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The Sydney methamphetamine market: Patterns of supply, use, personal harms and social consequences

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The Sydney methamphetamine market: Patterns of supply, use, personal harms and social consequences

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List of abbreviations

ABS	Australian Bureau of Statistics
ACC	Australian Crime Commission
ACT	Australian Capital Territory
ATS	Amphetamine-type stimulants
BPRS	Brief Psychiatric Rating Scale
DIS-III-R	Diagnostic Interview Schedule Version Three – Revised
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders Version Four - Technical Revision
DUMA	Drug Use Monitoring in Australia
GHB	Gamma-hydroxybutyrate
HIV	Human Immunodeficiency Virus
ICD-9	International Classification of Diseases Version 9
ICD-10	International Classification of Diseases Version 10
IDRS	Illicit Drug Reporting System
LSD	Lysergic acid diethylamide
MDA	3,4-Methylenedioxyamphetamine
MDMA	3,4-Methylenedioxymethamphetamine
NDARC	National Drug and Alcohol Research Centre
NDLERF	National Drug Law Enforcement Research Fund
NT	Northern Territory
NSW	New South Wales
OMCG	Outlaw Motor Cycle Gang
OTI	Opiate Treatment Index
P2P	Phenyl-2-propanone
PDI	Party Drugs Initiative
QLD	Queensland
SA	South Australia
SDS	Severity of Dependence Scale
SF-12	12-Item Short-Form Health Survey
SPSS	Statistical Package for the Social Sciences
SSD	Statistical Subdivision
TAS	Tasmania
VIC	Victoria
WA	Western Australia

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Executive summary

Background

The methamphetamine market in Australia has undergone radical changes since the late 1990s with the emergence of new, more pure forms of base and ice. The current research was undertaken to fulfil a need to understand the impact of base and ice on the methamphetamine market, and the health and social consequences associated with these more pure forms of methamphetamine. The research was funded by the National Drug Law Enforcement Research Fund (NDLERF) and was implemented by the National Drug and Alcohol Research Centre, University of New South Wales, in collaboration with the Australian Customs Service and the New South Wales Police. The specific objectives of the research were to:

1. clarify the relationship between the physical forms of methamphetamine and the terminology used to describe these different forms of the drug;
2. estimate the demand for the more potent forms of base and ice methamphetamine;
3. document the nature of methamphetamine supply;
4. describe the characteristics of methamphetamine users, methamphetamine use patterns and the social and health problems associated with methamphetamine use;
5. examine the relationship between methamphetamine use and criminal activity;
6. describe and estimate the prevalence of psychiatric sequelae associated with methamphetamine (i.e., psychosis and aggressive or violent behaviour);
7. examine the occupational health and safety implications of the above psychiatric sequelae for frontline workers (i.e., police, ambulance officers and emergency department staff); and to
8. determine the utility of the various methodologies employed in the project for investigating the methamphetamine market.

Methodology

The research used a range of different methods to understand the nature of the methamphetamine market in Sydney and address the specific objectives of the project. These methods included:

- semi-structured interviews with 54 health and law enforcement professionals;
- a face-to-face survey of 310 regular methamphetamine users from the Sydney metropolitan region, which included interviews with 55 regular methamphetamine dealers;
- in-depth interviews with 13 methamphetamine dealers;
- in-depth interviews with 31 frontline workers (police, ambulance and emergency personnel);
- a manual review of 2905 emergency department records at an inner Sydney hospital;
- analysis of forensic data on the purity and physical appearance of methamphetamine seizures in Victoria from 1997 to 2002; and
- analysis of other relevant routine data sources.

The geographic focus of the research was Sydney, although information on interstate, national or regional methamphetamine trends was also sought, where relevant, to contextualise the supply side of the Sydney methamphetamine market. Participants in the survey of methamphetamine users and dealers were recruited from across Sydney through advertisements in a variety of publications and through Needle and Syringe Programs. The only inclusion criteria for the survey was being at least 16 years of age and having used methamphetamine at least monthly in the past year.

Key findings

Methamphetamine: Physical forms, purity and terminology

Base methamphetamine was found to be twice the average purity of powder (21% vs. 10%), and ranged in colour from white to yellow or brown. The term '*base*' in Sydney appeared to be synonymous with un-cut or higher purity methamphetamine, and was best distinguished from powder methamphetamine by its damp or oily appearance rather than its colour.

The majority of methamphetamine seizures that had a crystalline appearance were not high purity ice, but a lower purity crystalline substance (median purity 19%) that often had a yellow or brownish hue. This lower purity crystalline methamphetamine could reflect either '*base*' methamphetamine that had a crystalline appearance or ice that had been cut with crystalline adulterants.

Pure crystalline methamphetamine, or ice, was translucent or white and had a median estimated purity of around 80%, between four and eight times higher than the average purity of other forms of methamphetamine.

Methamphetamine users could clearly distinguish ice from the other forms of methamphetamine, and the street terms '*ice*' and '*crystal meth*' did accurately reflect the use of large translucent crystals of methamphetamine. However, base was very amorphous in its appearance and there were a variety of terms used to describe this wet/damp form of the drug. The term '*speed*' was strongly associated with the use of powder methamphetamine, although it was sometimes used as a generic term to describe any form of methamphetamine.

The terms associated with methamphetamine are likely to differ by geographic region and continue to change over time. This will compromise the comparability of data on methamphetamine trends if only the specific forms of methamphetamine are monitored using their street terms. It is recommended that the various physical forms of methamphetamine be monitored as sub-categories within a broader all-inclusive category of methamphetamine.

A substantial proportion of methamphetamine seizures occur in the form of pills, which typically contained methamphetamine alone or in combination with ketamine. Methamphetamine users did not report taking methamphetamine in pill form. This suggests that pills containing methamphetamine were being sold on the ecstasy market. In support of this proposition, methamphetamine users were aware that a proportion of ecstasy pills they had taken did contain methamphetamine.

Methamphetamine supply in Sydney

Methamphetamine supply in Sydney consists of a confluence of imported crystalline methamphetamine (i.e., ice) and domestically produced base and powder methamphetamine. There was also some evidence of domestic ice manufacture.

Established heroin trafficking networks were involved in ice importation and played a dominant role in the supply of ice within the inner region of Sydney. Outlaw Motor Cycle Gang members were reported to play a key role in the domestic production and distribution of base, and were particularly dominant in western Sydney, but their involvement was not exclusive to this geographic region. Other criminal networks were also involved in distributing the drug within various drug markets (e.g., ecstasy market).

Criminal networks involved in methamphetamine supply had a top-down influence on the market with evidence of 'turf' boundaries at a dealing level. The availability and consumption of base and ice in various regions of Sydney mirrored the involvement of criminal networks supplying these forms of the drug. The distribution of methamphetamine through retail level dealers operated in a similar way to a multi-level marketing scheme, occurring through existing social networks and word-of-mouth.

The regulation of the methamphetamine market occurred primarily through threats of retribution. These threats served to both protect and punish people involved in the methamphetamine trade and occurred both within a given supply network and also between various criminal networks involved in drug supply.

Methamphetamine users did not have detailed knowledge of methamphetamine manufacture and importation but often knew people who had undertaken these activities. This was particularly common for domestic manufacture, with one-third having known someone who had made methamphetamine within the past year. Fourteen per cent of methamphetamine users had been personally involved in activities related to high level methamphetamine supply, such as sourcing of precursors and transporting wholesale quantities of methamphetamine.

Dealing and the retail market for methamphetamine

Dealing methamphetamine was common among regular users of the drug, with almost one in five having sold the drug at least monthly during the past year. Methamphetamine dealers looked remarkably similar in their characteristics to their non-dealing peers.

Methamphetamine dealers started out by selling either cannabis or methamphetamine, and then diversified into selling other drugs to increase their profit as opportunities arose.

The median profit from dealing drugs was \$400 per week – almost double the median legitimate income of dealers. This additional income provided dealers with sufficient funds to pay for their drug use, and in some cases provided an income comparable to a well-salaried job.

Dealing acted as an occupation for some methamphetamine users, being an activity that they undertook daily that kept them busy, socially networked, and provided a stable source of income. Profit was an important incentive to retaining people in drug dealing, and the established networks that dealers had with both drug consumers and suppliers allowed them to re-initiate dealing very easily to obtain an attractive income.

Methamphetamine dealers typically sold a range of methamphetamine forms and other drugs. Drugs were usually sold through social networks and from the dealer's home. Pre-arranged dealing locations and home delivery were also reasonably common. Street dealing of methamphetamine was uncommon and only evident within inner Sydney. Methamphetamine was purchased with cash – purchasing on credit or in exchange for goods was rare.

Points (0.1 grams) of base and ice were the standard purchase units for methamphetamine, representing a typical 'hit'. Base was cheaper than ice (\$40 vs. \$50), and, given that different criminal groups appear to be involved in the supply of ice and base, it is likely that competition in the market between these two forms of the drugs will see further changes in the street level price and purity of methamphetamine. Powder was usually purchased in larger quantities of a half or full gram, but was less popular than base and ice, and its use was more common among younger drug users who preferred to snort methamphetamine.

Base and ice made up over two-thirds of methamphetamine consumption in our sample of regular methamphetamine users from Sydney. Methamphetamine users also showed a strong preference for these more pure forms of the drug. Ice use was concentrated in the inner region of Sydney, and to a lesser extent in the North and Southwest of Sydney. Both powder and base were common across all of Sydney, but base was particularly dominant in Sydney's West. These disparities in the consumption and availability of base and ice partly reflect a higher demand for ice in the inner regions of Sydney, where smoking ice was popular among younger ecstasy users. However, these disparities also reflect the turf boundaries associated with the various criminal groups involved in Sydney's methamphetamine supply.

Methamphetamine use in Sydney

The typical methamphetamine user interviewed in the current study was a young adult who was either on government benefits or employed in a semi-skilled non-specialized occupation. The majority were living in share households, living with their parents, or living alone. They typically earned less than the average young adult in Sydney. Around half would have had little money left to cover their living expenses after paying for their drug use (i.e., less than \$100 per week). One-in-five methamphetamine users derived additional income from illegal activities.

There were three general 'types' of methamphetamine users that could be distinguished within the current study: (1) primary methamphetamine injectors who took methamphetamine once to several times per week, and had high levels of cannabis and alcohol use and sporadic use of other drugs (e.g., cocaine, ecstasy, hallucinogens and benzodiazepines); (2) long-standing injecting heroin users for whom methamphetamine injection was a pattern of polydrug use; and (3) younger non-injecting drug users who took ecstasy and would also snort or swallow powder methamphetamine, or smoke ice.

A 'typical' methamphetamine use occasion consisted of taking a point of ice or base, or half a gram of powder. Methamphetamine users took the drug at home in the company of their friends, partner and/or acquaintances. They would often take the drug before going out to socialize, but many would also take the drug simply to enjoy its effects and would carry on with their usual activities or pastimes. It was uncommon for methamphetamine users to take the drug specifically to work or study.

Almost half of the methamphetamine users surveyed in the current study were dependent on the drug. Dependence was found to be more common among those who injected methamphetamine, used twice or more per week, and among people who used the more pure forms of the drug, particularly ice. The popularity of base and ice is likely to be associated with an increase in the number of dependent methamphetamine users, and a consequent increase in methamphetamine-related problems.

The smoking of ice among young recreational drug users is an important new trend that warrants urgent attention. Smoking is a highly accessible route of methamphetamine administration that provides an instant drug effect with very few immediate deterring side-effects; however, smoking ice has a high dependence liability and has been associated with a range of adverse consequences. The trend toward smoking ice also has the potential to introduce a younger, less drug involved population of people into a more risky pattern of drug use, and increase their risk of becoming dependent on methamphetamine.

Criminal involvement among methamphetamine users

Criminal involvement and consequent contact with the criminal justice system was high among regular methamphetamine users, as with other illicit drug using populations. Almost half had committed an offence in the past month (45%), one quarter had been arrested in the past year (26%), and one third had served a prison sentence during their lifetime. The most common types of crimes committed by methamphetamine users were dealing and property crime.

Methamphetamine users who committed crime were likely to be using methamphetamine frequently, taking the more pure forms of base or ice, and using a range of other drugs. They were also more likely to be younger drug users who had a history of antisocial behaviour (i.e., childhood Conduct Disorder) prior to the onset of their drug use.

Involvement in drug dealing was more strongly related to heavy drug use than to a predisposition to engage in antisocial behaviour (i.e., childhood Conduct Disorder). This finding is likely to reflect that dealing is not viewed as 'deviant' or antisocial within a drug using culture.

Levels of violent crime among methamphetamine users (12% in last year) were comparable to those seen among other populations of psychostimulant and injecting drug users in Sydney. Methamphetamine users who reported committing violent crime were likely to have a predisposition toward antisocial behaviour (i.e., a history of childhood Conduct Disorder). Alcohol use increased the likelihood of violent crime among methamphetamine users.

Almost one-third of methamphetamine users were under the influence of methamphetamine the last time they committed a violent crime. Methamphetamine use was reported to make the person feel more alert, confident and aggressive while undertaking the violent crime.

Health problems and risk behaviour associated with methamphetamine use

Dependence on methamphetamine was the key predictor of poor physical and mental health among users of the drug. Almost half of methamphetamine users suffered impairment in their physical functioning. Poor physical health was more pronounced in older methamphetamine users. Common physical health complaints included sleep disturbances, weight loss, bruxism and cardiovascular complaints such as palpitations.

Poor mental health among methamphetamine users was particularly pronounced, with two-thirds experiencing some degree of mental health disability and one in five suffering severe disability in their mental health functioning. Common psychological problems experienced by methamphetamine users included increased aggression, agitation, depression, poor motivation, impaired concentration and memory, and symptoms of psychosis. Self-reported diagnosis of mental disorders also suggested elevated levels of depressive and psychotic disorders among this population.

Methamphetamine injectors had similar levels of injecting risk behaviour, including needle and syringe sharing, to that reported in other populations of injecting drug users. Almost half had obtained their clean needles from places other than Needle and Syringe Programs (e.g., pharmacies, vending machines or friends), which has implications for the dissemination of HIV prevention information to methamphetamine users.

Dependence on methamphetamine was associated with unprotected sex, although this relationship did not appear to be due to intoxication with methamphetamine, but instead was likely to be due to lifestyle factors associated with dependent drug use or the nature of sexual relationships among dependent methamphetamine users.

Psychosis among methamphetamine users

Rates of psychosis among regular methamphetamine users were 11 times that seen among the general population. Over one in five regular methamphetamine users had experienced a clinically significant symptom of psychosis in the past year, and psychosis was not restricted to those who had a history of mental health disorders.

Symptoms of psychosis tended to be brief, most lasting up to three hours. Very few methamphetamine users who suffered psychosis attended hospital (11%), and those that did were more likely to have more severe long lasting symptoms.

Half of the methamphetamine users that had experienced psychotic symptoms during the past year felt hostile or aggressive at the time, and one quarter of methamphetamine users exhibited overt hostile behaviour while they were psychotic, such as yelling at people, throwing furniture or hitting people.

The impact of methamphetamine psychosis on frontline workers

The degree of hostility exhibited by some methamphetamine users when they became psychotic presented a crisis situation for both police and health workers, who often had to apprehend these people for their own safety and for the safety of bystanders. Methamphetamine psychosis presentations were extremely resource-intensive and posed a severe risk to the safety of the police, ambulance and emergency staff who were required to manage them.

The main occupational health and safety risks associated with the management of psychotic methamphetamine users was the risk of injury while trying to restrain them or being hit by them because of their unruly behaviour. In addition, there was an elevated risk of disease transmission because of the high level of physical contact with the methamphetamine user while attempting to apprehend or treat them.

Conclusion and implications

The Sydney methamphetamine market is supplied by a confluence of imported and domestically produced methamphetamine. These two important supply channels are mirrored in the availability of base and ice within different geographic regions of Sydney. The more pure forms of ice and base now make up over two-thirds of the market for methamphetamine in Sydney, while an additional unknown amount of methamphetamine ends up on the ecstasy market being sold as 'pills'. The diversification of methamphetamine forms introduces a far broader segment of the population into the methamphetamine market. Similarly, because base and ice are associated with increased risk of dependence, their popularity is likely to be associated with an increase in the number of dependent methamphetamine users. The up-take of ice smoking among young recreational drug users is a particular concern, as this pattern of use is associated with high levels of methamphetamine dependence. The likely net effect of these changes will be to increase the breadth of population who are involved in using methamphetamine, and also the number of dependent methamphetamine users, who are likely to place a burden on health services and the criminal justice system.

Dependence on methamphetamine is the key predictor of the major harms associated with the drug's use, including psychosis, poor mental and physical well-being, and HIV risk behaviour. Recent estimates indicate that the scale of dependent methamphetamine use in Sydney and Australia is in excess of that associated with regular heroin use, and in the same league as dependent heroin use during the peak of the heroin problem in the late 1990s (McKetin et al.,

2005). The scale of dependent methamphetamine use not only has important implications in its own right, but also in terms of its potential to translate into other drug use problems, such as dependent heroin use. This phenomenon was seen in the mid 1990s, when an emerging amphetamine epidemic in Australia rapidly shifted to a heroin use problem as many young amphetamine injectors made a transition to injecting heroin use when heroin became cheap and readily available (Darke et al., 1999). For this reason, any initiatives to tackle the methamphetamine problem need to be balanced with a focus on heroin and other potentially problematic patterns of drug use.

Improving treatment coverage for methamphetamine use is essential if the impact of dependent methamphetamine use is to be reduced. Currently there are few, if any, evidenced-based treatment protocols for methamphetamine use (Baker et al., 2004) and treatment coverage for this population is very low (Kelly et al., 2005). This highlights the need to both implement existing protocols for methamphetamine treatment more broadly and undertake further development and evaluation of treatment approaches for psychostimulant use, particularly among people who have mental health problems that may be exacerbated by methamphetamine use.

There is an urgent need to raise public awareness of the problems associated with methamphetamine use, while efforts also need to be directed toward preventing the up-take of high-risk patterns of methamphetamine use, notably smoking and injecting the drug. In particular, efforts need to be urgently directed toward stemming the up-take of ice smoking among young non-injecting drug users, and increasing public awareness of the potential harms associated with this pattern of drug use.

Any further increase in problematic methamphetamine use in Australia is likely to have a disproportionate impact on frontline health and law enforcement services. Appropriate resources need to be directed toward training frontline workers in the identification of methamphetamine psychosis and also toward the development of safety protocols to manage people suffering from methamphetamine psychosis where such protocols do not currently exist.

Introduction

The methamphetamine market in Australia has undergone radical changes since the late 1990s. Throughout the 1990s, methamphetamine, known then mostly as 'speed', was waning in its significance in the face of an emerging heroin epidemic, and the market for the drug had stagnated. Monitoring of the illicit drug market in Sydney, which was initiated in 1996, showed absolutely no sign of movement in the price, purchase units or incredibly low purity of the drug through the mid to late 1990s. It was not until 1999 that the market was re-kindled with the emergence of the new, more potent forms of base and ice methamphetamine (McKetin et al., 2000). Base was thought to be a poorly refined but more pure form of domestically produced methamphetamine, whereas large-scale border detections of ice shortly after its emergence on the street drug market suggested that this form of the drug was mostly imported.

Since 1999 the market for the more pure forms of ice and base methamphetamine has flourished. By 2002, 39% of injecting drug users surveyed by the Illicit Drug Reporting System (IDRS) in Sydney had recently used base, and 25% had recently used ice (Breen et al., 2004a). Use of base and ice had also become common among the party drug scene (Breen et al., 2004b). The popularity of ice in particular continued to climb in 2004 (Figure 1) and there was a high level of ice use among drug users in capital cities around Australia (Table 1, Breen et al., 2004c; Stafford et al., 2004).

Figure 1. The proportion of injecting drug users and party drug users surveyed by the IDRS in Sydney reporting recent use of ice methamphetamine, 1999-2004

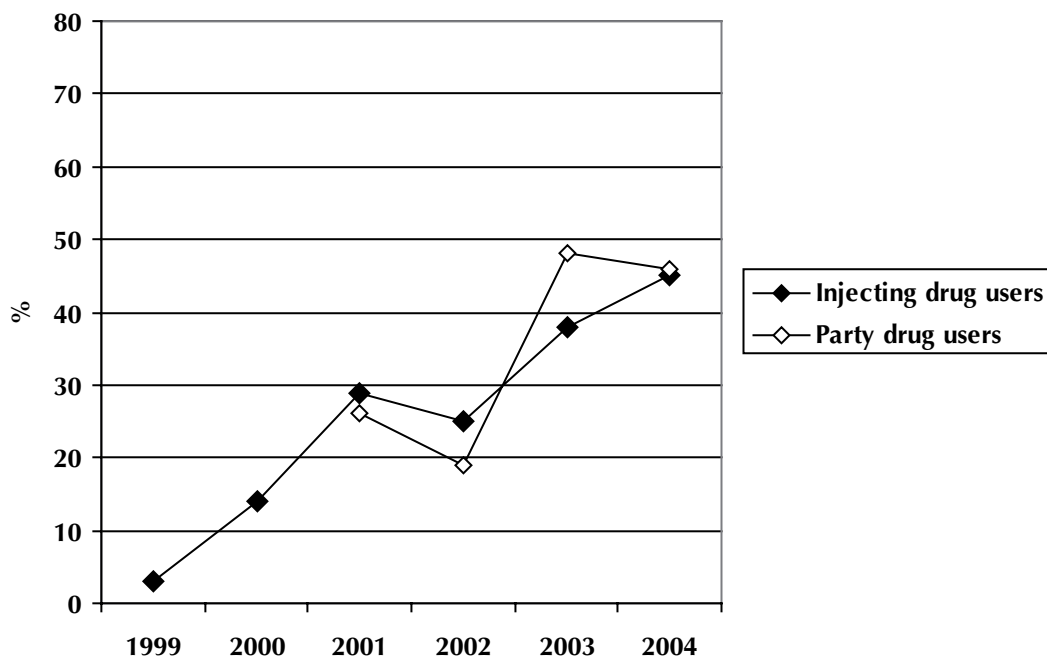


Table 1. Percentage of injecting drug users surveyed by the IDRS who recently used the various forms of methamphetamine, 2003.

	NSW	ACT	VIC	TAS	SA	WA	NT	QLD
Ice	38	65	50	69	48	80	34	60
Base	32	13	18	46	51	40	30	50
Powder	31	48	70	51	53	71	60	58

The advent of ice on the Australian illicit drug market has been associated with smoking the drug, a route of administration that yields a very rapid and intense drug effect akin to injection (Cook et al., 1993). This trend is a particular concern as it provides a very addictive means of taking methamphetamine that is accessible to non-injecting 'party' drug users. Continued detection of large shipments of ice at the Australian border, together with increasing use of ice among sentinel drug using populations in 2004, indicated that this trend was not a transient trend, but rather an established feature of the Australian illicit drug market.

Despite the substantive increase in the use and availability of ice and base since 2000, little was known about the dynamics of the market that underpinned the supply of these new forms of the drug, nor was there a comprehensive understanding of the social and health consequences associated with using these more pure forms of methamphetamine. Early evidence had suggested that the use of ice and base was coupled with increased risk of psychological and social adverse effects, including a higher likelihood of paranoia and aggressive or agitated behaviour (Degenhardt and Topp, 2003). The impact of aggressive and psychotic behaviour resulting from methamphetamine use had been a particular concern to frontline workers, such as police, ambulance and emergency services, who needed to manage the acute presentation of people intoxicated with the drug. There was also preliminary evidence from the illicit drug reporting system that the use of ice and base may be associated with a range of health and social consequences that were not well understood (Topp et al., 2002).

The current research was developed in response to the obvious need for a better understanding of the dynamic nature of the methamphetamine market, specifically the emergence of the more pure forms of methamphetamine on the drug market and the health and social consequences related to their use. The specific objectives of the current research were both very broad reaching and detailed, in that they addressed a range of issues in relation to the supply, demand and consequences of methamphetamine use. These objectives included:

1. clarifying the relationship between the different physical forms of methamphetamine, variously referred to by users as speed, meth, ice, crystal, crystal meth, shabu, base, wax, point and pure;
2. estimating the proportion of the Sydney methamphetamine market sourced by locally manufactured versus imported methamphetamine, specifically the proportion of the market sourced by traditional methamphetamine powder ('speed') versus the more pure forms of base and ice, and the relative desirability of these more pure forms of the drug from the users' perspective;
3. documenting the nature of the supply side of the market, including factors relating to the importation, manufacture, distribution and marketing of the various forms of methamphetamine;

4. describing the characteristics of methamphetamine users, their patterns of methamphetamine and other drug use, their expenditure on illicit drugs, their sources of income, and the physical, psychological, social harms, and risk-taking behaviour associated with methamphetamine use;
5. examining in detail the relationship between self-reported methamphetamine use and criminal activity;
6. providing prevalence estimates and describing the nature of serious psychiatric sequelae associated with methamphetamine use, such as paranoia, aggression, violent behaviour and psychosis;
7. examining occupational health and safety implications of the above psychiatric sequelae on frontline workers (i.e., law enforcement officers, emergency department workers and ambulance officers); and
8. determining the utility of the methodologies employed as a template for the examination of methamphetamine markets elsewhere in Australia, thereby providing the basis for the collection of comparable data across jurisdictions.

The research proposal was developed by Dr. Libby Topp, formerly from the National Drug and Alcohol Research Centre in Sydney, and was funded by the National Drug Law Enforcement Research Fund in 2002. The research project was carried out by the National Drug and Alcohol Research Centre in collaboration with the Australian Customs Service and the NSW Police. The research utilised a range of different research methods and capitalised on the expertise of both health and law enforcement agencies in understanding the methamphetamine market. These methodologies are described in detail in the following section.

Methodology

A range of different methods were employed in the current study to understand the nature of the methamphetamine market in Sydney and address the specific objectives of the project. These included:

1. Key expert interviews: Semi-structured interviews were conducted with experts in the drug and alcohol field, including both health and law enforcement personnel.
2. A survey of methamphetamine users: Face-to-face structured interviews were conducted with regular methamphetamine users in Sydney.
3. In-depth interviews with dealers: Qualitative in-depth interviews were undertaken with regular methamphetamine dealers or people involved with other aspects of supply or production of methamphetamine.
4. In-depth interviews with frontline workers: Qualitative in-depth interviews were carried out with police, ambulance officers and emergency workers on the impact of methamphetamine use and related psychiatric sequelae on their work.
5. Analysis of routine indicator data: Analysis of relevant routine data sources relating to methamphetamine and its impact on health and law enforcement services.
6. Review of emergency department data: A manual review of emergency department records to identify the number and nature of emergency admissions relating to methamphetamine.
7. Detailed analysis of forensic seizure data: Analysis of forensic data on the purity and physical appearance of methamphetamine seizures in Victoria from 1997 to 2002.

The geographic focus of the research was Sydney, although information on interstate, national or regional methamphetamine trends was also sought where relevant to contextualise the supply side of the Sydney methamphetamine market. Survey data collection was undertaken during the 2003/04 financial year. The time frame for indicator data varied depending on the availability of specific types of data, although the majority of indicator data included in the analysis spanned the period 1997 to 2003. The various research methods employed are explained in detail below.

Key expert interviews

Semi-structured interviews with health and law enforcement professionals were conducted to provide qualitative information about the methamphetamine market and also on the patterns and consequences of methamphetamine use in Sydney. Recruitment of key experts was conducted through a range of local Area Health Services (e.g., drug treatment centres, needle and syringe programs, community health centres, emergency departments and psychiatric facilities) and Local Area Commands within Sydney. Recruitment of key experts also occurred by referral from participating experts and from concurrent research projects, and recommendations from the project's advisory group. Eligibility criteria for participation as a key expert was either: (i) at least weekly contact with methamphetamine users (or dealers) in the past year, (ii) or contact with ten or more methamphetamine users (or dealers) in the past year. Key experts from the State Crime Command and Federal law enforcement agencies were chosen based on their relevant expertise in various aspects of methamphetamine supply, rather than their level of contact with methamphetamine users or dealers. Potential key experts were screened for eligibility over the telephone and provided informed consent prior to participation.

Key expert interviews were semi-structured and included open-ended questions addressing: the characteristics of methamphetamine users and/or dealers; methamphetamine dealing, production and importation; the availability of the different forms of methamphetamine; methamphetamine-related problems; the impact of methamphetamine on the key expert's work; and the criminal involvement of methamphetamine users. Key experts were only asked questions that were relevant to their area of expertise and were encouraged to answer only those questions that they felt confident about. Interviews took approximately 45 minutes and were conducted by telephone or face-to-face where this was more convenient.

A total of 54 key experts were interviewed between June and August 2003, including 26 health professionals and 28 law enforcement professionals, of whom 7 were representing Federal law enforcement agencies and who provided information on importation and high level distribution of methamphetamine. The majority of other key experts were based in Sydney and were recruited from a broad spread of geographic locations and services within Sydney. Data was analysed according to themes emerging from each of the topic areas addressed in the semi-structured interview schedule.

Survey of methamphetamine users

Participants and procedure

Regular methamphetamine users (N = 310) were recruited from across Sydney through advertisements in local newspapers and free press publications, word of mouth, flyers in needle exchanges and drug treatment centres or other venues likely to be frequented by drug users, advertisements on websites (e.g., pill reports website), and referral from other research studies. Recruitment took place from December 2003 to July 2004. Inclusion criteria for participation in the survey was having used methamphetamine at least monthly in the past year and being at least 16 years of age.

A structured questionnaire was administered face-to-face by researchers at a mutually convenient location (e.g., cafes, parks, health centres). The interview took approximately 90 minutes to complete. All participants were volunteers who completed informed consent prior to participation in the survey. Participants were reimbursed \$30 for their participation. No identifying information on participants was collected through the survey and only NDARC researchers involved with the study had access to the survey data.

Methamphetamine dealers within the sample

The survey of methamphetamine users included 55 participants who had been dealing methamphetamine at least monthly during the past year. Dealers had very similar demographic characteristics to methamphetamine users (see *Dealing Methamphetamine*). Participants who had been involved in dealing methamphetamine were administered a section of the questionnaire on methamphetamine dealing behaviour. Only one of these participants declined to complete this section of the interview, giving a final sample of 54 dealers.

The survey instrument

The survey instrument consisted of a structured questionnaire that included sections on each of the following areas:

- i. demographic characteristics;
- ii. general drug use and methamphetamine use patterns;
- iii. contact with health and law enforcement services;

- iv. price, purity and availability of methamphetamine;
- v. dealing behaviour;
- vi. knowledge of methamphetamine supply;
- i. criminal involvement;
- ii. income and expenditure on drugs;
- iii. symptoms of psychosis and their relationship to methamphetamine use;
- iv. HIV risk behaviour;
- v. conduct disorder; and
- vi. general physical and mental functioning.

The survey questionnaire was based on instruments that have been previously used in illicit drug research in Sydney and found to be reliable and valid. Specifically, questions on drug use history, demographics, price, purity and availability were based on questions used in the Illicit Drug Reporting System (Hando et al., 1998), the Opiate Treatment Index (OTI; Darke et al., 1992) and the Australian Treatment Outcomes Study (Darke, Ross, Teesson et al., 2003). These core questions were supplemented with additional questions on patterns of methamphetamine use, criminal involvement, and methamphetamine supply. The development of supply-side questions was based on information provided by law enforcement key informants and received input from law enforcement agencies.

Several additional questions were added to the survey based on an analysis of data from the initial 100 participants and discussions with the project's advisory committee members. These additional questions were included from the 163rd interview, resulting in a sample size of 148 for questions on: (i) specific health problems (e.g., chest pains, teeth problems etc); (ii) preferred form of methamphetamine and reasons for preference; (iii) drug or alcohol intoxication/withdrawal during the participants most recent contact with emergency and ambulance officers; (v) hostility during most recent contact with police, ambulance and emergency officers; and (iv) reasons for dealing involvement, frequency of methamphetamine dealing and number of people dealer's purchased methamphetamine from for the purpose of dealing.

The purpose of these additional questions was to clarify the nature of supply-side findings emerging from the study and quantify the extent of behaviours that had been documented through open-ended questions. For this reason, the sample size on which some question responses are based is relatively small. The reduced sample size is noted in the report where it impacts on the robustness or interpretation of the findings.

Specific measures and classifications used within the survey are outlined below. The questionnaire can be obtained from the authors of this report.

Classification of methamphetamine forms: Methamphetamine forms were classified according to the categories developed by Topp and Churchill (2002): (a) powder, (b) base (a damp wet powder, a resinous substance), and (c) ice (crystalline methamphetamine). Correct classification of methamphetamine forms by methamphetamine users was ensured through the use of a photographic identification sheet (see *Methamphetamine: Physical forms, purity and terminology*).

Employment: Employment status was classified using the Australian Standard Classification of Occupations (McLennan, 1997). In the present study, the categories of (i) advanced clerical and service workers, (ii) intermediate clerical, sales and service workers, and (iii) elementary clerical, sales and service workers groups were collapsed into one group (clerical, sales and service workers).

Dependence on methamphetamine: The Severity of Dependence Scale (SDS) was used to measure methamphetamine dependence. The SDS has been validated in samples of amphetamine users and other drug users in Australia and internationally and was found to have Cronbach's alpha coefficients of 0.81 and 0.89 respectively in two samples of amphetamine users from Australia (Gossop, et al., 1995). Scores of four or greater were used to indicate severe methamphetamine dependence yielding a sensitivity of 71% and a specificity of 77% against the DSM-III-R criteria for severe methamphetamine dependence, as measured by the Composite International Diagnostic Interview (Topp and Mattick, 1997a).

Criminal involvement: The crime scale of the Opiate Treatment Index (OTI) was used to assess criminal involvement. This scale has excellent test-retest reliability (Cronbach alpha = 0.96), and correlates strongly with other established measures of criminal involvement among drug users ($r = 0.54$ with the Addiction Severity Index measure of 'crime days', Darke et al., 1992). Questions from the OTI were supplemented with specific questions regarding the onset of each type of crime and involvement in violent crime in the past year. Offence history was coded according to ABS classifications for offences (ABS, 2001). These categories included offences against the person, dangerous or negligent acts endangering persons, robbery and extortion, theft and related offences, deception and related offences, property damage and environmental pollution, public order offences, illicit drug offences, road traffic and motor vehicle regulatory offences, offences against justice procedures, and 'other' offences.

Psychotic symptoms: Participants were screened for having experienced psychosis in the past year using a screening instrument based on the Schizophrenia section of the Composite International Diagnostic Interview. This screening instrument has been previously used in the Australian National Survey of Mental Health and Wellbeing to assess the prevalence of psychosis among the general population in Australia (Andrews et al., 1999). A conservative cut-off of three or greater was used to identify cases of psychosis. This cut-off score yields a sensitivity of 82% and a specificity of 57% against a DSM-III-R or an ICD-10 diagnosis of schizophrenia (Degenhardt et al., 2005). The severity of psychiatric symptoms most commonly observed in cases of methamphetamine psychosis (i.e., hallucinations, persecutory ideation, and delusions) were measured using the Brief Psychiatric Rating Scale (BPRS) subscales of "*suspiciousness*", "*unusual thought content*" and "*hallucinations*". These sub-scales all load on the factor of 'positive symptoms' on the BPRS (see Ruggeri et al., 2005, for further details on the factor structure of this instrument). Scoring of symptoms was done according to procedures developed by Ventura et al., (1993) which have been found to achieve an inter-rater reliability of 0.83 among lay clinicians. A cut-off of four or greater on each sub-scale was used to define clinically significant symptoms (Lukoff et al., 1986). Prevalence of clinically significant symptoms was based on having had any clinically significant symptom of suspiciousness, hallucinations or unusual thought content during the past year. The relationship between methamphetamine use and psychosis was based on the most severe symptom episode during the past year. Questions regarding the relationship between methamphetamine use and symptoms of psychosis were formulated using criteria provided by the International Classification of Diseases Version-10 (ICD-10, American Psychiatric Association, 2000) and the Diagnostic and Statistical Manual of Mental Disorders Version Four – Technical Revision (DSM-IV-TR, World Health Organisation, 1993).

HIV risk: HIV risk behaviour related to both injecting and sexual behaviour was measured using selected questions from the HIV risk-taking behaviour scale of the OTI. This scale has good test-retest reliability and show strong validity against collateral reports of HIV-risk taking behaviour (Darke et al., 1992).

Conduct disorder: DSM-IV-TR diagnoses of Conduct Disorder during childhood were obtained using a modified version of the Diagnostic Interview Schedule (Robins et al., 1981) that had previously been used in illicit drug research (Darke, Ross and Lynskey, 2003). The DSM-IV lists 15

symptoms for a childhood diagnosis of Conduct disorder falling under four general categories of (i) aggression to people and animals (e.g., often bullies or initiates fights with other people, hurts animals or people, use of a weapon to threaten people); (ii) destruction of property (e.g., arson, deliberately damaging other people's property); (iii) deceitfulness or theft (e.g., broken into houses, often lies, stolen from parents or other people); and (iv) serious violation of rules (e.g., staying out late despite parents not allowing this and frequent truanting, running away from home, American Psychiatric Association, 2000). The diagnosis of Conduct Disorder was based on a person expressing three or more of these behaviours prior to 15 years of age, or before the age of thirteen years in the case of truancy and defying parental prohibitions.

