hall, W., M. Lynskey, et al. (1999). *Heroin use in Australia: Its impact on public health and public order*. Sydney, National Drug and Alcohol Research Centre.
- Hall, W., J. Ross, et al. (2000). *How many dependent heroin users are there in Australia?* NDARC Monograph No. 44. Sydney, National Drug and Alcohol Research Centre, UNSW.
- Hall, W. D., J. E. Ross, et al. (2000). "How many dependent heroin users are there in Australia?" *Medical Journal of Australia* **173**: 528-531.
- Hando, J., S. Darke, et al. (1998). "The development of an early warning system to detect trends in illicit drug use in Australia: the Illicit Drug Reporting System." *Addiction Research* **6**: 97-113.
- Hando, J., L. Topp, et al. (1997). "Amphetamine-related harms and treatment preferences of regular amphetamine users in Sydney, Australia." *Drug & Alcohol Dependence*. **46**(1-2): 105-13.
- Harrison, A., P. Christie, et al. (2004). *The course and consequences of the heroin shortage in South Australia*. Sydney, National Drug and Alcohol Research Centre, UNSW.
- Hartnoll, R. (1997). Cross-validating at local level. *Estimating the prevalence of problem drug use in Europe*. European Monitoring Centre for Drugs and Drug Addiction. Luxembourg, Office for Official Publications of the European Communities: 247-261.
- Haverkos, H. W. and R. Langer (1990). "Serious infections other than human immunodeficiency virus among intravenous drug users." *Journal of Infectious Diseases* **161**: 894-902.
- Hser, Y. I., V. Hoffman, et al. (2001). "A 33-year follow-up of narcotics addicts." *Archives of General Psychiatry*. **58**(5): 503-8.
- Jonnes, J. (1996). *Hep-Cats, Narcs and Pipe Dreams: A History of America's Romance with Illegal Drugs*. New York, Scribner.
- Kaldor, J. and A. McDonald (2003). "HIV/AIDS surveillance in Australia." *Journal of Acquired Immune Deficiency Syndromes* **23**: S18-S23.
- Klee, H. and J. Morris (1994). "Crime and drug misuse: economic and psychological aspects of the criminal activities of heroin and amphetamine injectors." *Addiction Research* **1**(4): 377-386.
- Kleiman, M. A. R. (1992). *Against Excess: Drug Policy for Results*. New York, Basic Books.

- Kovaszny, B., J. Fleischer, et al. (1997). "Substance use disorder and the early course of illness in schizophrenia and affective psychosis." Schizophrenia Bulletin **23**(2): 195-201.
- Levine, O. S., D. Vlahov, et al. (1994). "Epidemiology of hepatitis B virus infections among injecting drug user: seroprevalence, risk factors, and viral interactions." Epidemiologic Reviews **16**(2): 418-436.
- Lintner, B. (2002). Blood Brothers: Crime, Business and Politics in Asia. Sydney, Allen and Unwin.
- MacCoun, R. J. and P. Reuter (2001). Drug war heresies: Learning from other vices, times, and places. Cambridge, UK, Cambridge University Press.
- MacDonald, M., N. Crofts, et al. (1996). "Transmission of hepatitis C virus." Epidemiologic Reviews **18**(2): 137-148.
- MacDonald, M., M. Robotin, et al. (2001). Drug use trends among injecting drug users (IDU): Findings from the Australian Needle and Syringe Program (NSP) Survey, 1995-2000. Drug Trends Bulletin. Sydney, National Drug and Alcohol Research Centre.
- MacDonald, M., S. Rutter, et al. (1999). K2 and Kings Cross: Community attitudes to the needles syringe program, discarded syringes and public injection. Sydney, NSW Health.
- MacDonald, M., A. D. Wodak, et al. (1997). "HIV prevalence and risk behaviour in needle exchange attenders: a national study." Medical Journal of Australia **166**: 237-240.
- Maher, L. (2002). "Don't leave me this way: ethnography and injecting drug use in the age of AIDS." International Journal of Drug Policy **13**: 311-325.
- Maher, L. and D. Dixon (1999). "Policing and public health: law enforcement and harm minimization in a street-level drug market." British Journal of Criminology **39**(4): 488-512.
- Maher, L. and D. Dixon (2001). "The cost of crackdowns: Policing Cabramatta's heroin market." Current Issues in Criminal Justice **13**(1): 5-22.
- Maher, L., D. Dixon, et al. (1998). Running the Risks: heroin, health and harm in South West Sydney. Sydney, National Drug and Alcohol Research Centre.
- Makkai, T. and K. McGregor (2002). Research and Public Policy Series Report No. 41: Drug Use Monitoring in Australia: 2001 annual report on drug use among police detainees. Canberra, Australian Institute of Criminology.
- Manager (2003). NSW Health. Sydney.
- Massing, M. (2000). The Fix. Berkeley, University of California Press.
- Matsumoto, T., A. Kamijo, et al. (2002). "Methamphetamine in Japan: the consequences of methamphetamine abuse as a function of route of administration." Addiction **97**(7): 809-817.
- Mattick, R. P. and S. Darke (1995). "Drug replacement treatments : is amphetamine substitution a horse of a different colour?" Drug and Alcohol Review **14**(4): 389-394.
- McCoy, A. W. (1980). Drug Traffic: Narcotics and Organised Crime in Australia. Sydney, Harper and Row.

- McGregor, C., R. Ali, et al. (2001). "Overdose among heroin users: evaluation of an intervention in South Australia." Addiction Research **9**: 481-501.
- Methamphetamine Interagency Task Force (2000). Methamphetamine Interagency Task Force: Final Report. United States, National Institute of Justice.
- Morgan, L. and A. Sleight (1986). Aboriginal Heroin Addiction in Sydney; Anatomy of a Crisis and a Program for Action. Sydney, Aboriginal Medical Service Co-operative Ltd.
- MSIC Evaluation Committee (2003). Final report of the evaluation of the Sydney Medically Supervised Injecting Centre. Sydney, authors.
- Munro, J. (1986). Aboriginal drug and alcohol abuse in the inner city area of Sydney. Sydney, Redfern Aboriginal Education Consultative Group.
- Nathan, K., W. Bresnick, et al. (1998). "Cocaine abuse and dependence." CNS Drugs **10**(1): 43-59.
- ODP (2002). Heroin: An Assessment Current Situation, Trends and Potential Risks for Australia and NSW, NSW Cabinet Office of Drug Policy.
- Penington, D. (1999). An international perspective on drug use in Australia. Heroin Crisis: Key Commentators Discuss the Issues and Debate Solutions to Heroin Abuse in Australia. K. van den Boogert and N. Davidoff. Melbourne, Bookman Press.
- Redfern, A. M. S. (1989). Extract from "A National Aboriginal Health Strategy".
- Rolls, E. (1992). Sojourners: The Epic Story of China's Centuries Old Relationship with Australia. St Lucia, University of Queensland Press.
- Ross, J. and S. Darke (1997). Benzodiazepine dependence & psychopathology among heroin users in Sydney. NDARC Technical Report No. 50. Sydney, National Drug and Alcohol Research Centre, UNSW.
- Ross, J., S. Darke, et al. (1997). "Transitions between routes of benzodiazepine administration among heroin users in Sydney." Addiction **92**: 697-705.
- Rouen, D., K. Dolan, et al. (2001). Changes in heroin availability in Sydney, Australia in early 2001. Sydney, National Drug and Alcohol Research Centre, University of NSW.
- Roxburgh, A., L. Degenhardt, et al. (2003). NSW Drug Trends 2002: Findings from the Illicit Drug Reporting System. Sydney, National Drug and Alcohol Research Centre, University of New South Wales.
- Rutter, S., K. Dolan, et al. (1997). "Rooms for rent: injecting and harm reduction in Sydney." Australian and New Zealand Journal of Public Health **21**(1): 105.
- Southgate, E., C. Day, et al. (2003). Dealing with risk: A multidisciplinary study of injecting drug use, hepatitis C and other blood borne viruses in Australia. Canberra, Australian National Council on Drugs.
- Topp, L., S. Darke, et al. (2001). Australian Drug Trends 2000: Findings from the Illicit Drug Reporting System (IDRS). Sydney, National Drug and Alcohol Research Centre.

- Topp, L., L. Degenhardt, et al. (2002). "The emergence of potent forms of methamphetamine in Sydney, Australia: A case study of the IDRS as a strategic early warning system." Drug and Alcohol Review **21**: 341-348.
- Topp, L., S. Kaye, et al. (2002). Australian Drug Trends 2001: Findings from the Illicit Drug Reporting System (IDRS). Sydney, National Drug and Alcohol Research Centre.
- US Department of Justice Drug Enforcement Administration (2002). Drug Intelligence Brief: The Evolution of the Drug Threat: the 1980's through 2002. Washington D.C., US Department of Justice.
- Vaillant, G. E. (1973). "A 20-year follow-up of New York narcotic addicts." Archives of General Psychiatry **29**: 237-241.
- van Beek, I., R. Dwyer, et al. (1998). "Infection with HIV and hepatitis C virus among injecting drug users in a prevention setting: retrospective cohort study." British Medical Journal **317**: 433-437.
- van Beek, I., R. Dwyer, et al. (2001). "Cocaine: the sharp end of drug related harm!" Drug and Alcohol Review **20**: 333-342.
- Warner-Smith, M., S. Darke, et al. (2001). "Heroin overdose: Causes and consequences." Addiction **96**: 1113-1125.
- Weatherburn, D., C. Jones, et al. (2001). "The Australian heroin drought and its implication for drug policy." Crime and Justice Bulletin(59).
- Weatherburn, D., L. Topp, et al. (2000). Drug crime prevention and mitigation: A literature Review and research agenda. Sydney, NSW Bureau of Crime Statistics and Research.
- Wodak, A. (1997). We lose 500 young each year. Sydney Morning Herald: 14.
- Wood, J. (1997). Final Report of the Royal Commission into the NSW Police Service: Volume 1: Corruption. Sydney.
- Wood, J. J. (1997). Royal Commission into the New South Wales Police Service. 8th International Anti-Corruption Conference, Lima, Peru.
- Zhou, J., M. A. MacDonald, et al. (2002). Hepatitis C antibody prevalence and risk behaviours among young injecting drug users at sentinel needle and syringe programs in Australia, 1995-2001. 14th Annual Conference Australasian Society for HIV Medicine, Sydney, Australia.

APPENDIX A. TIME SERIES ANALYSIS

Introduction

Data representing a process over time can show evidence of *serial dependence* which needs to be adjusted when performing statistical analysis. Usually this serial dependence takes the form of a relationship to the data observed in the previous month or the previous year. The main effect of this serial dependence is on the standard errors of estimates of linear predictors in regression models.

This problem applies in the time series data for the heroin shortage project. Two modelling processes were chosen to account for serial dependence while estimating the effect of the shortage: *intervention models* and *linear models*. These models (as they are applied to the event of the heroin shortage) will be discussed in the sections following.

Estimating the effect of the heroin shortage

The heroin shortage was represented as either 1) a permanent effect (step) or 2) a brief effect (pulse). In some instances it was possible to consider a third effect, a *change in slope*, though this was only attempted explicitly for intervention models.

If time is considered as an integer variable between 1 (the beginning of the series) and T (the end of the series), we set the onset of the shortage at t_0 , and write the step and pulse effects as:

$$S_t = \begin{cases} 0 & \text{if } t < t_0 \\ 1 & \text{if } t \geq t_0 \end{cases} \quad (1)$$

$$P_t = \begin{cases} 0 & \text{if } t \neq t_0 \\ 1 & \text{if } t = t_0 \end{cases} \quad (2)$$

The purpose in both models is to regress the outcome variable Y_t on these predictor variables (or combinations of them) to identify the size and magnitude of their effects, and any delay between the onset of the shortage and their effects. The most effective method for this is the intervention model, though in some instances the linear model is better. It is possible to include both the step and pulse effects in a single model, enabling initial changes and long term effects to be separated from one another where they cannot be easily modelled with just one effect.

Intervention models

The intervention model considers only the effect of the heroin shortage on the outcome variable and does not explicitly include the time variable t . The fundamental equation for this model is:

$$Y_t = \mu_t + f_1(B)S_t + f_2(B)P_t + \varepsilon_t \quad (3)$$

where

μ_t is a (time-independent) mean or intercept term

$f_1(B), f_2(B)$ are *transfer functions*

ε_t are the error-terms in the regression model.

The error-terms may exhibit serial dependence. The transfer functions are used to change the shape and form of the effect of the step or pulse function on the outcome variable. They are represented as rational functions of the *backshift operator* B , which operates on a data series in the following way:

$$BS_t = S_{t-1}$$

i.e. a time series acted on by B is shifted backwards in time by 1 time point.

Transfer functions can act to change the shape of the series upon which they act. For example, the transfer function

$$f(B) = \frac{\omega_0}{1 - B\delta_1}$$

is comprised of a constant term (in the numerator) and a denominator term which can be expressed as an infinite series

$$\frac{1}{1 - \delta_1 B} = 1 + B\delta_1 + (B\delta_1)^2 + (B\delta_1)^3 + \dots$$

This transfer function, when applied to the pulse effect in (2), produces a series in terms of prior values of the same series:

$$\begin{aligned} & \frac{1}{1 - \delta_1 B} P_t \\ &= [1 + \delta_1 B + (\delta_1 B)^2 + \dots] P_t \\ &= P_t + \delta_1 P_{t-1} + (\delta_1)^2 P_{t-2} + \dots \end{aligned} \quad (4)$$

Given that the pulse series takes the value 1 at time t_0 and 0 at all other times, we see that this transfer function will transform it to the form

$$\frac{1}{1 - \delta_1 B} P_t = \begin{cases} 1 & t=t_0 \\ \delta_1 & t=t_0 + 1 \\ \delta_1^2 & t=t_0 + 2 \\ \dots & \dots \end{cases}$$

This is a series of reducing values which decay to zero over time. The constant ω_0 controls the size of the initial spike and the 'decay term' δ_1 determines how rapidly the series decays to zero. A negative decay term indicates an effect which alternates from positive to negative as it decays, i.e. it oscillates about zero as it decays. Figure A1 shows an example of several such transfer functions applied to a simple pulse of magnitude 1, with $\omega_0 = 1$ in all cases (for comparability).

The properties of other transfer functions may be more complicated depending on the structure of numerator and denominator and the type of series to which they are applied, but the principles are similar. Descriptions of their effects and catalogues of appropriate transfer functions are available in Box and Ljung³³. In all cases the transfer functions might include a 'shift term' which

acts to delay the effect of the heroin shortage on the outcome variable. In some analyses one of the transfer functions may be set to zero (due to an inspection of the graph of the response).

The estimation process for this model was:

- Use a linear ordinary-least squares model to estimate the relative significance of the pulse and step terms, and the structure of the transfer functions;
- Estimate the auto-correlation structure (if any) of the error terms;
- Re-estimate the pulse, step and transfer function terms given the known auto-correlation structure.

Goodness-of-fit tests (AIC, SBC) were used to choose between competing models. The main considerations in model-building were:

- Significance of all estimates
- Lowest AIC and SBC statistics
- Parsimony
- Low standard error of all estimates
- Sensible and meaningful results

The time series is required to be stationary in order for the auto-correlation structure of the errors in (3) to be consistently estimated. For this reason the equation (3) was sometimes differenced:

$$Y_t - Y_{t-k} = \mu_t - \mu_{t-k} + f_1(B)[S_t - S_{t-k}] + f_2(B)[P_t - P_{t-k}] + \varepsilon_t - \varepsilon_{t-k}$$

or

$$(1 - B^k)Y_t = (1 - B^k)[\mu_t + f_1(B)S_t + f_2(B)P_t + \varepsilon_t]$$

where B is the backshift operator $BY_t = Y_{t-1}$, giving the differenced series

$$Y_t^* = \mu_t^* + f_1(B)S_t^* + f_2(B)P_t^* + \varepsilon_t^* \quad (4)$$

This differenced series is chosen to be stationary and can be analysed in the same way as (3). Note that the structure of the step and pulse functions is different when they are differenced. A full discussion of stationarity, auto-correlation and the estimation process is available in Brockwell and Davis³⁴.

A non-constant term in (4) indicates that the series is increasing or decreasing over time. If this was the case and there was evidence (by inspection) that the slope of his process had perhaps changed at the time of the heroin shortage, a second simple step function was inserted into (4), again occurring at the time of the shortage. This step if significant would represent a change in the magnitude of the constant term in (4), and thus a change in slope in the undifferenced series (3). This slope was only tested in situations where it was considered likely to have an effect, since its inclusion increases the prediction variance and reduces the significance of all parameter estimates.

³³ Box G, Jenkins G. (1976). Time series analysis: forecasting and control. San Francisco: Holden-Day.

³⁴ Brockwell P, Davis R.(2002). Introduction to time series and forecasting, 2nded. New York: Springer-Verlag.

For well-fitting models with significant estimates, results were reported as:

- 1) A table of estimates;
- 2) A plot of the transfer function (in the undifferenced series) with the observed values for comparison, and a vertical line at the point of the heroin shortage;
- 3) Any shifts in the onset of the shortage (representing delayed effects).

Step and pulse terms were also reported as the percentage change in level relative to either the last observation before the shortage (for increasing or decreasing series) or the pre-shortage mean (for static series). Numerator and denominator terms in the transfer functions were referred to as 'pulse' and 'decay' if they corresponded to ω_0 and δ_1 in (4) above, or could be interpreted similarly (for some other transfer function and series combination) or simply as 'numerator' and 'denominator' terms if they could not be simply interpreted. In the latter case, inspection of the predicted values of the plot of 'modelled' values should suffice to show the shape of the estimated transfer function. 'Numerator' and 'denominator' terms were labelled by their order in the numerator or denominator if required (e.g. 'Numerator 1', 'Numerator 2' for a second order polynomial in the numerator of the transfer function).

Intervention models were fit using SAS v 8.2.

Linear models

There were several instances where the intervention model was not appropriate:

- Poisson distributed errors where transfer functions could not be estimated;
- Increasing or decreasing series which required several different intervention models to adequately describe them.

In these cases a linear model was fitted using generalised least squares. Most such models required a set of natural spline smoothers with a step term for the heroin shortage. In this case the spline coefficients could not be interpreted, but the step could still be interpreted as a standard regression term. The fitting method for linear models was:

- Fit the expected model using ordinary least squares regression;
- Estimate the auto-correlation of the errors;
- Re-estimate the model using generalised least squares and the estimated error structure.

Standard model-building methods were used here (i.e. remove non-significant terms, re-estimate the model, test goodness of fit and choose the simplest model with the most appropriate residual structure). The same output was provided as for the intervention models. Plots for this output were the fitted values with the observed values.

Where natural spline smoothers were used several models had to be built. These may have included:

- Several models with different numbers of equally-spaced knot points;
- A model with basis points chosen by the researcher.

The second type of model was required where the point of the heroin shortage did not coincide with equally-spaced knot points and the post-shortage behaviour was very different to the pre-shortage behaviour. Model fitting for these types of smoothers is described in Venables and Ripley³⁵.

Linear models were fit using S-Plus 6.1.

Auto-correlation in Poisson processes

Auto-correlation can also occur in Poisson processes and other non-Gaussian random variables, but is more difficult to detect³⁶. Data series drawn from a Poisson process (such as overdose deaths) can be treated as non-linear models with an auto-correlated latent process affecting the mean. It has been shown that estimates of auto-correlation in the observed series will underestimate the magnitude of the auto-correlation due to the latent process. Computational methods have been developed for estimating the auto-correlation of the latent process³⁷ and these were used here on the assumption of an observation-driven model³⁸. Where auto-correlation was minimal or absent, generalised linear models were used to regress observations on time as these are simpler to fit and the parameter estimates easier to interpret. Auto-correlation was estimated in S-Plus 6.1 using procedures developed by William Dunsmuir (School of Mathematics, University of New South Wales). Generalised linear models were also fitted in S-Plus 6.1.

Because the processes developed for count data are still experimental and the model-building process less clearly described than for Gaussian data, use of these new computational methods was restricted to the study of overdose deaths in Victoria and NSW. If other series showed evidence that they could not be estimated by Gaussian methods (such as negative confidence limits on predicted values) the series were not modelled.

The problem of multiple non-random shocks

The time series models used for the heroin shortage present the shortage effect as a brief or ongoing non-random shock affecting the data series at an identifiable point. Some of the series showed some evidence of another non-random shock at an earlier point in time. It is possible that there are more than one such non-random shock and that some of these are not identifiable by visual inspection. Additional non-random shocks identified by visual inspection were generally *not* modelled except in the case of the fatal heroin overdose deaths and ADIS heroin-related calls, where spline smoothers were used. These non-random shocks were not modelled for other series because there was no prior information to suggest their existence or the cause of the shock, and as a consequence there was no basis on which to suggest a preferred modelling process. The overdose deaths and ADIS series were modelled with spline smoothers because they were considered to be important series and because the smoothing process did not make any assumptions about the structure of this previous shock. Spline smoothers may not be the best-fitting model in the presence of these random shocks (for example, piecewise linear regression might fit better) and so were not used as a general method across all series which might be judged to have such effects. Other series with possible evidence of non-random shocks were not modelled if it was considered possible that the presence of these shocks would affect the results of the standard intervention methods.

³⁵ Venables, W, Ripley R (2002). *Modern applied statistics with S*, 4th ed. New York: Springer-Verlag

³⁶ Davis, R, Dunsmuir W, Wang Y. On autocorrelation in a Poisson regression model. *Biometrika* (2000): 87(3), 491-505.

³⁷ Davis, R, Wang, Y, Dunsmuir, W (1999). *Modeling Time Series of Count Data*. In: *Asymptotics, Nonparametrics and Time Series*, Ed. Subir Ghosh, New York:Marcel-Dekker.

³⁸ Davis, R, Dunsmuir W, Streett, S. Observation-driven models for Poisson counts. *Biometrika* (In Press).

The initial model selection process and type-I error

In order to minimise the type I error associated with the analyses, a process of model selection was developed which minimised the number of significance tests required. This was:

1. Examine the data graphically for signs of an effect. An effect had to be clearly visible and physically significant in order to qualify for modelling.
2. Test for the delay between the onset of the shortage and the effect. If the effect was significant the delay had to be less than 3 months for the modelling process to continue. For example, a sudden change in level occurring 6 months after the shortage was eliminated from further modelling.
3. Fit the model using a significance level of 0.01 for all estimates and 0.05 for portmanteau tests for auto-correlation. In instances where one coefficient of a transfer function was of significance between 0.01 and 0.05 but all other coefficients were highly significant (<0.0001), the model would be retained if the effect being modelled was significant.
4. Reject the model if it required any of the following:
 - a. Auto-correlation terms at unusual lags unless those lags had a clear theoretical explanation;
 - b. Auto-correlated residuals (at the 0.05 level) due to an inability to adequately model them;
 - c. Terms of higher than 2nd order in either numerator or denominator of the transfer functions.
5. Narrow standard errors. Specifically, the 95% confidence interval about the post-shortage data had to be clearly separate from the pre-shortage data series for at least a large part of the data set. In most cases this was equivalent to requiring a simple model with few terms.
6. A clear and sensible theoretical explanation for the behaviour of the model.

If the model met all of these conditions then it would be retained as the preferred model. This process enabled the minimum number of significance tests to be conducted. Type 1 error could then be estimated as $1-(0.99)^k$ where k is the number of *intervention terms* tested. Given the large number of models tested this still leads to a potentially very high type 1 error, which should be considered when assessing the importance of the various models presented here.

APPENDIX B. QUALITATIVE METHODOLOGY

Qualitative reports were obtained for the purpose of primarily identifying key trends and events occurring during the period of reduced heroin supply. It was intended that this information would provide both a guide and a context for the selection and interpretation of pertinent indicator data (see Appendix C).

Interviews were conducted with health and law enforcement sector professionals, pharmacotherapy clients and street level user-dealers. Additional interview data was obtained from a separate study being conducted by Australian Customs Service (Beyer unpublished research).

Key informants

Table 1 documents the number of KI interviewed from the law enforcement and health sectors. The drug markets that KI provided comment on are also listed. State KI often provided comment on a number of drug markets as well as providing a State-wide perspective.

Table 1: Key informants interviewed by service type and drug market, NSW 2001-2003

Service Type	Drug Market			
	<i>Cabramatta</i>	<i>Kings Cross</i>	<i>Redfern</i>	<i>State</i>
Law Enforcement	6	5	5	9
Health	16	16	10	6
Total	22	21	15	15

Source: Heroin shortage project, NSW.

KI were drawn from three broad levels within their respective organisations: management, middle management and front-line positions. As a group they were able to provide comment from a range of perspectives including that of policy, program design and implementation and service delivery.

The number of KI interviewed differed between the health and law enforcement sectors. Law enforcement KI at the local area command (LAC) level often performed general duties as well as holding supervisory positions and were able to provide detailed information covering various perspectives. State law enforcement KI were able to comment on more than one drug market. Law enforcement KI were often found to have moved between Local Area, Regional or State Commands and were therefore often able to comment on multiple aspects of law enforcement. Health agencies tended to be specialised and KI, although at times functioning in both clinical and supervisory roles, were often only able to comment on the aspect of the drug market addressed by their organisation. As a result more health than law enforcement KI were interviewed in order to provide as complete a picture as possible of the effect of the heroin shortage.

The interview schedule

An interview schedule was developed to provide a comprehensive guide for interviews with KI and a consistent approach. This did not limit comment by KI as all were given the opportunity to add information not covered in the interview schedule.

The general domains covered by the interview schedules included:

Law Enforcement: respondents knowledge of the shortage including chronology; respondent's task at the time of the shortage; respondent's views of the causes of the shortage; effect of the shortage on drug use (including drug substitution), crime, drug markets (including market visibility), drug production/importation (including seizures) and effects on communities and drug users, information regarding the effect of the shortage on law enforcement operations was also sought.

Health: respondent's knowledge of the shortage including chronology, respondent's tasks at the time of the shortage; respondent's views of the causes of the shortage; effect of the shortage on drug use (including drug substitution), crime, drug markets (including market visibility), treatment seeking, psychosocial and general health of users (including injecting practices and overdose), effects on communities and drug users, information regarding the effect of the shortage on community and health service provision was also sought.

All interviews were taped unless otherwise requested by the interviewee. The audio tapes and transcripts are stored in accordance with NH&MRC and UNSW guidelines. (Transcripts on computer files are password protected and accessible only to research personnel, audiotapes and paper copies of interviews are in locked filing cabinets at NDARC). All records of interview will be destroyed after 7 years.

Transcripts were categorised first by sector and then by drug market and analysed thematically.

Heroin users

Heroin dependent persons were interviewed retrospectively about their patterns of drug use, entry into treatment, criminal behaviour, health problems, social situation and drug market structure and activity. The interview included both quantitative and qualitative measures of these domains.

Timeline follow-back methodology was utilised on an initial sample of 82 dependent heroin users recruited through a range of health services. Test re-test reliability was measured over seven days and found to be poor. This method was abandoned and the data was not included in the present study. Details of the methodology and results can be found in a separate report Day, 2003 #550.

Following the failure of the timeline follow-back methodology to provide reliable information, it was decided to interview heroin dependent persons who had commenced maintenance pharmacotherapy in one of two time periods: August to November 2000 and February to April 2001. This approach enabled a comparison of motivation for seeking treatment on clients entering treatment prior to and during the heroin shortage. A total of 53 clients (approximately half in each time period) were recruited through public and private pharmacotherapy clinics in the Greater Sydney Metropolitan Area. In NSW, private clinics may dose clients for the entire duration of their treatment program, while public clinics transfer clients to pharmacies or private clinics once the client is stabilised (generally after 3 months). Recruitment was stopped short of the target sample size of 100 owing to poor recruitment rates. Recruitment was impeded possibly because the length of time that had elapsed since the heroin shortage and the present study meant that some clients had since moved on to pharmacy dosing or had left treatment. A decision was made to combine the NSW sample with the two other jurisdictional samples to enable adequate quantitative analysis. The analysis of the combined sample is reported in the accompanying National report. The qualitative information was analysed thematically.

Street level user-dealers

A self-administered questionnaire was developed to obtain information on the effect of the

shortage on street level dealing. This questionnaire covered dealing history (including drug types and reasons for dealing), changes in the type, quantity, price and purity of drugs sold, changes in the market (including location of dealing, communication with customers), and the effect of the shortage on income gained from involvement in drug supply. Information was also sought about changes in the purchasing of drugs to sell and if the respondents had ever stopped selling and the reasons for this.

Attempts to contact drug dealers to participate in interviews through a drug user peer organisation were unsuccessful. One street level user-dealer was recruited through the methodology used to recruit clients of pharmacotherapy services described above. Some information regarding the impact of the shortage on drug dealers was obtained through the ACS survey (Australian Customs Service 2003).

APPENDIX C. QUANTITATIVE METHODOLOGY

A range of indicator data were sought to triangulate with the qualitative information obtained from key informant and pharmacotherapy client interviews. These are described below, according to the Chapters in which they appear in the report.

1. NSW heroin markets

1.1 Australian Bureau of Statistics

The following indicator was used in this Chapter:

- Number of opioid deaths among those aged 15-44, NSW 1980-2000.

1.2 Pharmaceutical Services Branch (PSB) client database, NSW Department of Health

NSW Health collect information on all clients registered for pharmacotherapy in NSW. A form detailing demographic, dose and prescriber information is submitted to PSB for authorisation before clients can commence treatment. At the conclusion of treatment a separate form is submitted which includes treatment end date and reason for cessation.

It is possible to conduct a range of analyses on this dataset. In this Chapter the number of methadone clients at a particular point in time was calculated:

- Number of methadone clients in NSW on 30 June by year, 1987-1999.