General health and well-being: The 12-Item Short-Form Health Survey (SF-12) was used to assess physical and mental well-being (Ware, 1996). The SF-12 is a brief version of the SF-36, which is a reliable and sensitive measure of general health and psychological well-being in drug using populations (Ryan and White, 1996). Scores on the SF-12 correlate extremely highly with scores on the SF-36 ($r = 0.96$, Ryan and White, 1996). The SF-12 yields a measure of physical health (Physical Component Summary) and mental health (Mental Component Summary). Scores on the physical and mental health components of the SF-12 are normalised against samples of the general population in the United States of America. Lower mean scores on each scale represent greater disability. The prevalence of disability on each scale was categorized using the scales designed by Sanderson and Andrews (2002): no disability (scores of 50 or greater), mild disability (scores of 40 to 49), moderate disability (scores of 30 to 39), and severe disability (scores of 29 or less).

Analysis of the survey data

Data were analysed using SPSS (SPSS, 2003) and STATA (STATA, 2003). Data that were not normally distributed were either normalised using logarithmic transformations prior to parametric analysis or analysed using non-parametric statistics. Geographic variation of trends within Sydney was examined by dividing the sample into four regions based on the participant's postcode of residence (Table 2). Homeless individuals were categorised according to the region in which they were interviewed, and those living outside of Sydney ($n = 2$) or who declined to provide their postcode ($n = 2$) were excluded from the analysis of geographic trends. Missing cases in other response categories (including those due to refusal to answer) were excluded from the analysis, unless otherwise stated.

Table 2. Geographical distribution of methamphetamine users surveyed by statistical subdivision.

Region	Statistical Sub-divisions	n	Per cent of sample
Inner	Inner Western Sydney, Eastern Suburbs, and Inner Sydney	139	45
North	Northern Beaches, Central Northern Sydney, Lower Northern Sydney	55	18
South-Southwest	Fairfield/Liverpool, Central Western Sydney, Outer South Western Sydney, Canterbury/Bankstown and St. George/Sutherland	52	17
West	Blacktown and Outer Western Sydney	60	19
Missing	Outside of Sydney or refused to provide postcode	4	1
Total		310	100

In-depth interviews with methamphetamine dealers

Qualitative in-depth interviews were conducted with methamphetamine dealers (N = 13) in order to obtain a clearer picture of the methamphetamine market in Sydney. Methamphetamine dealers were recruited through the survey of methamphetamine users. Participants who had been regularly involved in dealing in the past year were invited to participate in a follow-up unstructured in-depth interview. Five dealers were from the inner region of Sydney, three were from South-southwest Sydney and three were from Western Sydney. Two individuals that participated in the in-depth interview had not been eligible to take part in the methamphetamine user survey (as they had used methamphetamine less than monthly in the past year), but had informed the researchers during the screening process that they were involved in dealing or other aspects of methamphetamine supply and were subsequently invited to participate in an in-depth interview.

The interviews were unstructured, with no interview schedule and no specific predefined themes, which allowed the researchers to explore participant's view of the drug market, including those aspects of the drug market which the researchers had little knowledge or understanding. Several general topic areas were identified as relevant to the research prior to the interview, which were used to facilitate discussion and probe where appropriate. They were not used in the analysis of the data, and were not necessarily covered in the interviews. These general topics included (i) the participant's initiation and progression into dealing, the impact that dealing had on their life and issues around quitting dealing; (ii) the participant's knowledge of how the methamphetamine trade operated in terms of the structure of the supply chain and the inter-relationships between people involved in supply; and (iii) the participant's understanding of how methamphetamine was marketed in terms of pricing and purity. Participants varied in the level of knowledge they possessed about various aspects of the methamphetamine market and the interview focussed on the areas with which the participant was most familiar.

Interviews were conducted in public places convenient to the participant. All but one interview was taped and transcribed. Participants were paid \$30 for their participation and an additional \$20 per hour or part thereof if the interview exceeded 1.5 hours. All participants provided informed consent prior to participation in the interview process. The participant was given a hard copy of a participant information sheet and the information contained on the sheet was explained to the participant. Verbal consent was provided by the participant and tape recorded. Participants were asked not to disclose information during the interview that may identify themselves or other people known to the participant, such as names of people or places. All interview tapes and subsequent transcripts were de-identified. Only NDARC researchers involved in the study had access to interview tapes and transcripts.

In-depth interviews with frontline workers

Qualitative interviews were carried out with frontline workers (N = 31) that had contact with methamphetamine users during their work duties. These interviews were conducted with police officers (n = 14), emergency staff (n = 9), and ambulance officers (n = 8) within Sydney. A range of topics were covered including (i) the frontline worker's knowledge of methamphetamine and methamphetamine-related issues, (ii) the type of contact they had with methamphetamine users, (iii) the behaviour exhibited by people intoxicated with methamphetamine, (iv) the issues and risks faced in managing these people, (v) existing protocols for dealing with intoxicated people, (vi) information and training received on methamphetamine and dealing with intoxicated people, (vii) areas of need for further training or information on methamphetamine, and (viii) issues around referring methamphetamine-related cases between services. Frontline workers were sought who had a reasonable degree of experience with managing methamphetamine intoxicated people,

although there were not any formal inclusion criteria for the level of contact that participants had with methamphetamine users. Most participants were from services that had a high number of methamphetamine related presentations, these being located primarily within the inner region of Sydney.

Interviews ranged in duration from twenty minutes to one hour and all interviews were taped and transcribed. Participants provided informed consent prior to their participation in the interview. The interviews were conducted at the participant's place of work. Participants were paid \$30 for participation if the interview was conducted outside of work hours, this arrangement being subject to approval by the participant's work supervisor. Data analysis was conducted manually according to the topics addressed in the interview schedule.

Review of emergency department presentations

Emergency presentations relating to methamphetamine were identified through a manual review of 2905 emergency records from patients attending an inner-city emergency department from January 1 to 31, 2004. This review included all presentations seen during the one month period with the exception of cases where the medical records were currently in use within the hospital or the patient was dead on arrival ($n = 36$). Basic demographics (age and sex) and diagnostic information (ICD-9 code) was recorded for all presentations. Methamphetamine presentations were defined as those where there was any mention of current methamphetamine use, and included mention of the terms methamphetamine and amphetamine along with commonly used street terms for methamphetamine (e.g., speed, crystal meth, ice). The following additional details were recorded for cases where methamphetamine was mentioned or where there was a diagnosis of drug-induced psychosis: drug use, relevant information on symptoms noted in doctor's notes and triage notes; arrival and departure times; mode of arrival and other relevant arrival/referral details. The manual review took place at the hospital's medical record department. Only sections within each medical record pertaining to current presentation were reviewed, unless further information was required to clarify the details of the presentation. No identifying information was recorded from the medical records.

Analysis of routine indicator data

A number of routinely collected data sets were analysed to complement information provided by the survey of methamphetamine users, key expert interviews and in-depth interviews. The details of these data sources are provided below. All other data presented in the current report are based on published statistics or statistics derived by agencies and provided for the purposes of the report (e.g., import and border detection seizures provided by the Australian Customs Service). Analyses of routinely collected data from hospitals and emergency departments were restricted to people aged 15 to 59 years. This age restriction minimised the inclusion of stimulant-related admissions that were due to prescription use of stimulant medications used to manage Attention Deficit Hyperactivity Disorder. Also, the age distribution of treatment admissions for the use of amphetamines suggests that stimulant-related presentations among those aged 60 years or over were unlikely to be due to the illicit use of methamphetamine. Rates were based on the number of cases occurring among those aged 15-59 years and the estimated residential population for this age bracket. Data were sought for 2003 and preceding years where earlier data was available. The time frame for each of the routine data sources is specified in the sections below, along with further detail on the analysis of each data source.

Emergency presentations

Data on amphetamine-related emergency presentations within public hospitals in Sydney (excluding Wentworth Area Health Service) were obtained from 1997 to 2003. Amphetamine-related presentations were defined as those where the primary ICD-9 diagnosis was '*Drug dependence – amphetamine and other psychostimulant*' or '*Poisoning by psychotropic agents – psychostimulants*' (ICD-9 codes 304.4 and 969.7). The ICD-9 does include other diagnostic codes related to meth/amphetamine use¹; however, there were either no cases related to these additional codes or these diagnostic codes were found not to be used specifically to identify psychostimulant use. Geographic locality of presentations was based on the Area Health Services of the emergency department. Rates of amphetamine presentations per 100,000 population were calculated using NSW Health estimates of the residential population aged 15 to 59 years within each Area Health Service at June 30 for the relevant year.

Inpatient Statistics Collection

Data on stimulant-related hospital admissions included all hospital separations (i.e., episodes of care) recorded in the Inpatient Statistics Collection among those aged 15-59 years from July 1 1999 to June 30 2003 where the primary diagnosis was '*Mental and behavioural disorders due to the use of other stimulants including caffeine*' or '*Poisoning by psychotropic drugs not classified elsewhere: Psychostimulants with potential for use disorder*' (ICD-10 codes F15.x and T43.6 respectively). Stimulant psychosis cases included episodes where there was a primary ICD-10 diagnosis of F15.5 '*Mental and behavioural disorders due to other stimulants including caffeine - psychotic disorder*'. These diagnoses did not include mental and behavioural disorders due to cocaine, which are recorded under the ICD-10 code F14. Hospital facilities included in the Inpatient Statistics Collection are all public hospitals, public psychiatric hospitals, public multi-purpose services, private hospitals and private day-procedure centres. Geographic locality of hospital admissions was based on the Area Health Service of the hospital. Rates of stimulant admissions per 100,000 population were calculated using NSW Health estimates of the residential population aged 15 to 59 years within each Area Health Service at June 30 for the relevant year.

Offence data

Offence data included all criminal incidents reported by NSW Police between 1997 and 2003 that involved amphetamine use/possession, dealing/trafficking, importation or other drug offences (ecstasy and unspecified stimulant drugs were not included). There were 15,265 amphetamine-related incidents between 1997 and 2003, including 10,796 for use/possession, 3,614 for dealing/trafficking, 22 for importation and 833 for other drug offences. Rates per 100,000 in the population were calculated using the ABS estimated residential population for those aged 15 and 59 years in each Statistical Subdivision based on the 2001 Census.

Clandestine Laboratories

Data on seizures of clandestine drug manufacture laboratories included all laboratories seized by NSW Police in 2003 (N = 53). The size of methamphetamine laboratories was based on the size of the reaction vessel used in the manufacture process, and categorised as small (<1 litre), medium (1-5 litres) and large (>5 litres), corresponding to 'indictable', 'commercial' and 'large commercial'

¹ "*Non-dependent drug use disorder – amphetamine*" (ICD-9 codes 305.70-3); or "*Accidental poisoning by other psychotropic agents – psychostimulants (amphetamine and caffeine)*" (ICD-9 codes E854.2).

quantities under the *Drugs Misuse and Trafficking Act*. When manufacture involved other drug types, the laboratory size was based on the drug output per reaction procedure, and categorised as small, medium or large based on the respective quantities for indictable, commercial and large commercial manufacture for the drug involved as indicated in the *Drugs Misuse and Trafficking Act*. The location of the seizure may reflect the Local Area Command where the seizure was made, rather than the actual location of the clandestine laboratory. Where it was not possible to identify the drug being produced or the manufacturing process being undertaken (e.g., if only laboratory equipment was seized) the laboratory type is noted as 'unknown'.

NSW drug seizure and purity data

Data on the purity and physical appearance of methamphetamine and amphetamine seizures in NSW were analysed for the period 2001 through to 2003. Seizures included in this analysis form only a small proportion of all drug seizures made in NSW because purity analysis is usually only undertaken if evidence of the drug composition and purity is required for prosecution (Barker et al., 2003). Seizures below the weight of 5 grams were included in the current analysis (i.e., less than an indictable quantity, *Drugs Misuse and Trafficking Act, 1985*). Seizures with no recorded weight were excluded from the analysis. The number of seizures under 5 grams that were analysed for purity was 301 in 2001, 297 in 2002 and 254 in 2003.

NSW Police drug seizure data does not routinely distinguish between the different forms of methamphetamine, although a proportion of drug seizures made in NSW are accompanied by a physical description of the seized drug. Of the 6120 meth/amphetamine seizures under 5 grams that were made between 2001 and 2003, 5325 seizures were accompanied by a physical descriptor (2001: 2019 seizures; 2002: 1690 seizures; 2003: 1616 seizures).

Forensic data on drug seizures in Victoria

Forensic data on methamphetamine and amphetamine seizures in Victoria was provided by the Victorian Police Forensic Services Centre. The current analysis included all drug seizures that were made in Victoria between 1997 and 2002 where amphetamine or methamphetamine was the primary constituent by weight and the mass of the seizure was less than six grams (i.e., non-trafficable quantity). Forensic analysis was not possible on 556 seizures. The final sample consisted of 4963 seizures, including 124 seizures of amphetamine and 4839 seizures of methamphetamine. The mean weight of seizures was 1.03 grams (SD = 1.28), with methamphetamine and amphetamine seizures being similar in weight (1.03 vs. 1.15 grams). Information on each drug seizure included the estimated purity, the physical form and colour of the seizure, weight and packaging. The physical form and colour of seizures were determined by forensic analysts against detailed pre-specified categories. These descriptive categories were collapsed into broader categories that corresponded to those defined by Topp and Churchill, (2002) for the purposes of the current study (Tables 3 and 4). Analysis of colour and purity were undertaken using the number of seizures as the unit of measurement, while analyses of trends in the different physical forms of methamphetamine were conducted by the total weight of each form seized. Analysis of pill composition was based on the average composition of seizures involving pills and did not take into account the number of pills within each seizure.

Table 3. Categories used to define the physical appearance of powder, base, ice and pills.

Category	Physical descriptors provided by forensic analyst	Per cent (N = 4,963)
Powder	Powder (amorphous, fluffy, compressed and granular)	62
Base	Powder (damp, wet), resinous substance	4
Ice	Powder (crystalline)	10
Pills	Illicit tablet, tablet portion	24
Other	Compressed substance, capsule, trace, paste	<1

Table 4. Colour categories used to describe methamphetamine seizures

Category	Colour description provided by forensic analyst	Per cent (N = 4,963)
Translucent	Colourless, colourless/white	2
White	White	42
Off-white	Off-white	21
Yellow	Yellow, yellow/off-white, yellow/white	10
Brown	Brown	10
Other	All other colour descriptions	15

Methodological considerations

The current study utilizes a range of methods to understand the nature of the methamphetamine market in Sydney. The use of multiple methods in illicit drug research is a well accepted practice that capitalizes on the strengths of various methods and information sources, while minimizing the influence of biases inherent when relying on a single method or data source. Each methodological approach used in the current research is subject to strengths and weaknesses, which are discussed below.

Survey data on methamphetamine users provides a very rich source of information on patterns of drug use and the prevalence of specific drug-related behaviours and harms. However, it is very difficult to conclusively establish whether community samples of heavy drug users are representative of their target population. The biases that need to be considered in the current survey are that the sample: (a) included only methamphetamine users who took the drug at least monthly; (b) was likely to under-represent employed drug users from a higher socio-economic background, because these people would be unlikely to participate in a face-to-face survey on illicit drug use; (c) was likely to under-represent people from non-English speaking backgrounds because the survey was advertised and conducted in English; and (d) was likely to over-represent injecting drug users, particularly injecting heroin users, because needle and syringe programs were one of the recruitment points for the survey.

In the current study, qualitative data was collected from a sub-sample of 13 methamphetamine dealers interviewed within the community survey. This qualitative data was used to explore the methamphetamine market structure (see *The supply of methamphetamine in Sydney*).

This analysis provided a view of the market structure from the perspective of these 13 methamphetamine dealers and was not intended to be conclusive or representative of the views of all methamphetamine dealers in Sydney. Quotes from these dealers were also opportunistically included in other parts of the report to illustrate the nature of methamphetamine use, dependence and methamphetamine-related harms.

Further qualitative data was collected from key experts to understand methamphetamine supply and guide the development of the survey instrument used in the community survey of methamphetamine users (described above). Key experts included a reasonably large and diverse sample of both health and law enforcement professionals throughout Sydney, and as such, data from the key expert interviews provided a reasonably broad and representative overview of methamphetamine use and supply in Sydney. There were several disparities in the information provided by various law enforcement agencies that were difficult to reconcile. These disparities arose partly from the focus of specific law enforcement agencies (e.g., border control vs. local policing) and the respective information sources they utilize to understand drug supply (e.g., arrest and forensic data vs contact with drug users and dealers). Where conflicting views were expressed, the final perspective presented has considered the relative biases inherent in the views of various agencies, and has given greater weight to those agencies or key experts that had more contact with methamphetamine users or dealers, or more expertise on the relevant aspect of methamphetamine supply.

Qualitative information was also collected from ambulance, emergency and police personnel to examine the impact of methamphetamine psychosis and aggressive behaviour on frontline workers. These qualitative interviews targeted personnel who had experience managing methamphetamine intoxication and related aggressive behaviour, and therefore do not provide a representative view of all methamphetamine presentations to health and law enforcement services across Sydney. Indicator data and survey data were used to assess the number and proportion of methamphetamine-related presentations that involved psychosis and/or methamphetamine intoxication.

The current study has utilized a range of routine data sources, each of which is subject to inherent biases. For example, arrest and seizure data are heavily influenced by policing policies and targeting strategies. Also, certain forms of illicit behaviour or types of offenders are easier to detect than others, and are therefore likely to be over-represented in law enforcement data. The same types of biases occur in health data. Hospital and emergency data reflect the proportion of people who have problems with their drug use and require medical attention, and therefore do not reflect the broader spectrum of methamphetamine users who do not seek medical help for their drug use. Health data can also be influenced by the accessibility of health care services in particular areas and the socio-demographics of people seeking help (e.g., people from minority groups tend to be less likely to access health services).

Administrative practices, such as coding procedures, and data collation methods, can also introduce biases in routinely collected data. For example, the manual review of emergency records presented in the current report indicates that many emergency presentations for methamphetamine would not be detected in routinely collected emergency data. Similarly, national arrest and seizure data are affected by the double counting of arrests that involved the cooperation of multiple law enforcement agencies or jurisdictions, and also include cases where there was no forensic confirmation that the drug seized was methamphetamine.

Descriptions of methamphetamine purity and physical appearance provided in the current report were based on forensic seizure data from Victoria. Data from Victoria Police was used in the current study because, at the time of the study, Victoria was the only jurisdiction to undertake

forensic analysis on all drugs seized. These data can not be taken as a direct indication of the methamphetamine market in Sydney. However, these data still have utility in understanding the relative purity and appearance of different methamphetamine forms, and also in understanding how the emergence of the more pure forms of methamphetamine on the market is likely to impact on the purity of street level methamphetamine in Sydney. Moreover, the trends found in the Victorian methamphetamine seizure data were mirrored in the less comprehensive data on methamphetamine seizures made by NSW Police.

Where the authors consider that such biases have impacted on the conclusions from the research, they have noted this in the conclusion of the relevant chapter. The reader is advised to pay careful attention to the data definitions provided in the *Methodology* chapter of this report before citing or re-interpreting data for their own purposes.

Methamphetamine: Physical forms, purity and terminology

Rebecca McKetin², Cate Quinn³, Glen Groves³, Jennifer McLaren², and Erin Kelly²

Key points

- Powder methamphetamine had a median purity of 10%, and was usually white or off-white in colour. The term 'speed' was strongly associated with powder methamphetamine, although sometimes this term was used more generically to refer to other forms of the drug.
- The term 'base' appeared to be synonymous with more pure methamphetamine that had not been cut with adulterants to the same extent as powder. There were a range of terms used to describe this damp/oily form of methamphetamine. Base had a median purity of 21% and ranged in colour from white to brown. The key physical characteristic that distinguished base from powder was its damp/oily quality.
- The street terms 'ice' and 'crystal meth' accurately reflected the use of coarse translucent crystals of methamphetamine. A proportion (39%) of methamphetamine seizures consisted of translucent or white crystals of ice that had a median purity of around 80%. However, the majority (61%) of methamphetamine seizures that had a crystalline appearance were not high purity ice, but a lower purity crystalline substance (median purity 19%) that usually was off-white or had a yellow to brownish hue.
- A substantial proportion of methamphetamine seizures occurred in pill form (25% by weight). These pills usually contained methamphetamine alone or in combination with ketamine. Methamphetamine users rarely reported using methamphetamine in pill form, and therefore it is assumed that these pills were sold as ecstasy.
- The terms used to describe the various forms of methamphetamine, particularly base, are not very stable, and caution is suggested in using this street terminology alone to monitor the dynamics of the methamphetamine market.
- The median purity of methamphetamine seizures made in Victoria between 1997 and 2002 had increased five-fold from 3% to 15%. This increase in purity was not only a consequence of an increase in seizures of base and ice, but also because of a concurrent five-fold increase in the purity of powder methamphetamine.

Background

Over the past few years Australia has seen the emergence of new physical forms of methamphetamine on the illicit drug market, particularly imported high purity ice and a domestically produced form of methamphetamine that users refer to as 'base'. There has been much conjecture about the physical appearance and terms used to describe base and ice and there remains no concrete information on their respective purity. For example, there has been concern that the terms 'ice' and 'crystal meth' may be used as a marketing tool to sell low purity powder methamphetamine and that reports of ice use may not accurately reflect the use of high purity crystalline methamphetamine that is conventionally understood to be ice. There also remains

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some degree of confusion regarding the differential use of the terms base and ice to describe more pure forms of methamphetamine, and precisely what users are referring to when they say they are taking base. In addition, there remains an array of other terms used to describe methamphetamine, such as pure, paste, wax, and it is not clear whether these terms refer to ice and/or base.

Topp and Churchill (2002) developed a framework for identifying the different forms of methamphetamine, which goes a long way to helping clarify the relationship between the forms of methamphetamine variously referred to by users as '*speed*', '*base*', '*wax*', '*pure*' and '*ice*'. Essentially, Topp and Churchill define powder as the low purity form of the drug that users refer to as '*speed*'; base as a damp oily or gluggy form of methamphetamine that users refer to as either '*base*', '*paste*', '*wax*' or '*pure*'; and ice as the high purity clear or translucent crystals of methamphetamine that users refer to as either '*ice*' or '*crystal meth*'. The current chapter aims to develop this framework further by including more precise information on the physical appearance and purity of powder, base, and ice methamphetamine, and by verifying the terms used by methamphetamine users to describe these different forms of the drug.

The terminology used to describe powder, base, ice and pills

To establish the terminology used to describe the various forms of methamphetamine, regular methamphetamine users were asked what form of methamphetamine they had taken on their last use occasion and were subsequently asked to identify the photograph of methamphetamine most similar to what they had taken from an identification sheet (Figure 2).⁴ Terms used to describe the physical forms of methamphetamine were categorised as powder (including '*speed*'), base (including obvious variations on the term base, such as '*base meth*'), ice (including the terms '*crystal*' and '*crystal meth*'), and other (any other term that was not clearly recognised as a synonym for powder, base or ice). Photographs used to identify the physical forms of methamphetamine (Figure 2) were grouped into categories of powder (A1-A4), base (B1-B8) and ice (C1-C3) based on the classification system developed by Topp and Churchill, (2002). Photographs of other or unspecified forms were also included in the photo identification sheet (D1-D4) but these were excluded from the analysis of terminology used to describe powder, base and ice. The proportion of methamphetamine users nominating each photograph is shown in Table 5.

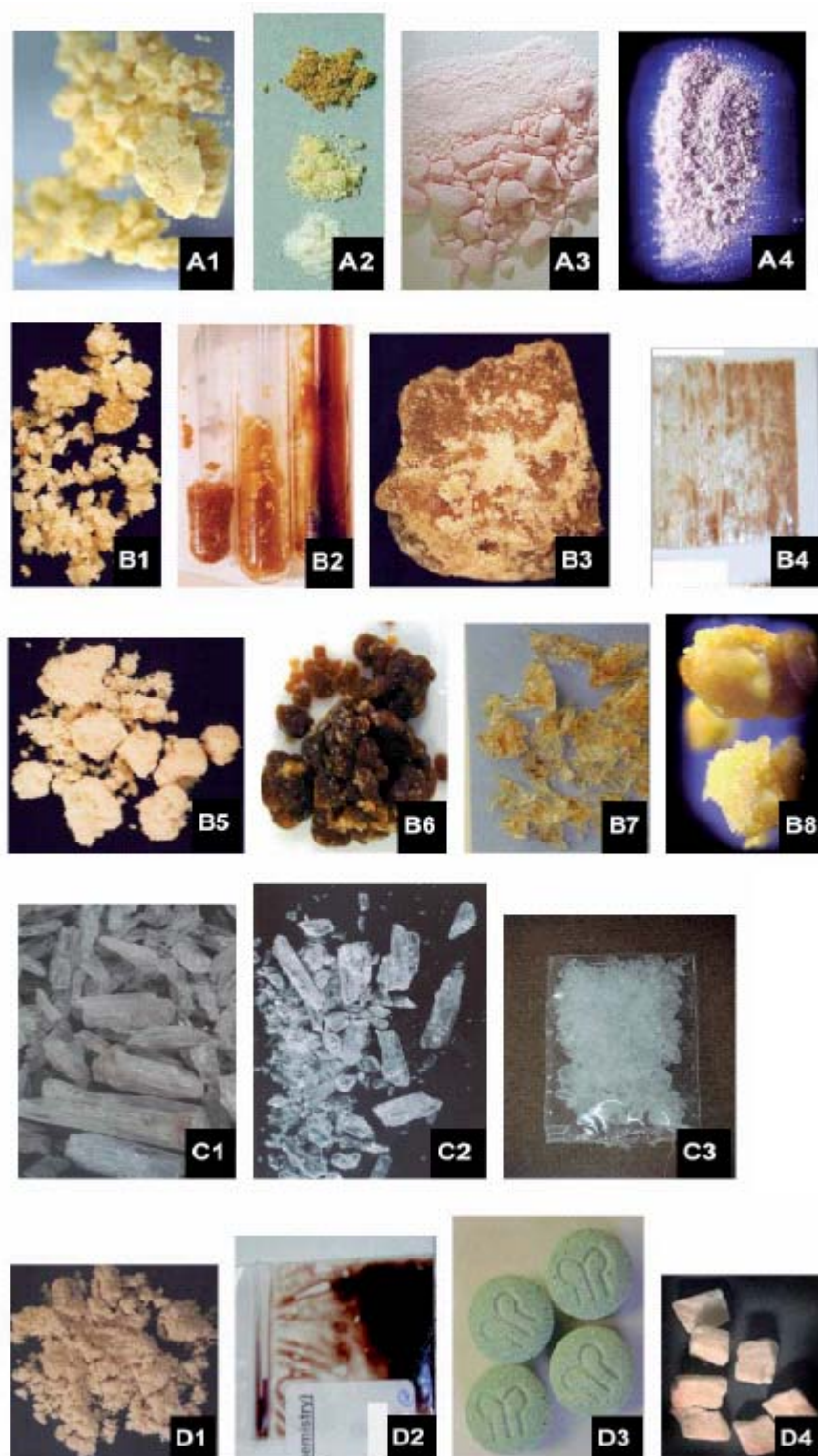
⁴ Photographs taken from Topp and Churchill, (2002) and supplemented with photographs provided courtesy of Glen Groves at the Victorian Police Forensic Services Centre (B1-3, B5-6, C2 and D1).

Table 5. Form of methamphetamine last used based on the photograph identification sheet.

Photograph identification code	Per cent of methamphetamine users (N = 303)
Powder	
A1	<1
A2	8
A3	3
A4	12
Total	24
Base	
B1	8
B2	1
B3	1
B4	9
B5	3
B6	<1
B7	<1
B8	4
Total	26
Ice	
C1	3
C2	27
C3	8
Total	38
Other or unspecified forms of methamphetamine	
D1 (Unspecified)	5
D2 (Liquid)	1
D3 (Pills)	1
D4 (Unspecified)	1
Total	8

Note. See Figure 2 for the photographs corresponding to the identification codes. Methamphetamine users were asked to indicate which photograph looked most similar to the methamphetamine they had taken on their last use occasion. Two per cent of methamphetamine users could only nominate generic categories (i.e., A, B or C) and 2% could not nominate any photograph on the identification sheet.

Figure 2. Methamphetamine photograph identification sheet



Concordance between terminology and physical forms of methamphetamine

There was a high level of concordance between the use of the terms ice (or '*crystal meth*') and photographs of ice (C1-C3, 96%). Only 4% of those who self-reported '*ice*' or '*crystal meth*' (or obvious synonyms for these terms) did not nominate photographs from this category (Table 6). Therefore, it is reasonable to have a high level of confidence that the self-reported use of '*ice*' or '*crystal meth*' refers to the use of coarse translucent crystals of the drug. The term '*shabu*' was also used by a number of methamphetamine users to refer to ice.

There was also good concordance between the term base and the photographs provided of base (B1-B8, 93%). However, many users noted that while the consistency of the methamphetamine that they had used matched the damp/oily appearance of the substances in the photographs B1-B8, the base they had used was white. Base methamphetamine was clearly the most amorphous form of methamphetamine both in relation to its physical appearance (Figure 2, B1-B8) and the various terms used to describe this damp/oily form of methamphetamine. This is probably due to the term base not clearly reflecting a physical characteristic in the way the terms powder and ice do. Other terms used to describe base methamphetamine included '*pure*' or variants on the term base, such as '*base-meth*', or simply '*meth*'.

The terms '*powder*' and '*speed*' were mostly used to refer to the powder form of the drug (A1-A4, 80%). However, 13% of people who nominated having used speed or powder had actually used base, and a further 6% had used ice. This finding suggests that some methamphetamine users apply the term speed to refer generically to methamphetamine rather than to a specific form of the drug.

The use of methamphetamine forms other than those categorised as powder, base and ice were nominated by 8% of the sample. Most of these methamphetamine users nominated D1. Of the 16 methamphetamine users who nominated D1, most referred to this photograph as either base or powder.

Only two participants (1%) nominated taking pills on their last occasion of methamphetamine use (see D3, Table 5).⁵ This finding demonstrates that methamphetamine users do not regard pills as a form of methamphetamine, and it is consistent with the view that pills containing methamphetamine are sold as ecstasy (see *Retail market for methamphetamine*).

Table 6. Concordance between the street terms for methamphetamine and the physical appearance of methamphetamine.

Nominated name	Identified photograph category (%)			Sample (n)
	Powder	Base	Ice	
Powder/speed	80	13	6	82
Base	7	93	0	57
Ice/crystal	1	3	96	114
Other	10	76	14	21

Note. The statistics in this table are based only on photographs from categories A, B and C on the photograph identification sheet.

⁵ Because methamphetamine users were asked to nominate the form of methamphetamine most similar to the photographs on the identification sheet, D3 would have been nominated for any pill use, regardless of whether the pill used had a similar appearance to that in D3.

The purity and physical appearance of powder, base, ice and pills

Drug seizure data collected in Australia does not routinely distinguish between the different forms of methamphetamine and this has been a hindrance in clarifying the appearance and purity of the new more potent forms of methamphetamine, namely base and ice. Moreover, the purity of drug seizures is usually only measured if evidence is required for prosecution, resulting in a relatively small and potentially biased sample of drug seizures. Since 1997 the Victoria Police Forensic Science Services Centre, Chemical Drug Intelligence Team, have been routinely collecting information on the estimated purity and physical characteristics of all drug seizures made in Victoria (see *Methodology* for details). This data allows analysis of the purity and physical appearance of different forms of methamphetamine.

The following sections describe the physical appearance and purity of the different forms of methamphetamine, and also how the emergence of these forms has impacted on the overall purity of methamphetamine in Victoria. These data are based entirely on seizures of drugs from Victoria and may not be taken as an indication of the methamphetamine market in Sydney. However, these data still have utility in understanding the relative purity and appearance of different methamphetamine forms, and also in understanding how the emergence of the more pure forms of methamphetamine on the market is likely to impact on the purity of street level methamphetamine in Sydney.

The physical characteristics of methamphetamine seizures were categorised according to the classification system developed by Topp and Churchill, (2002, see *Methodology*). Analysis of the different forms of methamphetamine seized over the period 1997 to 2002 in Victoria showed that most seizures were the powder form of the drug, accounting for 64% of all seizures by weight. Pills containing methamphetamine were the second most common form of the drug (25% of all seizures by weight), while other forms of the drug made up considerably smaller proportions of seizures, together accounting for 10% of seizures by weight.

The purity of powder, base and ice

The median purity of all methamphetamine seizures from 1997 to 2002 was 18%, with significant differences between the purity of each of the different physical forms of the drug. The median estimated purity of powder seizures was 10%. Base was double the purity of powder with a median estimated purity of 21%. Seizures with a crystalline appearance had a bimodal purity distribution (Figure 3). Those seizures with a purity estimate of 60% or greater were included as ice (39% of crystalline seizures) while those crystalline seizures with a purity estimate of below 60% were treated as a separate category, which have been termed low purity crystal for the sake of distinguishing it from ice. This distinction was made because ice, by definition, should have an average purity of around 80%. Crystalline methamphetamine seizures that do not have this high purity level clearly reflect a different manner of marketing methamphetamine, which has important implications for both the supply and health consequences associated with the drug's use. Ice had a median purity of 83% while the low purity crystal had a median purity estimate of 19%. Both base and the low purity crystal were significantly more pure than the powder form of methamphetamine (Figure 4).

Over the six year period there was an increase in the proportion of methamphetamine seizures with a crystalline or wet/damp appearance (i.e., ice or base) from less than 2% to 24% of all methamphetamine seizures by weight. The purity of methamphetamine seizures also increased significantly over this time ($F_{df=5, 4957} = 86.1, p = 0.000$) from a median of 3% in 1997 to 15% in 2002. However, this increase in the purity was not only due to the increase in seizures of the more pure forms of base and ice, with a significant increase in the purity of powder methamphetamine also occurring over this time (3% in 1997 to 15% in 2002; $F_{df=5, 3069} = 98.3, p = 0.0000$).

Figure 3. Distribution of purity estimates for methamphetamine seizures made in Victoria from 1997 to 2002 by form of methamphetamine

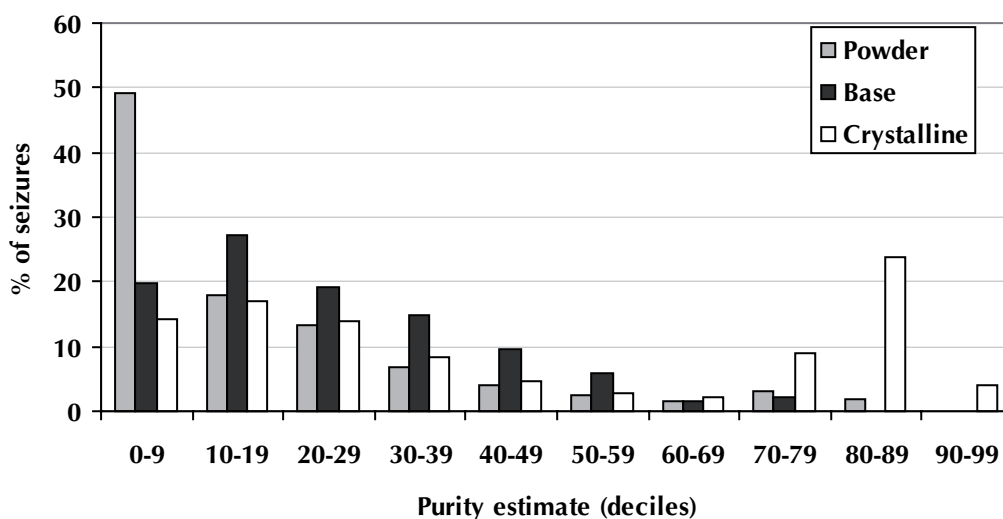
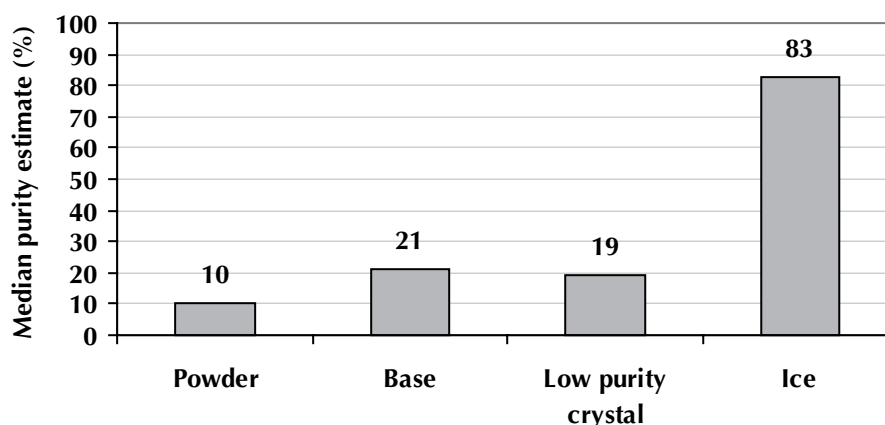


Figure 4. The median purity of methamphetamine seizures made in Victoria from 1997 to 2002 by form of methamphetamine



The colour of methamphetamine forms

Most powder was white (54%) or off-white (26%), with smaller proportions being brown (11%), yellow (6%) or other colours (3%). The distinguishing feature of base was that a greater proportion of seizures were brown (37%) or yellow (18%) in comparison with the dry powder form of the drug, although a considerable proportion of base seizures were also off-white (21%), or white (18%). Ice was almost exclusively clear to white in colour (92%), while low purity crystal was more likely to contain colouration, with 70% being off-white, yellow or brown in colour. The colour of pills varied, although the most common colour was white or off-white (30%), with other common colours being yellow (15%), green (14%), pink (14%), blue (12%) and orange (5%).