Further analyses on this dataset were conducted for Chapter 7 (see Section 1.7.1).

2. Documenting the shortage

2.1 Illicit Drug Reporting System (IDRS), NDARC UNSW

The IDRS is a national drug monitoring system triangulating three main sources of data to inform drug trends: survey of injecting drug users (IDU), interviews with key informants (KI), and collation of indicator data such as ambulance callouts to overdose events. A detailed description of the IDRS can be found in Roxburgh, Degenhardt, Breen & Barker (2002)³⁹. Results from the IDU survey on the price, purity and availability of heroin were used in the current report.

³⁹ Roxburgh, A., Degenhardt, L., Breen, C., & Barker, B. (2003) NSW Drug Trends 2002 Findings from the Illicit Drug Reporting System (IDRS). NDARC Technical Report No. 144, NDARC UNSW.

2.2 Australian Illicit Drug Report (AIDR), Australian Crime Commission (ACC) (formerly Australian Bureau of Criminal Intelligence, ABCI)

The AIDR is a national drug monitoring system which collates drug seizure and police operations data from each jurisdiction, including the Australian Federal Police (AFP) and the Australian Customs Service (ACS). The AIDR is published annually. Results on the purity of heroin seizures analysed by NSW Police (up to end June 2002) and seizures analysed by the AFP were used in this report.

The 2003 AIDR report had not yet been published at the time of writing therefore no data is available for the AFP series beyond June 2002. NSW seizure data is augmented with data obtained from a NSW source (see 2.3 below).

2.3 Heroin purity data, Division of Analytical Laboratories (DAL), NSW Health

A sample of illicit drug seizures made by NSW Police are sent to DAL for analysis. This does not reflect a random selection of drugs seized; samples are typically analysed for the purpose of verifying the substance where this has been called into question. It is also possible that more than one sample will be analysed from a single seizure. Data was requested for the financial year 2002-2003 to augment NSW drug seizure purity data obtained from the AIDR.

3. Changes in patterns of drug use

3.1 General Practice Research Network (GPRN) database, HCN Research

Data from the GPRN records on prescribing patterns of a random sample of general practitioners (GP) were examined. Data are generated by uploading the case files of the same GP over time, allowing for examination of changes in prescribing practices among these GP (Sayar et al, in press).

The following indicator was used in this Chapter:

- Rate of benzodiazepine prescriptions per 1000 patient visits per week.

3.2 Alcohol and Drug Information Service (ADIS)

ADIS provides a public telephone helpline service across NSW. Details of each telephone enquiry are recorded however this information is variable depending on the nature of the call. Enquiries regarding the caller's own drug use is the most reliable indicator of changes in patterns of drug use in this dataset.

The following indicators were used in this Chapter:

- Number of calls to ADIS where heroin was recorded as the primary reason for calling.
- Number of calls to ADIS where methamphetamine was recorded as the primary reason for calling.
- Number of calls to ADIS where cocaine was recorded as the primary reason for calling.
- Number of calls to ADIS where benzodiazepine was recorded as the primary reason for calling.
- Number of calls to ADIS where cannabis was recorded as the primary reason for calling.

The following indicators were analysed using TSA:

- Number of calls to ADIS where heroin was recorded as the primary reason for calling (TSA 1).
- Number of calls to ADIS where methamphetamine was recorded as the primary reason for calling (TSA 2).
- Number of calls to ADIS where cocaine was recorded as the primary reason for calling (TSA 3).
- Number of calls to ADIS where cannabis was recorded as the primary reason for calling (TSA 4).

TSA 1. Number of calls to ADIS where heroin was recorded as the primary reason for calling

This data series showed a peak in March 1999 and a subsequent decline, which appeared to accelerate or step down around the time of the heroin shortage. It was not possible to fit this series using standard intervention time series so a method of splines was used instead.

Chosen model: spline with step function with a one-month lag. Table 1 shows the parameter estimates for the model.

Table 1. Parameter estimates for linear model of TSA 1. – ADIS (heroin) time series

Parameter	Estimate	t-statistic	P value
Intercept	234.03	5.28	<0.0001
Spline 1	445.83	6.94	<0.0001
Spline 2	130.85	2.06	0.04
Spline 3	239.32	1.98	0.05
Spline 4	49.49	0.66	0.5
Step	-168.32	-3.60	0.0006

TSA 2. Number of calls to ADIS where methamphetamine was recorded as the primary reason for calling

This series was differenced to achieve stationarity.

Chosen model: pulse with a three-month lag. Table 2 shows the parameter estimates for the model.

Table 2. Parameter estimates for intervention ARIMA model TSA 2. – ADIS (methamphetamine) time series

Parameter	Estimate	t-statistic	P value
Pulse	97.86	7.70	<0.0001
AR(1)	-0.47	4.10	<0.0001
AR(2)	0.51	4.10	<0.0001

TSA 3. Calls to ADIS where cocaine was recorded as primary reason for call

This series was not differenced. There was evidence of a secondary event affecting the time series prior to the shortage; this secondary event was not modelled and may cause the actual effect of the shortage to be reduced in length and severity.

Chosen model: decaying pulse with a two-month lag. Table 3 shows the parameter estimates for the model.

Table 3. Parameter estimates for intervention ARIMA model TSA 3. – ADIS (cocaine) time series

Parameter	Estimate	t-statistic	P value
Constant	28.03	9.96	<0.0001
AR(1)	0.58	5.64	<0.0001
Pulse	39.50	4.52	<0.0001
Decay term	0.86	13.30	<0.0001

TSA 4. Number of calls to ADIS where cannabis was recorded as the primary reason for calling

This series was not differenced.

Chosen model: pulse with a three-month lag. Table 4 shows the parameter estimates for the model:

Table 4. Parameter estimates for intervention ARIMA model TSA 3. – ADIS (cannabis) time series

Parameter	Estimate	t-statistic	P value
Constant	293.03	45.99	<0.0001
AR(2)	0.29	2.49	0.01
Pulse	154.78	4.22	<0.0001

3.3 Medically Supervised Injecting Centre (MSIC) client database

The MSIC opened in May 2001, after the heroin shortage. All clients accessing the service are required to be registered and information regarding drug use, interventions and referrals are recorded at each visit.

The following indicators were used in this Chapter:

- Number of clients registered with the MSIC by month.
- Number of visits to the MSIC where the drug to be injected is a benzodiazepine.

3.4 Kirketon Road Centre Needle Syringe Program (KRC NSP) client database

KRC NSP record information on last drug injected from all clients accessing the service.

The following indicators were used in this Chapter:

- Number of visits where heroin was reported as the last drug injected coded as 'heroin alone' and 'heroin & cocaine'.
- Number of visits where methamphetamine was reported as the last drug injected.
- Number of visits where cocaine was reported as the last drug injected coded as 'cocaine alone' and 'heroin & cocaine'.

3.5 IDRS, NDARC UNSW

(see 2.1)

The following indicators were used in this Chapter:

Heroin

- Proportion of IDU reporting heroin use in the six months preceding interview.
- Median number of days of heroin use in the six months preceding interview.
- Proportion of IDU reporting daily heroin use in the six months preceding interview.
- Proportion of IDU reporting heroin as the last drug used.
- Proportion of IDU reporting heroin as the drug most injected in the last month.

Methamphetamine

- Proportion of IDU reporting methamphetamine use in the six months preceding interview.
- Median number of days of methamphetamine use in the six months preceding interview.
- Proportion of IDU reporting daily methamphetamine use in the six months preceding interview.

Cocaine

- Proportion of IDU reporting cocaine use in the six months preceding interview.
- Median number of days of cocaine use in the six months preceding interview.

- Proportion of IDU reporting daily cocaine use in the six months preceding interview.

Benzodiazepine

- Proportion of IDU reporting benzodiazepine use in the six months preceding interview.
- Median number of days of benzodiazepine use in the six months preceding interview.
- Proportion of IDU reporting daily benzodiazepine use in the six months preceding interview.

Cannabis

- Proportion of IDU reporting cannabis use in the six months preceding interview.
- Median number of days of cannabis use in the six months preceding interview.
- Proportion of IDU reporting daily cannabis use in the six months preceding interview.
- Changes in injecting drug use.

4. Changes in injecting drug use

4.1 Inpatient Statistics Collection (ISC), NSW Department of Health

The ISC represents data on all hospital separations (admissions) in NSW. Diagnostic information is coded using the International Classification of Diseases, 10th Revision (ICD-10).

This Chapter reported on injection related conditions defined as primary presentations for abscess, cellulitis, endocarditis, peripheral vascular disease, phlebitis/ thrombophlebitis, septicaemia and ulcers. The ICD-10 codes for these diagnoses are listed in Table 5.

Table 5. ICD- 10 codes used in the analysis of the ISC, NSW Department of Health

ICD-10 description	Code
Septicaemia due to streptococcus, group A	A40.0
Septicaemia due to streptococcus, group B	A40.1
Other streptococcal septicaemia	A40.8
Septicaemia due to Staphylococcus aureus	A41.0
Septicaemia due to other specified staphylococcus	A41.1
Septicaemia due to anaerobes	A41.4
Septicaemia due to other gram-negative organisms	A41.5
Septicaemia due to Escherichia coli [E. Coli]	A41.51
Septicaemia due to other gram-negative organisms	A41.58
Other specified septicaemia	A41.8
Septicaemia, unspecified	A41.9
Acute and subacute infective endocarditis	I33.0

Other specified peripheral vascular diseases	I73.8
Peripheral vascular disease, unspecified	I73.9
Phlebitis and thrombophlebitis of femoral vein	I80.1
Phlebitis and thrombophlebitis of other deep vessels of lower extremities	I80.2
Phlebitis and thrombophlebitis of other sites	I80.8
Cutaneous abscess, furuncle and carbuncle of neck	L02.1
Cutaneous abscess, furuncle and carbuncle of trunk	L02.2
Cutaneous abscess, furuncle and carbuncle of buttock	L02.3
Cutaneous abscess, furuncle and carbuncle of limb	L02.4
Cutaneous abscess, furuncle and carbuncle, unspecified	L02.9
Cellulitis of finger	L03.01
Cellulitis of toe	L03.02
Cellulitis of upper limb	L03.10
Cellulitis of lower limb	L03.11
Cellulitis of face	L03.2
Cellulitis of trunk	L03.3

4.2 Emergency Department Data Collection (EDDC), NSW Department of Health

Diagnostic information on persons presenting to the emergency departments of NSW hospitals is coded using the International Classification of Diseases, 9th Revision (ICD-9). This information is recorded at the time of presentation.

This Chapter reported on injection related conditions as per Section 4.1. The ICD-9 codes for these diagnoses are listed in Table 6.

Table 6: ICD-9 Codes for injection related conditions

ICD-9 description	Code
Septicaemia - unspecified septicaemia	038.9
Acute & subacute endocarditis	421.0
Other peripheral vascular disease	443.9
Phlebitis and thrombophlebitis	451.0
Other venous embolism and thrombosis	458.8
Cellulitis and abscess of finger and toe – Finger	681.00
Cellulitis and abscess of finger and toe – Toe	681.10
Other cellulitis and abscess – Face	682.0
Other cellulitis and abscess – Trunk	682.2

Other cellulitis and abscess – Upper arm and forearm	682.3
Other cellulitis and abscess – Hand, except fingers	682.4
Other cellulitis and abscess – Buttock	682.5
Other cellulitis and abscess – Leg except foot	682.6
Other cellulitis and abscess – Foot except toes	682.7
Other cellulitis and abscess – unspecified site	682.9
Other local infections of skin and subcutaneous tissue	686.9
Chronic ulcer of skin – ulcer of lower limb	707.1
Chronic ulcer of skin – unspecified	707.9

4.3 NSW Pharmacy Fitpack Scheme (PFS), NSW Department of Health

A fitpack contains clean injecting equipment such as needles, syringes, swabs and spoons. Fitpacks distributed through NSW pharmacies are subsidised by NSW Health. Details from the pharmacy invoices regarding these purchases are maintained in a database by NSW Health. This information includes the number of one millilitre syringes purchased.

The following indicators were used in this Chapter:

- Number of 1 ml syringes purchased in NSW per quarter.
- Number of 1 ml syringes purchased by drug market per quarter.

Table 7 lists the postcodes and suburbs included in the definition of each drug market.

Table 7: Postcodes and Suburbs in each drug market

Drug market	Postcode	Suburb
Kings Cross	2010	Darlinghurst, East Sydney, Strawberry Hills, Surry Hills, Taylor Square
	2011	Elizabeth Bay, Garden Island, HMAS Kattabul, Kings Cross, Potts Point, Rushcutters Bay, Woolloomooloo
Redfern	2016	Redfern
	2017	Waterloo, Zetland
	2042	Enmore, Macdonaldtown, Newtown
Cabramatta	2165	Fairfield, Fairfield East, Fairfield West, Fairfield Heights
	2166	Cabramatta, Cabramatta West, Canley Heights, Canley Vale, Lansvale, Hollywood
	2170	Warwick Farm, Prestons, Casula, Chipping Norton, Hammondville, Hargrave Park, Liverpool, Liverpool South, Lurnea, Moorebank, Mount Pritchard, The Cross Roads

Area Health Services were mapped to the drug markets as follows:

Kings Cross	South Eastern Sydney Area Health Service
Redfern	Central Sydney Area Health Service
Cabramatta	South Western Sydney Area Health Service

4.4 Needle Syringe Program (NSP), NSW Department of Health

The number of one millilitre syringes distributed through the public NSP are collated by NSW Health each month.

The following indicators were used in this Chapter:

- Number of 1 ml syringes distributed in NSW per quarter.
- Number of 1 ml syringes distributed by Area Health Service per quarter.
- Number of 1 ml syringes distributed by market per quarter.

These indicators were summed with those of the PFS (see 4.3) to provide an aggregate of needle distribution across NSW.

Drug market definitions and AHS used are as per PFS (see 4.3).

4.5 Notifiable Diseases Database (NDD) and HIV/AIDS database, NSW Department of Health

NSW has mandatory reporting of incident cases of hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV). This information is maintained in the NDD and the HIV/AIDS database.

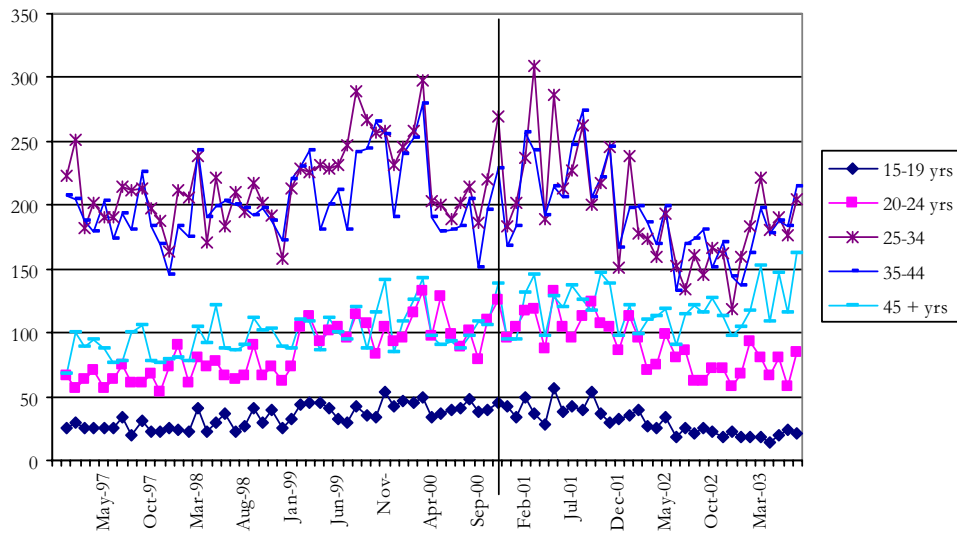
The following indicators were used in this Chapter:

- Number of HCV notifications in NSW per month.
- Number of HCV notifications in NSW by age group per month.
- Number of HBV notifications in NSW per month.
- Number of HBV notifications in NSW by age group per month.
- Number of HIV notifications in NSW per month.

The following graphs were referred to (without documentation) in this Chapter:

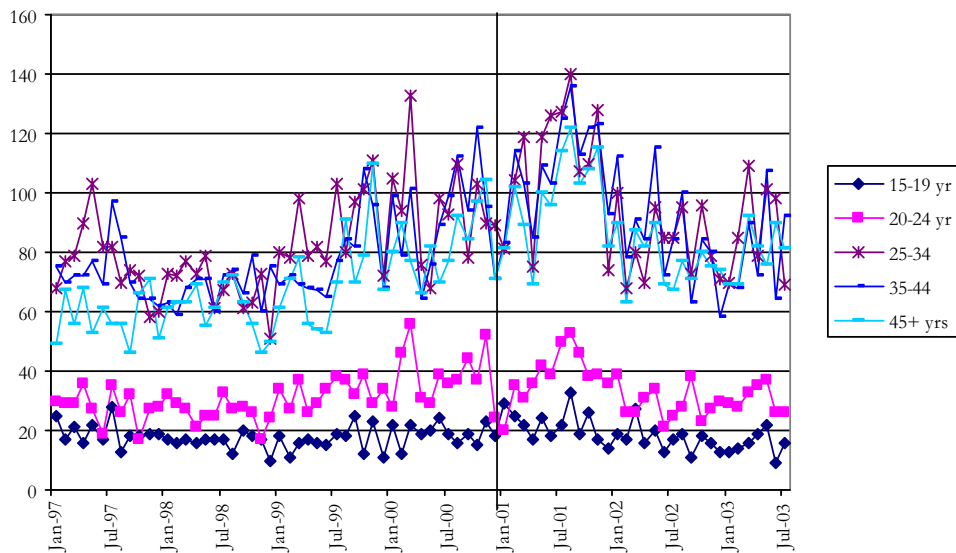
- HCV notifications in NSW – all age groups (Figure 1).
- HBV notifications in NSW – all age groups (Figure 2).

Figure 1: Hepatitis C notifications in NSW, showing all age groups, 1997-2003



Source: NDD and HIV/AIDS databases, Communicable Diseases Branch, NSW Health Department.

Figure 2: Hepatitis B notifications in NSW, showing all age groups, 1997-2003



Source: NDD and HIV/AIDS databases, Communicable Diseases Branch, NSW Health Department.

5. Changes in health effects

5.1 Ambulance Service of NSW database, NSW Department of Health

The NSW Ambulance Service maintains a database on all callouts. Callouts to suspected heroin overdose were defined as cases where the drug protocol was used *and* Narcan was administered.

The following indicators were used in this Chapter:

- Number of callouts to suspected heroin overdoses in NSW.
- Number of callouts to suspected heroin overdoses in NSW by gender.
- Number of callouts to suspected heroin overdoses in NSW by age group.
- Number of callouts to suspected heroin overdoses in NSW by geographic location.

The following indicators were analysed using TSA:

- Number of callouts to suspected heroin overdoses in NSW (TSA 5).

The following graphs were referred to (but not documented) in this Chapter:

- Number of callouts to suspected heroin overdoses in NSW by gender (Figure 3).
- Number of callouts to suspected heroin overdoses in NSW by age group (Figure 4).
- Number of callouts to suspected heroin overdoses in NSW by geographic location (Figure 5).

Drug market definitions used were as per Section 4.3.

TSA 5. Number of ambulance callouts to suspected heroin overdoses in NSW

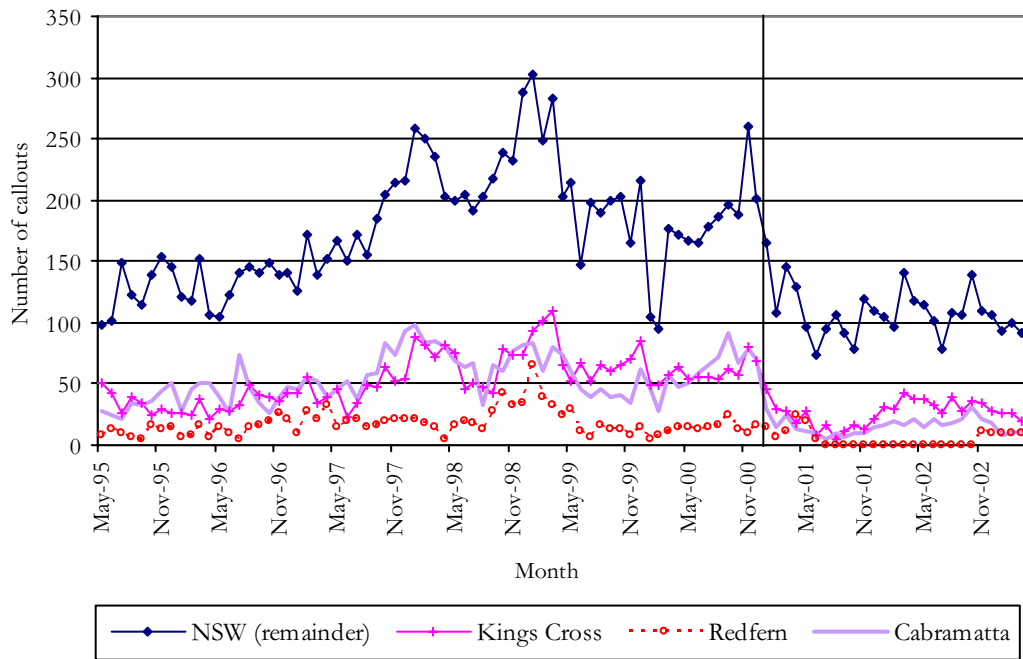
This series was differenced and log-stabilised.

Chosen model: decaying pulse with a decaying step and with one and two month lags respectively. Table 8 shows the parameter estimates for this model.

Table 8. Parameter estimates for intervention ARIMA model TSA 5 – Ambulance callouts (State)

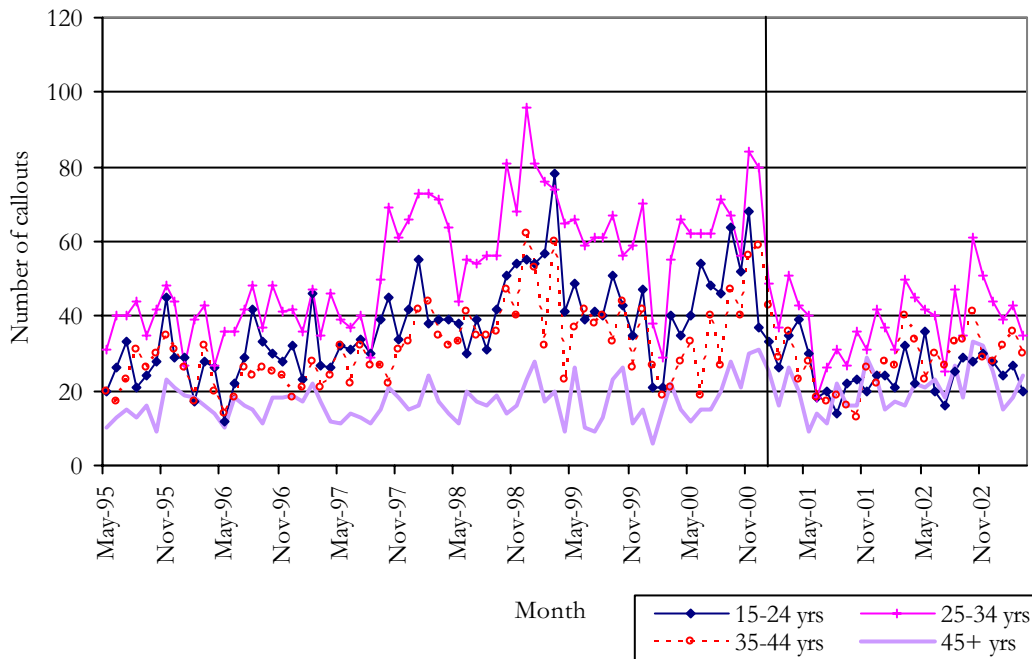
Parameter	Estimate	t-statistic	P value
AR(1)	-0.27	-2.61	0.009
AR(2)	-0.30	-2.92	0.004
Pulse	-0.21	-2.60	0.009
Pulse(decay)	-0.83	9.80	<0.0001
Step	-0.32	-2.28	0.02
Step(decay)	0.68	3.78	0.0002

Figure 3. Number of ambulance callouts to suspected heroin overdoses by gender, NSW 1995-2003



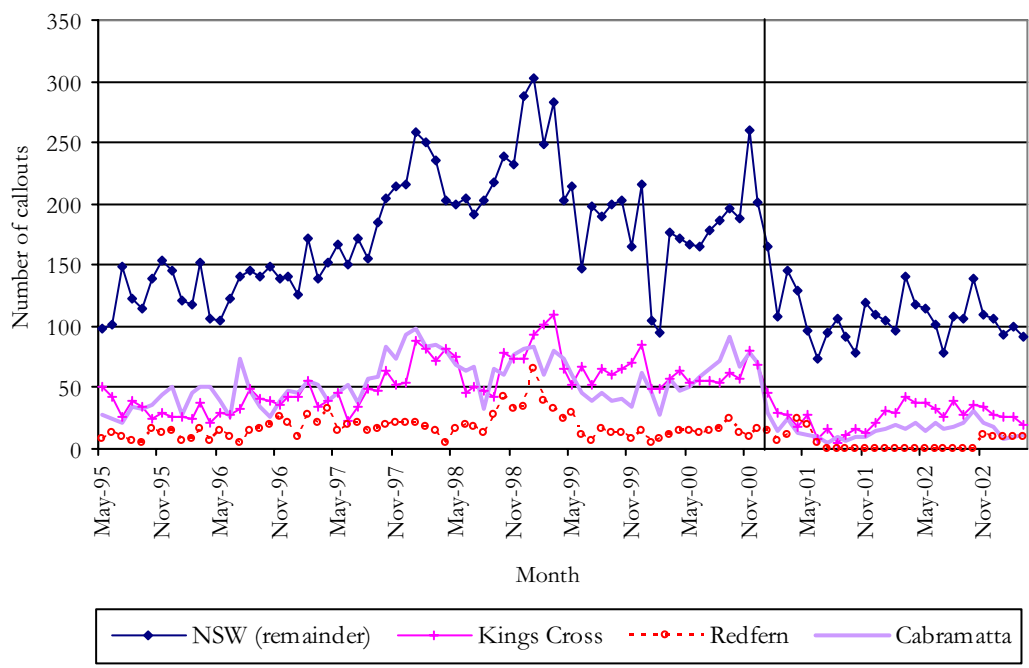
Source: Ambulance Service of NSW.

Figure 4. Number of ambulance callouts to suspected heroin overdoses by age group, NSW 1995-2003



Source: Ambulance Service of NSW.

Figure 5. Number of ambulance callouts to suspected heroin overdoses by geographic location, NSW 1995-2003



Source: Ambulance Service of NSW.

5.2 EDDC, NSW Department of Health

(see 4.2)

Table 9 lists the ICD-9 codes used in the data extraction and the organisation of these codes into diagnosis related groups for the purpose of analysis. Not all of the codes turned up in the data extraction for the time period of interest (January 1997 to April 2003); a tick denotes the presence of the code in the data extract and inclusion in analysis.

The following indicators were used in this Chapter:

- Number of heroin overdose presentations to emergency departments in NSW.
- Number of amphetamine overdose presentations to emergency departments in NSW.
- Number of cocaine overdose presentations to emergency departments in NSW.
- Number of benzodiazepine related presentations to emergency departments in NSW.
- Number of heroin withdrawal/intoxication presentations to emergency departments in NSW.
- Number of drug psychosis related presentations to emergency departments in NSW.

The following indicators were analysed using TSA:

- Number of heroin overdose presentations to emergency departments in NSW (TSA 6).

The following graphs were referred to (but not documented) in this Chapter:

- Number of heroin overdose presentations to NSW emergency departments by gender (Figure 6).
- Number of heroin overdose presentations to NSW emergency departments by age group (Figure 7).
- Number of heroin overdose presentations to NSW emergency departments by geographic location (Figure 8).
- Number of amphetamine overdose presentations to NSW emergency departments by gender (Figure 9).
- Number of amphetamine overdose presentations to NSW emergency departments by age group (Figure 10).
- Number of cocaine overdose presentations to NSW emergency departments by gender (Figure 11).
- Number of cocaine overdose presentations to NSW emergency departments by age group (Figure 12).
- Number of drug related psychosis presentations to NSW emergency departments by gender (Figure 13).
- Number of drug-related psychosis presentations to NSW emergency departments by age group (Figure 14).
- Number of drug related psychosis presentations to NSW emergency departments by geographic location (Figure 15).