The composition of pills

All pills included in the current analysis necessarily contained methamphetamine as the primary psychoactive constituent by weight. Pills had a uniform low purity with a median of 4% estimated purity by weight. Most pills weighed between 0.2 and 0.4 grams (87%) with an average weight of 0.28 grams. Methamphetamine was the only psychoactive drug contained in 50% of the pills. Ketamine was by far the most common secondary ingredient in pills, with 29% of methamphetamine pills containing ketamine. A smaller proportion contained the precursor drugs of pseudoephedrine and/or ephedrine (16%), and less than 1% contained the precursor drug P2P. MDMA was present in 6% of pills while 7% of pills contained caffeine. Very small proportions contained heroin (2%), cocaine (2%) or codeine (2%), and less than 1% contained 3,4-methylenedioxyamphetamine (MDA), 3,4-methylenedioxyethylamphetamine (MDEA) or morphine.

Conclusion

The street terms used to describe methamphetamine are reasonably accurate in distinguishing between the different physical forms of the drug (i.e., powder, base and ice). In particular, the street terms '*ice*' and '*crystal meth*' do accurately reflect coarse clear translucent crystals of methamphetamine. However, the use of the terms '*base*' and '*speed*' were more generic. The term '*base*' was applied in a very general way to describe methamphetamine that was more pure and usually damp or oily. There were also a number of possible synonyms that were used to describe the physical form of methamphetamine that were defined as base on the photograph identification sheet (i.e., photographs B1-B8 in Figure 2), while the physical characteristics of base as described by users were very amorphous. Similarly, the term '*speed*' was used generically by some methamphetamine users to refer to different forms of methamphetamine, even though the use of this term was still strongly associated with the powder form of the drug. For these reasons, caution is suggested in using street terms to classify and monitor trends in the different physical forms of methamphetamine.

It was found that a substantial proportion of methamphetamine seizures occurred in the form of pills (25%), either containing methamphetamine alone or in combination with ketamine. However, pills were not recognised as a form of methamphetamine among regular methamphetamine users, with only 2 people in the current sample (1%) nominating pills as the most recent form of methamphetamine that they had taken. Although methamphetamine users did not typically purchase or intentionally consume methamphetamine in pill form, they did recognise that a proportion of the ecstasy pills that they purchased contained methamphetamine (see *The retail market for methamphetamine*). The presence of methamphetamine pills on the ecstasy market may introduce harms associated with methamphetamine use, such as higher levels of dependence, to this population of drug users.

The analysis of forensic seizure data showed that base methamphetamine was typically double the purity of powder methamphetamine (median purity 21% vs. 10%). Crystalline methamphetamine was also more pure than powder, although only a proportion of crystalline seizures had purity levels indicative of crystalline methamphetamine. By definition, crystalline methamphetamine is effectively pure, and using the analytical techniques employed by the Victoria Police Forensic Services Centre, crystalline methamphetamine should yield a purity estimate of approximately 80%. However, over half of the methamphetamine seizures that had a crystalline appearance were less than 60% pure. These lower purity crystalline methamphetamine seizures were very similar in their colour and purity to base methamphetamine, suggesting that they were a crystalline variation of the base methamphetamine form (e.g., photograph B7 in Figure 2).

An alternative explanation for the low purity of some crystalline methamphetamine seizures is that these seizures had been adulterated with a crystalline substance: a practice evident in the Philippines where the smoking of crystalline methamphetamine (termed '*shabu*') is common among methamphetamine users (personal communication, Philippines Dangerous Drugs Board, August 2004). Reports that there is a residue remaining after smoking crystalline methamphetamine are also consistent with an adulterant being used to cut the drug (see *Methamphetamine use in Sydney*).

The higher purity of base and ice relative to the traditional powder form of methamphetamine has important health implications for users of the drug. Methamphetamine available in Australia has typically been very low in purity (less than 10%). Taking more pure forms of methamphetamine would increase the dose of the drug being consumed, and therefore increase the risk of acute side-effects from methamphetamine intoxication. It is also interesting to note that in Victoria the emergence of seizures of crystalline methamphetamine and base methamphetamine was associated with a four-fold rise in the purity of the powder methamphetamine. If such an overall increase in the purity of methamphetamine has also occurred in NSW, it would be likely to have a follow-on effect on the health of users and impact on patterns of methamphetamine use.

Differentiating between the various forms of methamphetamine provides valuable information about trends in the methamphetamine market. However, should these street terms shift over time, comparability in data on methamphetamine trends will be lost. Therefore methamphetamine should continue to be monitored as a broad category within which distinctions are made in the physical appearance of the drug, rather than treating ice, base and powder as stand-alone drug classes. This will ensure comparability of data on methamphetamine use over time and across geographic locations. Monitoring the proportion of the methamphetamine market made up of pills presents a particular challenge because methamphetamine pills are not recognised as such by drug users. Monitoring of this portion of the market will require routine data on amphetamine-type-stimulant pill composition together with an understanding of the consumer market for these pills.

Importation and domestic production of methamphetamine

Rebecca McKetin⁶ and Vincent Murtagh⁷

Key points

- There has been a marked increase in detections of ice importation at the Australian border since 2000. Border detections of large-scale ice importations have involved sea freight originating from Southeast Asia and these importations tend to be similar in their origin and nature to large-scale heroin shipments.
- Most methamphetamine available in Australia remains domestically produced in clandestine laboratories. The main method of domestic methamphetamine manufacture involves the conversion of pseudoephedrine contained in the over-the-counter cold and flu preparations into methamphetamine using hypophosphorous acid and iodine.
- The number of methamphetamine clandestine laboratories detected in Australia has increased substantially over recent years. One of the key challenges in stemming the increasing domestic production of methamphetamine is controlling the diversion of precursor chemicals used in methamphetamine manufacture from their legitimate use in pharmaceutical preparations.
- There has been an increase in the number of large illegal precursor importations detected at the Australian border in recent years. A continuation of this trend is likely to have an impact on the sourcing of precursors used in the domestic manufacture of methamphetamine.
- There have been very few clandestine methamphetamine laboratories seized in NSW that involved refining methamphetamine to ice; however, reports from drug dealers suggest that ice is being produced domestically. The extent to which domestic ice manufacture is occurring was not clear.

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Recent trends in the importation of ice

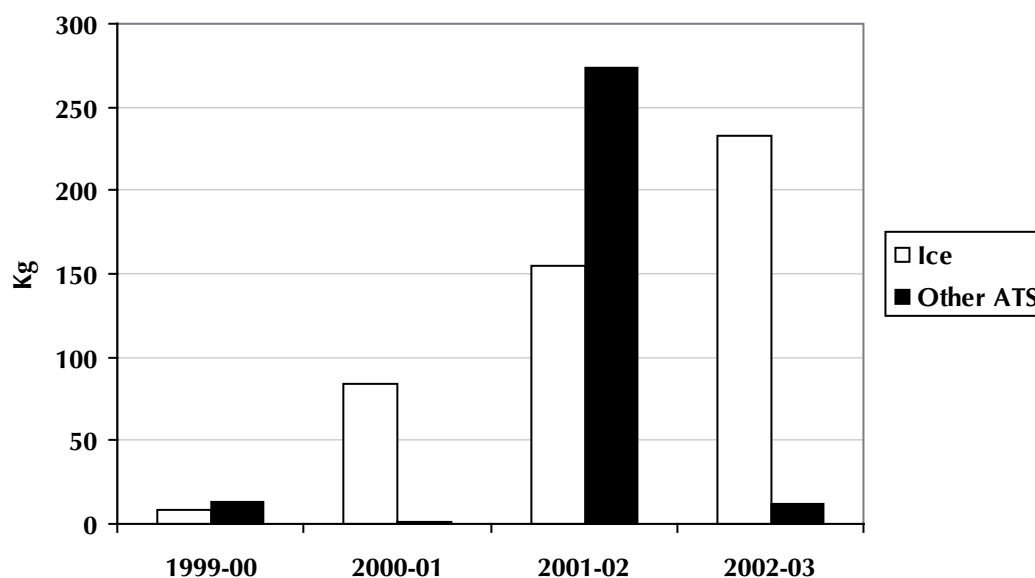
There has been a sharp increase in the detection of ice at the Australian border since 2000, this being due to several large shipments of the drug (Figure 5). Prior to 2000, ice was detected at the Australian border only in small quantities, and these importations were linked to small scale localized use of the drug among ethnic expatriate communities. The first significant seizure of 79 kg of ice occurred in November 2000. This was followed by a further significant seizure in July 2001 consisting of 152 kg of ice seized, together with almost 260 kg of tablet methamphetamine. The rise in detections of ice at the Australian border culminated in May 2003 with the largest ever

⁶ National Drug and Alcohol Research Centre, University of New South Wales

⁷ Forensic Services Group, NSW Police

detection of methamphetamine at the Australian border. This seizure consisted of 233 kg of ice which was detected in a shipping container carrying rice sticks from China (Rushby, 2004), and was similar in its origin and characteristics to previous large scale shipments of heroin. Since 2003 there has been one further significant seizure of 125 kg of ice, which was detected in a shipping container load of candles originating from China and entering Sydney in October 2004. This increase in large scale ice detections has occurred over a backdrop of smaller seizures of the drug that tend to be more varied in their origin and means of entry.

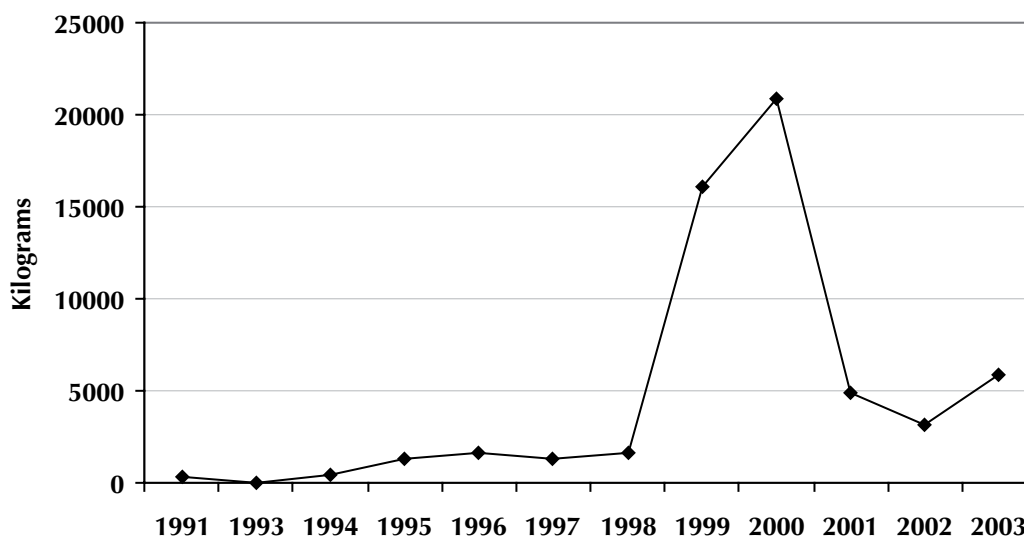
Figure 5. Weight of ice and other ATS seizures made at the Australian border, 1999/00 to 2002/03



Trafficking of ice from Southeast Asia

The increase in methamphetamine importation into Australia fits with growing production and supply of methamphetamine in Southeast and East Asia. An estimated 78% of global methamphetamine seizures occurred in Southeast and East Asia in 2001, half of which occurred in China (UNODC, 2004a). Large quantities of methamphetamine have been seized in China over the past few years (Figure 6), reaching a peak in 2001 with 20.9 tons. The ready availability of precursor chemicals and reagents, including extensive local cultivation of the ephedra plant (*Ephedra sinica*, or *Ma Huang*), and infrastructure to support methamphetamine production, are thought to be key factors facilitating the production of methamphetamine in China. Most methamphetamine seizures within China occur in the Southeastern provinces of Fujian and Guangdong (UNODC, 2004a); drug trafficking from this region being facilitated by its geographic proximity to commercial infrastructure and shipping routes.

Figure 6. Weight of methamphetamine seizures in China, 1991-2003



Large-scale shipments of ice that have been detected at the Australian border are very similar in their characteristics to previously detected large scale heroin importations, and have involved criminal networks traditionally involved in heroin importation. The majority of these shipments have originated from China, although they may have been trans-shipped through intermediary countries within the region, and have been bound for cities or ports along the east coast of Australia. Criminal networks importing methamphetamine appear to work cooperatively with other criminal syndicates in Australia: These cooperative arrangements being related to the specialist capacities of particular criminal entities or individuals within these groups.

While established heroin trafficking routes from China form one known trafficking route for large scale methamphetamine importations, trafficking routes for smaller importations are more widespread. Many smaller-scale seizures of methamphetamine are made in conjunction with passenger entry, courier or post. These seizures are more varied in the form of methamphetamine being imported, the country of origin and the types of people undertaking the importation. Importations of methamphetamine coming to Australia from other parts of Southeast Asia (e.g., Vietnam, Cambodia and Laos PDR) generally involve these smaller-scale import operations.

Although the majority of large-scale shipments of methamphetamine into Australia have involved ice, much of the methamphetamine produced in Southeast Asia is pressed into methamphetamine tablets. Production of methamphetamine tablets, often called *ya ba*, occurs predominantly in Burma, from where they are trafficked into the neighbouring sub-Mekong countries of Thailand, Cambodia, Laos and Vietnam (INCSR, 2002; Sattah et al., 2002; UNODC, 2004b).

Figure 7. Photo of methamphetamine tablets with the United Wa State Army logo

There has only been one significant border seizure of methamphetamine tablets in Australia to-date. The characteristics of this seizure were atypical of other detected large-scale drug importations, and therefore it is believed that it does not reflect a broader underlying trend in methamphetamine tablet importation. Methamphetamine tablets seized in Australia tend to have a different appearance and chemical profile to their Southeast Asian counterparts. Specifically, pills containing methamphetamine in Australia weigh around 200 to 400 milligrams and contain 4% methamphetamine by weight (see *Methamphetamine: physical appearance, purity and terminology*) whereas *ya ba* pills are smaller (90-120 milligrams) and contain 20 to 35% methamphetamine by weight (Personal communication, ONCB Thailand, April 2003). *Ya ba* pills also have a characteristic WY pill press marking and are pinkish-orange or green in colour (Figure 7). Having said this, there are growing reports of pill production in other parts of the region that involve methamphetamine alone or in combination with other drugs, which show more varied purity levels and differ in their physical appearance (UNODC, 2004c; Personal communication, ONCB Thailand, April 2003).

Domestic production of ice

It has generally been assumed that ice available in Australia is imported. This is a reasonable assumption given that (a) ice emerged on the Australian drug market at around the same time that large-scale shipments of ice were first detected at the Australian border, and (b) there have been very few clandestine laboratories seized in Australia that have involved refining methamphetamine into a crystalline product, and those that have been detected have involved only small scale production. The additional time and difficulty involved in manufacturing ice and the loss of drug product (hence lost profit) are thought to be key reasons why the manufacture of crystalline methamphetamine, or ice, is uncommon in Australia.

Despite the low number of domestic clandestine laboratory detections involving ice production, there was a belief among a proportion of Sydney methamphetamine dealers that the ice they were purchasing was domestically produced. When asked whether dealers believed that the ice they had purchased was locally manufactured or imported, 32% thought that it was domestically manufactured, and a further 9% thought ice was both imported and domestically manufactured (Table 7). Only 24% nominated importation alone, while 35% were not aware of its origin. Anecdotal reports from users also suggested that there may be differences in the appearance and quality of imported versus locally produced ice. Chemical profiling of methamphetamine seizures (specifically comparison of ice seized at the Australian border with that seized domestically) may help to confirm whether there are any systematic differences between imported versus domestically produced ice that could assist in the monitoring of domestic ice production.

Table 7. Source of methamphetamine (imported vs. domestic) purchased by dealers in Sydney.

	Powder n = 13	Base n = 30	Ice n = 34
Dealers' supplier (%)^a			
Other dealer in Australia	100	87	97
Made it themselves	0	0	0
Direct from manufacturer in Australia	0	13	3
Direct import	0	0	3
Originally imported (%)			
Don't know	15	41	35
Imported	8	0	24
Domestic production	77	59	32
Imported and domestic production	0	0	9

^a Participant could nominate more than one response category.

Recent trends in the domestic production of methamphetamine

The majority of methamphetamine available in Australia is domestically produced in clandestine laboratories. There has been a substantial increase in the number of clandestine laboratories seized in Australia from under 100 in 1997/98 to 340 in 2002/03 (Figure 8, unpublished data provided by the ACC, 2004).⁸ The number of clandestine laboratories detected in NSW more than doubled during this time period; however, the majority of clandestine laboratory detections in Australia occur in Queensland.

A notable trend in detections of clandestine methamphetamine laboratories over this time has been the proliferation of smaller scale laboratories, such as 'boxed labs' or 'boot labs' (ACC, 2003). These small-scale laboratories are most evident in Queensland (ACC, 2003), and this may in part account for the large number of clandestine laboratories detected in this State. In NSW there is also some evidence of small-scale production, although medium to large-scale laboratories remain more common. Seventy three per cent of clandestine methamphetamine laboratories detected in NSW in 2003 were either medium or large in size (i.e., with a reaction vessel of at least one litre, capable of producing a commercial quantity of 250 grams of methamphetamine).

Clandestine laboratory detections in NSW tend to be concentrated along the eastern seaboard north and south of Sydney and also in the outer western reaches of Sydney (Figure 9). Clandestine laboratories were often detected on small acreage subdivisions in the outer areas of Sydney. The rural environment in these areas makes detection of clandestine laboratories difficult. The proximity of these rural areas to urban centres also facilitates access to precursors, reagents and other necessary production equipment.

⁸ Data for 2002/03 includes ecstasy production facilities; however, ecstasy production in Australia is a very recent trend and there have only been several seizures involving clandestine manufacture of ecstasy in Australia to-date.

Figure 8. Number of clandestine laboratories detected in Australia by State, 1997/98 to 2002/03
(Source: ACC, 2004)

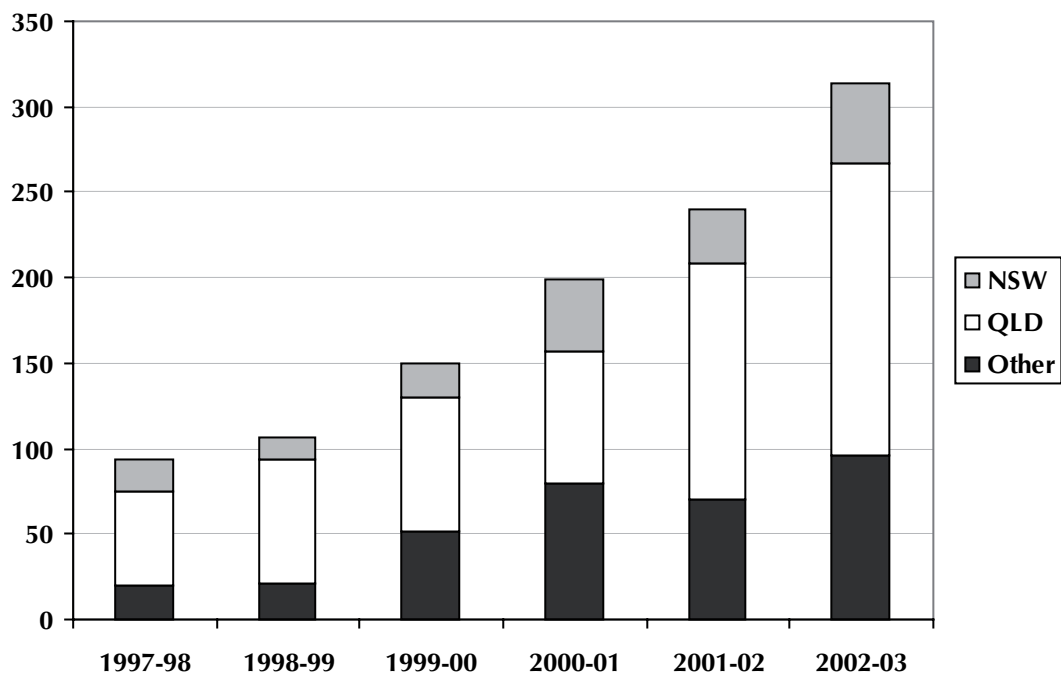
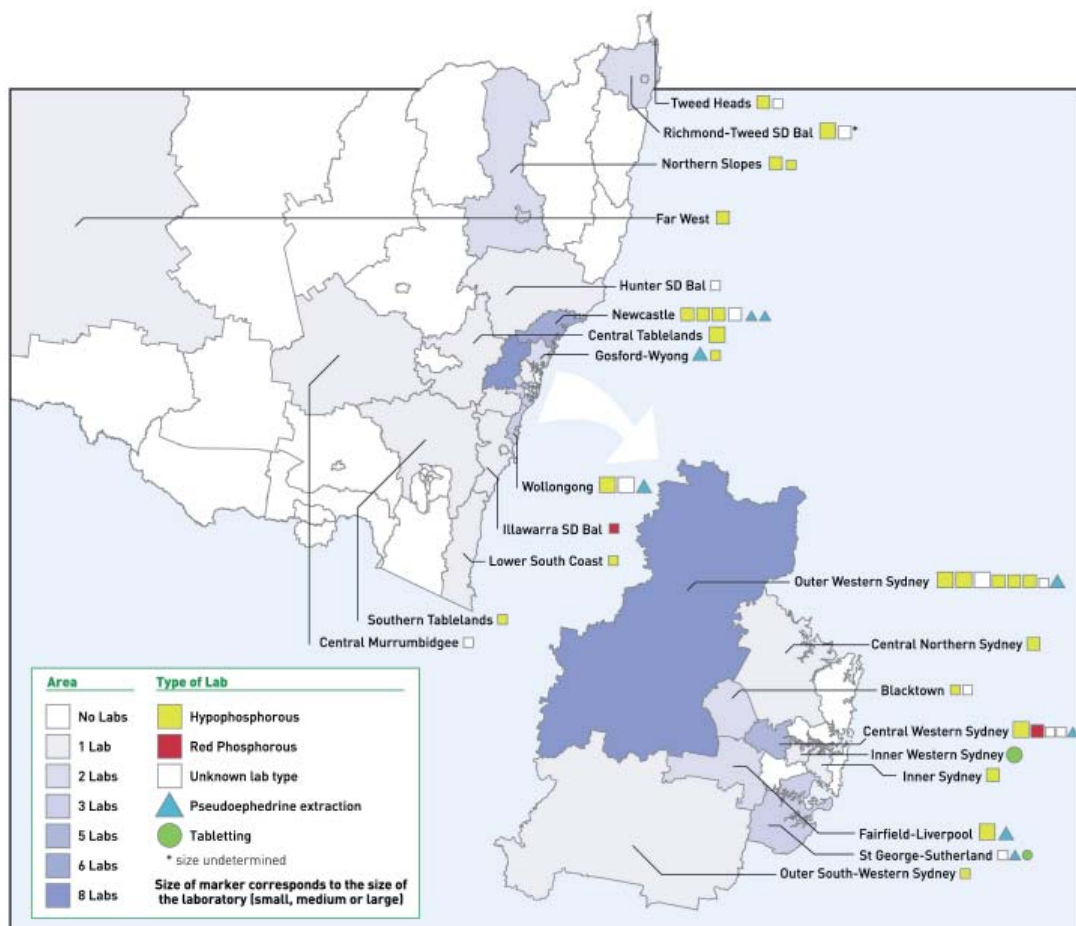


Figure 9. Location, type and size of clandestine laboratories seized in NSW in 2003.



Outlaw Motor Cycle Gangs (OMCG) are believed to play a dominant role in the clandestine production of methamphetamine in Australia; however, there has been a trend toward the involvement of other criminal networks in the manufacture and distribution of the drug. Larger criminal syndicates are also reported to 'contract' manufacturers to produce the drug for them, while manufacturers also rely heavily on criminal syndicates for the supply of precursors and chemical glassware, creating a necessary symbiotic relationship between the two entities. There has also been a trend toward increasing involvement of small-scale manufacture, and a 'cottage industry' approach to marketing the drug, which is thought to be in part fuelled by the availability of information on methamphetamine manufacture through the internet. This trend appeared not to be particularly evident within Sydney, where there was a stronger influence of established criminal networks and larger-scale production. However, our research did suggest that criminal networks within Sydney may source methamphetamine from a number of clandestine laboratories within a particular area, and this finding may reflect the dependence of methamphetamine manufacturers on criminal networks who can provide them with the necessary precursors and other chemical reagents used in the manufacture of the drug.

The manufacture of methamphetamine

There are a multitude of approaches to manufacturing methamphetamine (or amphetamine), 22 of which are reviewed by Allen and Cantrell (1989) and can be found in the scientific literature. Despite the diversity of approaches available, only several are commonly encountered in clandestine production (Allen and Cantrell, 1989; communication with the State Crime Command, 2003). Clandestine approaches to methamphetamine or amphetamine manufacture commonly used in Australia can be roughly categorized as those involving:

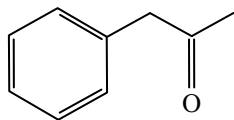
- a. the conversion of pseudoephedrine to methamphetamine using either (i) hydriodic acid and red phosphorus (i.e., the '*red phosphorus method*') or (ii) hypophosphorous acid and iodine (i.e., the '*hypophosphorous method*');
- b. the conversion of pseudoephedrine to methamphetamine using a reactive metal (e.g., lithium or sodium) with anhydrous ammonia (also known as the '*Nazi*' method); and
- c. the conversion of the precursor phenyl-2-propanone (P2P, also called benzyl methyl ketone or phenylacetone) to amphetamine using aluminium amalgam or formic acid (also known as the '*Leuckart method*').

The chemical precursors commonly used in the clandestine manufacture of methamphetamine (i.e., pseudoephedrine, ephedrine and P2P) are very similar in structure to both methamphetamine and amphetamine, and therefore can easily be used to synthesize either drug (Figure 10). Factors affecting the method used to produce methamphetamine or amphetamine include knowledge of the chemical procedures involved, the ease of manufacture, and access to the required precursor chemical and other necessary chemical reagents.

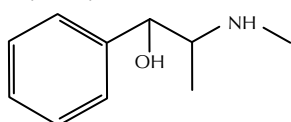
Figure 10. Precursors commonly used in the illicit manufacture of methamphetamine and amphetamine

Precursors

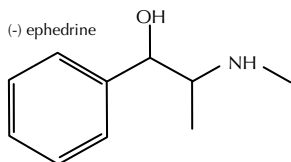
Phenyl-2-propanone (P2P)



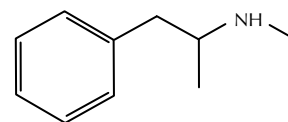
(+) pseudoephedrine



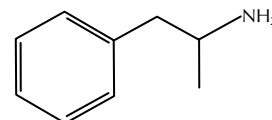
(-) ephedrine



Methamphetamine



Amphetamine



Synthesis of methamphetamine using hypophosphorous acid and iodine is by far the most common method encountered in NSW (Table 8). The hypophosphorous acid method originated in Gympie in 1995 and rapidly overtook production using hydriodic acid and red phosphorous in popularity, being a faster more efficient reaction that provided a greater yield of methamphetamine. The so-called *Nazi* method of manufacture is uncommon in NSW, being encountered more commonly in Western Australia. This method is potentially very dangerous because of the volatility of the chemical reaction. Procedures have recently emerged for carrying out variants of the *Nazi* procedure that are extremely simple and potentially very accessible to people without any formal training in chemistry.

The derivation of amphetamine from P2P was common in NSW until controls on the availability of P2P were tightened in the mid 1990s. However, there has been some evidence of a re-emergence of P2P as a precursor in NSW, this being a possible consequence of tighter controls being imposed on the supply of pseudoephedrine in NSW since 2001. Although P2P is also a controlled substance, it can be synthesized from other chemicals that are not controlled within NSW.

Table 8. Type and size of clandestine laboratories detected in NSW, 2003.

Laboratory type:	Number of clandestine laboratories detected			
	Small	Medium	Large	Total
Hypophosphorous acid and iodine	6	11	7	24
Hydriodic acid and red phosphorus	1	1	0	2
Pseudoephedrine extraction	4	4	0	8
Tabletting	1	0	1	2
Other ^a	2	1	0	3
Not classified	8	1	2	12
Total	22	18	10	51

Note. Methamphetamine laboratory size was measured according to the size of the reaction vessel: Small, <1 L; Medium, 1-5 L; Large, >5 L. The size of other drug laboratories were measured according to quantity of the drug being manufactured per reaction and the corresponding DMTA legislation for indictable (Small), commercial (Medium) or large commercial (Large) manufacture.

^a GHB, MDMA/cocaine and methcathinone.

Controlling the diversion of precursor chemicals forms the bane of attempts to control the domestic production of methamphetamine. Precursor chemicals that are used in the clandestine production of methamphetamine have a wide range of legitimate uses and therefore it is difficult to restrict their use to prevent diversion into clandestine methamphetamine manufacture. Over the past decade there have been several changes to precursor legislation in NSW in an attempt to control the diversion of precursor chemicals. These legislative changes have been associated with shifts in methods of sourcing precursors and changes in the methods used to manufacture methamphetamine, as discussed below.

Chemical diversion and the regulation of precursor drugs

The importation of precursor drugs used in the manufacture of methamphetamine (i.e., P2P, ephedrine and pseudoephedrine) has been controlled since 1991 (Customs [Prohibited Imports] Regulations 1956, 10 Sept 1991). In 1999 criminal offences were introduced for the illegal importation of these substances with a maximum of five years imprisonment and a pecuniary penalty. However, domestic controls did not come into play in NSW until 1995 when the following compounds were listed in NSW under Schedule 1 of the *Drugs Misuse and Trafficking Act*: pseudoephedrine, ephedrine, 1-phenyl-2-propanol, 1-phenyl-2-propanone, phenylpropanolamine, 1-phenyl-2-nitropropene, and 1-phenyl-2-chloropropane. Prior to this legislation, methamphetamine manufacturers in NSW sourced their precursors domestically through illegitimate bulk purchases from chemical suppliers and/or other methods of diversion from the chemical industry.

During the mid 1990s there was a strong law enforcement focus on the diversion of P2P from the chemical industry – P2P being the major precursor drug used in the manufacture of amphetamine at the time. At around the same time, there was an increasing awareness among clandestine drug manufacturers that methamphetamine could be easily and efficiently produced using pseudoephedrine. Both were likely factors contributing to the shift seen in the mid 1990s from P2P to pseudoephedrine as the major precursor, and consequent shift in street level seizures from amphetamine to methamphetamine (McKetin and McLaren, 2004).

A further benefit in using pharmaceutical grade pseudoephedrine as a precursor was that it conveniently converted directly to the active isomer of methamphetamine, rather than the racemic mix of half active and half inactive isomers that resulted from production using P2P.⁹ In other words, only half the amount of the precursor was required to produce an equivalent dose of methamphetamine, or, conversely, the methamphetamine yielded from pharmaceutical grade pseudoephedrine was double the potency.

From 1996 there was a trend emerging toward sourcing pseudoephedrine from over-the-counter cold and flu preparations. Further tightening of industry controls in 1997 resulted in a strong decrease in bulk diversion and theft from the chemistry industry, with no reported incidents of theft or diversion of pseudoephedrine within NSW from 1999 until 2002. Despite curbing the diversion of pseudoephedrine from the chemical industry, the number of clandestine laboratories detected in NSW continued to increase, with over-the-counter cold and flu tablets containing pseudoephedrine (e.g., Sudafed®) having become the precursor of choice.

In 2000, controls on the availability of precursor drugs were again reviewed, and since September 2001 pseudoephedrine has been placed under a specific schedule designed to tighten the control of precursors used in the illicit manufacture of synthetic drugs.¹⁰ Regulation of over-the-counter products containing pseudoephedrine was also tightened in November 2001 with the rescheduling of products containing pseudoephedrine as the single active ingredient from Schedule 2 (S2) to Schedule 3R (S3R) for packet sizes under 60 tablets and S4 for packets containing more than 60 tablets. The Schedule 3R required that these products be kept behind the counter at chemist outlets rather than on display, and sold through consultation with a pharmacist to ensure their appropriate use. This schedule also required that the pharmacist record purchases of the product. The S4 preparations can only be obtained with a prescription from a medical practitioner.

In response to the rescheduling of cold and flu preparations containing pseudoephedrine as the single active ingredient, people involved with clandestine methamphetamine manufacture turned their focus toward 'combination' pseudoephedrine preparations that remained available as over-the-counter Schedule 2 products. In 2000, prior to the re-scheduling of single ingredient pseudoephedrine products, preparations containing pseudoephedrine in combination with other products accounted for only 7% of all precursor tablets seized by NSW Police in conjunction with the illicit manufacture of methamphetamine. By 2003 these combination preparations accounted for 86% of tablets seized at clandestine manufacture sites (communication with the State Crime Command, 2003).

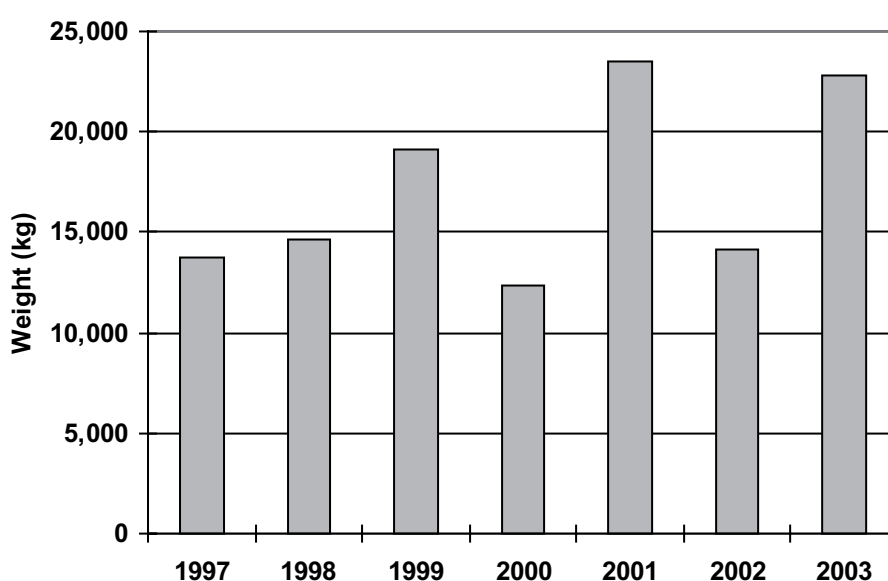
It is difficult to monitor the diversion of over-the-counter preparations containing pseudoephedrine. Legitimate imports of pseudoephedrine into Australia have increased on average 1.5 tons per year since 1997, although the amount of pseudoephedrine imported each year is highly varied

⁹ Pharmaceutical preparations containing pseudoephedrine contain only the active (+) optical isomer of pseudoephedrine. This isomer converts to the active (+) isomer of methamphetamine. In the case of methamphetamine, the active isomer (+) methamphetamine has a central nervous system stimulant action, whereas the inactive (-) isomer has minimal central nervous system stimulant action. An optical isomer is the mirror image of a molecule that is otherwise identical in structure. Active and inactive optical isomers (or enantiomers) of chemicals are referred to as dextrorotatory (d) or levorotatory (l).

¹⁰ Under the NSW *Drugs Misuse and Trafficking Act* it is now an offence to possess pseudoephedrine with the intent to manufacture. Pseudoephedrine now also falls under Category 1 of the Industry Code of Practice, which restricts purchase of the drug and deters diversion of these products for use in the manufacture of methamphetamine. Purchase of these products needs to be accompanied by an "end-user-declaration", the purchaser needs to be an account holder with the supplying company and the products need to be purchased through this account, and there is a delay of 24 hours before release of the purchased goods.

(Figure 11). The increase in legitimate pseudoephedrine importation could reflect increasing use of pharmaceutical preparations into illicit drug manufacture; however, at a population level this increase only amounts to between two and three 30 mg tablets of pseudoephedrine per person per year.¹¹ It would be difficult to dispute that such a small increase was not due to an increase in the legitimate use of cold and flu preparations, particularly without good data on trends in pseudoephedrine consumption. Moreover, data provided here on pseudoephedrine importations includes only raw pseudoephedrine, and does not capture pre-manufactured pseudoephedrine preparations that are imported into Australia (e.g., Telfast® decongestants), which could also be used in clandestine methamphetamine manufacture. These type of problems highlight the difficulty in monitoring the diversion of pseudoephedrine, with piecemeal data on the legitimate importation and sale of these products, and no corresponding trend information on their legitimate usage.

Figure 11. Weight of Australian Customs Service import entries for pseudoephedrine, 1997-2003



Sourcing of precursors

Since controls on precursors have tightened, diversion from pharmacies has remained the most common method of sourcing precursors; however, diversion strategies have become increasingly sophisticated, and sourcing of these chemicals has developed as a criminal enterprise in its own right. Sourcing of cold and flu preparations may be very organized and undertaken in collaboration with criminal syndicates involved in methamphetamine manufacture and other aspects of the drug's supply. Individuals or groups of individuals embark on 'runs' of pharmaceutical outlets in towns across the state and interstate, targeting chemist outlets that have large amounts of cold and flu tablets on display and chemists who do not comply with requirements for providing identification that are stipulated under the S3R. Chemist outlets in each town are systematically visited and pseudoephedrine-containing products are purchased or shop-lifted. These chemist runs can be very organized and may yield thousands of tablets which are provided to the criminal syndicate(s) organising the methamphetamine manufacture. Burglary is another means of obtaining cold and flu preparations, and chemist runs can provide an opportunity to identify chemist outlets that may be an easy target for burglary.

¹¹ Based on the ABS estimated residential population in Australia at June 30, 2003 (19,880,599).

Another strategy for sourcing over-the-counter preparations containing pseudoephedrine is through methamphetamine dealers offering to pay their customers for purchasing these products. Although this approach may seem less sophisticated than large organized chemist shopping expeditions, this method of obtaining precursors would be difficult to detect due to the number of different people purchasing the product, their distance from the producer, and also because they need not purchase the product in conspicuously large quantities. Methamphetamine users and low level dealers are ideal candidates for sourcing precursors as they often rely on income from illicit activities, can be paid in drugs, and are directly or indirectly networked with those involved in methamphetamine production.