Table 9 ICD-9 codes used in the analysis of the Emergency Department Data Collection, NSW Department of Health

Diagnosis Related Group / ICD-9 Description	ICD-9 code	Analysis
<i>Drug Psychosis</i>		
Drug psychoses - drug withdrawal syndrome	292	✓
Drug psychoses - drug-induced delusional syndrome	292.11	
Drug psychoses - drug-induced hallucinosis	292.12	
Drug psychoses - pathological drug intoxication	292.2	
Drug psychoses - drug-induced delirium	292.81	
Drug psychoses - drug-induced dementia	292.82	
Drug psychoses - drug-induced amnesic syndrome	292.83	
Drug psychoses - drug-induced organic affective syndrome	292.84	
Drug psychoses - drug-induced other syndrome	292.89	
Drug psychoses - unspecified drug-induced mental disorder	292.9	✓
<i>Alcohol</i>		
Alcoholic psychoses - alcohol withdrawal delirium	291	✓
Alcoholic psychoses - alcohol amnesia	291.1	
Alcoholic psychoses - other alcohol dementia	291.2	
Alcoholic psychoses - alcohol withdrawal hallucinosis	291.3	✓
Alcoholic psychoses - idiosyncratic alcohol intoxication	291.4	
Alcoholic psychoses - alcohol jealousy	291.5	
Alcoholic psychoses - other unspecified psychoses	291.8	✓
Alcoholic psychoses - unspecified psychoses	291.9	✓
Alcohol dependence syndrome - acute alcoholic intoxication	303.0x (x=0-4)	✓
Alcohol dependence syndrome - other & unspecified alcohol dependence	303.9x (x=0-4)	✓
Non-dependent drug use disorder - alcohol use disorder	305.0x (x=0-3)	
Non-specific findings on examination of blood - excessive blood level of alcohol	790.3	✓
Toxic effect of alcohol	980	✓
Accidental poisoning by alcoholic beverages	E860.0	

<i>Heroin dependence or misuse</i>		
Drug dependence - opioid	304	✓
Drug dependence - combinations of opioid with other drug	304.7	
Non-dependent drug-use disorder - opioid	305.5x (x=0-3)	
<i>Heroin overdose</i>		
Poisoning by analgesics, antipyretics, & antirheumatics - opium	965	✓
Poisoning by analgesics, antipyretics, & antirheumatics - heroin	965.01	
Accidental poisoning by analgesics, antipyretics, & antirheumatics - heroin	E850.0	✓
<i>Methadone overdose</i>		
Poisoning by analgesics, antipyretics, & antirheumatics - methadone	965.02	✓
Accidental poisoning by analgesics, antipyretics, & antirheumatics - methadone	E850.1	✓
<i>Other opioid overdose</i>		
Poisoning by analgesics, antipyretics, & antirheumatics - other (codeine, morphine, pethidine)	965.09	✓
Accidental poisoning by analgesics, antipyretics, & antirheumatics - other opiates & related narcotics (codeine, morphine, pethidine & opium)	E850.2	
Self-inflicted poisoning - analgesics, antipyretics & antirheumatics	E950.0	
Poisoning, undetermined whether accidentally or purposefully inflicted - analgesics, antipyretics & antirheumatics	E980.0	
<i>Cocaine dependence or misuse</i>		
Drug dependence - cocaine	304.2	✓
Non-dependent drug-use disorder - cocaine	305.6x (x=0-3)	✓
<i>Cocaine overdose</i>		
Poisoning by other central nervous system depressants & anaesthetics (cocaine)	968.5	✓
<i>Amphetamine & other psychostimulant dependence or misuse</i>		
Drug dependence - amphetamine & other psychostimulant	304.4	✓
Non-dependent drug-use disorder - amphetamine	305.7x (x=0-3)	
<i>Amphetamine & other psychostimulant overdose</i>		
Poisoning by psychotropic agents - psychostimulants (amphetamine)	969.7	
Accidental poisoning by other psychotropic agents - psychostimulants (amphetamine & caffeine)	E854.2	

Benzodiazepine

Drug dependence - barbiturate & similarly acting sedative	304.1	
Non-dependent drug use disorder - barbiturate & similarly acting sedative	305.4x (x=0-3)	✓
Poisoning by psychotropic agents - benzodiazepine-bas	969.4	✓
<i>Other or unspecified drug</i>		
Drug dependence - cannabis	304.3	✓
Non-dependent drug use disorder - cannabis	305.2x (x=0-3)	✓
Drug dependence - hallucinogen	304.5	
Non-dependent drug use disorder - hallucinogen	305.3x (x=0-3)	✓
Drug dependence NEC	304.6	
Drug dependence - combinations of drugs excluding opioid	304.8	
Drug dependence - unspecified	304.9	✓
Non-dependent drug use disorder - other, mixed or unspecified	305.9x (x=0-3)	✓
Poisoning by psychotropic agents - psychodysleptics	969.6	✓

TSA 6. Heroin overdose presentations to NSW emergency departments

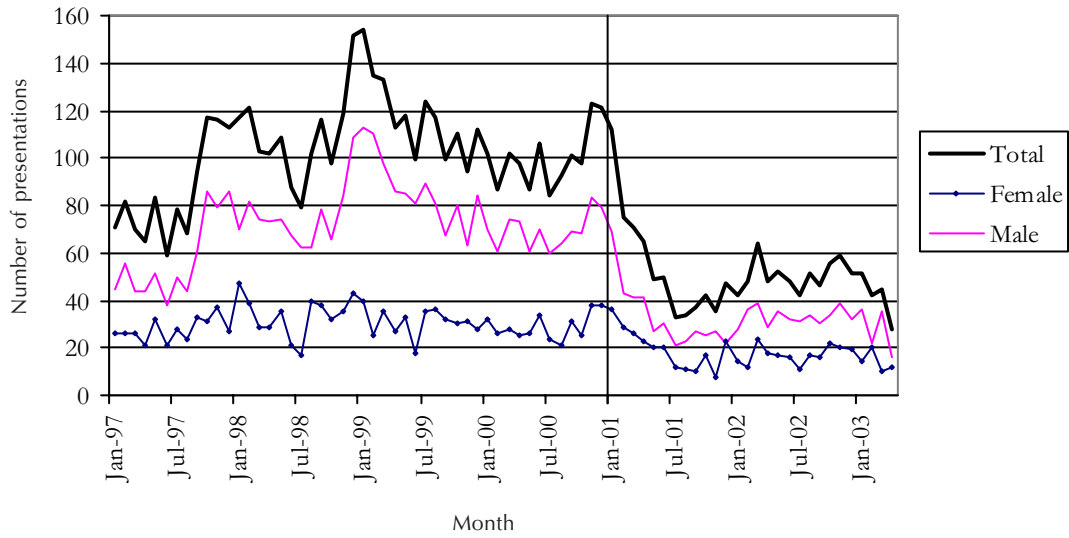
This series was differenced.

Chosen model: basic step with a one month lag. Table 10 lists the parameter estimates for this model.

Table 10: Parameter estimates for intervention ARIMA model TSA 6 – EDDC heroin overdose presentations

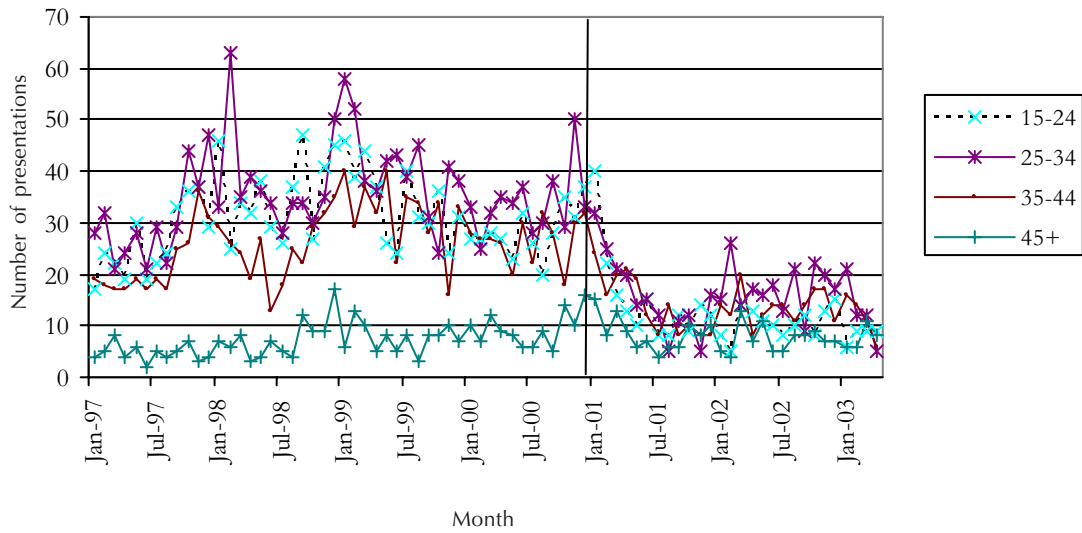
Parameter	Estimate	t-statistic	p-value
Step	-41.08	-3.24	<0.0001
MA(1)	0.28	2.43	0.02

Figure 6: Heroin overdose presentations to NSW emergency departments by gender, 1997-2003



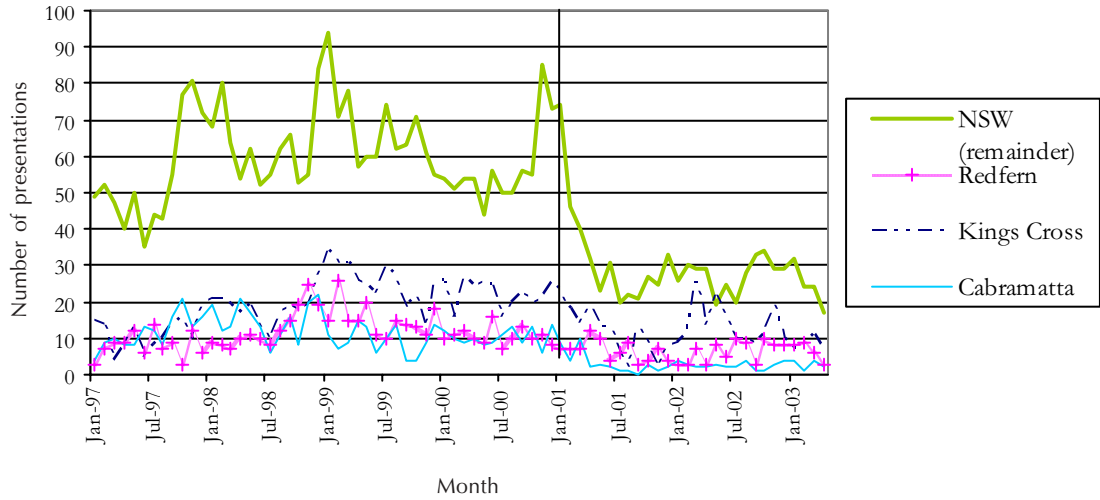
Source: Emergency Department Data Collection, NSW Department of Health.

Figure 7: Heroin overdose presentations to NSW emergency departments by age, 1997-2003



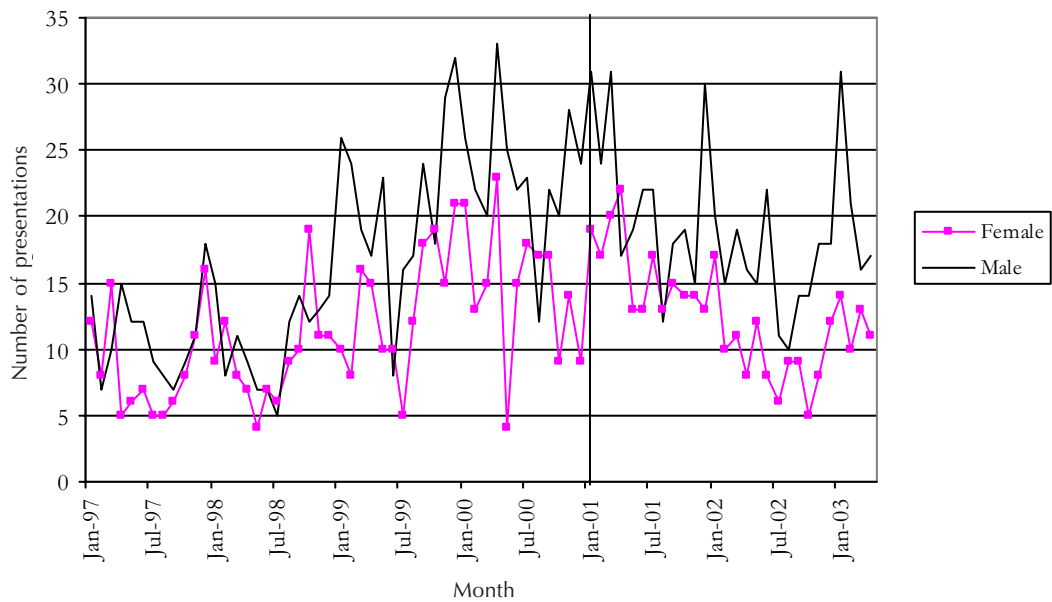
Source: Emergency Department Data Collection, NSW Department of Health.

Figure 8: Heroin overdose presentations to NSW emergency departments by geographic area, 1997-2003



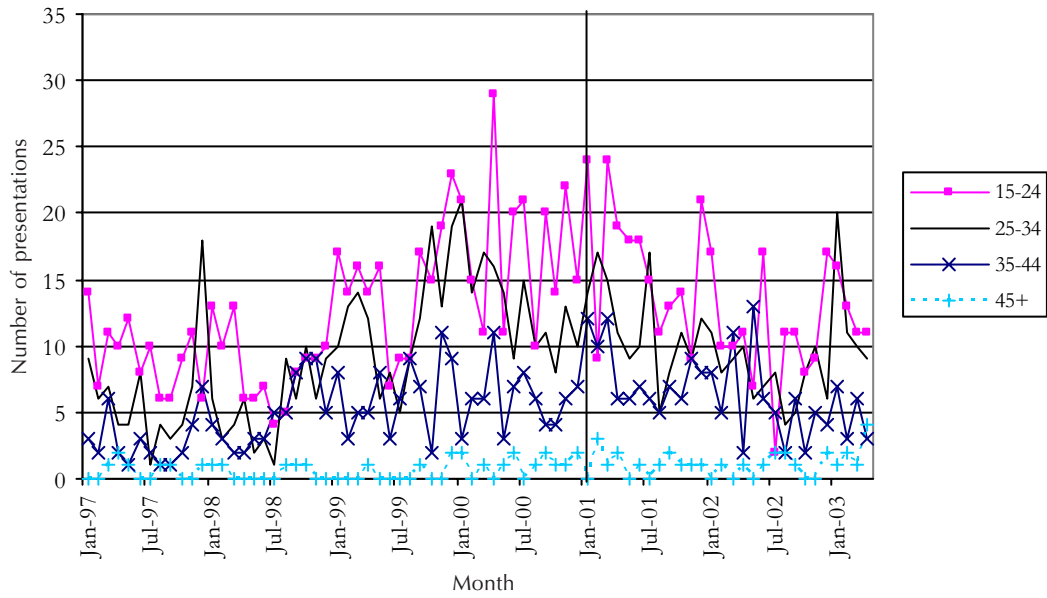
Source: Emergency Department Data Collection, NSW Department of Health.

Figure 9: Amphetamine related presentations to NSW emergency departments by gender, 1997-2003



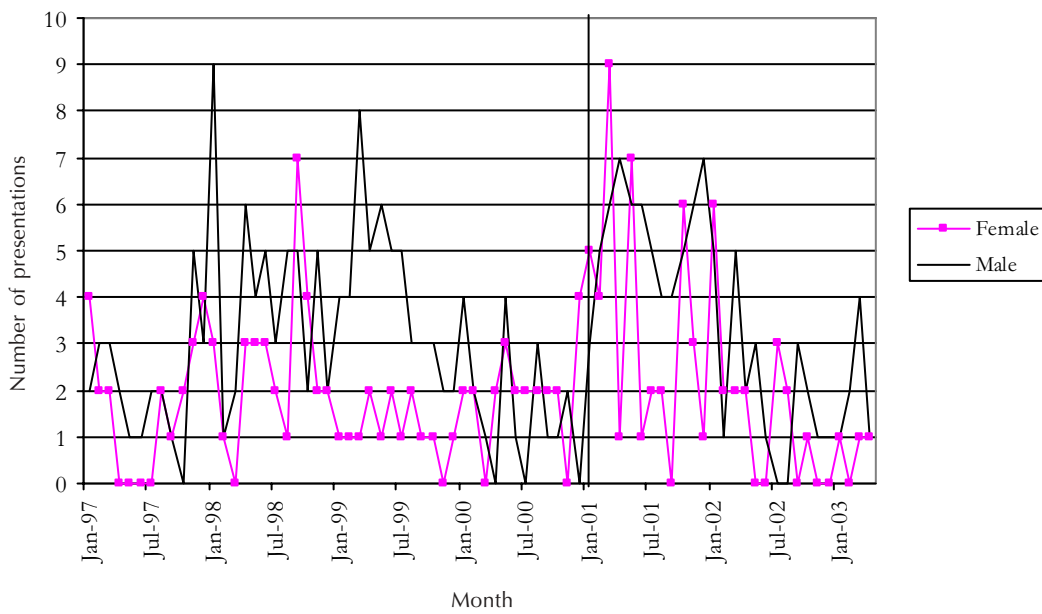
Source: Emergency Department Data Collection, NSW Department of Health.

Figure 10: Amphetamine related presentations to NSW emergency departments by age group, 1997-2003



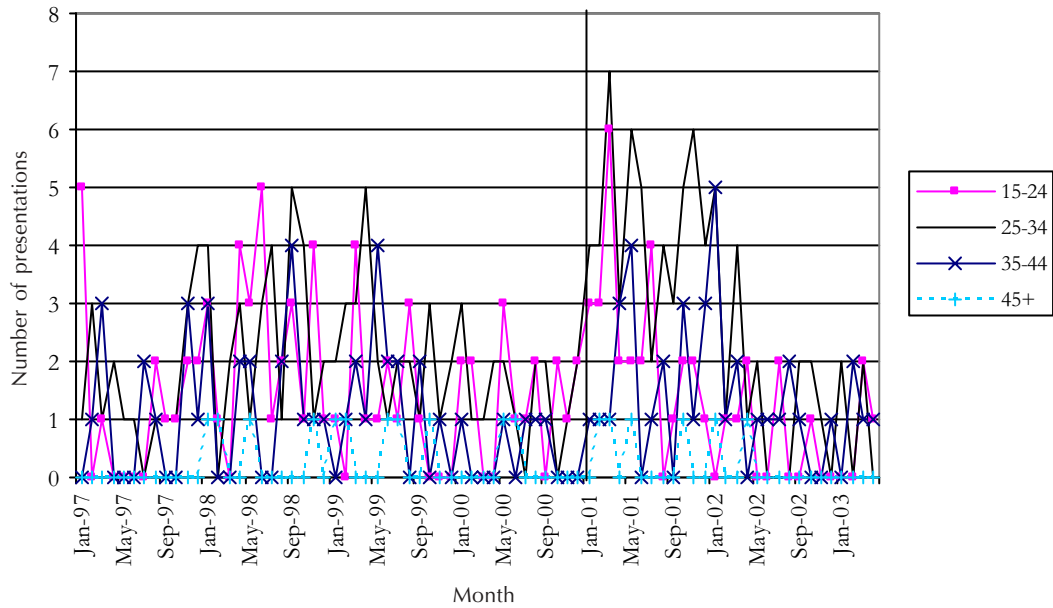
Source: Emergency Department Data Collection, NSW Department of Health.

Figure 11: Cocaine related presentations to NSW emergency departments by gender, 1997-2003



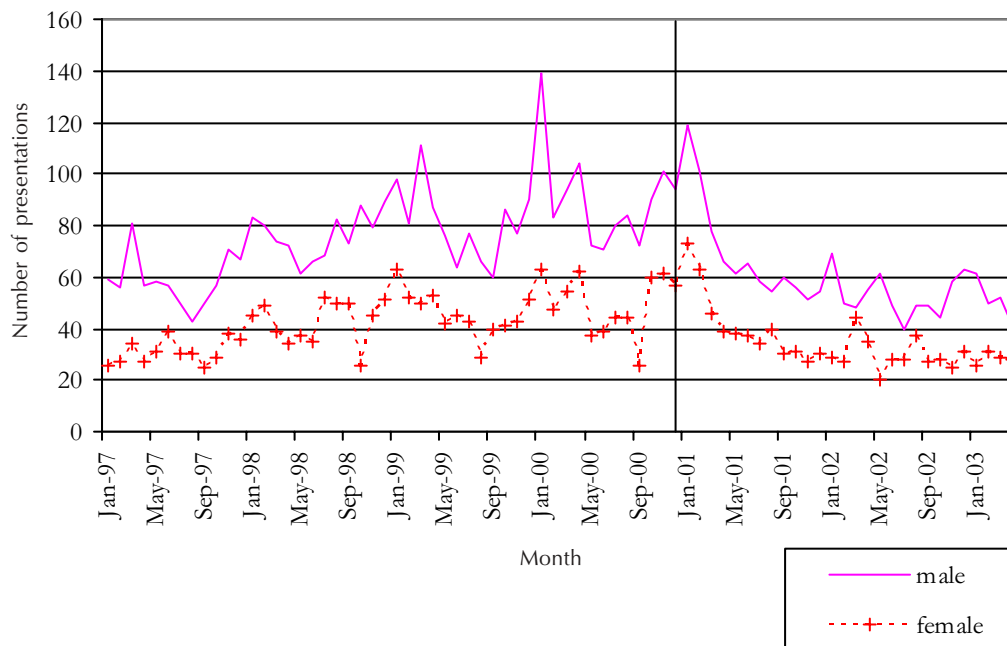
Source: Emergency Department Data Collection, NSW Department of Health.

Figure 12: Cocaine related presentations to NSW emergency departments by age group, 1997-2003



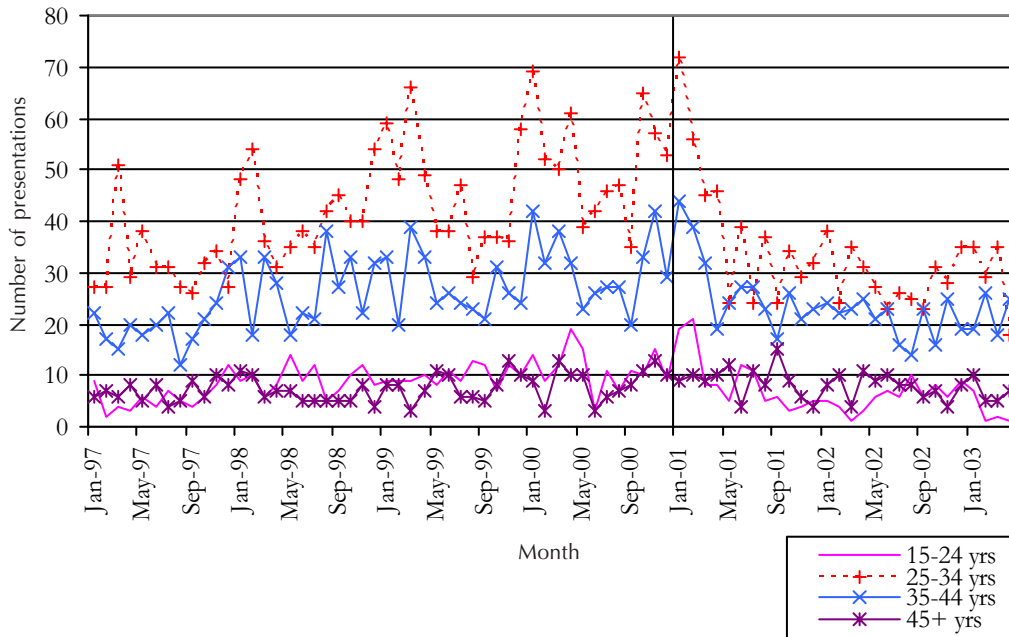
Source: Emergency Department Data Collection, NSW Department of Health.

Figure 13. Number of drug related psychosis presentations to NSW emergency departments by gender, 1997-2003



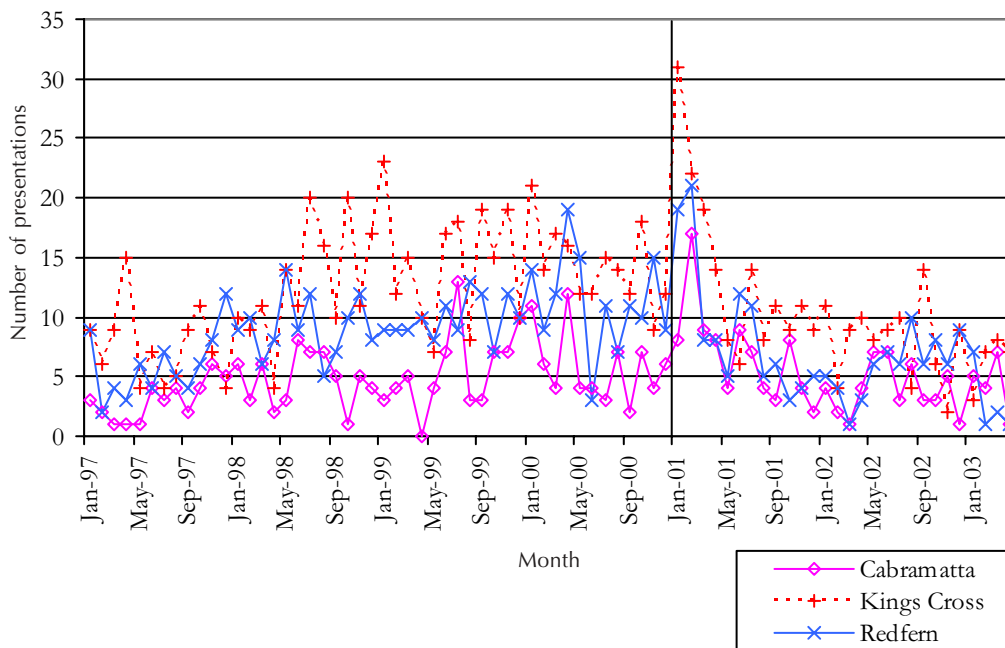
Source: Emergency Department Data Collection, NSW Department of Health.

Figure 14. Number of drug related psychosis presentations to NSW emergency departments by age group, 1997-2003



Source: Emergency Department Data Collection, NSW Department of Health.

Figure 15. Number of drug related psychosis presentations to NSW emergency departments by geographic location, 1997-2003



Source: Emergency Department Data Collection, NSW Department of Health.

5.3 DAL toxicology data, NSW Department of Health

DAL records drug toxicology data from post-mortem analyses on cases of suspicious death or where the person is a known drug taker.

The following indicators were used in this Chapter:

- Number of drug related deaths in NSW.
- Number of drug related deaths in NSW by drug combination.
- Number of drug related deaths in NSW by gender.
- Number of drug related deaths in NSW by age group.

The following indicators were analysed using TSA:

- Number of drug related deaths in NSW (TSA 7).
- Number of drug related deaths in NSW by age group (TSA 7).

Tables 11 and 12 list the definition of drug classes and drug categories used in the analysis of this dataset.

Table 11. Definition of drugs (broad category) – DAL toxicology data on cases of suspicious death or known drug taker

Drug – Broad Category	Drugs included
Methadone:	Methadone only
Cannabis:	Delta-9-THC or Cannabinoids
Methamphetamines:	Amphetamine, Methamphetamine or p-Methoxyamphetamine (NB: Methamphetamine and amphetamine tend to be interconverted in the body. Allan Hodder recommends coding them all as methamphetamine 19/9/03)
Alcohol:	Alcohol
Cocaine:	Cocaine or Benzoyllecgonine
Morphine/Codeine:	Morphine or codeine
Benzodiazepines:	Any word ending with “zepam” or Benzodiazepines
Antidepressants:	Amitriptyline, Citalopram, Dothiepin, Doxepin, Fluoxetine, Fluvoxamine, Imipramine, Mianserin, Mirtazapine Moclobemide, Nortriptyline, Paroxetine, Sertraline, Trimipramine, or Venlafaxine
Other opioids:	Dextromoramide, Dextropropoxyphene, Fentanyl, Opiates, Oxycodone, Pethidine, or Tramadol
GHB:	Gamma-Hydroxybutyrate
Ketamine:	Ketamine
Other Stimulants:	Ephedrine, Pseudoephedrine
Ecstasy:	MDMA
Viagra:	Sildenafil
Nodrug:	if all fields have 0 characters
Other:	if all the above categories are not met.

Table 12. Classification of DAL toxicology results based on the drug categories in Table 11

Variable	Definitions included (must be true)	Definitions excluded (must be false)
Heroin only	Morphine/Codeine	Other opioids, Benzos, Methadone, Alcohol, Cocaine, Methamphets, Stimulants
Heroin and Benzos	Morphine/Codeine, benzos	Other opioids, methadone, alcohol, cocaine, Methamphets, Stimulants
Heroin and ATS	Morphine/Codeine, (cocaine alcohol and/or Methamphets and/or Stimulants)	Benzos, methadone,
Heroin and alcohol	Morphine/Codeine, alcohol	Other opioids, benzos, methadone, cocaine, methamphets, stimulants
Heroin, benzos, alcohol	Morphine/Codeine, benzos, alcohol	Other opioids, methadone, cocaine, methamphet, stimulants
Heroin and CNS depressants	Morphine/Codeine and (alcohol, benzos and/or methadone)	Cocaine, Methamphets, stimulants, [h-only, h-benz, h-alc, h-benalc codes]
Methadone only or with Benzos	Benzos and Methadone or methadone only	Morphine/Codeine, other opiates, alcohol, cocaine, methamphets, stimulants
Other combinations, no categories, heroin	Morphine/Codeine	All above
Other combinations with opiates	Morphine/Codeine	All above categories

TSA 7. Number of drug related deaths in NSW

The time series for this data were analysed using natural spline smoothers. An overall model was fitted for the data, and individual models tested for each of the age groups in turn. These models included a term for a serially correlated latent process and were estimated as observation-driven models.

If no evidence was found for a simple auto-correlation structure in the latent process for the overall model and the models for individual age groups, the data was fitted with a standard generalised linear model, using natural splines. The overall and age group sub-series were tested for different numbers of knot-points.

If the auto-correlation structure and knot-point parameters were found to be identical across all series, a single model was developed which included age group as a parameter, the step due to the heroin shortage, and an interaction term for age group and step.

No evidence was found of an auto-correlated latent process in this time series, either overall or in the individual age categories. Parameter estimates from the simple general linear model (with interaction term) are shown in Table 13.