Recent large-scale border detections of pseudoephedrine and ephedrine suggest that methamphetamine manufacturers are also looking to import precursors as a viable alternative to their domestic supply. One of the first large precursor border detections at the Australian border occurred in September 2001 and involved a shipment of approximately 550 kg of ephedrine in a crystalline powder form that had been concealed in a consignment of ceramic tiles from Europe. In September 2003 a further seizure of 750 kg of pseudoephedrine was detected in wall-plaques being imported into Sydney. More recently in March 2004 a shipment of 1.5 tons of pseudoephedrine was intercepted in the Philippines that was destined for Australia. During the following month approximately 456,000 imported pseudoephedrine tablets were detected in multiple courier deliveries of bogus vitamin pills that originated from a falsified company in Malaysia. Importations of pseudo/ephedrine detected at the Australian border also include cold and flu remedies sold in Southeast Asian countries and herbal ephedra, from which ephedrine can be derived.

The majority of pseudo/ephedrine importations detected at the Australian border are not destined for use in clandestine methamphetamine manufacture. In many instances they are the result of people ordering products from overseas that may contain pseudoephedrine or ephedrine (e.g., dietary supplements) and their not being familiar with Customs legislation, as opposed to any criminal intent on the part of the importer. Therefore it is difficult to monitor trends in the importation of precursors that are destined for use in illicit drug manufacture. Moreover, monitoring the weight of precursor seizures is complicated by the varied physical forms and dosage concentrations in which they occur. However, the recent large-scale border detections of precursor chemicals do suggest that a proportion of domestic methamphetamine manufacture relies on imported precursors.

The trend toward the importation of precursors is likely to be driven by profit as much as the tightening of domestic precursor regulations. Domestic sourcing of precursors remains viable and prolific, while organising large-scale importations necessarily entails a considerable degree of organisation and risk, which would presumably outstrip that associated with purchasing over-the-counter cold and flu preparations within Australia. Conversely, ephedrine at import to Australia is estimated to cost around \$10,000 to \$30,000 per kilogram, whereas this same amount can be purchased in bulk for as little as US\$70-120 per kilogram in countries within Southeast and East Asia (communication with the Australian Customs Service, 2004, and the NSW Police State Crime Command, 2005). This price differential makes importing precursors a lucrative business, while the penalties associated with such imports are lower than those for importing methamphetamine if detected.

Conclusion

Traditionally the methamphetamine available in Australia has been domestically produced; however, since 2000 there has been a trend toward large-scale ice importations from Southeast Asia. The number of clandestine methamphetamine laboratories detected within Australia has also

increased since the late 1990s, suggesting a concurrent increase in the domestic production of the drug. There is also evidence that ice is being manufactured domestically, although it was not clear to what extent this was occurring. These trends are likely to have increased the net supply of methamphetamine to Australia, as well as having increased the availability of high purity methamphetamine.

OMCG are thought to play a dominant role in the domestic production of methamphetamine within Australia, whereas criminal networks involved in heroin importation have been involved with the large-scale importation of ice from Southeast Asia. The involvement of different criminal groups in the supply of domestic and imported methamphetamine may invoke competition in the market. However, the increasing involvement of a range of criminal syndicates in methamphetamine supply is likely to complicate the impact of imported methamphetamine on the dynamics of the Sydney drug market. The opportunistic arrangements between these various criminal syndicates and/or competition between these syndicates is also likely to be a driving force in the emergence of domestic ice production and the importation of precursor chemicals used in methamphetamine manufacture.

One of the main barriers to controlling domestic methamphetamine manufacture is the ready availability of precursor chemicals. There are a multitude of methods that can be used to manufacture methamphetamine which allow the use of a variety of different precursor chemicals and various chemical reagents. Trends in the production of methamphetamine over the past decade clearly demonstrate that methamphetamine manufacturers readily adapt their methods of production and the sourcing of precursors in the face of legislative changes and law enforcement focus. Currently, domestic controls over precursor availability remain sufficiently lax to allow pseudoephedrine to be sourced from over-the-counter cold and flu preparations, and these preparations remain the primary source of precursors used in domestic methamphetamine manufacture. It is difficult to limit the supply of domestic precursors because they have a wide range of legitimate uses, and, as mentioned above, manufacturers change the types of precursors they use and their sourcing of precursors in the face of precursor restrictions. Even in the event that the diversion of domestic precursors could be effectively controlled, the methamphetamine supply is unlikely to abate because of the trend toward large-scale importations of both precursors and methamphetamine.

The consequences of any further shifts in legislation to control methamphetamine precursor chemicals are likely to be multidimensional. This fact needs to be considered when attempting to prevent methamphetamine manufacture by reducing precursor availability. One serious limitation in monitoring the impact of precursor legislation on methamphetamine manufacture is the absence of comprehensive data relating to precursor usage. First, there are no estimates on the consumption of cold and flu tablets containing pseudoephedrine. Second, data on the sale of products containing pseudoephedrine are incomplete. Third, data on legitimate importations of pseudoephedrine are not centralised. Finally, the use of pseudoephedrine and ephedrine in a range of imported products makes it extremely difficult to monitor the importation of pseudo/ephedrine intended for use in methamphetamine manufacture. These data limitations mean that it is not possible to monitor the discrepancy between the legitimate importation and the legitimate usage of pseudo/ephedrine. It is also not possible to definitively monitor trends in precursor importations destined for use in methamphetamine manufacture. Monitoring the diversion of precursor chemicals is likely to become more complicated in the face of precursor importation because it will be difficult to track the origin of precursors used in the domestic manufacture of methamphetamine. Improvements in precursor data are essential if precursor diversion and the effectiveness of precursor legislation are to be accurately monitored.

The supply of methamphetamine in Sydney

Rebecca McKetin, Jennifer McLaren and Erin Kelly¹²

Key points

- The structure of the methamphetamine market in Sydney can be viewed as consisting of several broad levels relating to: (i) manufacture/importation and related activities; (ii) the movement of the drug from the manufacture/importation stage to the dealing level of the market; (iii) wholesale dealing; and (iv) the retail of the drug to consumers. Variations in the structure of the supply chain are contingent on a number of external factors and there are also various sub-structures and layers within each level of the market.
- There were at least two criminally involved groups that exerted a top-down influence on the methamphetamine market in Sydney. The influence of criminal groups was manifested in 'turf' boundaries at a dealing level and geographic disparities in the supply of imported ice and domestically produced base.
- The distribution of methamphetamine through retail level dealers operated in a similar way to a multi-level marketing scheme, occurring through existing social networks and word-of-mouth.
- In the absence of any legitimate business structures, fear of violent retribution played an important role in regulating methamphetamine supply, both protecting and punishing people involved in the industry.
- The methamphetamine industry was impregnated with a culture of creating distance between individuals involved in high level supply and any activities or events that may lead them to be detected by law enforcement.
- Methamphetamine users had limited knowledge of high level supply activities, such as manufacture and importation. However, a small proportion of methamphetamine users had been recruited to undertake miscellaneous tasks related to methamphetamine manufacture and the wholesale distribution of the drug (e.g., obtaining precursors and transporting methamphetamine).

The organisation of the methamphetamine market

Most drug dealers and law enforcement personnel viewed the methamphetamine market as having several levels (usually three to five) that corresponded to the different processes involved in methamphetamine supply, notably (i) production or importation of the drug, (ii) distribution of the drug to the dealing layer of the market, (iii) wholesale dealing, and (iv) the retail of the drug to consumers. People involved in high level methamphetamine supply would limit their contact with lower levels of the market through the use of their associates and/or 'runners' who would courier or pass on the drug to high level dealers.

Two different scenarios of a methamphetamine supply chain are depicted in Figure 12. These examples of the supply chain were based on the descriptions provided by methamphetamine dealers in Sydney who were primarily involved in selling base methamphetamine. These scenarios

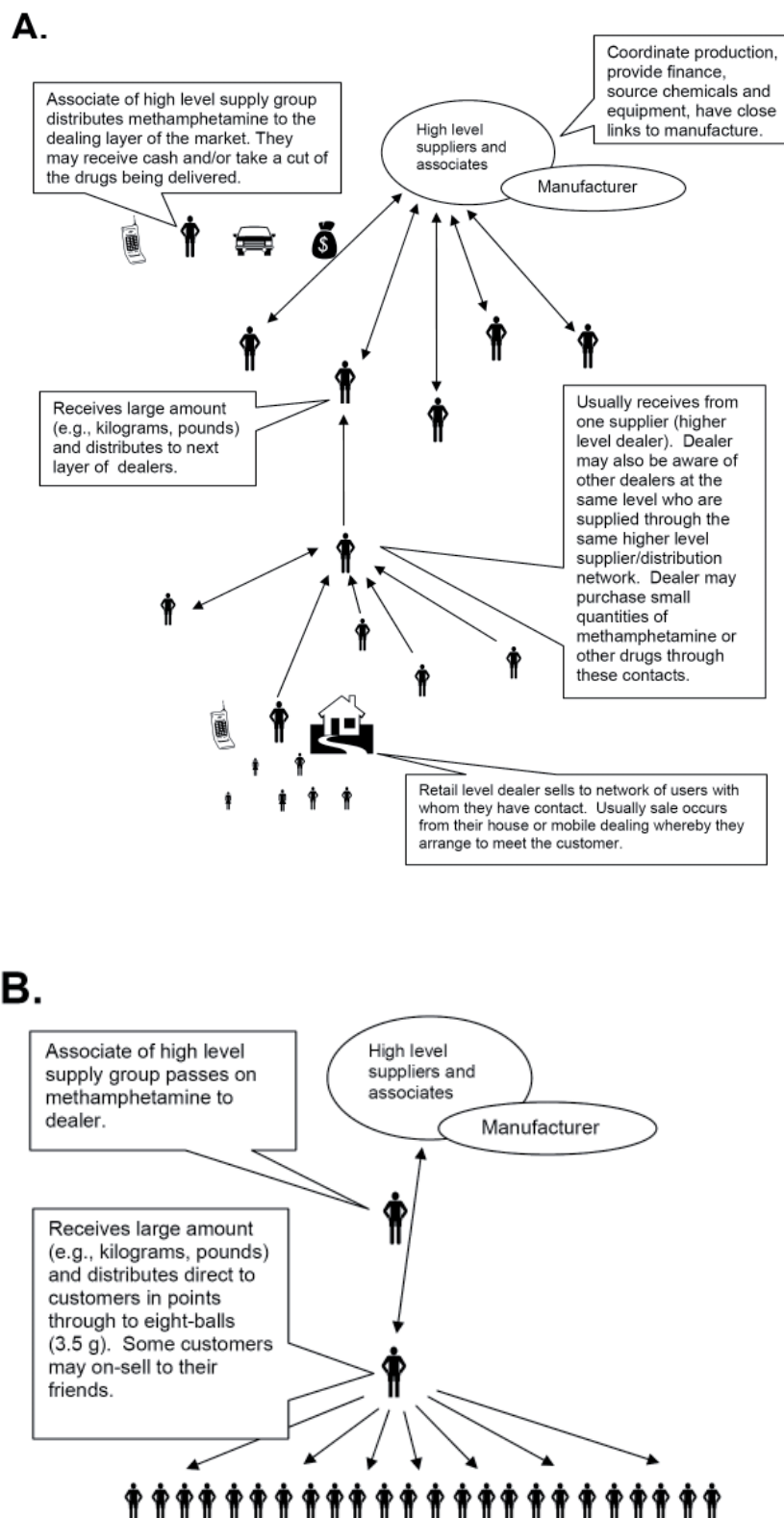
¹² National Drug and Alcohol Research Centre, University of New South Wales

show how the number of dealing levels within the market can vary, as can the number and type of customers to whom a dealer sells. It was difficult to classify these dealers as exclusively wholesale or retail level dealers because they often took on both roles simultaneously and also varied the quantities and types of drugs they sold at different points in time. Similarly, some methamphetamine dealers and users appeared to be opportunistically involved in specific aspects of high level methamphetamine supply, such as sourcing of precursors, obtaining chemical glassware, or transportation of methamphetamine between high level dealers. Moreover, the organisation of the supply chain and the number of different processes involved in supply varied, depending on the source of methamphetamine (e.g., local manufacture, interstate or imported); the interpersonal relationships between people within the supply chain (i.e., friendships or business relationships) and a range of other circumstantial factors.

Most dealers interviewed in the current study did not have detailed knowledge of high level methamphetamine supply, but dealers did refer to the involvement of dominant groups of people or individuals who had a controlling influence on methamphetamine supply. These groups included various outlaw motor cycle gangs (OMCG), ethnically based criminal networks, and interstate suppliers of the drug. The involvement of dominant groups within the methamphetamine market is consistent with the views expressed by law enforcement key informants from Sydney and previous research on methamphetamine markets in Western Australia (Ovenden et al., 1995). The involvement of these various groups in methamphetamine supply is discussed in the following section.

The involvement of dominant criminal groups in the methamphetamine market is somewhat at odds with the contemporary notion that drug markets consist of loosely associated networks of individuals (Pearson and Hobbs, 2001; Reuter and Haaga, 1989). However, the involvement of dominant criminal groups or networks does not necessarily exclude small-time dealers or producers, nor does it preclude the formation of opportunistic relationships between individuals or groups of individuals. In the current study, the process of circumstantial and opportunistic supply networks seemed to co-exist within the framework of more dominant criminal networks – the influence of the latter being mediated by their ability to produce or import methamphetamine, or provide access to the precursor chemicals and equipment needed to produce the drug.

Figure 12. Schematic representation of the supply chain for distribution of domestically produced methamphetamine with A. multiple dealing layers and B. a single dealing layer



Criminal groups involved in the methamphetamine market

The involvement of OMCG in the domestic manufacture and supply of methamphetamine in Australia is well recognised (ACC, 2003) and our research reflected this perception, with members or associates of OMCG frequently being mentioned in relation to methamphetamine supply in Sydney. The involvement of OMCG in methamphetamine supply appeared to be ubiquitous, but focused predominantly on the domestic manufacture of base methamphetamine and its distribution. The involvement of OMCG was particularly dominant in the outer Western regions of Sydney; however, their involvement was not exclusive to these regions.

"I mean if the Asian's run an area there's always bikies in there somewhere. It's just one of those things. As to my knowledge, the bikies have got their fingers in every single pie. ...I wouldn't necessarily say they work together, but as I say the Asians will own an area, but the bikies will always have something to do with that. ...Same as the Lebs, you know the Lebs own a few areas, and, but, you know there's always something to do with bikies around there."

"The bikies control the speed market as I know of, that's just sort of one of them common knowledge things..."

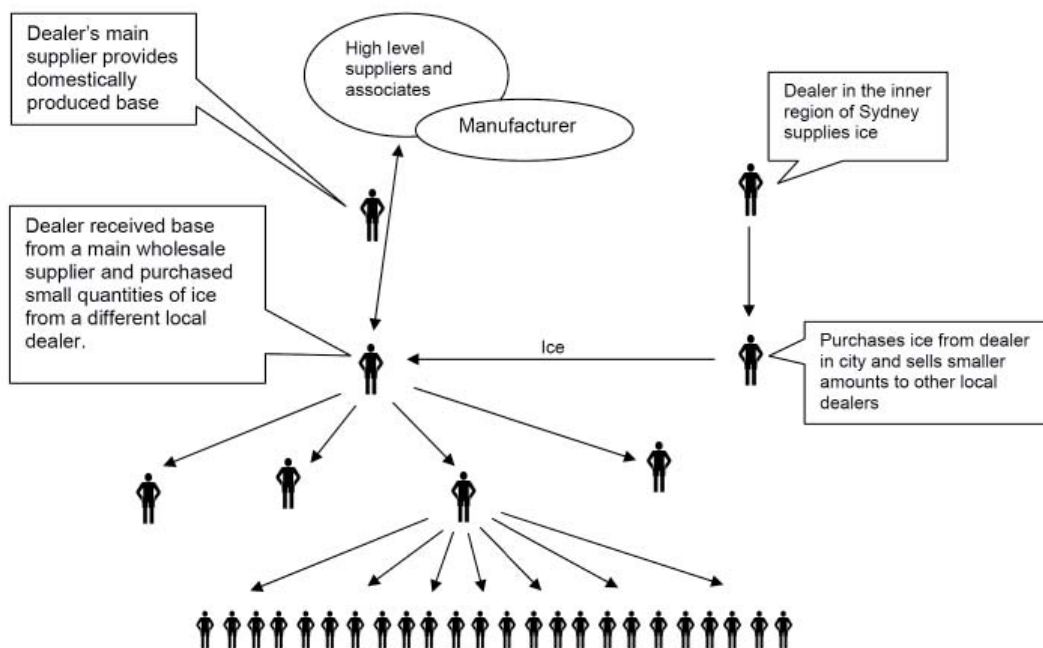
Manufacturers of methamphetamine relied on OMCG connections for obtaining precursors, reagents and glassware. The breadth of OMCG networks facilitated access to these chemicals and equipment, and also provided a broad network through which methamphetamine could be distributed once it had been produced. The establishment of OMCG chapters both interstate and internationally facilitated the development of networks of people through which methamphetamine and other drugs could be imported, manufactured, transported and distributed while also effecting a geographically disperse influence over the methamphetamine supply.

Juxtaposed with the influence of OMCG over domestically produced methamphetamine was the dominance of criminal networks associated with heroin trafficking in the importation and distribution of ice, particularly within the inner region of Sydney. One dealer located on the outskirts of Sydney, who primarily sold base methamphetamine, commented that although small quantities of ice could be purchased from dealers within his local area, purchasing large quantities of ice required approaching dealers within the inner regions of Sydney – a similar phenomenon being observed for cocaine (Figure 13). Similarly, other dealers noted a much stronger market for ice in the inner regions of Sydney compared with the outer Western regions of Sydney (see *The retail market for methamphetamine* for further detail).

"A couple of friends have got dealers in the city that they buy off and ice isn't that big for me yet. I know other people are selling large amounts of it, to me it's only an eight ball say every two weeks. Like it's not that much, I'm just buying off other dealers like myself."

"If I wanted like large amounts of crack, say rock, then I'd have to go somewhere else. If I wanted like kilos and kilos of cocaine, yeah I'd have to go into the city to get it. I know they sell decent amounts, like I could probably get a half kilo off them (i.e., local supplier), but if I wanted say three or four kilos then I'd probably have to go somewhere else."

Figure 13. Schematic representation of a dealer sourcing domestic vs. imported methamphetamine



Established heroin trafficking networks were linked to heroin distribution channels within Sydney through which ice was distributed. This pattern of ice distribution was observed following a large scale ice seizure in Sydney, when packets from an imported consignment stored within inner Sydney were dispatched to traditional heroin distribution networks in other parts of Sydney. Distribution of ice through such channels was also evidenced by ice use among injecting heroin users in Sydney during the heroin shortage of 2001 (Darke et al., 2001), while key experts in the current research also reported ice use among heroin users in the inner region of Sydney.

Other established and emerging criminal networks also played a role in drug supply more generally, these networks often being based on ethnic or cultural ties. Ethnically-based criminal networks in Southwest Sydney were dominant in the distribution of ice as well as other forms of methamphetamine and other drugs (e.g., cocaine, cannabis and ecstasy), particularly to nightclubs and other entertainment venues within Sydney. These criminal networks were also involved in other aspects of methamphetamine supply, notably manufacture of amphetamine-type stimulant pills, but their involvement in methamphetamine manufacture was less pronounced than for OMCGs and their involvement with importation appeared not to include methamphetamine.

It was also clear that not all methamphetamine supply in Sydney was controlled by Sydney based criminal groups, with the presence of interstate influences and interstate supply of methamphetamine. Interstate supply of methamphetamine may reflect a higher demand for methamphetamine in Sydney than can be met by local production/importation or the relative ease of methamphetamine manufacture in geographic locations outside of Sydney (e.g., due to interstate differences in precursor chemical legislations or the ability to conceal methamphetamine laboratories). Interstate supply of methamphetamine to Sydney could also result from importation of ice destined for Sydney through other ports in Australia.

Dealing 'turf' associated with criminal groups

There was a perception among dealers that various criminal networks or groups tended to control the distribution of methamphetamine within distinct geographic areas, or 'turf'. These geographic areas were described by one dealer as *"territorial acquisitions"*. He also explained *"the Southwest is owned by the (name of group), you wouldn't go there"*. Similarly, *"Blacktown's a (name of group) area. You know what I mean?"* Dealers were mindful of boundaries between the territories controlled by different groups, and to what extent and in what circumstances it was not acceptable to cross into dealing turf associated with a rival supplier.

"There's some areas where you don't want to move in on... If you jumped in on say around Kings Cross or Blacktown, big problems, big problems. You don't want to, you just, you know you, like houses will get blown up and shit... because like Blacktown's a (name of group) area."

"You know, I'd go out one night and I'd meet some bloke and then the next thing you know he's a customer. You know what I mean? I wouldn't be particularly moving into an area, but say you know I was living in Carlingford, say if I was selling to five people in Fairfield, I wouldn't be really moving into Fairfield, do you know what I mean?"

"We had some (dealer) down by (suburb), they came out here and they wanted to sell on my street, like on my very street. We weren't going to have that, so we started like breaking their windows, and standing out on the street with golf balls, and golf clubs and just hitting balls into their house and stuff, tried to scare them off. And then they came around my house and started shooting through the windows and stuff. After that it got a bit more out of control. It's the only time I've ever really had any trouble with people trying to stop me doing my business."

Although these kinds of territorial breaches typically occur at the lower end of the market, they may instigate the involvement of groups controlling supply who have a vested interest in protecting their distribution territory. In this context, a degree of protection was afforded by loyalty to a particular criminal group supplying methamphetamine, because the dealer could rely on back-up from their suppliers in situations where they felt threatened.

"Anyone who I was, who I was sort of sketchy about, who I was moving particular amounts to, I'd always have a few big guys behind me. So then, you know, and they'd see the colours and they'd go 'okay cool, we're not going to mess with this bloke.'"

"You know I threatened some of them and they'd hide and because I knew they knew I had contacts and they weren't going to piss me off, I'd say you really don't want to piss me off. ...And those people that I knew were particularly bad people, so that's why we never used to get touched, because they were bad people. People know who they are and that, and they have a reputation and yeah people don't fuck with people that have reputations."

"A lot of the white dealers go to (name of group), a lot of the Asian dealers have their own sort of contacts, the Lebanese have their own, they get that from Lebanon and stuff like that as well. ...because of that it makes them only too happy to sort it out because then they (i.e., the supplier) have less competition as well."

The distribution of methamphetamine

Distribution of methamphetamine through wholesale and retail level dealers occurred primarily through groups or networks of people known to dealers, and, where this was not the case, dealers used discretion regarding where and to whom they sold drugs. This finding was borne out in the survey of methamphetamine users, where 91% of users indicated that their dealer was either a friend or an acquaintance. Retail level dealers needed to have good rapport with prospective customers. Being of a similar demographic was important in this regard.

"Like if I walk up to a twenty-three year old or something and say 'Hey do you want to buy some drugs?' They'll laugh at me and say 'Whatever, what do you think you are?' "

"I met them somehow, you know, through a friend or whatever. I would never go up to someone on the street and deal, no way. I wouldn't even ask them. ... But I'm sensible in my ways, so."

It was not the case that retail level dealers had to seek out new customers to support their business. In fact, it was more often a problem that they could not or did not wish to meet the demands of clients. As one dealer commented: *"I wish I could sell less than what I do now. I'm trying to sell less."* Acquisition of customers appeared to occur with little effort, and primarily through word-of-mouth. Referral from other customers rapidly led to increased business, especially if the dealer was providing good value for money.

"You get one, one user, one buyer from the dealer, that goes to another couple of users 'I'm getting it here, I know where to get it'. You know. He hasn't been doing it long, but yeah, it's all right, it's good stuff. And it just goes on from there. And if it is good stuff the word goes out even quicker, 'Here try this'. Like a mate will say, or his mate will say 'do you know where I can get some gear from...'"

"I didn't even really know that many people there... and my flatmate was working behind a bar, and then suddenly it's just people coming from everywhere, all sorts of people. ...Because everyone was buying really shitty deals off everyone else, and I was really fair and cheaper."

Retail dealers needed to manage the number of people to whom they sold methamphetamine, either because they did not want to become more heavily involved in dealing or because they feared that having too many customers would increase the risk of police detection or being apprehended with a large quantity of the drug. There were a number of strategies that retail dealers used to manage the increased risk associated with having more customers, such as only taking customers on referral, not dealing to people who they did not trust, or getting to know the customer before selling to them.

"Well the first time I normally meet them, I normally like, invite them over to my house and we have a few cold ones or whatever with them. It's better that you know who you're selling to. I wouldn't say I'm on so close a relationship that I go to their birthdays or anything like that. I sort of only, sort of, try to... like you try and suss out if they're under-covers or whatever."

"I tended to get a good client coming in, and then I'd cut him off, like guys I didn't trust, I'd just cut them off."

Some retail dealers did not accept extra customers and preferred to restrict their dealing to a small group of customers they knew and trusted. This reservation about selling to a large number of customers had the potential to create an extra layer in the dealing level of the market. Specifically,

the consumer became a retail level dealer for their network of friends, and the former retail level dealer became a wholesale dealer because they were now able to sell larger quantities of the drug. This additional layer in the market also served to insulate the former retail dealer from the retail level of the market, and consequently served to reduce their risk of being detected by law enforcement.

"That's why I give some to somebody else and some to another person, yeah I don't want too much on me, you don't want too many people coming round, me being seen with too many people as well."

"I just sell to that one person. If they want to bring someone else to there, they can do that, that's their job, not my job."

There appears to be a certain degree of strategy among dealers who move larger amounts of methamphetamine in that they either opportunistically network among potential clientele and/or sell to retail dealers with access to different segments of the market. Having distributors in different localities and among different user groups provides access to broader networks through which the drug can be sold.

"Well you wouldn't put all your ice cream trucks in one street around a lake would you, you know you'd spread them out sort of thing? Do you know what I mean?"

"Well I try to get more students because they're more willing to experiment and stuff, so, but a lot of them I know are junkies and stuff like that. ...There's no average person but I'm building up, yeah more students, that's where I'm trying to sell to."

The role of credit and trust in facilitating distribution

The amount of methamphetamine that a retail dealer could distribute or 'move' was limited by how much methamphetamine they could afford to purchase. Purchasing large quantities such as pounds or kilograms required an up-front investment of several thousand dollars. Profits from dealing could be put back into purchasing larger amounts of methamphetamine; however, the amount of profit available was still limited by the quantity of methamphetamine the dealer was able to purchase in the initial instance. In situations where drugs were provided to dealers on credit, there needed to be an element of interpersonal trust between the dealer and the supplier, or the dealer needed to first develop a reputation of being reliable.

"The profit margin... I know I've been making three and a half thousand actually. Then I'd be putting say more than what I bought last time, I'd put some of my own money back into it, and buy a larger amount or something like that, just keep on building it up like that."

"Well I earned that trust at first, you know, because there was a time where like I'd known him for a while, and I was buying by cash, and when he started getting this base, it's just, things just went like amazingly. And it's just, you know with what was going on, and what I was moving and all the rest of it, I just had to buy it on tick, and he had no problem with it. You know tick is a regular thing, yeah, but you know you don't just get it straight off the bat, you've sort of got to earn that kind of trust..."

Providing drugs on credit to retail level dealers allowed drugs to be moved more quickly to the retail end of the market, and suppliers sought out trustworthy dealers who could provide this opportunity, especially younger dealers who had little criminal history, as this helped avoid detection by law enforcement. In turn, retail dealers expressed a degree of earnestness in how they capitalised on this business opportunity, including the establishment of the supplier's trust.

"He claims that I was the only one that sort of could look him in the eyes and be straight with him, he found everyone else just really sketchy. And he said to me 'Here have a whole lot of it go and sell it and go and make yourself some money'. And he gave me a great amount on credit, which I, for some strange reason people seemed to have trusted me a lot with it. ...Yeah after that he started to give me pounds of pot, grams of ecstasy, whatever I wanted. ...then I met more sort of criminals, older ones, that then started giving me acid on tick, in sheets of it. And I suddenly had all this trust, all these weird gang people that were just coming round and giving me everything that I wanted."

"I know dealers in Sydney that are like 16, and they're huge big time dealers, they're still at school. And dealers like to sort of target 16 year olds before they get busted as being juveniles, and they can't go down testifying, so they tend to find a very trustworthy 16 year old, give him all his trust which makes him special. If he's good he'll make a lot of money."

"...he'd tick me up ten, fifteen grand, and I'd come back and see him the next day with more. And he'd be like 'okay cool', so he just sort of started looking after me."

"So by me just buying large amounts off him it's just helping him get more of a reputation of a reliable source of income for them as well."

Debts and retribution

One of the downsides for dealers of receiving methamphetamine on credit was the risk of retribution should they be unable to meet their financial obligations to their supplier. Owing money and/or drugs was a common antecedent to violence or threats of violence within the methamphetamine market. In some instances this violence may be inflicted not by the supplier directly but by their associates. In this context, groups or networks of people associated with the supplier tended to act as a catalyst for fear of retribution. Dealers would go to great lengths to try to avoid contact with supply networks to whom they owed money, but sometimes the pervasiveness and influence of these groups made it difficult to hide.

"I did, well, only owe him twelve thousand dollars, but he's not the sort of person that you want to mess with ...probably fifteen of his mates who know who I am ...it doesn't matter where you're hiding, if they want to get you, they'll get you ...if I moved to Brisbane or if I moved to Melbourne it would still be the same kind of danger, because it's an Australia-wide organisation."

"...a guy borrowed \$60,000 ...and then just took off. ...they were going to go round and chop his fingers off, they're going to break his legs, and it's a really hard situation. But the guy split the country anyway so they couldn't find him anyway but he won't feel very safe. And they were like two really good friends. And this was with friends, there's no friends in this industry."

"This dude did a runner on me with some drugs ...and I promised the dude that nothing would happen and it did. So I went out there and faced up, ended up copping a beating whatever you want to call it, and then I stayed at this girl's place that I knew for about a week while everything healed up."

Despite dealers reporting having been involved in supply relationships where they were able to obtain drugs on credit, this practice was not common among retail level dealers. The overwhelming majority of methamphetamine dealers (96%) interviewed through the current research reported that they paid cash for their methamphetamine, with only 4% of dealers

reporting that they usually received methamphetamine on credit. Not providing drugs on credit was perceived as a way of circumventing the need for retribution, which in itself was a risk activity too because carrying out retribution could attract the attention of law enforcement.

The culture of an illicit drug industry

Based on the commentaries of dealers, there appeared to be several aspects of the methamphetamine supply culture that reduced the risk of detection by law enforcement. A particularly salient aspect of the drug culture that minimised police detection was an unwritten code of conduct that those involved in methamphetamine supply did not 'talk out of school' or 'dob' on the activities of their associates. Talking to the police, or being a 'dog', was strongly despised and appeared to be regarded as one of the lowest forms of conduct and deserving of serious retribution.

"You talk out of school you'll probably get kneecapped, shot in the leg. You don't talk to the police or you get killed for doing that."

"I know a lot of people who've been killed, shot, murdered, never been found, skinned alive, hung and tortured, fucking everything. Deserved it ...they're talking out of school, talking to the police. A dog, you know, you die for that."

An extension of this culture was that dealers did not ask questions of their suppliers. Knowledge of drug supply may be gleaned from information offered by suppliers, or from people's general understanding of events, but to ask questions was discouraged. Dealers seemed to accept that they did not need to know where their supply came from, and felt that asking questions roused suspicion and might implicate them in higher level supply activities. Dealers also interpreted this disapproval of curiosity as concern that they were attempting to go direct to a higher level supplier. This pattern of communication implied that information was shared on a 'need to know' basis, and this protected both the higher level suppliers from 'dobbing' and the lower level dealers from being implicated in higher level supply activities.

"I don't like to ask too many questions about those areas, because people will start saying so well what's it to you? Do you know what I mean? You don't want to implicate yourself too much. ...The number one rule is don't ask questions. And you hear, if someone tells you, that's fine, but even then there's been situations where there's been too much information and it's freaked me out."

"I wouldn't know. I don't need to. ...I don't really need to know. I don't really care about it, like it doesn't really bother me, as long as I got it."

"I know it's not really something you would ask, I wouldn't actually ask my bloke, 'Who are you getting it from?' I'd get a shiv in the back, even though we've been best friends for bloody twenty years he'd still bloody kill me, if he knew I was buying up on him or whatever so, you know what I mean I don't want to get in trouble."

High level methamphetamine suppliers also created distance between themselves and illicit activities by out-sourcing tasks or organising 'gophers' to do tasks for them, such as transporting drugs, packaging and labelling drugs and purchasing precursors and reagents needed to manufacture methamphetamine. They took measures to prevent their own identity being associated with illicit activities, such as hiring rental vehicles, purchasing identity documents, or using other people to purchase chemicals or reagents that required registration of identity. People recruited to undertake these tasks may have limited awareness of their role in drug supply and

may not be aware of the other people involved in the supply network. Tasks may be outsourced at random to decrease the risk of a consistent pattern of behaviour being noticed and thereby decreasing risk of detection by law enforcement.

"...for example, I introduced someone who was a real desperado, had no money, and what they really wanted was his passport. So when they go to DHL and do the shipment it's in his name. ...and then the person that it arrives to, it's a lot safer too, because they can go 'I had no idea that bloody James was sending me that statue. Naughty James.' You can bluff it off, you know. "

"Yeah they go over there (and get) the parcel to send it, and they get someone to seal it, and they do that just random. Because like if you kept using the same people and the same syndicate, you've got more chance of being busted haven't you? Because if somebody's watching someone... they probably just move around, change places and people and stuff, do it for safety you know."

"I used to do this trip now and then for this guy and take some money somewhere and pick up something. And every time I did it, I'd jump on it all, and give me some, and as well as what he gave me, and the cash for doing it and that was it, yeah. ...did it about once a month. Quite an amount yeah, ...twelve ounces. ...cruise down the highway, drop this off, pick this up. Stop somewhere, jump on it all, and then head back and party on it all. ...Then I'd have this suitcase full of money, and I don't know how much money was in there because I never counted it. But I used to get a certain amount for doing it. And my car was unregistered, never had a licence. ...didn't know nothing about it, wouldn't know where it comes from. I just knew somebody had something, and I was able to, knew somebody who was in another situation and I was able to get rid of it."

Higher level suppliers also needed to outlay money (or other resources) for protection in the event of detection by law enforcement. This could involve ensuring that they could afford to pay someone off or otherwise provide them with sufficient incentive to take the blame or to prevent conviction. The need to outlay significant expenditure on protection and avoiding detection by law enforcement was a barrier to progression in the market, and also an explanation for why people involved in high level drug distribution tended to be well financed and unlikely to be convicted.

"Yeah and then there's more risks, you're paying more, and more money you've got to outlay for your protection as well. ...I was with this cook and I was in his car, he goes 'if police pull us over'...he said 'you put your hand up, I'll give you a hundred thousand dollars for every year you're in jail'. And I'm going to jail for two or four years, like there's going to be a hundred thousand dollars in my bank account, hundred thousand dollars for every year, so I'll get four hundred thousand dollars for it. So I just put me hand up. Instead of him taking the rap, because he was the main man then, I would have just said 'Look this is all mine', and I'd know I'd get looked after. ...And you know you've got to rent cars, you've got to use friends' cars to do this, and all these different (things)... See all of this is costing money."

People involved in middle and high level methamphetamine supply minimized their contact with the retail end of the market because of the risks associated with drug consumers and low-level dealers. Drug users and user-dealers were a liability because they attracted unwanted attention, and were not reliant on the loyalty of higher level suppliers for protection. They were therefore more likely to engage the support of, or cooperate with, law enforcement than those involved in higher levels of the market.

"...it's different with other dealers and you know right they can't screw you, because they're doing exactly the same thing. Buyers can. Like you can't mess with them, ...all they have to do is tell the police when, where and how. And then if they raid my house I'm screwed."

Violence, or the threat of violence, appeared to act as a regulatory influence in the illicit drug industry in the absence of a legitimate legal framework. This phenomenon has also been observed in other research on illicit drug markets (Bourgois, 1989; Fagan and Chin, 1989; Mieczkowski, 1986). Threats or acts of violent retribution served as 'punishment' when people breached unwritten codes of conduct, did not pay debts or otherwise reneged on obligations. Dealers often viewed violence as being deserved in situations where people had done the wrong thing. Conversely, threats of violence protected the dealers' business from extortion or violence from other dealers. Reports of stand-overs, threats and beatings were relatively common. Most dealers had experienced or witnessed drug market-related violence and seemed to accept the possibility of retribution as part of the lifestyle associated with the illicit drug trade.

"I was shot at, there's nothing you can really do but like return it in like, because if someone's prepared to try and kill you, they're not going to stop and talk about it. Do you know what I mean? You just have to get back. I've had people pull knives on me and stuff, but like they weren't trying to knock me off, they were trying to rob me for my gear and stuff. That's easy to deal with, you just get more violent with them. I've got a pretty good reputation and I don't take much shit."

"Yeah I've seen stand-overs and all the rest of it, but as for violence and people getting shot, or anything like that, no I haven't seen too much of that. ...I mean no one wants to go out and shoot anyone."

"Yeah they break kneecaps, ...bolt cutters to your Achilles heel. ...and like your feet pop. I've seen that personally."

"Usually a blowtorch, go out and tie them down and just burn their feet or something. I don't take it too far, I haven't had to, but I've seen some pretty bad stuff before. ...So I know what to do to get someone scared."