Table 13. Parameter estimates for linear model TSA 7 – drug related deaths

Parameter	Estimate	T statistic	P value
Intercept	0.35	2.88	0.002
Spline1	1.07	10.16	<0.0001
Spline2	-0.28	-2.07	0.02
Spline3	-0.55	-1.93	0.03
Spline4	-0.10	-0.44	0.3
Step	0.06	0.24	0.41
Age			
15 – 24 years	1.21	12.01	<0.0001
25 – 34 years	1.81	19.05	<0.0001
35 – 44 years	1.46	14.86	<0.0001
45+ years	Ref	Ref	<0.0001
Interaction (step * age)			
15 – 24 years	-1.06	-4.07	<0.0001
25 – 34 years	-0.49	-2.24	0.01
35 – 44 years	-0.55	-2.40	0.008

The step associated with the heroin shortage was not statistically significant, but in the presence of the interaction terms this step term can be interpreted as the effect of the heroin shortage on overdose deaths amongst those aged over 45 (a non-significant effect). Since this term is non-significant, the interaction terms for step and age group can then be interpreted as the change in number of deaths in the other age groups due to the heroin shortage. Table 14 shows the relative changes for each of these age groups.

Table 14. Parameter estimates for TSA 7 – drug related deaths by age group

Age group	Relative change (decrease in level)
15 – 24 years	65%
25 – 34 years	39%
35 – 44 years	42%

5.4 ISC, NSW Department of Health

(see 4.1)

The following indicators were used in this Chapter:

- Number of drug psychosis related hospital separations in NSW.
- Number of hospital separations in NSW for pregnant women where drug and alcohol problems were coded as complicating the pregnancy.

The codes included in the definitions of these indicators are listed in Table 15.

Table 15 ICD-10 codes used in the analysis of the ISC, NSW Department of Health

Diagnosis related groups / ICD_10 description	code
<i>Maternal drug related conditions</i>	
Maternal care for (suspected) damage to foetus from alcohol	035.4
Maternal care for damage to foetus by drugs	035.5
Mental disorders and diseases of the nervous system complicating pregnancy, childbirth & the puererium (includes alcoholism, dependence etc)	099.3
<i>Psycho-stimulant psychosis</i>	
Mental & behavioural disorders – cocaine psychotic disorder	F14.5
Mental & behavioural disorders – cocaine residual & late onset psychotic disorder	F14.7
Mental & behavioural disorders – other stimulants psychotic disorder	F15.5
Mental & behavioural disorders – other stimulants residual & late onset psychotic disorder	F15.7
<i>Other drug psychosis</i>	
Mental & behavioural disorders – opioid psychotic disorder	F11.5
Mental & behavioural disorders – opioid residual & late onset psychotic disorder	F11.7
Mental & behavioural disorders – cannabinoid psychotic disorder	F12.5
Mental & behavioural disorders – cannabinoid residual & late onset psychotic disorder	F12.7
Mental & behavioural disorders – sedatives or hypnotics psychotic disorder	F13.5
Mental & behavioural disorders – sedatives or hypnotics residual & late onset psychotic disorder	F13.7
Mental & behavioural disorders – hallucinogen psychotic disorder	F16.5
Mental & behavioural disorders – hallucinogen residual & late onset psychotic disorder	F16.7
Mental & behavioural disorders – multiple drug use & use of other psychoactive substances psychotic disorder	F19.5
Mental & behavioural disorders – multiple drug use & other psychoactive substances residual & late onset psychotic disorder	F19.7

6. Changes in treatment

6.1 Pharmaceutical Services Branch (PSB) client database, NSW Department of Health

(see 1.2)

The following indicators were used in this Chapter:

- Number of pharmacotherapy registrations in NSW.
- Number of re-registrations for pharmacotherapy in NSW.
- Number of new registrations for pharmacotherapy in NSW.
- Number of new registrations for pharmacotherapy in NSW by gender.
- Number of new registrations for pharmacotherapy in NSW by age group.
- Number of new registrations for pharmacotherapy in NSW by geographic location.
- Proportion of clients registering for treatment (new and repeat) who did not commence treatment.
- Proportion of clients registering for treatment (new and repeat) who ceased to attend.
- Proportion of clients registering for treatment (new and repeat) who cease treatment within one month.

The following indicators were analysed using TSA:

- Number of new registrations for pharmacotherapy in NSW (TSA 8).
- Number of new registrations for pharmacotherapy in NSW by gender (TSA 9).
- Number of new registrations for pharmacotherapy in NSW by age group (TSA 10).

The following graphs were referred to (but not documented) in this Chapter:

- Number of new registrations for pharmacotherapy in NSW by geographic location (Figure 16).
- Proportion of clients registering for treatment (new) who ceased to attend (Figure 17).

TSA 8 Number of new registrations for pharmacotherapy in NSW

This series was not differenced.

Chosen model: step with a two month lag. The parameter estimates for this model are shown in Table 16.

Table 16. Parameter estimates for intervention ARIMA model TSA 8 – pharmacotherapy new registrations

	Parameter estimate	T-statistic	P value
Constant	232.75	23.30	<0.0001
Step	-68.96	-5.09	<0.0001
AR(1)	0.54	5.35	<0.0001
AR(12)	0.31	2.46	0.01

TSA 9. Number of new registrations for pharmacotherapy in NSW by gender

These series were not differenced.

Chosen model: step with a two month lag. The parameter estimates for this model are shown in Table 17 (males) and Table 18 (females).

Table 17. Parameter estimates for intervention ARIMA model TSA 9 – pharmacotherapy registrations (males)

	Parameter estimate	T-statistic	P value
Constant	152.84	34.37	<0.0001
Numerator 1	-38.66	-5.39	<0.0001
AR(1)	0.39	3.58	0.0003

Table 18. Parameter estimates for intervention ARIMA model TSA 9 – pharmacotherapy registrations (females)

	Parameter estimate	T-statistic	P value
Constant	76.47	46.00	<0.0001
Step	-20.16	-7.36	<0.0001

TSA 10. Number of new registrations for pharmacotherapy in NSW by age group

These series were differenced.

Chosen models:

15-24 year age group: pulse with step with two month and twelve month lags. The parameter estimates for this model are shown in Table 19.

25-34 year age group: step with one month lag. The parameter estimates for this are shown in Table 20.

35-44 year age group: step with two month lag. Not significant.

45+ year age group: step with two month lag. Not significant.

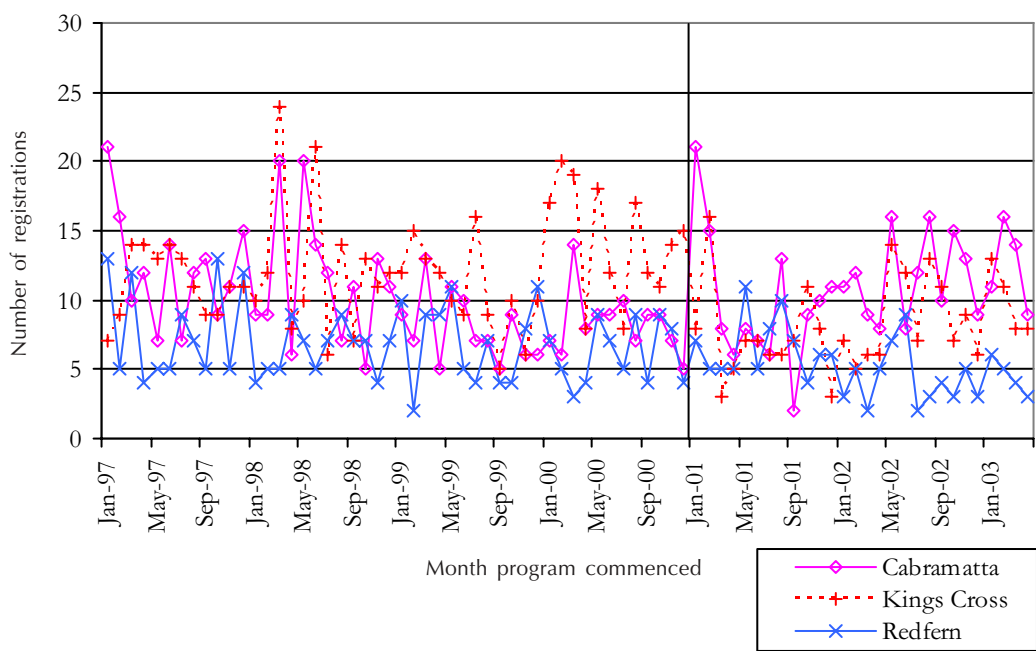
Table 19. Parameter estimates for intervention ARIMA model TSA 10 – new pharmacotherapy registrations (15-24 years)

Parameter	Estimate	t-statistic	P value
MA(1)	0.63	6.78	<0.0001
AR(12)	0.40	3.55	0.0004
Pulse	35.09	2.91	0.004
Step	-62.27	-6.03	<0.0001

Table 20. Parameter estimates for intervention ARIMA model TSA 10 – new pharmacotherapy registrations (25-34 years)

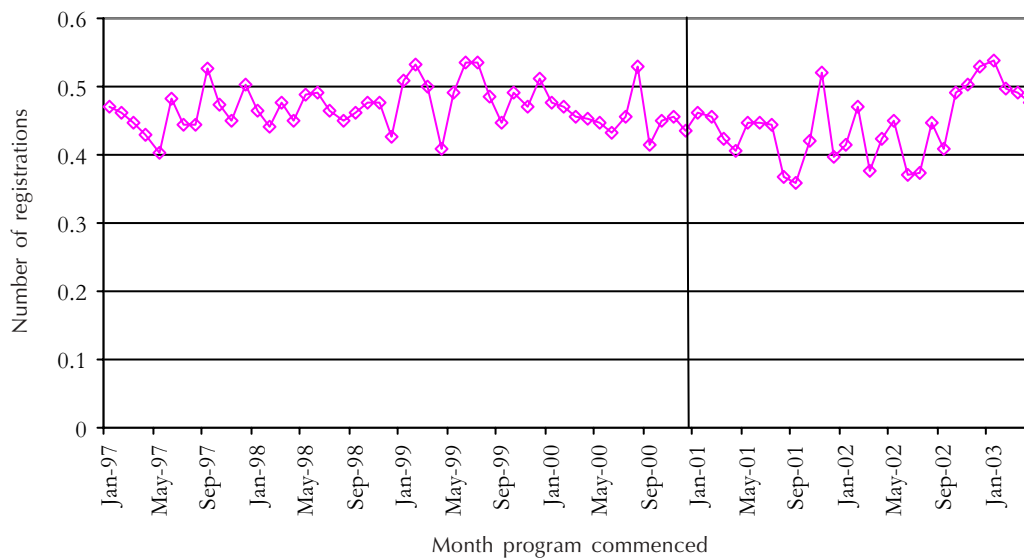
Parameter	Estimate	T statistic	P value
MA(1)	0.74	9.13	<0.0001
Step	-36.99	-4.02	<0.0001

Figure 16. Number of new registrations for pharmacotherapy in NSW by geographic location



Source: Pharmacotherapy Services Branch, NSW Department of Health.

Figure 17. Proportion of clients registering for treatment (new registrations) who ceased to attend



Source: Pharmacotherapy Services Branch, NSW Department of Health.

6.2 National Minimum Data Set for Alcohol and Other Drug Treatment (NMDS-AODT), NSW Department of Health

NSW Health collects information regarding drug treatment in NSW as part of the NMDS-AODT. All Area Health Services except Far West Area Health Service are represented. The information is collected following discharge from treatment so the data does not include people currently in treatment. This data collection commenced in July 2000 (six months prior to the onset of the heroin shortage) therefore TSA was not conducted on indicators drawn from this dataset.

The following indicators were used in this Chapter:

- Number of treatment presentations where heroin is recorded as the primary drug of concern.
- Number of treatment presentations where heroin is recorded as the primary drug of concern by gender.
- Number of treatment presentations where heroin is recorded as the primary drug of concern by age group.
- Number of treatment presentations where heroin is recorded as the primary drug of concern by treatment type.
- Proportion of heroin treatment episodes where other drugs were noted as secondary problems by drug type.
- Number of treatment presentations where Amphetamine type stimulants (ATS) were recorded as the primary drug of concern.
- Number of treatment presentations where Amphetamine type stimulants (ATS) were recorded as the primary drug of concern by gender.
- Number of treatment presentations where Amphetamine type stimulants (ATS) were recorded as the primary drug of concern by age group.

- Number of treatment presentations where Amphetamine type stimulants (ATS) were recorded as the primary drug of concern by treatment type.
- Number of treatment presentations where cocaine was recorded as the primary drug of concern.
- Number of treatment presentations where cocaine was recorded as the primary drug of concern by gender.
- Number of treatment presentations where cocaine was recorded as the primary drug of concern by age group.
- Number of treatment presentations where cocaine was recorded as the primary drug of concern by treatment type.
- Number of treatment presentations where benzodiazepines were recorded as the primary drug of concern by treatment type.
- Number of treatment presentations where other drugs were recorded as the primary drug of concern by treatment type.

The following drug definitions apply:

Heroin	heroin
Cocaine	cocaine
ATS	amphetamine, amphetamine NEC*, amphetamines (broad category), ecstasy, dexamphetamine, ephedrine/shabu, methamphetamine, methylphenidate/ritalin, other stimulants/hallucinogens NEC, stimulants/hallucinogens (broad category)
Cannabis	cannabis
Benzodiazepines	alprazolam, benzodiazepines (broad category), benzodiazepines NEC, clonazepam, diazepam, flunitrazepam, nitrazepam, oxazepam, temazepam
Alcohol	alcohol, alcohols (broad category), alcohols NEC, methanol/metho
Other opioid	codeine, morphine, organic opiates (broad category), organic opiates NEC, oxycodone/Endone, paracetamol, pethidine, semi-synthetic opioids (broad category), semi-synthetic opioids NEC, synthetic opioids (broad category), synthetic opioids NEC, pethidine, methadone
Other drug	aliphatic hydrocarbons (broad category), amyl nitrate, anabolic androgenic (broad category), anaesthetics (broad category), aromatic hydrocarbons (broad category), aromatic hydrocarbons NEC, barbiturates NEC, buprenorphine, butane, butyl nitrate, caffeine, diethyltryptamine, diuretics (broad category), ephreda alkaloids (broad category), fentanyl, GHB/GBH/liquid ecstasy, halogenated hydrocarbons NEC, ketamine, lithium, LSD/acid, naltrexone, nicotine, non-opioid analgesics (broad category), non-opioid analgesics NEC, opioid antagonists (broad category), opioid antagonists NEC, other drugs NEC, other sedatives/hypnotics NEC, other volatile solvents NEC, propane, pseudoephedrine/benadryl, sedatives/hypnotics (broad category), sertraline/Zoloft, toluene/glue/paint, tricyclic antidepressants NEC, tryptamines (broad category), volatile nitrates (broad category), volatile nitrates NEC, volatile solvents (broad category).

*NEC = not elsewhere classified

7. Changes in drug crime

7.1 Recorded Crime Database (RCD), NSW Bureau of Crime Statistics and Research (BOCSAR)

NSW Police record all police activity using the Computerised Operational Policing System (COPS). Information from this 'real time' dataset is downloaded at regular intervals by BOCSAR for analysis.