The involvement of methamphetamine users in supply-side activities

In general, methamphetamine users had limited knowledge of high level methamphetamine supply. This lack of awareness about high level supply was more pronounced for imported methamphetamine than for domestic production of the drug. None of the methamphetamine users interviewed in the current study had ever been personally involved in methamphetamine importation. Methamphetamine users were also much less likely to have contact with people involved in importation than with those involved in domestic production (Table 9). Their limited knowledge of importation may reflect that it is conducted in a particularly covert fashion, or that domestic manufacture is more common than importation of methamphetamine in Australia.

Despite methamphetamine users' lack of knowledge of high level supply activities, they were clearly aware of people involved in these activities. Fifty-three per cent indicated that they had known someone who had been involved in methamphetamine manufacture in their lifetime and 32% had known someone who manufactured the drug within the past year. Methamphetamine users had less contact with people importing the drug, but still 20% had known someone involved in importation during their lifetime. It cannot be determined based on the current study whether reported involvement in manufacture and importation reflected small scale activities related to

personal use or larger scale supply activities. Nonetheless, these findings do suggest a social inter-connectedness between people involved in methamphetamine manufacture and importation and those who use the drug. This inter-connectedness is consistent with methamphetamine users acting as 'gophers' in the methamphetamine market (e.g., transporting drugs, sourcing precursors), and has important implications for understanding the nature of criminal networks involved in methamphetamine supply.

Table 9. The percentage of methamphetamine users who were involved or knew someone involved in methamphetamine importation or manufacture.

	Importation (%, N = 310)	Domestic manufacture (%, N = 310)
Known someone involved		
Ever	22	53
In past year	13	32
Personally involved		
Ever	0	6
In past year	0	1

Note. Percentages exclude participants who refused to answer (< 3%).

Only 6% of methamphetamine users surveyed indicated that they had ever been personally involved in manufacturing methamphetamine, and only 1% indicated that they had manufactured methamphetamine during the past year. Those that had manufactured methamphetamine in the past year had learnt to do so from friends who were manufacturing the drug, were taught while in prison, learnt from a book, or were self-taught from the internet.

The majority of methamphetamine users knew little about the actual procedures involved in methamphetamine manufacture. Many were aware that pseudoephedrine derived from cold and flu tablets formed the main precursor. To a lesser extent they were aware of the use of liquid pseudoephedrine, ephedrine and P2P as precursors. People who had seen methamphetamine being produced were familiar with the chemical processes and equipment involved, but usually could not explain the reaction process in detail. Those people that had attempted to manufacture methamphetamine based on a recipe alone, and/or having watched other people make it, tended to find the procedure was difficult to follow and were not successful. Detailed understanding of production methods only seemed to occur among people that had been personally involved in manufacture or had ongoing contact with someone else who was manufacturing methamphetamine (e.g., shared a house with a manufacturer). These people were generally more aware of the various methods of manufacture and the reagents involved (e.g., use of hypophosphorous acid, red phosphorus and iodine).

Fourteen per cent of methamphetamine users had also been involved in activities related to other aspects of methamphetamine manufacture, importation or wholesale distribution. Seven per cent had been involved in obtaining precursors during the past year, their involvement ranging from large chemist runs to selling one or two packets of cold and flu tablets to their methamphetamine dealer. Seven per cent were involved in transporting methamphetamine for other people. This included moving small amounts of the drug from one dealer to another within Sydney, through to regional and interstate transportations of wholesale methamphetamine (e.g., up to two kilograms). Other activities undertaken by methamphetamine users included obtaining chemical reagents, glassware, or other products required for manufacturing methamphetamine.

The most common supply-side activity that methamphetamine users were involved in was dealing methamphetamine. Seventy per cent of methamphetamine users had sold an illicit drug at some point in their lifetime, and 18% had been dealing methamphetamine at least monthly during the past year. The involvement of methamphetamine users in methamphetamine dealing is discussed in detail in the following chapter.

Conclusion

Contemporary drug markets are often viewed as consisting of loose networks of associated individuals rather than as involving clearly defined criminal groups. Despite this view, the current research found a dominance of particular criminal groups or networks involved with the higher level supply of methamphetamine to the Sydney drug market. There were two particularly strong influences on the methamphetamine market in Sydney: (1) the influence of OMCG on domestic production and distribution of base methamphetamine, and (2) the influence of criminal syndicates involved in importation and distribution of ice, particularly within the inner regions of Sydney. A range of other criminal networks were also involved in various aspects of methamphetamine supply and/or other drug supply, and the data provided evidence of interstate supply of methamphetamine to Sydney. The involvement of some criminal syndicates appeared to exert a top-down influence on the supply of methamphetamine which appeared to manifest as geographic 'turf' boundaries at a dealing level. These turf boundaries did not preclude the opportunistic and social nature of methamphetamine dealing relationships at a retail level.

The distribution of methamphetamine at the retail level in the market relied heavily on social networks and word-of-mouth. Reliable dealers that could be provided methamphetamine on credit were a particular asset in the distribution of methamphetamine, as were those who were likely to go undetected by police (i.e., dealers with little or no criminal background or other criminal involvement). Similarly, it was advantageous to have retail dealers who had access to different sub-populations of drug users. Dealers would often avoid having contact with a large number of customers as this increased their risk of police detection. In these situations the dealer's customer would distribute the drug to their friends, creating an additional layer of dealing within the market. This additional layer in the market provided dealers with a level of insulation from the retail market and the risk of being detected by law enforcement.

The threat of retribution appeared to act as a regulatory influence over drug supply activities in the absence of a legitimate legal framework, serving to both protect and punish those involved in the illicit drug trade. Threats of violent retribution within the methamphetamine market were commonly reported and were observed in three different scenarios: threats or violence related to debt collection; perceived violence related to competition between dealers over dealing 'turf'; and threats of violence to ensure people did not 'dob' on people carrying out illegal activities. There was also a strong culture of not asking questions, which limited knowledge of higher level supply activities among those involved in lower levels of the drug market, and also minimised their liability of being implicated in higher supply activities. High level suppliers distanced themselves from the lower levels of the drug market and took measures to ensure their identity was not associated with events that might come to the attention of law enforcement.

The current study presents an exploratory examination of the Sydney methamphetamine market based on the perspectives of a small number of methamphetamine dealers together with the views of law enforcement personnel in Sydney. Sydney is a large city covering a broad geographic area, within which exist a number of different drug markets and sub-populations of methamphetamine users (e.g., dance party culture vs. injecting drug users). Moreover, it is clear that Sydney is supplied by a confluence of imported and domestically produced methamphetamine and a

number of criminal networks are involved in the distribution of methamphetamine to the street level drug market. The interplay between these various factors and how they impact on the dynamics of the methamphetamine market is undoubtedly complex and unlikely to be fully captured by the current study. These limitations aside, the current research is one of few Australian studies to have interviewed drug dealers outside the confines of the criminal justice system, and provides a unique, albeit preliminary, perspective on how the illicit methamphetamine trade operates in Sydney.

Dealing methamphetamine

Rebecca McKetin, Jennifer McLaren and Erin Kelly¹³

Key points

- Methamphetamine users who dealt methamphetamine had similar demographic characteristics to their peers who were not dealing the drug. Methamphetamine users easily entered the retail dealing level of the market by selling methamphetamine to their friends who use the drug. Income from dealing was an important factor in attracting and retaining people in dealing.
- Methamphetamine dealers sold a range of drugs, including the various physical forms of methamphetamine. The majority initiated their dealing career by selling cannabis and/or methamphetamine (76%), and progressed to selling a broader range of drugs. This progression appeared to be related to opportunities to obtain a wider range of wholesale drugs over time and also the attractiveness of increased profit from selling particular drugs.
- There was considerable fluidity in the dealing level of the methamphetamine market. It was relatively easy for consumers to become small-time dealers by selling the drug to their friends, and to increase the amount of the drug they sold through their distribution networks. The amount and types of drugs that dealers sold also varied considerably at different time points in their dealing career.
- Dealing provided an occupation for some people, being an activity that they undertook daily that kept them busy, socially networked, and provided a stable source of income. However, the lifestyle associated with dealing was fraught with risks, and the profits from dealing were often offset by threats of retribution, fear of police detection and the adverse effects of drug use.
- Profit was an important incentive to retaining people in drug dealing. The established networks that dealers had with both drug consumers and suppliers allowed them to re-initiate dealing very easily to obtain an attractive income.
- Methamphetamine dealers did not cut ice or powder, but did cut base, in which case they were likely to sell it as powder methamphetamine or 'speed'. The most common adulterant used when cutting methamphetamine was glucose.
- The retail price of methamphetamine appeared to be affected by the relative availability and purity of methamphetamine on the market and how much was being purchased by the customer, how much the drug had been adulterated, or 'cut', in addition to personal or situational factors.

The demographic profile of retail level methamphetamine dealers

Almost one in five methamphetamine users surveyed had been dealing methamphetamine at least monthly during the past year. These methamphetamine dealers did not differ significantly in their demographic characteristics from other methamphetamine users (Table 10). Two-thirds were male, most were in their twenties, they were almost exclusively English speaking, and the majority (80%) were Australian born. Methamphetamine users who were involved in dealing the drug were

¹³ National Drug and Alcohol Research Centre, University of New South Wales.

no more likely to be unemployed or have a prison history than their non-dealing counterparts. Males were not significantly more likely to be regular methamphetamine dealers than females (19% vs. 16%, $\chi^2_{df=1} = 0.5$, $p = 0.48$). However, male methamphetamine users were more likely to have been arrested for their involvement in methamphetamine supply (23% vs. 10%, $\chi^2_{df=1} = 7.8$, $p = 0.005$). Dealers tended to use drugs more heavily than their non-dealing peers, reporting more frequent methamphetamine use and higher levels of polydrug use. Heavier drug use among dealers could result from having access to wholesale drugs. Alternatively, heavier drug users may be more likely to become involved in dealing to support their drug use (see *Criminal involvement*).

Table 10. The demographic characteristics of methamphetamine users involved in regular methamphetamine dealing.

	Regular methamphetamine dealers (%) (n = 55)	Other methamphetamine users (%) (n = 253)
Male	64	59
Age (median years)	26	29
English as main language	96	96
Born in Australia	80	82
Tertiary education	44	57
Unemployed	62	62
Prison history	31	34
Arrest history	71	68
Days used methamphetamine	12**	7
Number of drug classes used	5*	4

* $p < .05$

** $p < .01$

Initiation to dealing

Methamphetamine dealers typically began selling drugs regularly around the time they started using methamphetamine regularly (median of 18.5 years, range 14-33 years). It was uncommon for methamphetamine dealers not to have used methamphetamine prior to initiating drug dealing (11%). Most methamphetamine dealers were introduced to dealing by a close friend, or another person with whom they had a close relationship (Table 11), although a proportion (22%) commenced dealing without a specific introduction by another person.

Table 11. Introduction to dealing among regular methamphetamine dealers.

	Per cent of dealers (n = 55)
Close friend	50
No introduction	22
Partner	13
Family member	7
Acquaintance	4

Most people became involved in dealing because they had access to wholesale drugs, were networked with drug users to whom they could sell methamphetamine, and recognized the opportunity to make money. For example, one dealer explained that people were asking him to purchase drugs on their behalf, so he decided to sell the drugs to them at a profit. Income generation was the primary motive for initiating dealing, with income being used to support drug use and/or other lifestyle expenses. Social networks were also a key factor in the development of drug dealing among methamphetamine users.

"...the dealing was pretty much a consequence of unemployment ...I was on the dole, I was on Centrelink benefits and it wasn't enough, so I needed some extra money and my friend, he had no place to stay, so he moved in, paid some rent. Plus he asked me if I wanted to sell some ice for him. And I go, 'Yeah, no worries' you know, it was extra money, pay for bills, and pay for my drugs. "

"Well like I always used to hang out with my brother's friends and that. And they were I guess you could say deviants and stuff at school and out of school. And then when I started playing football, I started like playing with, around locals. I got friends that were into dealing and into gangbanging and stuff like that. So I picked up with them. Did different stuff, ...and then when we started using we started selling to pay for it, and it just built up from there. So selling like from a small group to a bigger group, and just getting different substances."

"I've always been with people that are not the best people within society, you know what I mean, like drug dealers, criminals, people that are known in the area for being like how they are, and what they do and things like that, and I was already hooked up with a lot of people like that. So when I got into the rave scene, yeah I just found a few people who I knew and I sussied out who was who, and who dealt what and I ended up becoming like, not friends, but making acquaintances with a lot of these people and that. And then from there I found a dealer to run for and I started running for him. And then when I started running for him, I ran for a year, and that was just basically to make money and to get free drugs when we were at the rave scene and that, for me and my mates."

Most methamphetamine dealers initiated dealing with cannabis and to a lesser extent methamphetamine (Table 12). However, within their first year of dealing many had already diversified into selling other drugs. At the time they were interviewed, they were all dealing methamphetamine at least monthly, 37% were also involved in dealing ecstasy, and 24% had become involved in dealing either cocaine or heroin. The higher profit associated with dealing certain drugs was a factor in diversification. It is also likely that over time dealers developed more extensive contacts with suppliers of different drugs.

"...I dealt pot for about a year. ...And that was just basically to make a bit of extra money and support my pot habit as well ...someone came up to me and said, 'Hey, do you know what I mean, you can make heaps more money off dealing heroin'. And someone put heroin in front of my face."

Table 12. The shift in the type of drugs sold by regular methamphetamine dealers over their dealing career.

	Per cent of dealers selling each drug (n = 54)		
	First ever deal	First year of dealing	Current year
Cannabis	57	65	56
Methamphetamine	26	46	100
Heroin	4	13	17
Cocaine	4	9	13
Ecstasy/pills	7	26	35

Note. Participants could nominate more than one drug sold in their first year of dealing and in the current year.

Dealing lifestyle

One of the most appealing features of being a dealer was the profit and the perceived lifestyle it afforded. In general, profit from dealing methamphetamine was not substantially in excess of what was required to support drug use. Among regular methamphetamine dealers who had made money from dealing in the past week, their median total dealing income during this time was \$400 (range \$10 to \$5,000), while their median income specifically from methamphetamine supply was \$200 (range \$10 to \$4,500). By way of comparison, their comparative median legitimate income during this time was \$235, and their median expenditure on drugs was \$275. This finding is consistent with the notion that most methamphetamine users dealt drugs to support their drug use (see *Criminal involvement*). However, it is also clear that the profits from dealing could be much more substantial. Dealing could be more lucrative if the dealer was selling larger quantities of methamphetamine or a variety of drugs, yielding profits akin to a well-salaried job. High profits gave dealers the freedom to do what they wanted and pay for what they wanted without the restrictions of a normal nine to five job. Those involved in the higher levels of supply were clearly making a large profit and were generally very well financed.

"Yeah I love the money, I like the lifestyle. ...I've got all the money I want, I can do what I want when I want, buy what I want ...go to casinos, go to motels, go to horse races, don't have to work."

"I've had more money to spend for myself. I was working for a while, and for the buck it's worth more just doing what I'm doing now, than working. I could work a forty-hour week and wouldn't make half as much as what I do now. So after that I sort of lost interest pretty much in like office society, I don't really care about how I'm viewed in society now. Apart from that, like my life hasn't changed a hell of a lot, I'm still always doing the stupid stuff I've always done."

"They're making like a million dollars a month. Nobody can (touch) that. ...They took me to the casino, and gave me ten thousand dollars. ...It's like a hundred dollars to him."

Dealing appeared to play the role of an occupation or career for some people, keeping them busy, socially networked and feeling worthwhile. It also gave some people a sense of identity and improved their self-esteem, while for others they enjoyed the social aspects.

"Like it gave me self-esteem, you know, because I was the man, because I had my phone ringing all the time. You know I was always busy, I was always going to see someone, someone was always coming to see me and it was just, you know it gave me that sort of

fulfilment, within myself. It's like all right I've found my place, I'm a dealer ra-ra-ra. And it's amazing when the chips like, when everything fell down and I didn't have the drugs to sell or anything, no one wanted to know me."

"It's like 'right I've got to do this, I've got to do that, I've got to do that', so you're just too busy to even think about getting busted. ... it was hectic, it was like well, and you know you forget things and you get people calling you back going 'Where are you?' And it was 'Fuck I'll be there soon'."

However, there were several downsides to being a dealer which countered the lifestyle benefits of profit and freedom. Among these draw-backs were the intensity of being surrounded by drug-using customers; being closely associated with people who were heavily involved in crime and drug dependent; fear of violent retribution; being 'ripped-off' by customers; not being able to trust people; not being able to rely on the legitimate legal system for support; and a constant fear of being detected by police. Access to wholesale methamphetamine also tempted some dealers to use more of the drug, meaning that they were no longer making a significant profit from dealing and were experiencing more problems related to their own drug use. The paranoia that emerged with heavy methamphetamine use further compounded the negative aspects of the dealing lifestyle.

"And I'd rather just say it was fun, and it was party, party, party, but eventually we all started getting really screwed up, and psychologically and emotionally, and we just, we couldn't trust each other. That was due to the paranoia and the head-fucking going on with everyone, and you couldn't trust your friends, and felt like you were all alone."

"...people who were giving me money, who were buying ice from me, was basically paying for my ice too. So I was basically making nothing out of it, I was making money out of it, but it was just going up in smoke. That lasted for a few months, that was on and off sporadic. My friend moved out, he told us that he was in trouble from his boss and his big dealers. And that got us really paranoid, we were really worried about being busted and raided."

"When you get right into it, you're up to your armpits and all the time, it's 24/7, you don't know who to trust and anything like that. Stuff goes missing in your house and you wouldn't know who's got it. So I just like to keep it at arms length. The reason I stay in it is because I like speed. It's my drug of choice."

"I was almost nineteen by that time. And it was, it was a big wake up call, I didn't get bail, I ended up in jail for two weeks, because like it took me a while to get the bail, because I needed to get the bail met, and then just things went pear-shaped for a good year after that, yeah ...I was suffering multiple psychosis problems. I was just, I had to run because I owed, I still do owe some guy twelve thousand dollars. This is from back then. You know, it was constantly a worry of whether I was going to get locked up or not. I spent a few months in rehab to try and sort of get myself out of it, and then for the nine months that I, once I left rehab and got everything sorted with court it was just hectic, because I was always looking over my shoulder, because you know I was like 'oh my God what happens if he runs into me' or whatever."

"It's too risky nowadays. I don't want to go to jail. And ever since I really messed up, you know the damage that I did to myself in that time with all the abuse, and like, you know, it's one thing having a habit like I did seven or eight months ago now. But it's also one thing having a really abusive habit, as in the way it's just, I'd end up dead, I can't control myself around it. I don't want to get into any more debt, like I mean I'm still battling a gambling problem and it's just, it's something I'm not interested in doing any more."

The risk of going to prison was a key fear among methamphetamine dealers. For younger dealers being 'busted' or seeing friends go to prison provided a reality check on how involved they had become in the illicit drug scene. For older more experienced criminals, prison did not appear to be such a strong deterrent. When asked about the risk associated with dealing, one person remarked: *"going back to jail, and that doesn't worry me, it's only a school reunion anyway, every time."*

One of the barriers to giving up dealing was that dealers were immersed in a drug using culture. Dealers were socially networked with people who could provide them with wholesale drugs and were also known to most of their peers as a drug dealer. They constantly faced the temptation of being able to turn to dealing as an alternative source of income and have a more liberal lifestyle than that associated with their legitimate employment. Furthermore, if the dealer continued to use drugs they would usually remain in contact with other drug users and drug dealers, making it difficult to avoid situations where they may be tempted to sell drugs. For this reason, giving up dealing often went hand-in-hand with giving up drug use.

"I've found it very, very hard living in Sydney and trying to work nine to five and not surviving on drug money. Changing your life back around and going back to school, and didn't get a good enough education and trying to leave all that. And it's all about not associating with those people and trying to do things, and it's hard because everywhere you go, you go to parties, it's everywhere you know, and the temptation's too great really. If I want to have a good time now, I find now that I'm better off not going out, not associating one with the other. But it's hard, the same way because it's what you've done all your life."

"People still know that you used to (deal) and they'll still come up and try, and you know, even if you're totally bloody broke, or whatever, and you're not doing it, they'll say you know, come on. That's really hard because you can have access to that money like that and you've got to say no. That's the hardest part, is the financial side of it."

Dealing behaviour

Frequency of methamphetamine dealing ranged from less than weekly through to daily, with 22% of dealers selling methamphetamine daily or almost daily.¹⁴ Dealers tended to sell a combination of the different physical forms of methamphetamine and a range of other drugs (Table 13). The majority of methamphetamine users who were regularly involved in dealing the drug were selling to other users (76%). There was a proportion of methamphetamine users who were selling to both users and other dealers (20%), while selling only to dealers was uncommon (4%). Methamphetamine dealers had high levels of contact with methamphetamine users, with 85% indicating that half or more of the people they knew well were using the drug.

¹⁴ This question was only asked of 23 methamphetamine dealers. Among methamphetamine users who had dealt any drug within the past month (n = 91), 15% had dealt drugs daily.

Table 13. Drugs sold by methamphetamine dealers during the past year.

Drugs sold by dealers during the past year	Per cent of dealers (n = 54)
Forms of methamphetamine	
Powder	39
Base	59
Ice	67
Other drugs	
Cannabis	56
Ecstasy ^a	35
Heroin	17
Cocaine	13
Other ^b	17

^a Includes all ATS pills.

^b GHB, ketamine, LSD, magic mushrooms, benzodiazepines, hashish and crack.

Most regular methamphetamine users who were involved in dealing were purchasing small quantities of the drug (i.e., up to 3.5 grams), which is consistent with their supply being mostly to users rather than to dealers (Figure 14). Quantities of ice purchased for dealing were notably small, with one-quarter of purchases being less than one gram. This observation is consistent with the extremely high purity of ice and that it is retailed in very small quantities (i.e., points, or 0.1 g). A small number of methamphetamine users had purchased larger quantities of methamphetamine for dealing, such as ounces, pounds and kilograms. There were only a handful of dealers who could comment on the purchase price of these larger quantities of methamphetamine, although prices that were reported suggested that ice was more expensive than base (Table 14). The higher price of ice relative to base was also reflected in the price of eight-balls (3.5 g, \$600 vs. \$350; see *The retail market for methamphetamine*).

Figure 14. Weight of methamphetamine purchased for the purposes of dealing

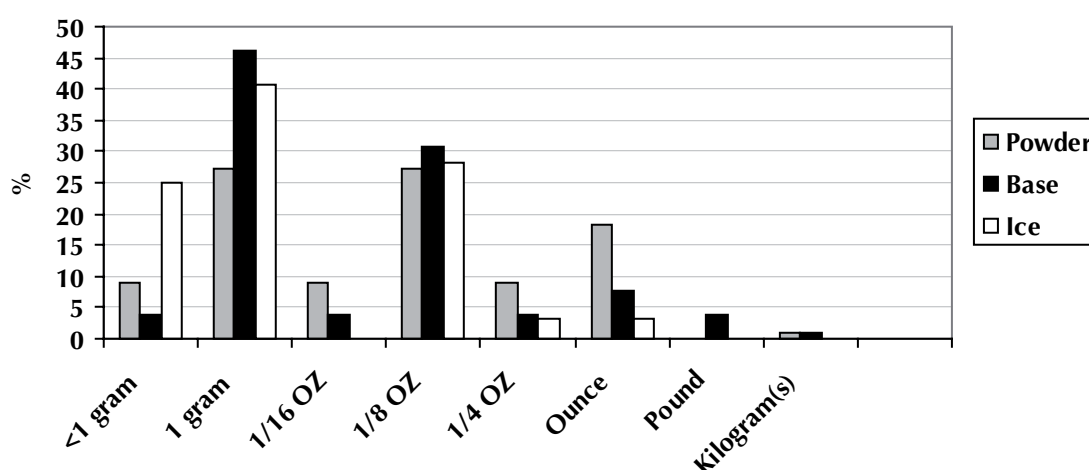


Table 14. Methamphetamine wholesale purchase prices reported by dealers.

Weight of purchase	Price	No. of observations
Powder		
Ounce	\$700-750	2
Half-kilogram	\$1,800	1
Base		
Ounce	\$700-2,000	2
One pound	\$3,000	1
Two kilograms	\$5,000	1
Ice		
Quarter ounce	\$1,800	1
Ounce	\$4,500	1

Note. Ounce (oz) = 28.35 g; Pound = 453.6 g.

A large proportion (44%) of methamphetamine dealers had relied on a single supplier of methamphetamine during the previous year, although the remaining dealers had purchased from up to seven different suppliers during this time. The majority of dealers could obtain different physical forms of methamphetamine from their suppliers as well as other drugs, the profile of which looked reasonably similar to those sold by methamphetamine dealers themselves. Generally speaking, methamphetamine dealers were well networked with other drug dealers from whom they could purchase drugs and reported knowing a median of six other dealers.

"...when you're in that whole dealing circle right, like it doesn't matter what you want, do you know what I mean? Like you can say, you can ask one person 'Do you know where I can get some ice or Shabu?' And that person might know another person, that might know another person, that might know another person, do you know what I mean? You can always get it. That's the thing, once you're in that circle you know where to get it from, you just have to make a couple of phone calls, or ask a few people, and without fail you'll end up getting it anyway, so it's not that hard."

Cutting and marketing methamphetamine

Dealers often cut the base form of methamphetamine prior to selling it to customers, in which case they were likely to sell it as powder methamphetamine or 'speed'; however, no dealers reported cutting either ice or powder (Table 15). The most common agent used to cut base was glucose (used by 9 of the 12 dealers who cut base), with some use of Epsom salts (n = 2) and sucrose (n = 1). One person reported using baby powder as a cutting agent for customers who snorted the drug. None of the dealers interviewed in the current study reported attempting to market powder methamphetamine as the more pure forms of base or ice.

Cutting methamphetamine played a particularly important role when there were few layers of dealing within the supply chain. In this context, reducing the purity of the methamphetamine circumvented unwanted toxic reactions to the drug. For example, one dealer was receiving wholesale methamphetamine that was 85% pure. This dealer was also retailing direct to consumers

and would pre-cut methamphetamine for his customers on a ratio of 3:1 for recreational users and 2:1 for heavier injecting users. Although cutting the drug could increase profit, low purity methamphetamine was undesirable from the consumer's perspective and difficult to sell. None of the dealers in the current study reported cutting methamphetamine with harmful adulterants, which is consistent with previous research on the innocuous nature of adulterants used to cut heroin (Maher et al., 2001).

"Well I just normally buy ...a block of it, and cut it myself to what people want. It makes it a bit easier then, because people feel better if you're putting so much cut into it, to the amount they want. They see you cut it, and know you're not cutting it with bleach or anything bad. ...I did buy a little bit of like already pre-cut a little while ago, but it was shit as well, so it wasn't very good quality. "

"Just yeah different people buy it to different cuts themselves. Like they'll say, 'Can I have it cut to this?' And normally I ask though 'Do you want it cut to anything in particular?' If they say 'yeah', it's 'What do you want?' If they don't I'll ask 'do you want to get really charged up, and only need a little bit, or do you want to use big amounts or what?'. Depending on what they want, I'll do it for them. Sort of specialise a bit."

"If it's too pure, you don't want to surprise people and just send them crazy, so you have to cut it a little bit, and then you can make more profit."

Table 15. The cutting and marketing of powder, base and ice by methamphetamine dealers.

	Purchased for dealing in the past year (%, n = 54)	Cut prior to selling (% of those who sold each form)	Sold as:
Powder	24	0	Powder or speed
Base	56	41	Base, pure, baseball, powder or speed
Ice	63	0	Ice, crystal, shabu, bu, skates

The quality and price of methamphetamine that dealers sold was affected by the quality and price of methamphetamine available through other dealers within their local area, with some dealers reporting that they may alter their price or the quantity they sold to match the value provided by their competitors and to attract or retain customers. There was also a perception that if a dealer wanted to 'move' their supply of methamphetamine more quickly they may choose to drop the price. Dealers also increased the price of methamphetamine if they felt that there was a high demand and relative low availability of a particular form of methamphetamine.

"It just varies on how good it is, whatever else other people have got as well. If they've got shit, you know, I don't have to put it up as high, but if they've got good stuff, I want to be competitive with them, you know, I might put it a little bit cheaper or if it's the same you know, put it a little bit cheaper, or put it a little bit bigger. Then I know they'll come to me."

"Well, it's sort of like areas, and who you're getting it from. Like if he wants to move his stuff quicker, and he realises that selling it a bit cheaper is going to move it quicker, and he's also going to make more, so he's going to have more customers."

"He would tell me a rough estimate of what to sell for. It was more like his basic price was \$35 a point. I would be selling it for at least, because at that time ice was really scarce, it wasn't that known then and you could only get it from a few people. And they knew that supply better meet demand. So I jacked up the prices to around \$40, \$45 a point, even \$50 people were buying it because they were that desperate to have a smoke of it, because it's that good."

Dealers usually offered lower prices when customers were purchasing larger quantities of methamphetamine. This was not only true in terms of larger purchase amounts being relatively cheaper per unit weight, but also in that dealers were willing to provide better prices to regular customers. Dealers also tended to provide different prices to customers depending on other situational factors including their personal relationship with the customer.

"My very good friends get like lower prices than what I would charge just normal friends, but, like because they've been with me from the start and stuff, so I sort of owe them. But since they're my friends and they've always been my friends when they're after something now, I'm happy to give it to them at almost like zero profit. But I've only got a couple of friends that are like that anyway, that I really trust that much."

"Some people I feel sorry for them. I know they're doing it a bit hard, or they've got a young family or something. I hate seeing them wasting their money on this shit when they could be putting money in their kids' mouths or something. I might give them a ten dollar (discount) or something. I say make sure you use that money on your kids, buy nappies or whatever, buy something."

Conclusion

Methamphetamine users easily entered the retail dealing level of the market by selling methamphetamine to friends who used the drug. The majority of methamphetamine dealers were introduced to dealing by a friend or someone with whom they had a close relationship. Other situational factors that facilitated entry into dealing were having access to wholesale drugs, being networked with methamphetamine users who could purchase the drug, and a desire to make money. Most dealers began dealing cannabis and/or methamphetamine at around the time they started using methamphetamine regularly and diversified into selling a range of drugs as they developed in their dealing career. Dealers tended to rely on one or two main suppliers for their methamphetamine but were well networked with other dealers from whom they could purchase various forms of methamphetamine, as well as other drugs.

Methamphetamine users who were also dealers tended to be involved in dealing small quantities of the methamphetamine, and purchased grams or eight-balls (3.5 g). Most sold methamphetamine only to users of the drug, but almost one quarter also sold methamphetamine to other dealers. Dealers did not cut ice or powder, but often cut base with glucose or other innocuous adulterants, in which case they were likely to sell it as powder or 'speed'. There was no evidence of dealers attempting to sell powder as the more pure forms of ice or base methamphetamine. Dealers varied the price and purity of the methamphetamine they sold depending on the availability and purity of methamphetamine available on the market, the quantities being purchased by the customer, and situational factors, such as personal relationships with customers.

Income from dealing was an important factor in attracting and retaining people in dealing, and methamphetamine users dealt drugs both to pay for their drug use and to support a desirable lifestyle. Dealing played the role of an occupation for some people, being an activity that they

undertook daily that kept them busy, socially networked and provided a stable source of income. The profit from dealing and the lifestyle that it afforded appealed to many dealers; however, the lifestyle associated with dealing could be intense and volatile, especially when combined with the effects of heavy methamphetamine use. Some dealers had problems moderating their drug use when they had access to wholesale drugs and ended up not making any significant profit from dealing or being in debt to suppliers. Dealers found it difficult to cease dealing because they were socially integrated into the drug using culture, where they were known among their peers as a drug dealer and where they also knew wholesale drug dealers. These factors made it very easy for them to re-initiate dealing, while the additional income they could derive from dealing was also a strong incentive to continue dealing.

The retail market for methamphetamine

Rebecca McKetin, Jennifer McLaren and Erin Kelly¹⁵

Key points

- Base and ice methamphetamine were typically purchased in points (0.1 g) for \$40 and \$50 per point respectively. Powder methamphetamine was purchased in half-grams and grams, at \$40 per half-gram and \$60 per gram.
- The most common purchase location for methamphetamine was the dealer's home, although a proportion of users also arranged to meet the dealer at a mutually convenient location or to have the drug delivered to their home. Purchasing methamphetamine from street dealers was uncommon and was more likely to occur within the inner region of Sydney.
- Methamphetamine users paid for their methamphetamine in cash. Dealers rarely provided drugs to methamphetamine users on credit or in exchange for other goods or services.
- Methamphetamine users preferred base and ice, and it was estimated that these more pure forms of the drug comprised over two thirds of methamphetamine consumption among our sample of regular methamphetamine users in Sydney.
- There was a distinct geographic disparity in the retail level market for base and ice, with ice more commonly dealt and used in the inner region of Sydney, whereas base dominated the methamphetamine market in the Western region of Sydney. The availability of ice, base and powder were more evenly distributed in the North and Southwest of Sydney.
- The retail level methamphetamine market is a polydrug market. Most dealers can supply a range of methamphetamine forms and other drugs. Methamphetamine users also tended to purchase their drugs from a number of different dealers, even if they relied heavily on one or two regular dealers.
- Regular methamphetamine users often knew that ecstasy pills they purchased contained methamphetamine. These pills appeared to be absorbed within the ecstasy market, rather than being marketed or consumed as a recognized form of methamphetamine.

Purchasing methamphetamine

Price and purchase units

Approximately \$50 represented a benchmark standard for purchasing a 'hit' of methamphetamine¹⁶ (range \$20-\$70, Table 16). Purchase units differed significantly between the different forms of the drug, with points being the most common unit of purchase for ice and base, whereas powder was more likely to be purchased in larger amounts, such as half-grams or grams (Table 17). Points of base were slightly cheaper than points of ice (\$40 vs. \$50), consistent with lower wholesale prices for base relative to ice (see *Dealing methamphetamine*). Powder methamphetamine cost \$60 for a full-weight and \$40 for a half-weight. Purchase of powder in points was not common, although users that did buy points of powder reported that they cost \$50. This reported price for points of

¹⁵ National Drug and Alcohol Research Centre, University of New South Wales.

¹⁶ A typical 'hit' being a point (0.1 g) of base or ice or a half-gram of powder (see *Methamphetamine use in Sydney*).

powder is inconsistent with the price of half-grams and full-grams of powder, and suggests that either (a) powder sold in points may be of higher purity than powder sold in gram quantities, or (b) that the term 'point' was being used to refer to a standard 'hit' of methamphetamine, equivalent to \$50 worth, rather than 0.1 grams of the drug.

The more pure forms of base and ice could also be purchased in gram quantities for \$150 and \$250 respectively, and this occurred in one-quarter of purchases. Almost one in five purchases of powder consisted of eight-balls (an eighth of an ounce or 3.5 grams) which sold for \$150. Purchasing eight-balls of base and ice was less common and considerably more expensive (\$350 and \$600 respectively).

Table 16. Median price of methamphetamine by purchase unit and form of methamphetamine.

Weight of purchase	Price (\$)			Last purchase price (n = 306)
	Powder (n = 226)	Base (n = 222)	Ice (n = 190)	
Point	50	40	50	50
Half-gram	40	80	150	50
Full-gram	60	150	250	115
Eight-ball	150	350	600	155

Note. Purchases were made within the previous year. Prices were based on purchase of a single quantity of the nominated weight.

Table 17. Most recent purchase unit reported by methamphetamine users by form of methamphetamine.

Unit purchased (%)	Form of methamphetamine			Last purchase unit (n = 287)
	Powder (n = 208)	Base (n = 201)	Ice (n = 175)	
Point	17	60	58	45
Half-gram	33	11	12	15
Full-gram	25	15	17	21
Eight-ball	15	6	5	8
Other	10	8	8	11

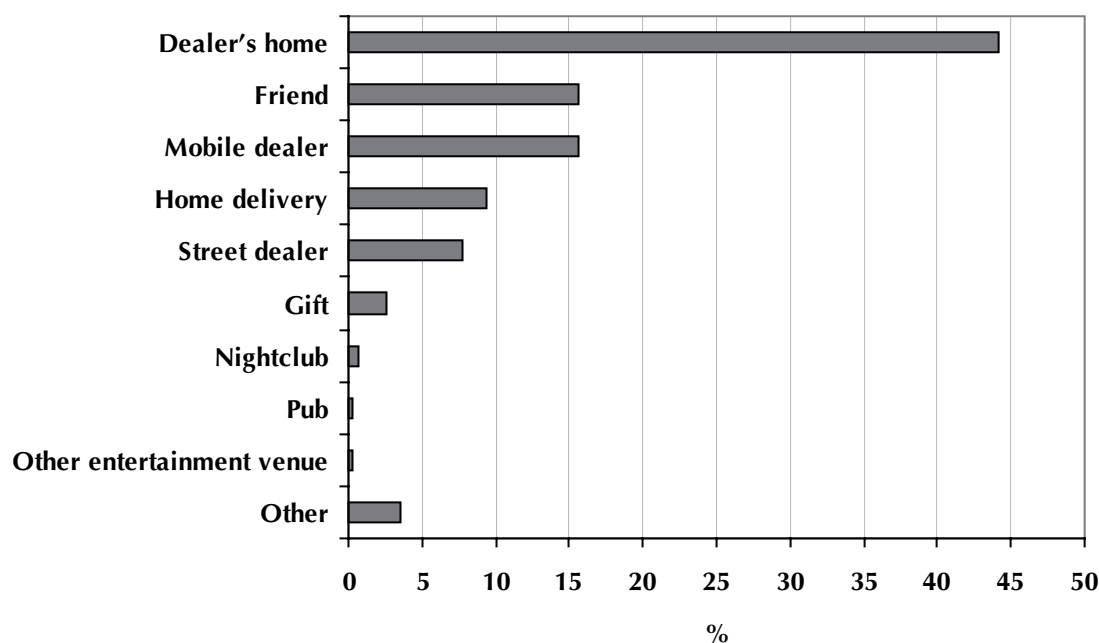
Note. Not all participants were aware of the weight of the methamphetamine they purchased.