The following indicators were used in this Chapter:

- Incidents of dealing or trafficking illicit drugs by drug type.
- Incidents of heroin possession/use.
- Incidents of heroin possession/use by gender.
- Incidents of heroin possession/use by age group.
- Incidents of heroin possession/use by geographic location.
- Incidents of methamphetamine possession/use.
- Incidents of methamphetamine possession/use by geographic location.
- Incidents of cocaine possession/use.
- Incidents of cocaine possession/use by gender.
- Incidents of cocaine possession/use by geographic area.

The following indicators were analysed using TSA in this Chapter:

- Incidents of cocaine possession/use (TSA 11).

The following graphs were referred to (but not documented) in this Chapter:

- Incidents of methamphetamine possession/use by geographic location.

The drug markets were mapped to Statistical Subdivisions (SSD) as follows:

Table 21. Drug markets, suburbs and SSD

Drug market	SSD	Suburbs
Redfern Kings Cross	Inner Sydney	Botany, Daceyville, Eastlakes, Hillsdale, Mascot, Pagewood, Annandale, Balmain, Balmain East, Birchgrove, Forest Lodge, Glebe, Leichhardt, Lilyfield, Rozelle, Dulwich Hill, Enmore, Lewisham, Marrickville, Petersham, St Peters, Stanmore, Sydenham, Tempe, Alexandria, Beaconsfield, Camperdown, Centennial Park, Chippendale, Darlinghurst, Darlington, Elizabeth Bay, Erskineville, Newtown, Potts Point, Redfern, Rosebery, Rushcutters Bay, Surry Hills, Waterloo, Woolloomooloo, Zetland, Dawes Point, Millers Point, Sydney, The Rocks, Haymarket, Pyrmont, Ultimo
Cabramatta	Fairfield-Liverpool	Abbotsbury, Bonnyrigg, Bonnyrigg Heights, Bossley Park, Cabramatta, Cabramatta West, Canley Heights, Canley Vale, Carramar, Edensor Park, Fairfield, Fairfield East, Fairfield Heights, Fairfield West, Greenfield Park, Lansvale, Mt Pritchard, Old Guildfield, Prairiewood, Smithfield, St Johns Park, Villawood, Wakely, Wetherill Park, Yennora, Ashcroft, Busby, Cartwright, Casula, Cecil Hills, Chipping Norton, Green Valley, Hammondville, Heckenberg, Hichinbrook, Holsworthy, Horningsea Park, Hoxton Park, Liverpool, Lurnea, Miller, Moorebank, Prestons, Sadlier, Voyager Point, Warwick Farm, Wattle Grove, West Hoxton

TSA 11. Incidents of cocaine possession/use

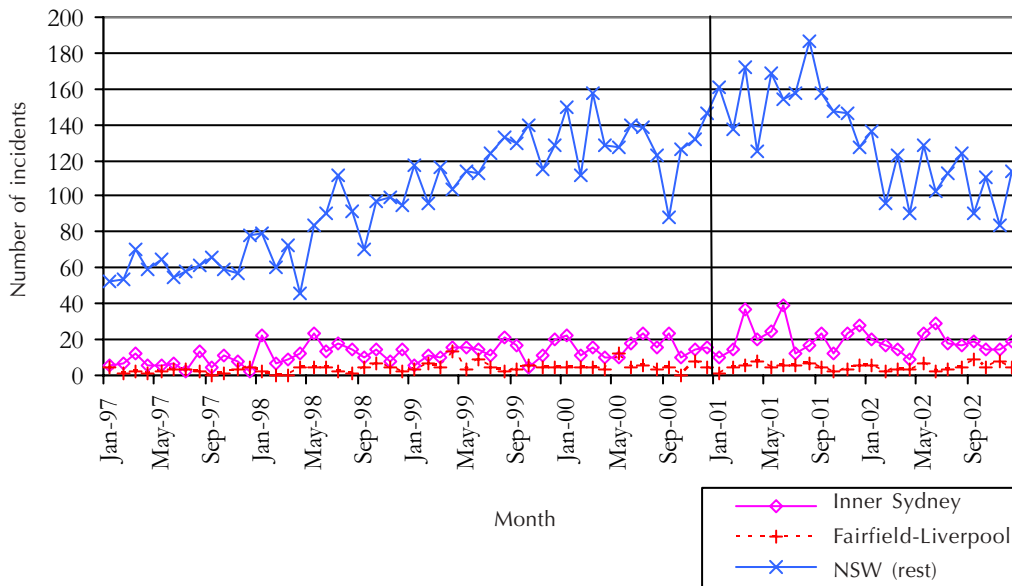
This series was not differenced.

Chosen model: pulse with quadratic denominator transfer function, Table 22.

Table 22: Parameter estimates for intervention ARIMA model TSA 11 – cocaine possession/use

	Parameter estimate	T statistic	P value
Constant	18.00	15.42	<0.0001
Pulse	10.60	4.84	<0.0001
Decay term 1	1.75	33.23	<0.0001
Decay term 2	-0.80	-16.01	<0.0001
AR(1)	0.27	-11.52	<0.0001

Figure 17. Incidents of methamphetamine possession/use by SSD, NSW 1997-2002



Source: NSW Bureau of Crime Statistics and Research.

8. Changes in crime associated with drugs

8.1 RCD, BOCSAR

(see 7.1)

The following indicators were used in this Chapter:

- Robber without a weapon
- Robbery with a weapon not a firearm
- Robbery with a firearm
- Break & enter dwelling
- Break & enter non-dwelling
- Motor vehicle theft
- Steal from person
- Steal from motor vehicle
- Steal from dwelling
- Steal from retail
- Fraud
- Prostitution
- Homicide

- Assault
- Weapons
- Resist/hinder/assault police
- Breach apprehended violence order
- Drive whilst disqualified
- Drive with prescribed content of alcohol

The following indicators were analysed using TSA:

- Robbery without a weapon (TSA 12)
- Break and enter dwelling (TSA 13)
- Prostitution offences (TSA 14)

The following graphs were referred to (but not documented) in this Chapter:

- Robbery without a weapon by SSD (Figure 18)
- Robbery with a weapon not a firearm by SSD (Figure 19)
- Break and enter dwelling by SSD (Figure 20)
- Break and enter non-dwelling by SSD (Figure 21)

The drug markets were mapped to the SSD as per 7.1.

TSA 12. Incidents of robbery without a weapon

This series was not differenced.

Chosen model: decaying pulse with no lag from the heroin shortage.

Table 23. Parameter estimates for intervention ARIMA model TSA 12 – robbery without a weapon

	Parameter estimate	T statistic	P value
Constant	549.47	73.78	<0.0001
Pulse	266.76	7.21	<0.0001
Decay	0.85	26.59	<0.0001

TSA 13. Incidents of break and enter dwelling

This series was differenced.

Chosen model: pulse (no lag).

Table 24. Parameter estimates for intervention ARIMA model TSA 13 – break and enter dwelling

Parameter	Estimate	T statistic	P value
AR(1)	-0.39	-3.29	0.001
AR(12)	0.45	3.74	0.0002
Pulse	969.88	3.78	0.0002

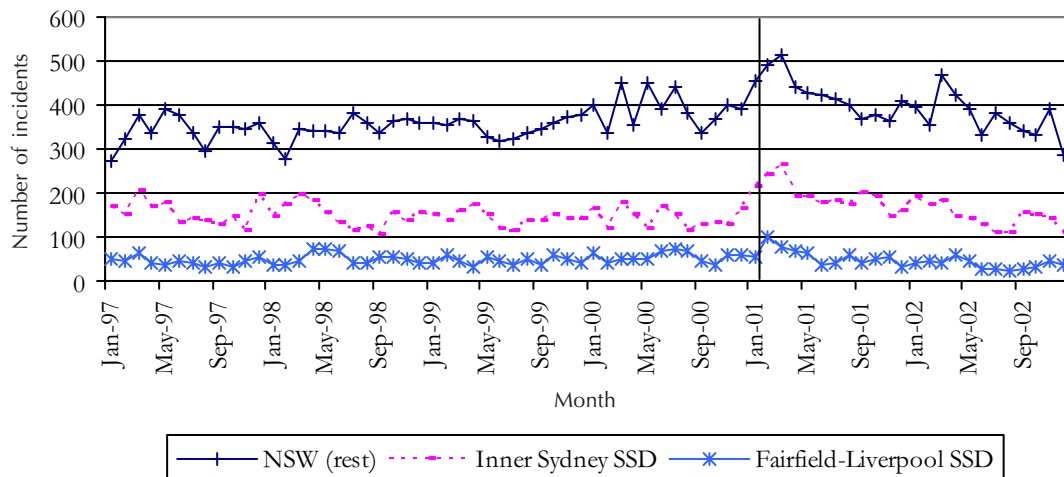
TSA 13. Incidents of prostitution offences

This series was not differenced.

Chosen model: decaying pulse with step with one month lag.

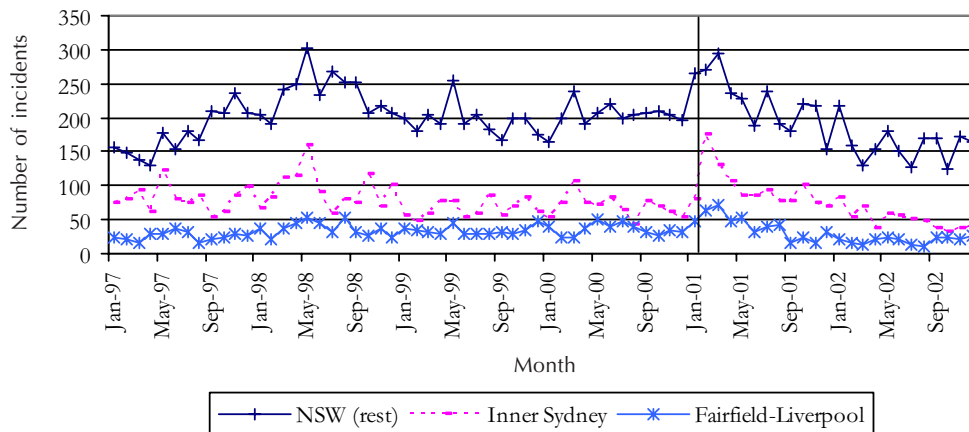
Table 25. Parameter estimates for intervention ARIMA model TSA 14 – prostitution offences

Parameter	estimate	T statistic	P value
Constant	31.50	18.55	<0.0001
AR(1)	-0.28	-2.37	0.02
Pulse	84.12	8.46	<0.0001
Decay	0.79	16.00	<0.0001
Step	15.64	3.25	0.001

Figure 18. Recorded police incidents of robbery without a weapon by SSD, NSW 1997-2002

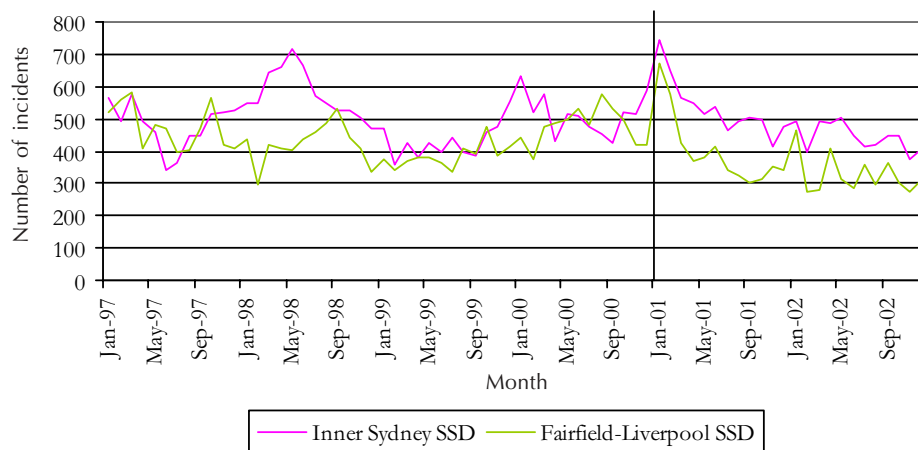
Source: NSW Bureau of Crime Statistics and Research.

Figure 19. Recorded police incidents of robbery with a weapon not a firearm by SSD, NSW 1997-2002



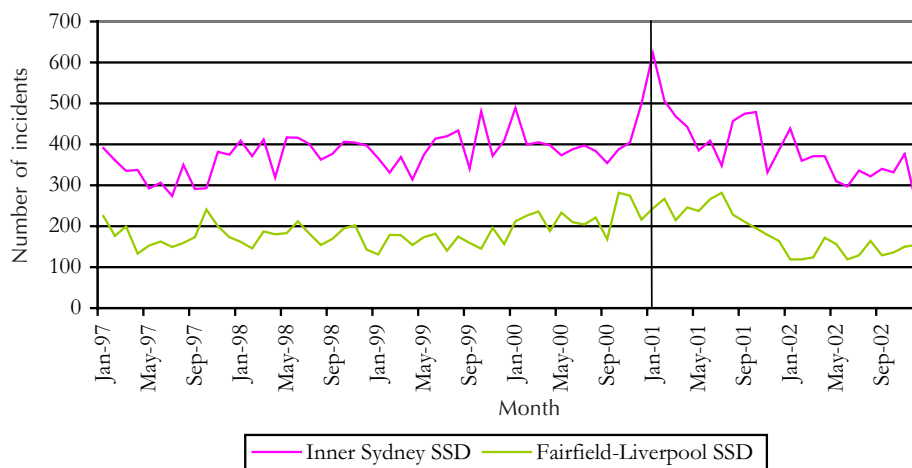
Source: NSW Bureau of Crime Statistics and Research.

Figure 20. Incidents of break and enter dwelling by SSD NSW, 1997-2002



Source: NSW Bureau of Crime Statistics and Research.

Figure 21. Incidents of break & enter non-dwelling by SSD, NSW 1997-2002



Source: NSW Bureau of Crime Statistics and Research.

8.2 Drug Use Monitoring in Australia (DUMA), Australian Institute of Criminology (AIC)

Bankstown and Parramatta are the two NSW sites participating in this national monitoring system. Information is collected over a three week period at the beginning of each quarter. Detained persons are interviewed regarding their drug use and criminal activity and are requested to provide a urine sample. Details regarding the current offence(s) are obtained from police records. Not all persons detained during the recruitment period are interviewed; similarly, not all those interviewed agree to provide a urine sample.

The following indicators were used in this Chapter:

- Proportion of detainees interviewed charged with a violent offence who tested positive to drugs by drug type, Parramatta.
- Proportion of detainees interviewed charged with a violent offence who tested positive to drugs by drug type, Bankstown.

9. Changes in law enforcement operations

No indicator data were used in this Chapter; information was obtained from qualitative interviews with key informants from local, regional and State level commands (see Appendix B).

10. Changes in health agency operations

No indicator data were used in this Chapter; information was obtained from qualitative interviews with key informants from a range of health and community services (see Appendix B).