Place of purchase

Methamphetamine users most commonly reported last purchasing methamphetamine from a dealer's home (44%, Figure 15). Arranging to meet a dealer at a particular location to make a purchase was also relatively common (16%), while the drug was delivered to the customer's home in 9% of purchases. Purchasing methamphetamine from a street dealer was not particularly common (8%), and was more likely to occur in the inner region of Sydney (14% of purchases vs. 2-4% in other regions). Sixteen per cent of methamphetamine users had friends purchase the drug for them. A small proportion of methamphetamine users also received methamphetamine as a gift (3%), and a few indicated that they purchased the drug from people they knew through

their work or other personal networks, but in no particular location. It was rare for regular users of methamphetamine to purchase the drug from public entertainment venues such as nightclubs and pubs (1%). There were no substantial differences between purchase locations for ice, base or powder methamphetamine.

Figure 15. Place of most recent methamphetamine purchase



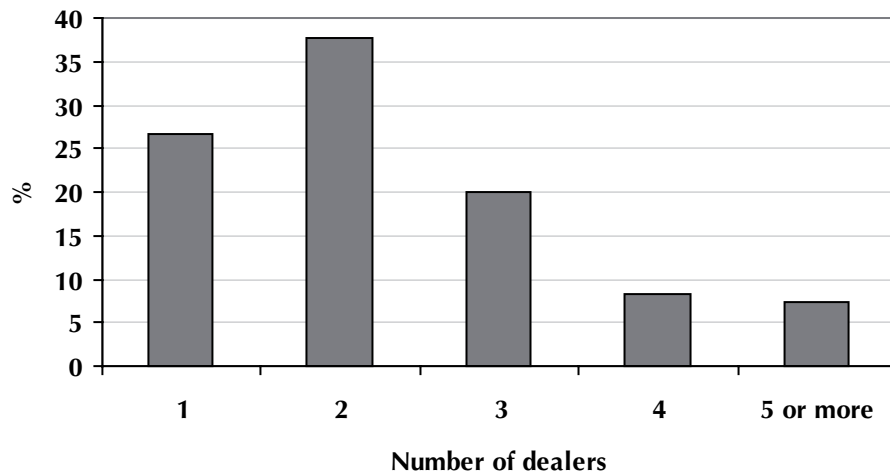
Payment

In contrast to markets for other drugs, such as heroin, which may also host an exchange economy (Maher et al., 1998), methamphetamine users almost exclusively used cash to purchase methamphetamine (94%). Methamphetamine users in the current study rarely obtained methamphetamine on credit (2%) or paid for the drug through other means, such as in exchange for goods or services (<1%). A small proportion of methamphetamine users also reported receiving methamphetamine as a gift (3%).

Choosing a dealer

The majority of methamphetamine users indicated that their main dealer was a close friend or acquaintance (91%), again emphasising the importance of social networks in the distribution of methamphetamine. Almost all methamphetamine users (96%) had purchased methamphetamine in the month preceding the interview, and most had done so from more than one dealer (Figure 16). Methamphetamine users usually relied on one or two main dealers for their methamphetamine, stating that if they were loyal to a dealer they could often get a better price and could also predict the quality of the methamphetamine they were intending to purchase. Most methamphetamine users reported having a back-up dealer in case their main dealer was not available. Methamphetamine users also reported going to different dealers for different types of drugs or to get different forms of methamphetamine that were not available from their main dealer. There were also a number of methamphetamine users who reported 'shopping around' for methamphetamine, trying different dealers who they had heard could provide better quality methamphetamine.

Figure 16. Number of different dealers from whom methamphetamine users purchased methamphetamine in the past month



The availability and purity of methamphetamine

Availability of methamphetamine

The majority of methamphetamine users (93%) felt that methamphetamine was easy or very easy to obtain. Methamphetamine users also perceived all forms of the drug to be readily available (Table 18), with the more pure forms of base and ice reportedly as easy to obtain as the traditional powder form of methamphetamine. Seventy seven per cent of methamphetamine users surveyed reported ice to be easy or very easy to obtain while 85% indicated that base was easy or very easy to obtain.

Table 18. Perceived availability of methamphetamine by form of methamphetamine.

Availability rating (%)	Form of methamphetamine			
	Any form (n = 307)	Powder (n = 226)	Base (n = 235)	Ice (n = 206)
Very easy	50	39	31	32
Easy	43	44	54	45
Difficult	6	15	15	19
Very difficult	1	2	<1	4

Availability of ice and base from methamphetamine dealers

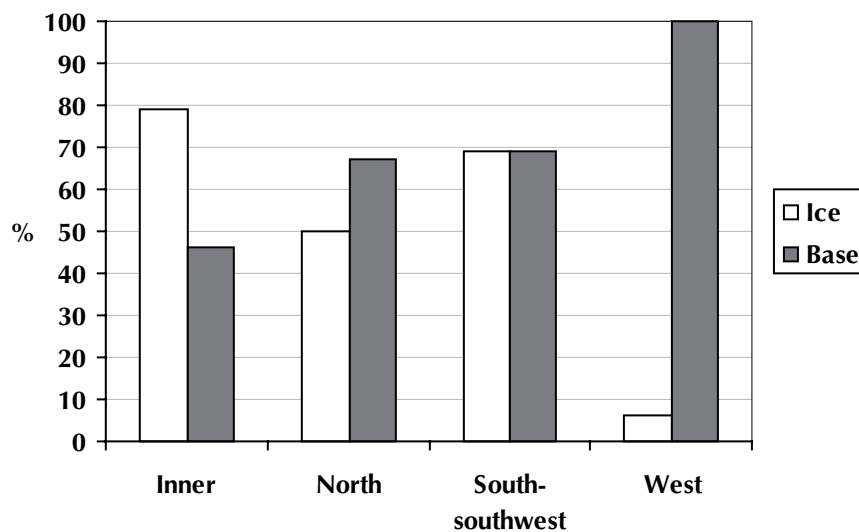
The majority of methamphetamine users were able to purchase ice, base or powder from their main dealer (Table 19); however, there were geographic differences in the availability of ice and base. Methamphetamine users from the inner region of Sydney were more likely to report that their main dealer could supply ice (78%) than their counterparts in other regions of Sydney (39-67%). In contrast, methamphetamine users in Western Sydney were far more likely to be able to obtain base from their dealer than methamphetamine users from other parts of Sydney, and less likely to be able to purchase ice (39%). This trend was seen in both users' reports of what they could

purchase from their main dealer (Table 19), and more clearly in dealers' reports of the forms they had sold during the past year (although the latter reports were based on only seven dealers in the Western region of Sydney, Figure 17).

Table 19. Percentage of methamphetamine users reporting their main dealer could provide powder, base and ice, by region.

	Forms of methamphetamine supplied by main dealer		
	Powder	Base	Ice
Inner (%, n = 241)	59	69	78
North (%, n = 53)	66	68	64
South-southwest (%, n = 49)	63	57	67
West (%, n = 54)	57	85	39

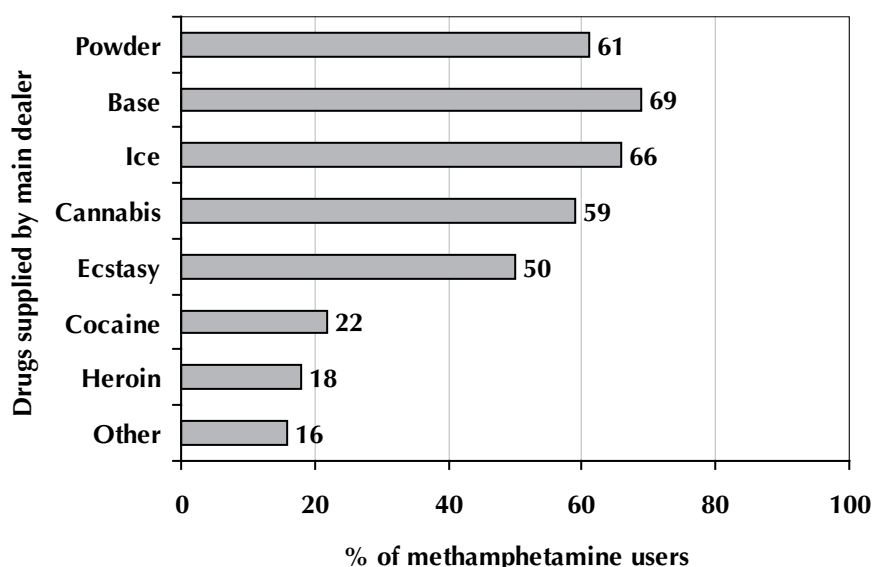
Figure 17. The proportion of dealers reporting the sale of base and ice in the past year, by region



Availability of other drugs from methamphetamine dealers

The majority of methamphetamine users reported that they could purchase drugs other than methamphetamine from their main dealer (77%). The median number of other drugs that could be supplied by dealers was two (range 1-7). The most common drugs that could be obtained besides methamphetamine were cannabis and ecstasy, with a small proportion of dealers being able to supply cocaine and heroin. Sixteen per cent of dealers also supplied other drugs including ketamine, GHB, LSD and, to a lesser extent, prescription drugs (e.g., benzodiazepines and methadone, Figure 18). Although methamphetamine dealers could supply a range of different drugs, dealers who could supply ice were more likely to supply other imported drugs such as heroin (22% vs. 8%) and cocaine (28% vs. 10%) and ecstasy (55% vs. 38%).

Figure 18. Drugs supplied by methamphetamine users' main dealer



Purity of methamphetamine in Sydney

Methamphetamine users recognised the high purity of base and ice relative to powder methamphetamine (Table 20) and the majority (73%) rated the overall purity of methamphetamine as medium to high. Analysis of methamphetamine seizures in NSW indicated that, although the median purity of methamphetamine was low, purity doubled from a median of 6% in 2001 and 2002 to 13% in 2003.¹⁷ These purity data should be treated with caution because they are based on only a small and potentially biased sample of drug seizures that undergo purity analysis. Nonetheless, this increase in the purity of NSW methamphetamine seizures is consistent with more comprehensive data from drug seizures in Victoria (see *Methamphetamine: physical forms, purity and terminology*).

NSW Police drug seizure data does not routinely distinguish between the different forms of methamphetamine; however, a proportion of drug seizures made in NSW are accompanied by a physical description of the seized drug.¹⁸ Based on this incomplete data, 10% of methamphetamine seizures made between 2001 and 2003 were described as having a crystalline appearance. The proportion of crystalline seizures increased from 8% in 2001 and 6% in 2002 to 17% in 2003. Consistent with forensic seizure data from Victoria, 40% of crystalline methamphetamine seizures in NSW did not have a high purity indicative of ice.¹⁹ Again, while these data should be interpreted with caution, they do suggest a recent rise in the number of ice seizures and evidence of low purity crystalline methamphetamine similar to that seen in Victoria (see *Methamphetamine: physical forms, purity and terminology*).

¹⁷ Includes all drug seizures under 5 grams (i.e., less than the quantity for an indictable offence, *Drug Misuse and Trafficking Act, 1985*) where methamphetamine or amphetamine was present. Methamphetamine was contained in 98%, amphetamine in 1.5%, and 0.5% contained both amphetamine and methamphetamine. The number of seizures under 5 grams that were analysed for purity was 301 in 2001, 297 in 2002 and 254 in 2003. Seizures with no recorded weight were excluded from this analysis.

¹⁸ Of the 6120 meth/amphetamine seizures under 5 grams that were made between 2001 and 2003, 5325 seizures were accompanied by a physical descriptor (2001: 2019 seizures; 2002: 1690 seizures; 2003: 1616 seizures).

¹⁹ Purity $\geq 60\%$. Based on a sample of 134 seizures of methamphetamine under 5 grams made between 2001 and 2003.

Table 20. Perceived purity of methamphetamine forms among methamphetamine users.

Purity rating (%)	Form of methamphetamine			
	All forms (n = 303)	Powder (n = 217)	Base (n = 259)	Ice (n = 195)
High	28	14	47	57
Medium	45	41	38	28
Low	14	36	9	11
Fluctuated	13	9	6	4

The demand for the more pure forms of methamphetamine

Users' preference for base and ice

The majority of methamphetamine users who had tried powder, base and ice preferred the more pure forms of the drug (81%) with their preference split equally between base and ice (Figure 19). The main reason users preferred the more pure forms of base and ice was because they provided a more intense and longer lasting high.

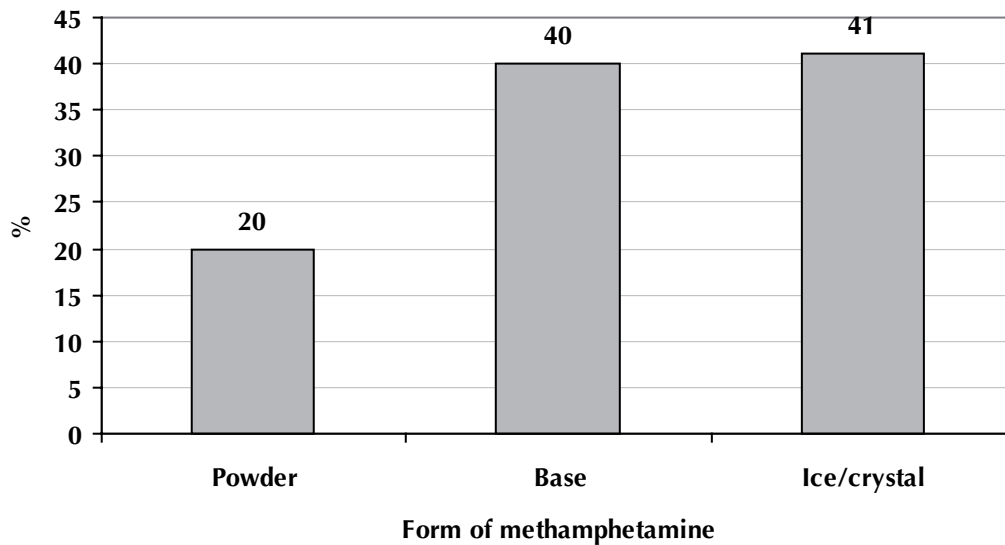
Several methamphetamine users justified their preference for purer forms of methamphetamine, particularly ice, because they did not contain as much cutting agent as powder, and therefore viewed them as 'cleaner' forms of the drug. This view was particularly common for ice, which was perceived as being uncut and 'professionally' produced. Other people preferred using base to ice because the former was more readily available and less expensive.

Methamphetamine users who preferred less pure forms of the drug did so because they disliked the side-effects that occurred when they used the more pure forms of methamphetamine, such as feeling scattered, agitated and psychotic, while they also feared the increased risk of dependence with the more pure forms of base and ice.

Preference for different forms of methamphetamine was also related to the way the methamphetamine user usually took the drug. The majority of methamphetamine users that usually smoked the drug preferred ice (85%), whereas those that snorted the drug were more likely to prefer powder (57%). Methamphetamine users who preferred base usually injected the drug (85%).

The majority of methamphetamine users reported that they would be willing to pay more money for base and ice. Many users indicated that they would also be willing to wait for these more pure forms of the drug; however, if they had to wait more than a couple of hours they would usually buy whatever else their dealer could offer.

Figure 19. Preference for powder, base or ice among methamphetamine users



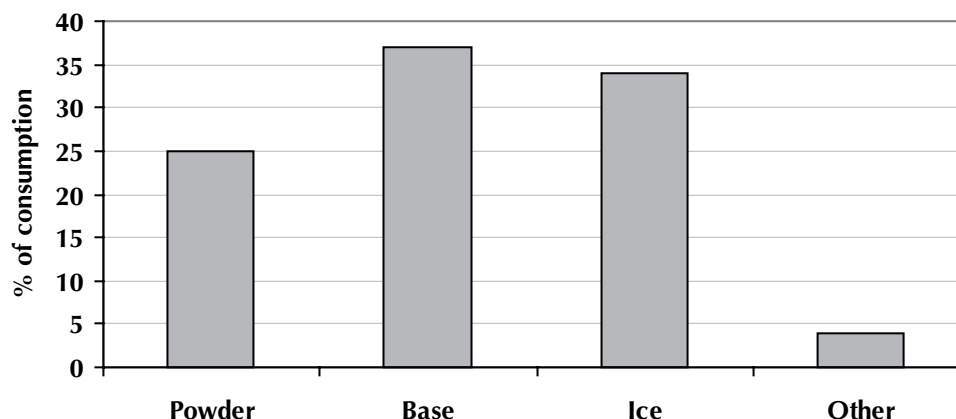
The proportion of the methamphetamine market made up of base and ice

The proportion of the market consisting of base and ice was estimated using the relative consumption of the various forms of methamphetamine. Consumption was estimated as the total number of days that each form of methamphetamine was used in the past month. Using the total days of methamphetamine use as an index of consumption allows direct comparison between the different forms of methamphetamine and circumvents problems that arise when comparing different dosage units (e.g., points of base with grams of powder). Pill consumption was excluded from the analysis, because it was not possible to conclude definitively whether or not pills contained methamphetamine, ecstasy or other drugs.

The more pure forms of base and ice methamphetamine comprised over two thirds of methamphetamine consumed by the current sample of regular methamphetamine users in Sydney (Figure 20). Ice accounted for 34% of methamphetamine consumed by the sample and base accounted for slightly more (37%). Only 25% of consumption was accounted for by powder. Four per cent of methamphetamine consumed did not fall neatly into our pre-defined categories of base, ice and powder methamphetamine. This included the use of liquid methamphetamine and prescription methamphetamine.

Several caveats need to be placed around these estimates of powder, base and ice consumption. First, these estimates reflect only those geographic areas sampled in the current study. Second, they were based on drug consumption among regular methamphetamine users. Third, they reflect only those 'types' of users who entered our study. Specifically, the current estimates are likely to under-represent recreational non-injecting methamphetamine use, particularly among employed higher socio-economic groups, and methamphetamine use among people from non-English speaking backgrounds. These caveats aside, the above estimates are based on a large sample of methamphetamine users from across Sydney who had a range of use patterns, and are likely to be a reasonably accurate reflection of the methamphetamine situation within Sydney. Again, it should be noted that these estimates of methamphetamine consumption exclude methamphetamine pills.

Figure 20. Proportion of methamphetamine consumption during the past month by methamphetamine form



There were strong geographic disparities in the consumption of ice and base across Sydney (Table 21). Ice consumption was concentrated predominantly in the inner region of Sydney, where it accounted for almost half of methamphetamine consumed. Ice use was also common in North and Southwest Sydney, but accounted for only around one-third of methamphetamine consumption in these regions. In contrast, ice accounted for only 7% of methamphetamine consumption in the Western region of Sydney, where base accounted for the majority of methamphetamine consumed. Base was also dominant in Southwest Sydney, but not to the same extent as in Sydney's West.

Table 21. Percentage of powder, base and ice consumed within each Sydney region.

	Powder	Base	Ice
Inner (% , n = 139)	27	27	46
North (% , n = 55)	30	34	36
South-southwest (% , n = 52)	28	45	28
West (% , n = 59)	19	74	7

Note. Consumption measured in total days of use; analysis restricted to consumption of powder, base and ice methamphetamine.

The 'pill' market

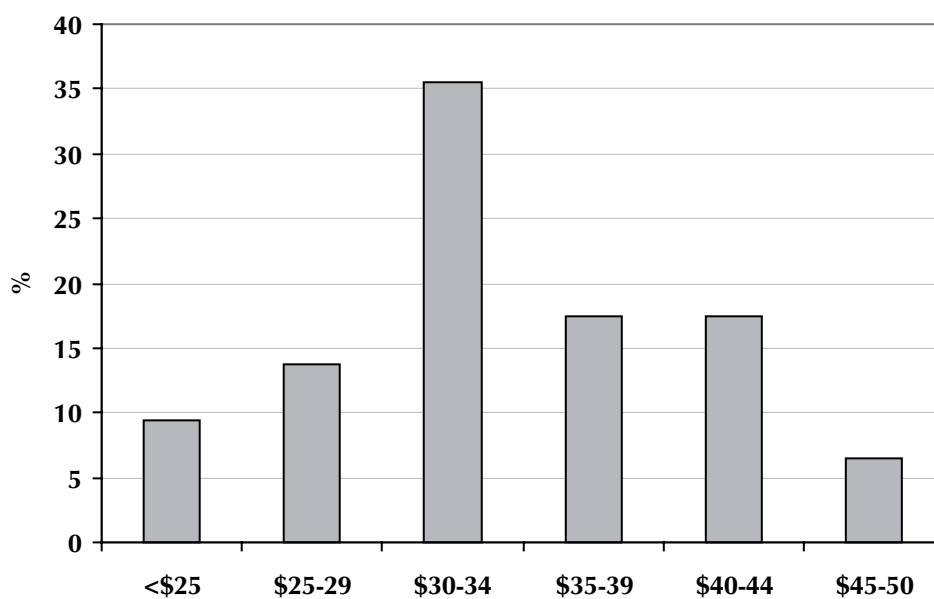
Forensic analysis of Victorian drug seizure data presented earlier in this report indicates that a significant proportion of methamphetamine seizures are in tablet form, even though pills are not a recognised form of methamphetamine among users (see *Methamphetamine: physical forms, purity and terminology*). NSW police seizure data are consistent with the Victorian drug seizure data, showing that almost one in five drug seizures that contained either methamphetamine or amphetamine were in tablet form.²⁰ It is generally believed that pills containing methamphetamine

²⁰ Although NSW Police drug seizure data do not routinely or systematically distinguish between the different forms of methamphetamine, a proportion of drug seizures made in NSW are accompanied by a physical description of the seized drug. There were 6,266 drug seizures between 2001 and 2003 that contained methamphetamine or amphetamine and were accompanied by a physical description (includes seizures of all weights). Based on this incomplete data, 21% of methamphetamine/amphetamine seizures were in tablet form.

are sold on the ecstasy market as a locally produced fake form of ecstasy pills. The trend toward increasingly varied composition of ecstasy pills has been recognised in the way ecstasy pills are marketed, in that they are often bought and sold as '*pills*' rather than ecstasy pills per se (Topp and Churchill, 2002).

Use of 'ecstasy' pills was common among methamphetamine users, with 62% having taken pills in the past year, and half (52%) having purchased pills during this time. Almost all methamphetamine users (92%) who could comment on the availability of pills thought that they were either easy or very easy to obtain. The median price of a single pill purchase was \$30 (range \$15-50) with no evidence of a bimodal price distribution that might be expected if people were paying different prices for authentic imported ecstasy pills and domestically produced 'fake' ecstasy (Figure 21).

Figure 21. Price distribution for methamphetamine users' most recent pill purchase



When methamphetamine users were asked if they knew whether the ecstasy pills they purchased contained ecstasy, or whether they were 'fake' ecstasy (i.e., pills containing methamphetamine or other drugs), most users indicated that they believed that the pills they purchased contained ecstasy (32%) or both ecstasy and other drugs (35%). A further 9% believed pills contained only drugs other than ecstasy. Almost one-quarter (24%) of methamphetamine users indicated that they did not know what drugs were contained in the pills they had purchased.

The majority of methamphetamine users who believed that pills contained drugs other than ecstasy were aware that their pills contained methamphetamine (or amphetamine) and ketamine (79% and 76% of people who commented respectively). Smaller proportions of methamphetamine users believed that their pills contained other drugs (e.g., heroin, cocaine, LSD, MDA, PCP and GHB). Methamphetamine users who claimed to be able to distinguish between pills containing ecstasy and those containing other drugs mostly did so based on the psychoactive effects, although a proportion also relied on pill testing kits and reports from dealers and/or peers.

Conclusion

The more pure forms of ice and base methamphetamine made up two-thirds of methamphetamine consumption in Sydney. There was a strong preference among methamphetamine users for the more pure forms of base and ice over powder methamphetamine, with some users willing to wait a few hours and pay more to obtain these forms of the drug. Both base and ice were available across Sydney; however, ice was reported to be more commonly available through dealers in the inner region of Sydney, whereas the majority of dealers in the Western region of Sydney sold base methamphetamine. This pattern of availability fits with our understanding, gained from the in-depth and key informant interviews, of the different criminal groups involved in the supply of imported and domestically produced methamphetamine.

The ready availability of different forms of methamphetamine throughout Sydney appears to have created competition in the methamphetamine market, resulting in a convergence of the price per 'hit' of methamphetamine across the different forms of the drug. However, base remains slightly cheaper than ice (\$40 vs. \$50 per point), consistent with the domestic production of base and its cheaper wholesale price. Given the price differential between base and ice, and that different criminal groups appear to be involved in the supply of base and ice respectively within Sydney (see *Supply of methamphetamine in Sydney*), it is likely that competition in the market will continue, along with further changes in the price and purity of the drug.

There was no substantive evidence of a specific market for methamphetamine pills in Sydney, with the use of pills containing methamphetamine presumably absorbed by the ecstasy market. Many methamphetamine users appreciated that pills sold as ecstasy (or more generically as 'pills') often contained methamphetamine and/or other drugs, and some users claimed to distinguish between 'real' ecstasy pills and those containing methamphetamine. However, it would be unwise to rely solely on consumers' reports of pill content to monitor this component of the methamphetamine market because a substantial proportion of users did not know what drugs were contained in the pills they purchased.

Finally, the retail methamphetamine market is a polydrug market, with the majority of methamphetamine dealers indicating that they supplied several different drugs, including different forms of methamphetamine. The most common drugs sold through methamphetamine dealers were cannabis and ecstasy pills, with a smaller proportion supplying heroin and/or cocaine. The majority of methamphetamine users had approached more than one methamphetamine dealer within the past month, although methamphetamine users did report primarily relying on one or two main drug dealers, and/or sometimes approaching different dealers for different types of drugs. Most methamphetamine users were friends or acquaintances of their dealer, and, in line with this, the majority of methamphetamine users purchased the drug at dealers' homes. Methamphetamine was paid for in cash, with no significant evidence of the drug being provided on credit or in exchange for other goods or services.

Methamphetamine use in Sydney

Rebecca McKetin, Erin Kelly and Jennifer McLaren²¹

Key points

- The majority of regular methamphetamine users in the current sample were English speaking Australian born young adults living independently, who had average education levels. Most were either unemployed or employed in clerical, service or sales work, and they typically earned less than the average young adult in Sydney.
- One quarter of participants had spent more on drugs in the past week than they had legally earned in this time. Moreover, a further quarter of the sample would have had less than \$100 remaining to cover their living expenses after they had purchased illicit drugs. One in five methamphetamine users (21%) reported having received money from illegal activity in the past week, with a median illegal income of \$325 during this time.
- The majority of methamphetamine users injected the drug once to several times per week, although patterns of methamphetamine use varied from people who snorted or swallowed methamphetamine on a monthly or weekly basis through to those who injected the drug almost every day.
- Almost two-thirds of the methamphetamine users interviewed in the current survey preferred to inject methamphetamine (64%), with the remaining methamphetamine users preferring to snort (19%), swallow (9%) or smoke (9%) the drug.
- Around half of regular methamphetamine users were severely dependent on methamphetamine. Dependence was more likely among those who injected the drug, used twice or more per week, and among those who used the pure forms of methamphetamine, particularly ice.
- There were two distinct populations of ice users: heavy injecting polydrug users who injected ice, and non-injecting drug users who smoked ice. Although ice injectors and ice smokers differed significantly in their demographics and patterns of polydrug use, both groups showed frequent methamphetamine use and high levels of dependence on methamphetamine.
- The smoking of ice among young recreational drug users is an important new trend that warrants urgent attention. The trend toward smoking ice has the potential to introduce a younger, less drug involved population of people into a more risky pattern of drug use, and increase their risk of becoming dependent on methamphetamine.

Socio-demographic characteristics of methamphetamine users

The following sections describe the characteristics of the 310 methamphetamine users surveyed in the current research. These type of surveys are subject to sampling biases, which can affect whether they are representative of the underlying target population of drug users. The biases that need to be considered when interpreting the current findings are: (a) the sample included only regular methamphetamine users, most of whom took the drug at least weekly, and therefore these results do not necessarily reflect less frequent recreational methamphetamine use; (b) the sample is likely to under-represent employed drug users from a higher socio-economic background,

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because these people would be unlikely to participate in a face-to-face survey on illicit drug use; (c) the sample is likely to under-represent people from non-English speaking backgrounds because the survey was advertised and conducted in English; and (d) the sample is likely to over-represent injecting drug users, particularly injecting heroin users, because needle and syringe programs were one of the points of recruitment for the survey.

All participants used methamphetamine at least monthly in the past year, with the majority (82%) having used the drug at least weekly. Polydrug use was common among the sample, with participants having used a median of ten drug classes in their lifetime (range 4-12) and seven drug classes in the past year (range 2-11), including methamphetamine and licit drugs such as antidepressants and benzodiazepines. Over half of the participants (55%) nominated methamphetamine to be their drug of choice, with other common drugs of choice being cannabis, ecstasy and heroin (12% each). Seventy two per cent of participants had injected a drug in their lifetime and two thirds nominated injecting as their main route of methamphetamine administration during the past year. The most common non-injection route of administration was snorting (19%), with swallowing and smoking methamphetamine being less common (9% and 8% respectively). Participants had a median age of 28 years and 59% were male. Almost all participants (96%) reported English to be the main language they spoke at home and the majority (80%) were born in Australia. Further detail on the socio-demographics of the sample is presented in the following sections.

Demographics

The median age of methamphetamine users was 28 years (range 16 – 60 years) and most were aged in their twenties. Over half were male (59%) and there was no substantial difference in the gender composition of younger and older methamphetamine users. Almost all methamphetamine users (96%) reported English as the main language spoken and the majority (80%) were born in Australia (Table 22). In comparison with the general population of Sydney, methamphetamine users were younger (median age 28 vs. 34 years), more likely to be male (59% vs. 49%), and were more likely to have been born in Australia (80% vs. 62%, ABS, 2002).

Table 22. Demographic characteristics of regular methamphetamine users.

Demographic	Per cent (N = 310)
Male	59
Age (median years)	28
English as main language	96
Born in Australia	80
Tertiary education	
None	46
TAFE/technical	41
University/college	14
Employment status	
Unemployed	61
Part time/casual	17
Full time	14
Student	6
Home duties	2
Prison history	33

Employment

Over half (61%) of methamphetamine users were currently unemployed and only 14% were in full time employment. Seventeen per cent were in part time or casual employment and 6% were current students (high school, TAFE or university). Current and most recent occupations reported by methamphetamine users were categorised using the Australian Bureau of Statistics Australian Standard Classification of Occupations (Commonwealth of Australia, 1997). The most common type of occupation among methamphetamine users was clerical, sales or service work (47%, Table 23) with smaller proportions employed as associate professionals (14%), tradespeople (13%) or labourers (12%). Occupations that fell under these four broad categories included jobs such as reception or office administration, working at call centres, customer service and sales assistant work, bar attendance and waiting, cleaning and other labour-based jobs. Regular methamphetamine users were less likely than the general population of Sydney to have been employed as managers or professionals (9% and 19% vs. 2% and 10% respectively, ABS, 2002).

Table 23. Type of occupation among employed methamphetamine users.

ABS Occupation Category	Per cent (n = 107)
Manager/administrator	2
Professional	10
Associate professional	14
Tradesperson or related work	13
Clerical, sales or service	48
Production or transport work	3
Labourer or related work	12

Living arrangements

The majority of methamphetamine users lived with non-related adults (28%) or at home with one or both parents (23%, Table 24). One in five methamphetamine users lived alone. Ten per cent of regular methamphetamine users were living with children: this included both couples with children and single parents. A small proportion of methamphetamine users were homeless or living in temporary accommodation. The majority of methamphetamine users had lived in the same suburb of Sydney for at least one year (69%).

Table 24. Current living arrangements among methamphetamine users.

Living arrangement	Per cent (N = 310)
Non-related adults sharing	28
At home/with parent(s)	23
Person living alone	19
Couple living alone	8
Couple living with child(ren)	6
Single parent living with child(ren)	4
Hostel/refuge/homeless	7

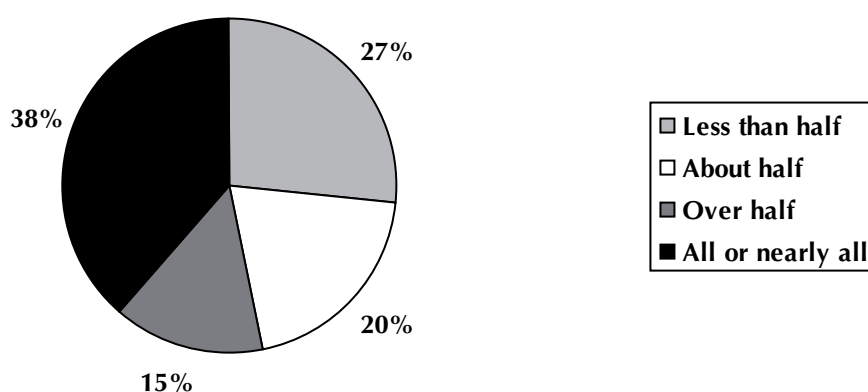
Treatment contact

The majority of methamphetamine users (58%) had received specialised treatment for their drug use at some stage of their life and 25% had received treatment for their methamphetamine use. Thirty per cent were currently in some form of drug treatment, mostly methadone maintenance (19%), with smaller proportions in buprenorphine treatment (4%) and drug counselling (3%). The high exposure to opioid treatment among the current sample of methamphetamine users is likely to reflect the high proportion of the sample that were also using heroin (29% had used heroin in the past month). Four per cent reported other types of drug treatment, such as Narcotics Anonymous, Therapeutic Communities, naltrexone, detoxification and natural therapies.

Contact with other methamphetamine users

Methamphetamine users had regular contact with other methamphetamine users (Figure 22). Over one third indicated that all or nearly all of the people they knew were also methamphetamine users. Conversely there were no methamphetamine users in the sample who didn't know any other methamphetamine users.

Figure 22. Proportion of people known to regular methamphetamine users who also use methamphetamine



Expenditure on illicit drugs and sources of income

Methamphetamine users had spent a median of \$120 on illicit drugs in the past week, of which \$60 was spent on methamphetamine; however, expenditure was highly varied and 40% of methamphetamine users had spent \$200 or more on illicit drugs during the past week (Table 25). The majority of regular methamphetamine users (90%) had received a legal income during the past week through which they could fund their drug use (Table 25). However, those in the current sample earned significantly less than the general population in Sydney (median income in the past week \$253 vs. \$400-499, ABS, 2002) and one quarter of participants had spent more on drugs in the past week than they had earned legally in that time. Moreover, a further quarter of the sample would have had less than \$100 remaining to cover other living expenses after they had purchased illicit drugs.

Methamphetamine users reported paying for drugs through a range of legal and illegal income sources (Table 25). The majority indicated that the main way that they had supported their drug use during the past year was money from employment or government benefits (59%). There was a wide array of other methods used to obtain funds, such as pocket money, compensation payouts,

inheritances, savings, pawning or 'hocking' goods, and sex work. A small proportion did not need to fund their drug use because they were usually given drugs by their friends or partner. The main illegal means used to obtain money for drugs was dealing and, to a lesser extent, property crime.

Table 25. Expenditure on illicit drug use among regular methamphetamine users.

	Per cent
Amount spent on illicit drugs in past week	(n = 308)
Nothing	13
Less than \$20	2
\$20-49	11
\$50-99	16
\$100-199	19
\$200-399	24
\$400 or more	16
Amount spent on methamphetamine in past week	(n = 308)
Nothing	32
Less than \$20	<1
\$20-49	11
\$50-99	12
\$100-199	21
\$200-399	14
\$400 or more	10
Main source of funding for drug use during the past year	(n = 163)
Did not pay for drugs	4
Income from legal employment	34
Pensions or other government benefits	25
Dealing	10
Property crime	4
Borrowing from friends/family	4
Scoring for others	2
Other	14

One in five methamphetamine users (21%) reported having received money from illegal activities in the past week, and their median illegal income during this time was \$325 (range \$10-5000). The most common source of illegal income was drug dealing, reported by 19% of the sample (Table 26). Of those dealing drugs, most were dealing methamphetamine. The median income from dealing methamphetamine was \$200 a week (range \$10-4500). Although only 4% of methamphetamine users reported having made money from property crime in the past week, this

was a more lucrative activity than dealing, yielding a median income of \$650 during the previous week. Less common sources of illegal income such as fraud and sex work were reported by only 2% of the sample.

Table 26. Income received by methamphetamine users during the past week.

Income source	Received income source (%, N = 310)	Median income ^a (\$)
Any income	95	325
Legal income	93	250
Illegal income	21	325
Income from dealing		
Any drug	18	200
Methamphetamine	12	200
Income from property crime	4	650

^a Among those that reported this type of income.

Patterns of methamphetamine use

Methamphetamine use history

Methamphetamine use was initiated at around 17 years of age (range 12-43 years). Most users first took methamphetamine by snorting (50%) or swallowing (23%) the drug, although one quarter injected methamphetamine on their first occasion of use (Table 27). The majority of those who injected methamphetamine on their first use occasion were already injecting drug users at the time (81%). Regular use of methamphetamine²² occurred approximately two years after the first use of the drug, with the median onset for regular use being 19 years of age.

Since their first use of methamphetamine, the majority of methamphetamine users had moved on to more efficient routes of administration (i.e., smoking and injecting). Once people make a transition to using more efficient routes of administration, such as injecting, it is very unlikely that they will revert to a less efficient way of taking the drug (Darke, Cohen et al., 1994; Swift et al., 1999). This observation was borne out in the current study, where 88% of methamphetamine users who had ever injected a drug nominated injection as their preferred current route of administration. The majority of methamphetamine users had also begun using the more pure forms of base and ice that are now available on the Sydney drug market (Table 27).

²² At least monthly use.

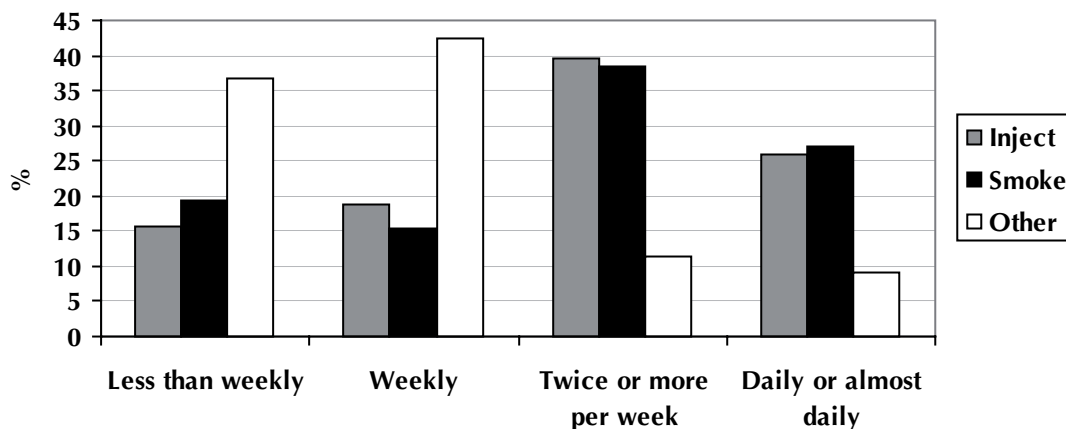
Table 27. Methamphetamine use patterns at first use and most recent use occasions.

	Initial use (%, N = 310)	Most recent use (%, N = 310)
Form of methamphetamine		
Powder	77	28
Base	5	23
Ice	7	37
Other	11	12
Route of administration		
Snort	50	16
Swallow	23	10
Smoke	2	11
Inject	25	63

Current methamphetamine use patterns

Regular methamphetamine users typically took the drug two to four times per week (49%) but frequency of use varied from less than weekly (18%) to daily or almost daily use (13%). The main way that methamphetamine users took the drug was injection (64%), with 19% snorting the drug and only a small proportion nominating either smoking or swallowing as their usual route of administration (8% and 9% respectively). Methamphetamine users who usually injected or smoked the drug tended to use more often (Figure 23) and were more likely to be dependent on methamphetamine (see section on *Dependence* in this chapter).

Figure 23. Frequency of methamphetamine use in the past month by route of administration



Use patterns were similar for base and ice, with a median of four and five days use in the last month respectively. Approximately one in ten methamphetamine users had taken base or ice daily in the past month (12% and 13%). A 'hit' of methamphetamine usually consisted of taking one point of base or ice. Methamphetamine users would usually have one or two hits in a day, or less commonly three hits in one day. A small proportion of heavy methamphetamine users reported using several points in one hit (e.g., up to three points of ice or up to five points of base) and using more than three times per day. Powder was usually taken in quarter-grams, half-grams or full grams rather than points and was typically taken one to three times per day. People were less likely to use powder daily, and a larger proportion of those taking powder preferred to snort methamphetamine (Table 28). There were also differences in the route of administration associated with powder, base and ice, in that ice was usually injected or smoked, whereas base was usually injected, and powder was more likely to be snorted – if not, injected (see Figure 13 later in this chapter).

Almost two-thirds of methamphetamine users had taken a break from using methamphetamine for at least one month during the past year (62%). The median duration of abstinence among those who did take a break was two months, with most people resuming use within 4 months (85%). Reasons given for this period of abstinence were (i) circumstantial factors such as not having enough money, changes in social habits, work or study commitments, or being in jail; (ii) needing a break from the negative side-effects of methamphetamine use such as depression and psychosis; or (iii) methamphetamine not being available or not being able to obtain good quality methamphetamine.

Table 28. Patterns of powder, base and ice use among regular methamphetamine users.

	Powder	Base	Ice
Main route of administration (%)	(n = 309)	(n = 263)	(n = 239)
Inject	57	68	63
Smoke	0	1	30
Snort	36	7	2
Swallow	7	24	5
Past month use patterns:	(n = 169)	(n = 182)	(n = 152)
Daily use ^a (%)	5	12	13
Days used in the past month (median) ^b	3	4	5
No. 'hits' per day (median)	2	2	2
Amount used per 'hit' (mode)	Half gram	1 point	1 point

^a 20 or more days of use in the past month.

^b Of those who had used that methamphetamine form in past month.

Characteristics of people who use base and ice

Methamphetamine users who took the more potent forms of the drug (i.e., base and ice) had different characteristics from those who used only powder (Table 29). People who took base and ice were more likely to be older injecting drug users who were also using heroin (33% vs. 9%; $\chi^2_{df=1} = 12.7$, $p = 0.000$) or other opioid drugs (39% vs. 18%; $\chi^2_{df=1} = 9.7$, $p = 0.002$). They tended to be using methamphetamine more heavily than those who only took powder and were also more likely to be unemployed and to have a criminal record. In contrast, people who used only the powder form of the drug tended to be younger drug users who were more likely to snort methamphetamine and had little previous criminal involvement.

Table 29. Characteristics of people who use powder, base and ice.

	Most potent form used in the past month (%)		
	Powder (n = 51)	Base (n = 97)	Ice (n = 152)
Age (years)	24	30**	29**
Unemployed	43	68**	64**
Prison history	8	34*	35*
Arrest history	12	34**	27*
Ever injected a drug	33	80***	80***
Dependent on methamphetamine	33	52*	66***
Median days of methamphetamine use (past month)	4	6**	12***
Currently in opioid maintenance therapy	4	27**	27***
Polydrug use			
Heroin	8	24*	39***
Other opioids	16	40**	39**
Benzodiazepines	24	31	44*
Ecstasy	59	29***	38**

Note. Comparisons made using Pearson or Kruskal-Wallis Chi-Square relative to those who only used powder in the past month.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Ice smokers vs. ice injectors

Among people who used ice, there were those that preferred to smoke the drug (30%) and those that preferred to inject ice (63%), with snorting and swallowing ice being relatively uncommon (2% and 5% respectively). Ice injectors had very similar demographics and drug use patterns to heroin injectors or other heavy injecting drug users (cf. Breen et al., 2004a; Table 30). Those who smoked the drug had socio-demographic and drug use characteristics more similar to recreational drug users, with relatively higher levels of education and employment, and low levels of opioid use (cf. Breen et al., 2004b). Ice smokers were also younger and had commenced methamphetamine use more recently than injectors. Although ice smokers were 'better off' than ice injectors in terms of their socio-demographic characteristics, they still used ice frequently and a large proportion of those who preferred to smoke ice (46%) were dependent on methamphetamine.

Table 30. Characteristics of ice smokers versus ice injectors.

	Main route of ice administration (%)	
	Smoking (n = 72)	Injecting (n = 151)
Age (years)	22	33***
Employment	61***	24
Prison history	13	46***
Drug treatment	11	41***
Dependent on methamphetamine	46	69**
Drugs used in past month		
Heroin	11	44***
Other opioids	17	49***
Benzodiazepines	17	46***
Ecstasy	81***	14
Hallucinogens	24***	3

Note. Comparisons made using Pearson Chi-Square.

* p < .05, **p < .01, ***p < .001.

Polydrug use among methamphetamine users

Methamphetamine users had very high levels of polydrug use, having tried a median of ten drug classes in their lifetime (range 4-12) and having used seven drug classes within the past year (range 2-11). Cannabis use was particularly prevalent among the sample, with 76% of methamphetamine users having smoked cannabis in the past month and 42% of these people having smoked daily. Other stimulant and hallucinogen use was common but use occurred on a less frequent basis. Alcohol and tobacco use were also common. A large proportion of the methamphetamine users were also current heroin users, but only 6% of methamphetamine users were currently using heroin daily; however, one-in-five used other opioids on a daily basis, indicative of opioid maintenance therapy. A similar proportion reported being in opioid substitution therapy at the time of being surveyed (see *Treatment contact* earlier in this chapter). Taken together, these data suggest that at least one-in-five methamphetamine users were dependent heroin users. Methamphetamine users who had taken antidepressants in the past month tended to do so daily, indicative of prescription use of these drugs (Table 31).

Table 31. Drug use history among regular methamphetamine users.

Drug Class	Prevalence (% , N = 310)				Median days used in the past month ^b
	Lifetime	Past year	Past month	Daily use ^a	
Methamphetamine	100	100	97	21	8
Tobacco	97	91	88	83	30
Alcohol	100	89	77	15	6
Cannabis	99	87	76	42	20
Ecstasy/pills	87	59	38	0	3
Benzodiazepines	75	57	36	7	6

Table 31 continued.

Drug Class	Prevalence (% , N = 310)				Median days used in the past month ^b
	Lifetime	Past year	Past month	Daily use ^a	
Other opioids	64	47	36	21	30
Heroin	66	40	29	6	6
Cocaine	79	45	16	1	2
Antidepressants	50	25	13	8	30
Inhalants	59	21	10	0	1
Hallucinogens	84	26	10	0	1

^a 20 or more days of use in the past month.

^b Among those who had used drug in past month (n = 301).

A snapshot of a typical use occasion

The vast majority of methamphetamine users (81%) were in the company of other people the last time they took the drug, usually a couple of close friends, acquaintances and/or their partner. They usually took the drug at their own home or at a friend's home. Methamphetamine consumption in public places was relatively uncommon (Table 32).

Methamphetamine users partook in a range of activities after using methamphetamine, although most took the drug when they were planning to socialize (e.g., going to a party or nightclub). A lot of methamphetamine users simply enjoyed the feeling the drug gave them and carried on doing their normal activities or pastimes (e.g., doing household chores, listening to music, drawing, 'chilling-out' at home on their own, or socializing with friends). Methamphetamine users described a sense of well-being while on methamphetamine, feeling more confident, alert and talkative, and generally having a greater interest in what was happening around them. The euphoria or 'rush' associated with injecting and smoking the drug was a particularly attractive aspect of using methamphetamine. The following quotations are from methamphetamine users in the current study.

"...and I eventually had my first smoke. And I was blown away, I was, the euphoria I was feeling, feelings of well-being and of just being invincible. And just this feeling of closeness to everyone, and relating to people and talking, and having fun and dancing, and just a deep appreciation of everything in life. It was very weird and like I had a high self-esteem already and I loved life, and everything about it, and exploring new things."

"The rush is very fast and strong. It's quite euphoric. And you can feel it straight away, like a wave going through you."

A proportion of methamphetamine users also took the drug to make them feel better when they were coming down or withdrawing from methamphetamine or because they were dependent on the drug. Only 11% of methamphetamine users reported using the drug specifically to help them work or study, or to stay awake so that they could work or study.

Table 32. The characteristics of methamphetamine users' most recent use occasion.

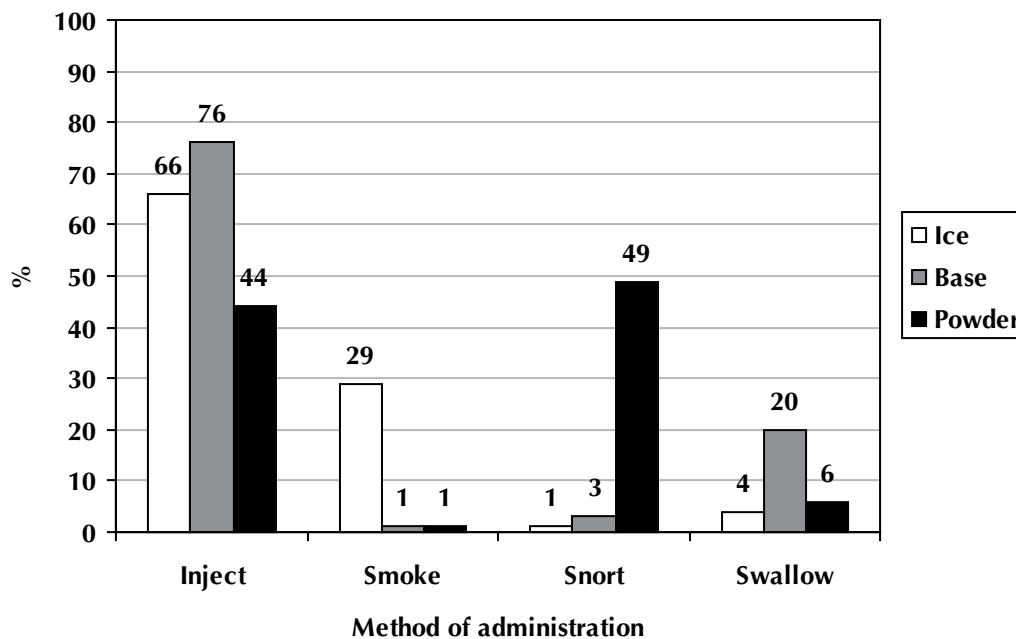
	Per cent (N = 310)
Form used^a	
Powder	28
Base	23
Ice/crystal	37
Other	12
Route of administration	
Inject	63
Smoke	11
Snort	16
Swallow	10
Location	
Own home	45
Friend's house	32
Entertainment venue	9
Public place	8
Injecting facility	2
Dealer's house	1
Other	3
Number of other people present	
Alone	20
One to three	58
Four or more	23
Relationship to those present^b	
Close friend(s)	74
Acquaintance(s)	24
Partner	20
Family member(s)	3
Dealer	2
Stranger(s)	1

^a Based on self-report of the most recent form used.

^b Excluding those who used alone; participants could nominate more than one category.

By far the most prevalent route of administration on the last use occasion was injection (Figure 24). When injecting methamphetamine, people usually dissolved the drug by adding water to the plastic sachet in which they purchased their methamphetamine, and withdrawing the solution into the syringe. Methamphetamine usually dissolved easily in the water; however, some users reported needing to shake the bag or grind the substance through the bag with their fingers before it would dissolve. Other people mixed methamphetamine with water in a spoon, sometimes having to mix it with the back of the syringe or heat it to get the methamphetamine to dissolve.

Figure 24. Route of administration on last use occasion by form of methamphetamine taken



Smoking methamphetamine was limited almost exclusively to those who took ice on their last use occasion (Figure 24). People who smoked ice described placing the crystals into a glass pipe, lighting the bulb of the pipe to heat and melt the crystals of methamphetamine, and inhaling the fumes of methamphetamine vapour. In social situations the pipe would be passed around and people would take turns at smoking from the pipe. Melted methamphetamine would re-crystallise when the pipe cooled and could then be smoked by the next person or on a later occasion. Many people reported that there was a powdery residue left over after the methamphetamine crystal had been smoked, which could be either white or black. Less common methods of smoking ice included using a 'bong' (water pipe used for smoking cannabis), placing the crystals on a piece of a broken light bulb and then heating underneath the light bulb and inhaling the vapours of methamphetamine, or placing the crystals onto aluminium foil and heating the foil from underneath with a cigarette lighter and inhaling the vapors through a straw.

People who snorted methamphetamine were taking the powder form of the drug, and would line up the powder with a card or similar object and snort it through a note or straw. If the methamphetamine was granular or lumpy, a razor or other hard object was sometimes used to cut or crush the methamphetamine to a finer consistency. A minority of methamphetamine users (10%) swallowed the drug. People who swallowed methamphetamine added it to water or to other drinks, wrapped it in 'tally-ho' or tissue paper and swallowed it, or rubbed it on their gums.

Dependence on methamphetamine

Methamphetamine has a defined dependence syndrome characterized by affective and physical withdrawal symptoms, taking the drug to relieve withdrawal, and rapid reinstatement of use following periods of abstinence. Withdrawal is characterized by fatigue, craving, psychological distress (lethargy, irritability, depression, anxiety, circadian disturbances, and difficulty concentrating) and physical complaints (decreased appetite, sweating, weakness, perceptual disturbances, body aches - see Topp. et al., 1995; Topp and Mattick, 1997b). The following quotations from methamphetamine users illustrate the lifestyle and symptoms associated with dependent methamphetamine use.

"...every day I want to use. It's one of those things like when I do use, I regret using in a sense. Like there's not a day where I don't think about having a [hit] and you know I'm able to say to myself that I'm not going to do it today. And sometimes I'll say that every day for two weeks, and then it'll come to a point where 'okay cool, got to get on and have a good time'."

"...you just feel like you need to have ice to function. And I couldn't get out of bed without a smoke of ice. And my life evolved around this pipe. I'd clean it, and I'd go crazy if someone touched it. ...And the come-downs were just disgusting, the paranoia, hearing things, delusional state ...just thinking about where my next hit of ice was going to come from."

Dependence on methamphetamine was common among regular users of the drug. Fifty six per cent of those surveyed were severely dependent on methamphetamine (score of four or greater on the Severity of Dependence Scale; Topp and Mattick, 1997a). People who reported usually injecting methamphetamine were far more likely to be dependent than people who swallowed or snorted the drug (Figure 25). Levels of dependence among those who usually smoked the drug were also high (58%); however, only a small proportion of the sample nominated smoking as their main route of methamphetamine administration (8%).

Methamphetamine users who took ice were twice as likely to be dependent on methamphetamine compared to people who used other forms of the drug, even after adjusting for the higher frequency of methamphetamine use and the high prevalence of injecting drug use found among ice users (Table 33).

Figure 25. Percentage of dependent methamphetamine users by route of administration

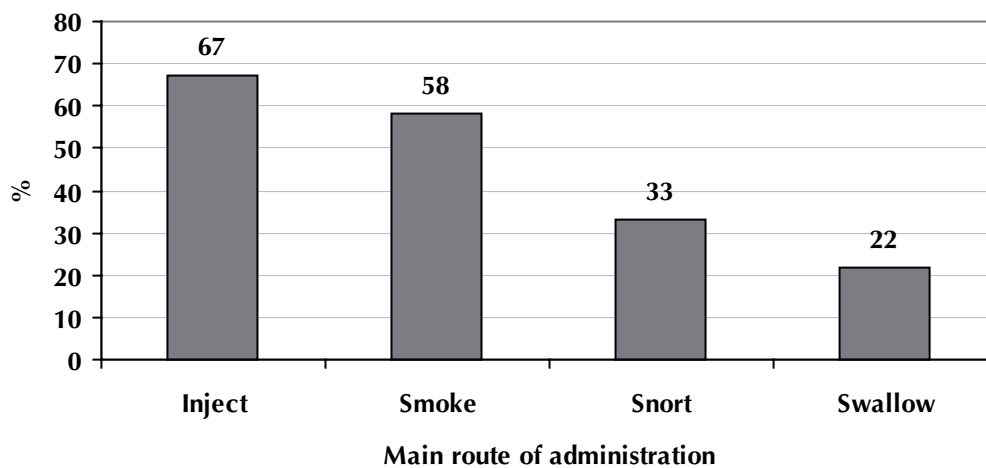


Table 33. Predictors of methamphetamine dependence.

	Odds Ratio	95% Confidence interval		p value
		Lower	Upper	
Frequency of methamphetamine use ^a				
Weekly	1.6	0.8	3.4	0.195
Twice or more per week	2.8	1.4	5.6	0.002
Injecting methamphetamine	2.7	1.6	4.6	0.000
Use of more potent forms ^b				
Base	1.2	0.6	2.7	0.562
Ice	2.2	1.0	4.6	0.039

^a Relative to less than weekly methamphetamine use.

^b Used in the past month.

Conclusion

Regular methamphetamine users were predominantly young adults with average levels of education who were unemployed or employed in semi-skilled non-specialised occupations. They typically earned less than the average young adult in Sydney. The majority were living in share households, living with their parents or living alone. As a group, regular methamphetamine users were not as disadvantaged as populations of injecting heroin users in Sydney (Roxburgh et al., 2004); however, they were substantially worse off than ecstasy users in Sydney (White et al., 2004), having lower levels of education and higher levels of unemployment. This finding is likely to reflect both a high prevalence of methamphetamine use among brackets of the population with low levels of education and low income occupations, and also that the current sample of methamphetamine users included both heavy injecting drug users with a history of opioid use and younger non-injecting drug users who were more likely to be recreational ecstasy users.

Patterns of methamphetamine use varied from people who snorted or swallowed methamphetamine on a monthly or weekly basis through to people who injected the drug almost every day. At least one-fifth of the methamphetamine users surveyed were likely to be primary heroin users, many of whom were in treatment for their heroin use, and were injecting methamphetamine as a form of polydrug use. However, a large proportion of methamphetamine injectors regarded methamphetamine as their drug of choice (63%) and reported no heroin use in the past year (42%). These methamphetamine users would inject the drug once to several times per week, and their polydrug use centered on cannabis and alcohol, with occasional use of other drugs (e.g., cocaine, ecstasy, hallucinogens and benzodiazepines). In addition there was also a group of non-injecting methamphetamine users who were very similar in their characteristics to ecstasy users, and who tended to snort or swallow the drug, or smoke ice methamphetamine. The variation in drug use patterns found among methamphetamine users was also reflected in their expenditure on illicit drugs. The bulk of methamphetamine users were able to support their drug use through legitimate income sources; however, one-quarter of methamphetamine users spent more on drugs than they earned, and a proportion of this group supported their drug use through income derived from crime.

Methamphetamine dependence was common, with just over half of the methamphetamine users interviewed in the current research being severely dependent on the drug. Consistent with previous research, those who injected methamphetamine were three times more likely than other methamphetamine users to be dependent on the drug. One particularly interesting finding from the current research was that people who used ice were at twice the risk of dependence than people who took other less pure forms of methamphetamine, even after controlling for their frequency of methamphetamine use and route of administration.

Dependence is a key risk factor in predicting the adverse social and health consequences of drug use. The current findings suggest that any increase in the use of ice in Sydney is likely to increase levels of dependence on the drug, and this will in turn lead to an increase in the observed health and social consequences of methamphetamine use, such as methamphetamine-related drug treatment admissions, methamphetamine psychosis, and possible increases in criminal involvement among methamphetamine users. Given the ready availability and popularity of ice in Sydney, there is an urgent need to warn people about the potential harms associated with using this form of methamphetamine.

A particularly worrying trend was the popularity of smoking ice among younger non-injecting drug users. It should not be assumed that smoking ice is a 'safe' way to use the drug – this is far from the case. Smoking ice is a very efficient way of taking methamphetamine that has a high dependence liability (Cook et al., 1993; Copeland and Sorensen, 2001; Quinn et al., 1997). Ice smokers in the current study showed levels of methamphetamine dependence more similar to those seen among injecting drug users than to those seen among methamphetamine users who took the drug through other non-injecting routes of administration. Smoking is a highly accessible route of administration that provides an instant drug effect with very few immediate deterring side-effects. It is clear that smoking ice appeals to younger people of a higher socio-demographic background that may not otherwise engage in heavy or injecting drug use. This population of drug users may not be aware of the increased risks associated with smoking ice, and it may be some time before the consequences of ice use among this new population of methamphetamine users are fully realized.

Criminal involvement

Rebecca McKetin, Jennifer McLaren and Erin Kelly²³

Key points

- Methamphetamine users had a high level of criminal involvement and a high degree of contact with the criminal justice system. Almost half had committed an offence in the past month (45%), one quarter had been arrested in the past year (26%) and one third had served a prison sentence during their lifetime. The most common types of crimes committed by methamphetamine users were dealing and property crime.
- Methamphetamine users who committed crime were likely to be using methamphetamine frequently, taking the more pure forms of base or ice, and using a range of other drugs. They were also more likely to be younger drug users who had a history of Childhood Conduct Disorder prior to the onset of their drug use.
- Involvement in drug dealing was more strongly related to heavy drug use than a predisposition to engage in antisocial behaviour (i.e., Childhood Conduct Disorder). This finding is likely to reflect that dealing is not viewed as 'deviant' or antisocial within a drug using culture.
- Levels of violent crime among methamphetamine users (12% in last year) were comparable to those seen among other populations of psychostimulant and injecting drug users in Sydney. Methamphetamine users who reported committing violent crime were likely to have a personality that predisposed them to antisocial behaviour. Alcohol use increased the likelihood of violent crime among methamphetamine users.
- Almost one-third of methamphetamine users were under the influence of methamphetamine the last time they committed a crime involving violence. Methamphetamine use was reported to make the person feel more alert, confident and aggressive at the time of committing the violent crime.

Background

There is much evidence for an association between illicit drug use and crime. Criminal involvement has been found to be higher among those who use drugs compared with those who do not (Gjeruldsen et al., 2004; Simpson, 2003). Within drug using populations, more frequent drug use is associated with higher levels of crime and when drug use declines, so does crime (Ball et al., 1981, 1983; French et al., 2000; Gjeruldsen et al., 2004). The most common reason put forward for why drug users commit crime is to fund their drug habit (Klee and Morris, 1994; Maher et al., 1998; Maher et al., 2002). Illicit drugs are expensive and people who are dependent on these drugs need a continuous supply of funds to support their drug use. Acquisitive crime may be the only option for some drug users to obtain these funds (Kaye et al., 1998). It has been found that people who commit crime to fund their drug use do so predominantly through drug dealing and theft (Ball et al., 1981, 1983).

Although many dependent drug users commit crime to obtain money to fund their drug use, criminal involvement is also closely related to an underlying antisocial personality (Darke et al., 1998; Kaye et al. 1998). Kaye and colleagues found that people who committed crime prior to the

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onset of their drug use were more likely to have a diagnosis of Antisocial Personality Disorder and its childhood pre-requisite, Conduct Disorder, than those who committed crime only subsequent to their drug use. Kaye et al., also found that the tendency to commit violent crime in particular relates to a predisposition to antisocial behaviour rather than a need to fund drug use.

Consistent with the notion that drug users commit crime to fund their drug use, previous research on crime among amphetamine users has also found a relationship between higher levels of amphetamine use and criminal involvement (Hando and Hall, 1994; Klee and Morris, 1994; Wright and Klee, 2001). However, similar to the research of Kaye et al., described above, these studies also highlight other important contributing factors. Notably, Klee and Morris (1994) found that the levels of crime among amphetamine users exceeded that required to fund their drug use, and postulated that personality or cultural factors may play a role in predicting criminal involvement among amphetamine users. Similarly, Hall and Hando (1994) found that the most common antecedent to committing violent crime among amphetamine users was having committed violent crime prior to the onset of their drug use.

It is clear from previous research on crime among drug users that both a need to fund drug use and other predisposing personality factors are likely to play a role in predicting the nature and intensity of criminal involvement. The following sections of this chapter examine the level of criminal involvement among methamphetamine users and the types of crimes they commit. It also examines the relationship between methamphetamine use and criminal involvement, and other predictors of criminality, particularly the contribution of a pre-existing antisocial personality (i.e., history of Conduct Disorder during childhood/adolescence).

Level of criminal involvement among methamphetamine users

Criminal involvement was prevalent among the current sample of regular methamphetamine users. The majority of methamphetamine users (88%) had committed a crime during their lifetime (Table 34). Property crime (e.g., shoplifting, theft, break and enter) and dealing (i.e., selling drugs for a profit) were by far the most common types of crime committed (72% and 70% respectively). Violent crime and fraud were less common (32% and 30% respectively).

Methamphetamine users who had been criminally involved during their lifetime were involved in crime from a young age. The median age at which participants committed their first crime was 15 years; however, the age of onset varied depending on the type of crime committed (Table 34). Property crime was committed at a median age of 14 years, whereas other crimes were initiated later at a median of 17 to 20 years of age. It should be noted that property crime included relatively minor offences such as shoplifting and this is likely to account for the earlier onset of property crime. Males tended to initiate crime at a younger age than females (median 14 yrs vs. 15.5 yrs, $\chi^2_{df=1} = 4.1$, $p = 0.04$).

Approximately half of methamphetamine users initiated crime prior to their involvement in methamphetamine use (52%). Males were not significantly more likely than females to initiate crime prior to the onset of their drug use (54% vs. 50%, $\chi^2_{df=1} = 0.4$, $p = 0.51$). As found previously by Kaye et al., (1998), methamphetamine users who initiated crime prior to the onset of their methamphetamine use were significantly more likely to have a diagnosis of Conduct Disorder (60% vs. 40%, $\chi^2_{df=1} = 11.0$, $p = 0.001$). The overall prevalence of Conduct Disorder was high among methamphetamine users (62%) and was higher among males than females (73% vs. 45%). This finding is consistent with previous research on the prevalence of conduct disorder among drug users (Cottler et al., 1998; Darke et al., 1998; Darke, Ross and Lynskey, 2003) and gender differences observed in the disorder among the general population (Robins et al., 1991).

Table 34. Lifetime involvement and age of initiation into crime among methamphetamine users.

	Ever committed crime (% , N = 305)	Median age first committed crime
Property crime	72	14
Dealing	70	18
Violent crime	32	20
Fraud	30	17
Any crime	88	15

Almost half (45%) of methamphetamine users reported being involved in crime in the month preceding the survey. Dealing was the most common type of crime to have been committed (30%) followed by property crime (19%). Only 7% of methamphetamine users had committed fraud and 8% had committed a violent crime in the past month. Not only was dealing the most common crime committed by methamphetamine users, but it was also the most frequently committed type of crime. Forty per cent of those who had dealt drugs in the past month had done so more than weekly. In contrast, the majority of methamphetamine users committing other types of crime did so less than weekly (Table 35).

Table 35. Types of crime committed by methamphetamine users in the past month.

	Any crime in the past month (%, N = 305)	Frequency of crime (%)			
		Less than weekly	Once a week	More than weekly	Daily
Dealing	30	51	10	24	16
Property crime	19	61	18	16	5
Fraud	7	88	4	4	4
Violent crime	8	71	19	10	0

Predictors of criminal involvement

Higher levels of criminal involvement were significantly related to more frequent use of methamphetamine ($r_s = 0.22$, $p = 0.0001$, Figure 26) and the use of the more pure forms of methamphetamine (i.e., base or ice, Table 36). People who initiated methamphetamine use at a younger age were also more likely to be criminally involved ($r_s = -0.19$, $p = 0.008$), a finding which is consistent with previous research showing that younger onset of drug use is related to increased risk of criminal involvement (Fergusson and Horwood, 1997).

Other factors predictive of criminal involvement were heavy polydrug use, younger age, and having a diagnosis of Conduct Disorder (Table 36). Methamphetamine users who were criminally active also spent more on drugs and had less remaining income after they had purchased drugs than their non-criminally involved counterparts. Male methamphetamine users were not significantly more likely than their female peers to have engaged in crime in the past month (48% vs. 42%, $\chi^2_{df=1} = 1.2$, $p = 0.26$).

Figure 26. Mean OTI crime score by frequency of methamphetamine use

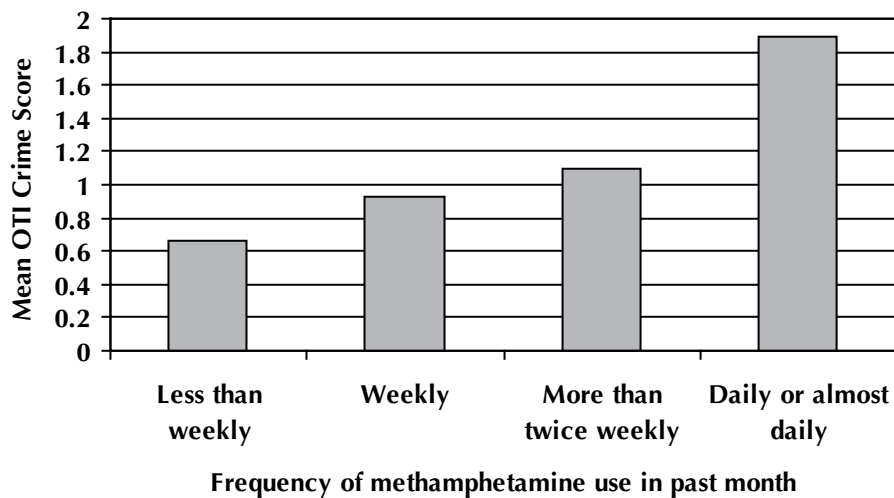


Table 36. Characteristics of criminally involved methamphetamine users.

	Crime in the past month	
	No (n = 167)	Yes (n = 143)
Age (years)	31	27*
Sex (% male)	54	62
Drug use in the past month (%)		
Used methamphetamine more that twice per week	40	57**
Use of base or ice	71	88**
Polydrug use ^a	55	77***
Conduct Disorder (%)	46	72***
Income and drug expenditure in the past week (median)		
Income	\$263	\$226
Expenditure on drugs	\$100	\$150
Funds remaining after drugs purchased	\$145	\$100

* p < 0.05, **p<0.01, ***p<0.001.

Note. Participants were excluded from the analysis if they began using methamphetamine before 15 years of age.

^a Used more than four drug classes in the past month.

Logistic regression was used to examine the relative contribution of different factors to criminal involvement among methamphetamine users. Frequent methamphetamine use and having used the more pure forms of base or ice were both significantly associated with criminal involvement after adjusting for polydrug use, age and a history of Conduct Disorder (Table 37). After adjusting for drug use, methamphetamine users with a history of Conduct Disorder as a child remained two to three times more likely to be criminally involved than their peers. This finding highlights the importance of considering pre-disposing personality factors in contributing to crime in this population.

Table 37. Predictors of criminal involvement among methamphetamine users.

	Odds Ratio	95% Confidence interval		p value
		Lower	Upper	
Methamphetamine use ^a				
Used more than twice per week	2.7	1.5	5.0	0.001
Used base or ice	3.1	1.4	6.6	0.004
Polydrug use ^b	2.2	1.2	4.0	0.010
Conduct Disorder	2.8	1.6	4.9	0.001
Less than 30 years of age	3.2	1.7	6.1	0.000

^a Methamphetamine use in the past month.

^b Used more than four drug classes within the past month.

Note. Participants were excluded from the analysis if they began using methamphetamine before 15 years of age.

There was also evidence of an interaction trend between age and Conduct Disorder in predicting crime. To examine the nature of this interaction, the logistic regression model was replicated within each age stratum. After controlling for drug use, younger methamphetamine users with Conduct Disorder were almost five times more likely to commit crime than their same-age peers (OR = 4.7, CI: 2.0 – 11.0, $p = 0.000$), whereas, among older methamphetamine users, having a history of Conduct Disorder was no longer significantly predictive of criminal involvement (OR = 1.6, CI: 0.7 – 3.7, $p = 0.24$).

Predictors of dealing methamphetamine were different from predictors of other types of crime (Table 38). There was no clear relationship between Conduct Disorder and dealing, whereas Conduct Disorder was a very strong predictor of involvement in other types of crime. Also, dealing methamphetamine did not significantly decline with age, whereas older methamphetamine users were less likely to commit non-dealing offences than their younger peers. This finding suggests an intrinsic difference in the factors driving drug dealing when compared with other types of crime. Differences in the nature of dealing and other types of crime are not surprising when considering that dealing was the most common form of crime committed by methamphetamine users, and that most methamphetamine users dealt drugs to fund their own drug use.

Table 38. Factors associated with dealing versus other types of crime among methamphetamine users.

	Dealing		Other crime	
	No (n = 183)	Yes (n = 74)	No (n = 199)	Yes (n = 61)
Frequent methamphetamine use ^a	40	65***	47	49
Childhood Conduct Disorder	55	62	50	79***
Over thirty years of age	51	43	54	31**

Note. Participants were excluded from the analysis if they began using methamphetamine before 15 years of age.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^a more than twice weekly.

Violent crime

Almost one third (32%) of methamphetamine users had ever committed a violent crime and 12% had done so within the past year. Methamphetamine users who had committed a violent crime within the past year were far more likely to have a diagnosis of Conduct Disorder (92% vs. 58%, $\chi^2_{df=1} = 11.6$, $p = 0.001$) and to drink alcohol at least weekly (81% vs. 44%, $\chi^2_{df=1} = 12.7$, $p = 0.000$). Frequent use of methamphetamine was not significantly associated with having committed a violent crime in the past year ($T_b = 0.01$, $p = 0.79$).

Two thirds of the methamphetamine users who had committed a violent crime in the past year were under the influence of drugs or alcohol at the time of their most recent violent crime. Alcohol was the most common substance with which methamphetamine users were intoxicated, followed by methamphetamine and cannabis (Table 39). Of those that were under the influence of methamphetamine, over half (55%) were also under the influence of either cannabis, alcohol or both. Only 16% reported being in withdrawal or 'coming down' from drugs during their last violent crime. Of these six people, four were withdrawing from methamphetamine, one was withdrawing from heroin and one was withdrawing from methadone.

People who were intoxicated with methamphetamine at the time of their most recent violent crime described how the drug gave them more energy and made them feel more confident and alert, but that methamphetamine intoxication could also make them feel aggressive or angry. In a couple of cases, anger associated with methamphetamine use was the antecedent to committing the act of violence (e.g., resulted in assault). However, most people who had committed violent crimes pointed out that they had intended to commit the crime in any case, and their methamphetamine use was incidental to the crime.

Table 39. Drug and alcohol intoxication among methamphetamine users during their last violent crime.

Drug type	Per cent (n = 38)
Alcohol	32
Methamphetamine	29
Cannabis	26
Methadone	8
Heroin	8
Other drugs	<3

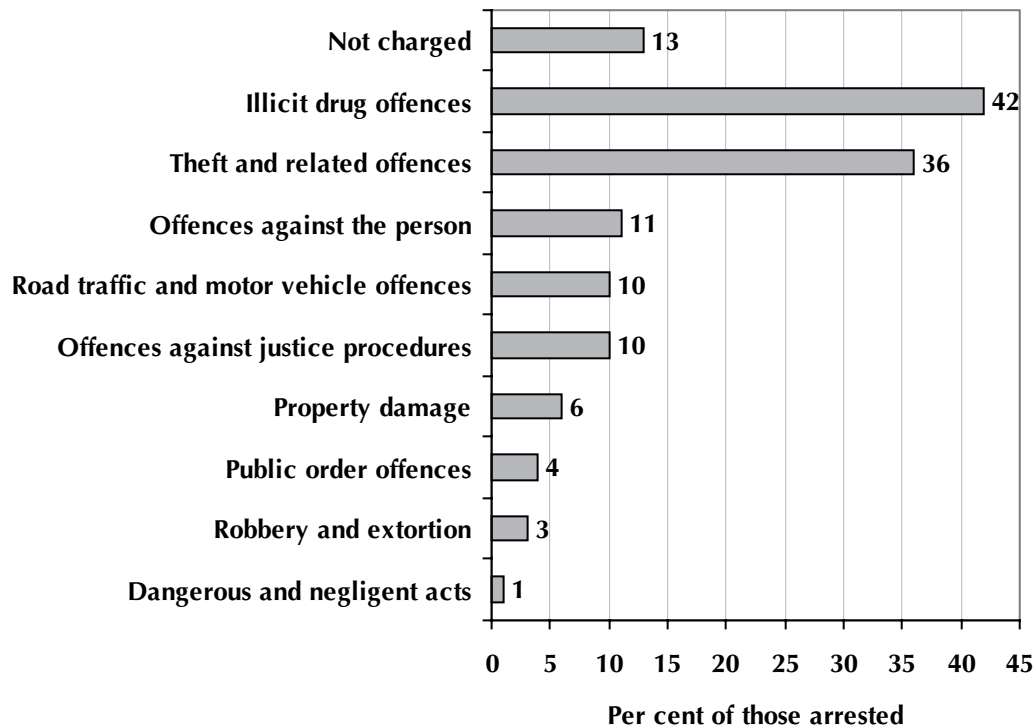
Note. Participants could nominate more than one drug.

Involvement with the criminal justice system

Methamphetamine users had a high level of contact with the criminal justice system from a young age. This was to be expected given the high level of criminal involvement among this sample of regular methamphetamine users. Over two thirds (68%) of methamphetamine users had ever been arrested and almost one in five (18%) of those who had been arrested had been charged with a methamphetamine related offence (i.e., use, possession, dealing or importation). The median age of first arrest was 17 years, at which time the majority were charged with theft or a related offence (34%) or an illicit drug offence (25%). One third of methamphetamine users had served a prison sentence in their lifetime and 10% had been in prison in the past year.

A significant proportion of methamphetamine users had been involved with the criminal justice system during the year prior to being interviewed. One in four (26%) reported being arrested during the past year, and 37% of these people had been arrested more than once during the past year (range: 1 to 10). Methamphetamine users who had been arrested during the past year had been charged mostly with theft and illicit drug offences (Figure 27). Ten per cent were charged with methamphetamine use or possession and 5% with dealing or trafficking methamphetamine.

Figure 27. Charges issued following the most recent arrest among methamphetamine users who had been arrested within the past year



Male methamphetamine users were more likely to have been arrested in the past year than their female counterparts (34% vs. 15%, $\chi^2_{df=1} = 13.4$, $p = 0.000$). This finding stands in contrast to the relatively similar levels of criminal involvement among males and females noted earlier in this chapter. However, the higher probability of males being arrested is consistent with the high proportion of male methamphetamine users represented in arrest statistics (around 80%) relative to health data sources and surveys of drug users, from which approximately two-thirds of methamphetamine users are found to be male (McKetin and McLaren, 2004). The finding that men were more likely than women to be arrested may reflect a number of factors, such as the specific types of crime committed by males, the risks they engage in when undertaking crime or the focus and nature of law enforcement strategies (Maher and Daly, 1996).

Conclusion

The majority of methamphetamine users in the current study began committing offences at a young age and had extensive histories of criminal justice system involvement. Overall, levels of crime among methamphetamine users were only slightly less than those seen among populations of injecting heroin users in Sydney (Breen et al., 2004a). Criminal involvement

among methamphetamine users in the current sample was slightly higher than that seen among Sydney amphetamine users surveyed in the early 1990s (Hall and Hando, 1993). The higher levels of crime found in the current survey are likely to reflect sampling differences between the two studies, but may also reflect an increase in the use of more pure forms of methamphetamine, and a consequent increase in levels of methamphetamine use and associated crime. Consistent with previous research on crime among drug users (Ball et al., 1981, 1983; Darke et al., 1998; Maher et al. 1998; 2002; Lynch et al., 2003), dealing and theft were the most common types of crime committed by methamphetamine users, with only a small proportion of methamphetamine users involved in either violent crime or fraud.

Heavy methamphetamine use and polydrug use were found to be predictive of criminal involvement. This finding is consistent with a proportion of methamphetamine users relying on illegal income from crime to support their drug use (see *Methamphetamine use in Sydney*), as well as with previous research on methamphetamine use and crime (Hall and Hando, 1994; Klee and Morris, 1994). A predisposition to engage in antisocial behaviour (i.e., history of Conduct Disorder) was also an important factor in predicting crime among methamphetamine users. However, a predisposition toward antisocial personality played a more important role in predicting non-dealing crime among younger methamphetamine users, and was not strongly related to involvement in drug dealing.

The finding that dealing was not strongly related to having a history of Conduct Disorder is consistent with dealing being the most common crime through which methamphetamine users supported their drug use (see *Methamphetamine use in Sydney*). Dealing does not entail the other behaviours associated with having an antisocial personality – namely disrespecting the rights of other people, deliberate cruelty or destruction of property, and deceitfulness. In this sense, it is not surprising that a predisposition to commit antisocial acts is not related to dealing among regular drug users, whereas it is related to committing other forms of crime regarded as 'external' to the routine lifestyle of drug users and which explicitly involve violating the rights of others. Also, dealing drugs is a highly prevalent behaviour among drug users and unlikely to be perceived as 'deviant' within a drug using culture.

Methamphetamine users who were younger, specifically those under the age of thirty years, were three times more likely than older methamphetamine users to be criminally involved. The lower prevalence of crime among older methamphetamine users is consistent with previous evidence that rates of criminal involvement tend to peak in late adolescence and decline in later adulthood (Hansen, 2003). A likely explanation for this decline in criminal involvement is the decrease in the expression of antisocial personality characteristics that occurs over a person's lifetime (Harpur and Hare, 1994). This explanation is consistent with the more noticeable decline with age in crimes predicted by Conduct Disorder (i.e., non-dealing crimes), and also that having had a history of Conduct Disorder was not significantly predictive of criminal involvement among older methamphetamine users.

An alternative explanation for higher levels of crime among young methamphetamine users is a birth-cohort effect, whereby people in more recent birth-cohorts are at higher risk of criminal involvement. This explanation is consistent with the drop in the age of initiation into illicit drug use in Australia in recent years (Degenhardt et al., 2000) – a trend also evident among methamphetamine users in the present study²⁴ – and that younger age of initiation into drug use is also associated with higher levels of criminal involvement (Fergusson and Horwood, 1997).

²⁴ Methamphetamine users under the age of 30 years initiated methamphetamine use on average two years earlier than their older peers (16 years vs. 18 years, $\chi^2_{df=1} = 42.1$, $p = 0.000$).

The level of involvement in violent crime among methamphetamine users was similar to that found in previous surveys of amphetamine users in Australia (Hando and Hall, 1993; Lynch et al., 2003), and was also comparable to that found in other populations of illicit drug users in Sydney (Roxburgh et al., 2004; Ross et al., 2002). The strongest predictor of having committed a violent crime in the past year was a history of Conduct Disorder, suggesting that methamphetamine users who do commit violent crime have a pre-existing tendency toward antisocial behaviour. Alcohol use further increased the likelihood of having committed a violent crime, a finding consistent with previous research showing that alcohol use is associated with violent behaviour, particularly assault (Badawy, 2003; Lynskey, 2001; Naranjo and Bremmer, 1993; Williams, 2001). Methamphetamine use appeared to be unrelated to involvement in violent crime generally; however, methamphetamine users who did commit violent crime were likely to be intoxicated with methamphetamine during the offence. Most methamphetamine users reported that intoxication with methamphetamine did not induce them to partake in violent crime, but being intoxicated could make them feel more aggressive or angry while undertaking pre-meditated violent crime.

Harms, risk behaviours and general functioning

Rebecca McKetin, Erin Kelly and Jennifer McLaren²⁵

Key points

- The overall general health and well-being of methamphetamine users was below that of the general population. Mental health was particularly poor, with two-thirds of methamphetamine users suffering some level of mental health disability and one in five having severe disability in their mental health functioning. Poor mental and physical health functioning was related to being dependent on methamphetamine.
- Psychological problems experienced by methamphetamine users included increased aggression, agitation, depression, poor motivation, impaired concentration and memory, and symptoms of psychosis.
- The most common physical complaints related to methamphetamine use were sleep disturbances, bruxism, and weight loss from loss of appetite. Physical complaints also included symptoms that may be indicative of more serious longer term health consequences, notably palpitations and chest pain.
- Methamphetamine use also impacted on users' social relationships and financial situations, sometimes resulting in relationship breakdowns, social isolation and financial difficulties.
- Methamphetamine users who inject were at risk of contracting or transmitting hepatitis C. Injecting risk behaviours among methamphetamine injectors, including needle and syringe sharing, were similar to that reported in other populations of injecting drug users.
- Methamphetamine users in the current study were a sexually active population who may be at risk of contracting sexually transmitted infections. Dependent methamphetamine users were more likely to have had unprotected sex in the last month; however, unprotected sex was not related to intoxication with methamphetamine and was likely to be due to lifestyle factors associated with dependent drug use.

General health and well-being among methamphetamine users

General health and well-being among methamphetamine users was measured using the SF-12. The SF-12 is a brief 12 item questionnaire that provides a global indication of both physical and mental health functioning (Ware et al., 1995). The scale has been calibrated against the general population and is widely used to monitor health outcomes in clinical or ill population sub-groups (Andrews et al., 1999; Lim and Fisher, 1999; Ware et al., 1995). It is also used in Australia to monitor health and well-being in response to drug treatment among heroin users (Darke, Ross, Teesson et al., 2003). The scale yields four categories of functioning that range from no disability through to severe disability.

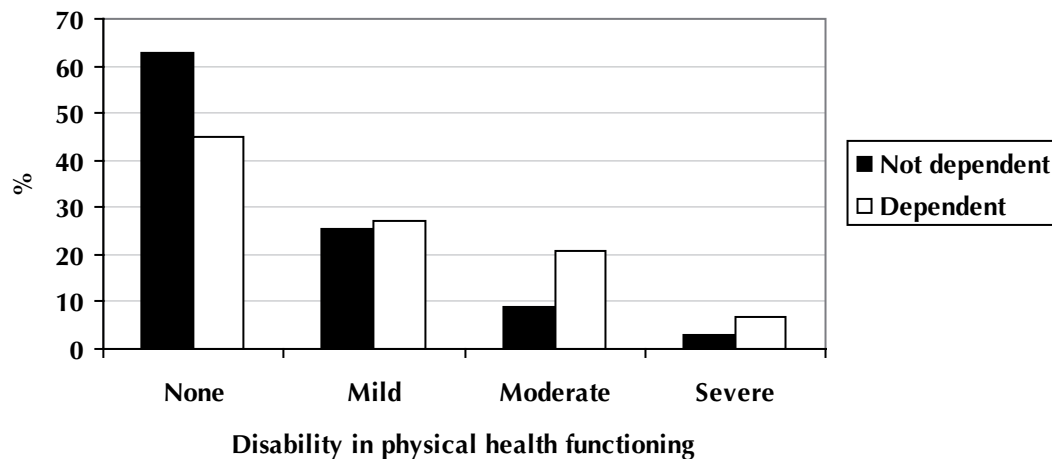
Physical health

Almost half of regular methamphetamine users (47%) had some degree of physical disability according to the SF-12, and one in five rated as having a moderate to severe disability (Table 40). Predictors of poor physical functioning were being dependent on methamphetamine, injecting,

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more frequent methamphetamine use and having used the drug for a longer time. Several socio-demographic factors were also related to physical health disability, including unemployment and low levels of education. Older age was also strongly related to higher levels of physical disability, as would be expected. After adjusting for age and other demographic factors related to physical functioning, dependence on methamphetamine remained significantly predictive of impaired physical health functioning (OR = 1.9, CI: 1.2-3.0, $p = 0.008$, Figure 28).

Figure 28. Percentage of dependent and non-dependent methamphetamine users experiencing disability in physical health functioning



Methamphetamine users tended to have worse physical functioning than people of the same age within the general U.S. population (Table 41, Note. The SF-12 was normed against the U.S. population and age stratified normative data were not available for the Australian general population). Poor physical functioning was more apparent among older methamphetamine users. Specifically, those aged over 35 had an average score approximately one standard deviation below that of the general population. Scores of one standard deviation below the normative score are interpreted to mean that the person has a significant impairment in functioning, while a difference of five points signifies a clinically relevant difference in functioning between two comparative groups (Ware et al., 1995; Lim and Fisher, 1999).

Table 40. Physical and mental health disability among methamphetamine users.

	Per cent of methamphetamine users		
	Males (n = 184)	Females (n = 126)	Total (N = 310)
Physical functioning			
No disability	57	46	53
Mild disability	26	28	27
Moderate disability	12	21	16
Severe disability	5	6	5
Mental functioning			
No disability	36	28	33
Mild disability	21	18	19
Moderate disability	27	25	26
Severe disability	16	30	22

Table 41. Comparison of the mean mental and physical functioning scores of methamphetamine users with the general U.S. population by age group

	Mean SF-12 Component Score, Mean (SD)	
	Methamphetamine users Mean (SD)	General population ^a Mean (SD)
Physical functioning		
18-34 years	50 (9)	53 (10)
35-44 years	44 (9)	52 (7)
45-54 years	42 (11)	50 (10)
Mental functioning		
18-34 years	42(12)	49(10)
35-44 years	40(13)	50(9)
45-54 years	39(16)	50(10)

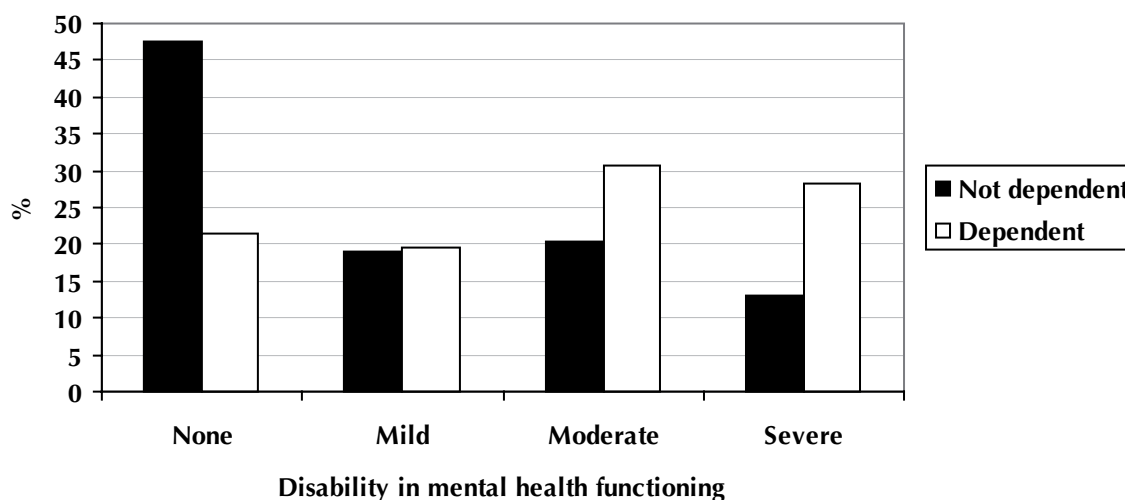
Note. Lower scores indicate worse functioning.

^a Normative sample drawn from the general population in the United States of America.

Mental health

Mental health functioning among regular methamphetamine users was particularly poor. Two thirds of regular methamphetamine users were experiencing some level of disability in their mental health functioning and one in five (22%) had scores indicative of severe disability in mental health functioning (Table 40). Mental health functioning scores were well below the normative U.S. population levels against which the scale was developed (Table 41), and the average score of 41.3 (SD = 12.4) was one standard deviation below the mean score for a general population sample from Australia (Andrews, 2002), indicating significant impairment in mental health functioning. The main factor associated with worse mental health was being dependent on methamphetamine (OR = 3.3, CI: 2.0 – 5.4, $p = 0.000$, Figure 29).

Figure 29. Percentage of dependent and non-dependent methamphetamine users experiencing disability in mental health functioning



Health problems reported by methamphetamine users

Methamphetamine users were asked whether they had experienced any health problems related to their methamphetamine use. Common health complaints included fatigue and sleep disturbances, poor appetite and weight loss, teeth grinding and jaw clenching, irregular or rapid heart beat and chest pains. Most of these complaints relate specifically to the physical effects of methamphetamine and its adverse effects at high doses or following long term use (MIMS, 2002). People who used methamphetamine also suffered a number of more general health complaints, such as nausea, twitching, dehydration, headaches and other general aches and pains. These more general complaints may be related to methamphetamine use, polydrug use or the lifestyle associated with drug use. Methamphetamine users also reported health problems related to their main route of administration. Specifically, some methamphetamine users who snorted the drug complained of nasal irritation, while some injectors complained of injection-related vascular damage.

Midway through the survey recruitment, additional questions were developed and included in the survey to help quantify the extent of these self-reported health problems (Table 42). The most common symptoms to be experienced and attributed to methamphetamine use among this sub-sample of 148 methamphetamine users were (i) fatigue and disturbed sleep patterns, (ii) problems with jaw clenching and teeth grinding, and (iii) loss of appetite and related weight loss. These symptoms had been experienced by around three quarters of regular methamphetamine users during the month prior to interview.

Approximately one third of methamphetamine users reported symptoms of palpitations and chest pain. Although a large proportion of methamphetamine users attributed these symptoms to methamphetamine use, around half already had these symptoms prior to the onset of their methamphetamine use. It is difficult to know whether these complaints were a consequence of tachycardia due to methamphetamine intoxication or an underlying cardiac pathology.

More general symptoms, such as aches and pains or headaches, were experienced by around half of methamphetamine users in the past month. These symptoms were less directly attributable to the effects of methamphetamine per se, with most methamphetamine users having experienced similar general symptoms prior to the onset of their methamphetamine use. However, approximately two thirds of methamphetamine users thought that methamphetamine had contributed to these symptoms, suggesting that the drug may have exacerbated pre-existing general health complaints.

Table 42. Health problems reported by regular methamphetamine users.

Physical Problem	Symptom present in the past month (%) (N=148)	Symptom occurred only since onset of methamphetamine use (%) ^a	Methamphetamine contributed to symptom (%) ^a
Fatigue/disturbed sleep patterns	84	40	89
Teeth problems/grinding/jaw clenching	76	79	90
Loss of appetite/weight loss	70	76	92
Aches/pains	56	45	67
Headaches	50	26	64
Acne/skin problems	43	49	75

Table 42 continued.

Physical Problem	Symptom present in the past month (%) (N=148)	Symptom occurred only since onset of methamphetamine use (%) ^a	Methamphetamine contributed to symptom (%) ^a
Heart flutters	38	66	84
Chest pain	33	51	78
Mouth ulcers	30	62	82
Nasal irritation	28	69	79
Vein damage	25	75	89

^a Of those who reported this physical problem.

Psychological and social problems reported by methamphetamine users

Regular methamphetamine users reported experiencing a range of emotional and social problems related to their methamphetamine use. Frequently reported emotional problems included agitation or aggression, decreased motivation or ability to maintain usual activities, psychotic symptoms such as paranoia and hallucinations, and decreased concentration or memory. The most common adverse social consequences of methamphetamine use reported were social isolation, relationship problems and financial difficulties. Similar emotional and social problems have been reported by amphetamine and methamphetamine users in other Australian studies (Hando et al., 1997; White et al., 2004; Hall et al., 1996).

Methamphetamine users commonly cited the ‘come-down’ or ‘crash’ related to methamphetamine as one of the particularly adverse aspects of using the drug. The methamphetamine come-down is characterised by depression, anxiety, over-self consciousness or paranoia, lack of energy and sleep disturbances. The come-down from methamphetamine may last two to three days and would overlap with symptoms of methamphetamine withdrawal, which are very similar in nature to the come-down. Several methamphetamine users commented that the come-down from ice was worse than for other forms of methamphetamine and users also reported self-medicating the symptoms of the come-down with benzodiazepines.

It is worth noting that a proportion of methamphetamine users had been diagnosed with a mental health disorder (Table 43). Depression was the most common disorder with which methamphetamine users had been diagnosed (30%) and 41% had been prescribed antidepressants. These rates of self-reported depression are higher than the lifetime prevalence of major depression found among general population samples (17%, Jacobi et al., 2004; Kessler et al., 1994), and consistent with high levels of depressive symptoms found among methamphetamine users (Copeland and Sorenson, 2001; Hall et al., 1996).

Anxiety disorders (e.g., phobias, Generalised Anxiety Disorder, Panic Disorder) were the second most common type of disorder with which methamphetamine users had ever been diagnosed, although the prevalence of anxiety disorders was more similar to what would be expected among the general population (Andrews et al., 1999).

The proportion of methamphetamine users that had ever been diagnosed with psychotic disorders was much higher than for the general population. Seven per cent had been diagnosed with a drug-induced psychosis, 5% with schizophrenia and 4% with bipolar disorder. These self-reported rates of psychotic disorders are in contrast to rates of less than 2% of the general population (Kessler et al., 1994; Robins et al., 1991).

Eight per cent of methamphetamine users reported having been diagnosed with other mental health problems, such as Attention Deficit Disorder, Post Traumatic Stress Disorder and eating disorders. Half of methamphetamine users (49%) had ever taken medication for a mental health problem, most commonly antidepressants (41% had been prescribed antidepressants, 16% sedatives and 12% anti-psychotic medication).

Table 43. Percentage of methamphetamine users that reported having been diagnosed with various mental health problems.

Mental health problem	Per cent (N = 308)
Depression	30
Anxiety disorders	11
Drug-induced psychosis	7
Schizophrenia	5
Bipolar Disorder	4
Other psychosis	2
Obsessive Compulsive Disorder	1
Other	8

Blood-borne virus (BBV) risk behaviour

Needle sharing among methamphetamine users

Thirteen per cent of methamphetamine injectors had used a needle and syringe after someone else had used it in the past month. The majority of these injectors had done so once or twice and usually only one person had used the needle before them (Table 44). The prevalence of needle sharing within the past month was identical to that found through the 2003 Australian Needle and Syringe Program Survey (Thein et al., 2004) and comparable to levels observed among other populations of injecting drug users in Sydney (Roxburgh et al., 2004; Kaye and Darke, 2000; Ross et al., 2002).

Most methamphetamine users obtained the needle they last injected with from a needle and syringe program (54%) or a pharmacy (24%). One in five (21%) had obtained their needle from another source, such as a vending machine, an injecting facility, a health centre or from a friend.

Table 44. Needle sharing behaviour among regular methamphetamine users.

Injecting risk behaviour in the last month	Per cent (N = 310)
Injected with a needle and syringe after someone else used it	
No times	87
Once	6
Twice	4
Three or more times	3
Number of people who used the needle and syringe before the participant	
No people	87
One person	11
Two people	2
Loaned used needle to another person	
No times	75
Once	10
Twice	9
Three or more times	5

Sexual risk behaviour

The risk of contracting sexually transmitted diseases is a concern among regular methamphetamine users. Methamphetamine use has often been associated with high rates of sexual activity and an increased incidence of unprotected sex with casual partners, although the nature of the relationship between methamphetamine use and sexual risk taking remains unclear (Rawson et al., 2002; Darke et al., 1995; Molitor et al., 1999; Semple et al., 2004; Yen, 2004). Most of the previous research that has examined the relationship between sexual risk behaviour and methamphetamine use has been conducted in the United States and focuses on gay men and the related potential for the spread of HIV. Ice use among the gay population among Sydney is only a recent concern, and consequently most of the previous Australian research on sexual risk behaviour among methamphetamine users, including the current research, has focussed on predominantly heterosexual populations of methamphetamine users. This research has broader implications for the transmission of sexually transmitted diseases that are prevalent among injecting drug users, such as Chlamydia.

The majority of methamphetamine users (70%) had been sexually active in the month preceding the survey, and one fifth (19%) had more than one sexual partner during this time. Almost two thirds of methamphetamine users who had had sex within the past month had not used a condom on their last occasion of sex. The main factors related to having unprotected sex were being older, not having had multiple partners in the past month, and being dependent on methamphetamine (Table 45). After adjusting for age and number of partners, dependent methamphetamine users were still twice as likely to have engaged in unprotected sex compared to non-dependent methamphetamine users.

Intoxication with methamphetamine did not account for the relationship between methamphetamine dependence and unprotected sex. Those who were intoxicated with methamphetamine when they last had sex were not significantly more likely to report engaging in unprotected sex than those who were not intoxicated (OR = 1.2, CI 0.67 – 2.2, p = 0.53).

Similarly, those intoxicated with other drugs or alcohol were also no more likely to have unprotected sex (OR = 1.1, CI 0.57 – 2.0, $p = 0.55$). It is likely that the higher level of unprotected sex reported by dependent methamphetamine users was related to lifestyle factors associated with dependent drug use.

Lifestyle factors that may increase risk of unprotected sex include a predisposition toward risk-taking behaviour and/or a chaotic lifestyle that leads to high risk situations. Conversely, higher levels of unprotected sex among older dependent drug users may reflect the nature of their sexual relationship. Specifically, older more dependent methamphetamine users may be in stable relationships with a long-term partner. This has been found to explain low levels of condom use among sub-populations of older dependent heroin users in Sydney (Darke, Hall et al., 1994).

Table 45. Factors associated with unprotected sex among regular methamphetamine users.

	Odds Ratio	95% Confidence interval		p value
		Lower	Upper	
Only one partner in the past month	3.8	1.9	7.6	0.000
Aged 30 years or older	3.2	1.7	6.3	0.001
Dependent on methamphetamine	2.0	1.1	3.8	0.030

Note. Analysis includes only methamphetamine users who had been sexually active in the past month ($n = 199$).

Conclusion

Overall, the general health and well-being of methamphetamine users was below that of the general population. Mental health was particularly poor, with one in five having severe disability in their mental health functioning. Dependent methamphetamine users were three times more likely to suffer impairment in their mental health functioning compared to non-dependent methamphetamine users. This finding iterates previous research in Australia that has also found a strong relationship between heavy methamphetamine use and psychological morbidity (Hall et al., 1996; Baker et al., 2004; Kaye and Darke, 2000; Vincent et al., 1998; Hall and Hando, 1994; Hando et al., 1997; Ross et al., 2002).

Methamphetamine users reported having been previously diagnosed with a range of mental health problems and half had taken medication for a mental health problem at some point in their lifetime. Depression was the most common mental health disorder reported by methamphetamine users, followed by anxiety disorders. Disorders involving psychosis were less common, but far more common than would be expected among the general population. It should be noted that these mental health conditions often precede the onset of drug use. However, drug dependence can precipitate and/or exacerbate some mental health disorders, notably psychosis (see *psychosis among methamphetamine users*).

Physical functioning among methamphetamine users tended to be better than their mental health functioning, although half still suffered some degree of impairment in their physical well-being. Physical disability was more pronounced for older users of the drug and those who were dependent on methamphetamine. Methamphetamine users noted a range of physical health problems related to their methamphetamine use, particularly disturbed sleep patterns, loss of appetite and weight loss, and jaw clenching/teeth grinding. A smaller proportion of people reported chest pain and palpitations, suggesting a risk for cardiac problems among methamphetamine users.

Methamphetamine injectors in the current study were at risk of exposure to blood-borne viruses. While the risk of contracting HIV is low, hepatitis C is one of the leading notifiable diseases in Australia, and an estimated 58% of injecting drug users are infected with this virus (National Centre for HIV Epidemiology and Clinical Research, 2003). Almost three quarters of regular methamphetamine users had ever injected a drug and almost two thirds indicated that injection was their preferred method of administering methamphetamine (see *Methamphetamine use in Sydney*). The prevalence of needle and syringe sharing among methamphetamine injectors was found to be comparable to levels reported in previous studies of injecting drug users in Sydney (Kaye and Darke, 2000; Ross et al., 2002; Roxburgh et al., 2004; Thein et al., 2004). Almost half of methamphetamine users obtained their clean needles from places other than Needle and Syringe Programs (e.g., pharmacies, vending machines or friends). This finding has important implications for the dissemination of HIV prevention information to methamphetamine users, as it suggests that a proportion of methamphetamine users may not have regular contact with Needle and Syringe Programs.

The potential exposure to sexually transmitted infections, particularly Chlamydia, is a particular issue for regular methamphetamine users because they are a sexually active population. Methamphetamine has often been associated with high rates of sexual activity and an increased incidence of unprotected sex with casual partners (Rawson et al., 2002; Hando and Hall, 1994; Darke et al., 1995; Zule and Desmond, 1999; Molitor et al., 1998, 1999; Semple et al., 2004; Yen, 2004). The current research found that dependent methamphetamine users were more likely to have engaged in unprotected sex. However, unprotected sex was not related to being intoxicated with methamphetamine or other drugs. Low levels of condom use among dependent methamphetamine users may be related to lifestyle factors linked to being dependent on methamphetamine.

Psychosis among methamphetamine users

Rebecca McKetin²⁶, Jennifer McLaren²⁶, Dan Lubman²⁷, Leanne Hides²⁷ and Erin Kelly²⁶

Key points

- The prevalence of psychotic symptoms among methamphetamine users was 11-12 times that seen among the general population in Australia.
- Twenty-three per cent of methamphetamine users had experienced clinically significant psychotic symptoms of suspiciousness, hallucinations or delusions within the past year, and eleven per cent met criteria for methamphetamine-induced psychosis according to the DSM-IV-TR criteria.
- People who were dependent on methamphetamine were three times more likely than their non-dependent peers to have experienced psychotic symptoms.
- Having a history of schizophrenia was a very strong risk factor for experiencing psychosis; however, one in five methamphetamine users *without* a history of schizophrenia had experienced clinically significant psychotic symptoms in the past year.
- Half of the sample of methamphetamine users who experienced clinically significant symptoms reported hostility at the time and one quarter exhibited overt hostile or aggressive behaviour, such as yelling at people, throwing objects and breaking furniture.

Background

The nature of methamphetamine psychosis

Methamphetamine psychosis is a transient drug-induced psychotic state that closely resembles the acute symptoms of paranoid schizophrenia. The first reported cases of methamphetamine psychosis occurred in 1938, shortly after methamphetamine's emergence on the market (Young and Scoville, 1938: cited by Connell, 1958). Since this time, numerous case reports of methamphetamine psychosis have been published in psychiatric journals, most of which coincide with the post World War II epidemic of methamphetamine use in the United States of America. The emergence of psychotic reactions to methamphetamine was one of the first warning signs that methamphetamine was not a 'safe' drug, and a key factor in leading to the regulation of methamphetamine under narcotics control conventions.

It is now well established that high doses of methamphetamine can induce a temporary psychosis in healthy individuals. Experimental induction of amphetamine psychosis in healthy adults quelled theories that this syndrome may be merely a manifestation of schizophrenic symptoms in predisposed individuals (Angrist and Gershon, 1970; Griffith et al., 1968). The behavioural sequelae of methamphetamine psychosis are well documented in the research literature and the characteristic symptoms are noted in Table 46 (Davis and Schlemmer, 1980). Although symptoms vary, the most common symptoms reported in published cases of methamphetamine psychosis have been persecutory ideation and delusions of persecution, together with auditory or visual hallucinations. Other less common symptoms include stereotypy, social withdrawal, tactile and

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olfactory hallucinations, thought disorder and confusion. Depression also features in some cases of methamphetamine psychosis, although this is often related to a pre-existing depressive condition or methamphetamine withdrawal, rather than being a symptom of acute methamphetamine psychosis (unpublished data, McKetin, 1998).

Table 46. Symptoms of methamphetamine psychosis reported by Davis and Schlemmer (1980).

Symptoms of amphetamine psychosis	
Frequently reported	Occasionally reported
Persecutory ideation	Tactile hallucinations, Delusions of parasitosis
Delusions of persecution	Olfactory hallucinations
Stereotyped, compulsive behaviour	Distortions of body image
Social withdrawal, autistic behaviour	Changes in libido
Auditory hallucinations	Flattening of affect
Increased philosophical concern	Thought disorder
Overemphasis on visual cues and hypervigilance	
Clear consciousness and correct orientation	
(Wide individual variation in symptomatology)	

Most cases of methamphetamine psychosis occur after ingesting a large amount of methamphetamine and/or in individuals with a history of chronic methamphetamine use. In cases involving chronic use, psychosis is usually precipitated by the person taking a larger than typical dose of methamphetamine. A single large dose of methamphetamine is also sufficient to precipitate psychosis in some individuals: the likelihood of this occurring probably depends on how much of the drug is taken, route of administration, and the susceptibility of the individual to psychosis or an idiosyncratic response to the drug.

Methamphetamine psychosis is a transient phenomenon that usually resolves within several days, provided the patient ceases methamphetamine use. More prolonged cases have been documented that last up to a month. Few cases last beyond a month and lengthy symptom duration in the absence of continued methamphetamine use would suggest the presence of an underlying chronic psychotic disorder such as schizophrenia. Recurrence of psychotic episodes has also been reported among susceptible individuals, with stress and continued methamphetamine use being important factors in dictating susceptibility to psychosis (Sato et al., 1992).

Violence associated with methamphetamine psychosis

The emotional state accompanying many cases of methamphetamine psychosis includes emotional instability and fear or panic, which is sometimes associated with aggressive or violent acts including assault and homicide. Hostile or aggressive behaviour was noted in 22% of the methamphetamine cases reviewed by Connell in his 1958 thesis on this topic (cited in Ellinwood, 1971). The most detailed analysis of violence associated with methamphetamine psychosis was provided by Ellinwood in 1971. Ellinwood described thirteen cases of homicide associated with amphetamine abuse. He stated that the "events leading to the homicidal act were directly related to amphetamine induced paranoid thinking, panic, emotional lability or lowered impulse control".

By way of example, one case study reported by Ellinwood described a 27 year old truck driver who had ingested 180 mg of amphetamine over the previous 20 hours in order to complete a non-stop 1,600 mile trip. He became suspicious that someone had planted drugs on his truck and

called a highway patrol officer, who detained him in the local jail for safe-keeping. During the time he was detained, his paranoid ideation grew, and he later recalled having believed people were trying to gas him: "...they tried to gas me. I could hear the hissing. I got down and looked under the door: I saw feet there, I still remember them. Both the jailer and the truck-stop people acted peculiar: I thought they were out to get me." When his boss arrived to take him home from the jail, the man's delusion enveloped his boss. On the trip home he attributed sinister significance to some bottles placed on the floor of the truck and consequently believed that his boss was going to harm him. Later he began to smell poison gas and panicked and shot his boss in the back of the head. His later recollection of how he perceived the situation was as follows: *"I tried to tell the boss that those men were waiting on us and would kill us. He said something and I knew then he was in on it ...I thought they had gassed me. My boss kept reaching down beside him and pulling on something. I rolled the window down to let the gas out. I got nauseated and passed out due to the gas: I then got up on my elbow and shot my boss, who was driving."*

Ellinwood described three factors relating to homicide: a predisposing personality; environment circumstances; and the use of other drugs. Ellinwood also examined the mind-set of those committing the homicides, and defined three stages leading to the violent act:

1. chronic amphetamine abuse, which may predispose the person to paranoid thinking and possibly carrying a weapon;
2. an acute change in the individual's state of emotional arousal (which may be precipitated by an increase in dosage of the drug, sleep deprivation or polydrug use) where the individual misinterprets their environment because of their delusional thoughts; and
3. a situation that triggers the specific events leading up to the act of violence: the act of violence often occurring as an impulsive response to a perceived threat or danger.

Ellinwood explains that the relationship between amphetamine use and violent behaviour was also recognised by other researchers at the time, and cites their descriptions of bizarre violence associated with amphetamine parties (Griffith et al., 1968) and the capricious manner in which people intoxicated with amphetamines turn on strangers and friends alike (Angrist and Gershon, 1970). He also pointed out this relationship was evident during the post World War II epidemic of amphetamine use, when Noda (1950, cited in Ellinwood, 1971) reported that in a two month period 31 out of 60 convicted murderers had some connection with the misuse of amphetamines. Anecdotal reports of bizarre violent acts associated with the use of methamphetamine have continued to occur throughout history, along with epidemics of amphetamine or methamphetamine use. In most cases it cannot be confirmed whether the acts of violence result from persecutory delusions. However, it is clear from the research of Ellinwood and Connell that a proportion of people experiencing methamphetamine psychosis will also exhibit hostile or aggressive behaviour and that the delusional state associated with methamphetamine psychosis may lead some people to commit violent acts.

Methamphetamine psychosis in Australia

Research conducted in Australia in the mid 1990s found that around half of regular amphetamine users reported having experienced paranoia or hallucinations since they began using the drug (Hall et al., 1996). Despite the high prevalence of self-reported psychotic symptoms, reports of 'full-blown' methamphetamine psychosis were uncommon at this time. Methamphetamine psychosis has only become a serious concern in Australia in recent years, with a rise in the number of hospital admissions coinciding with the introduction of more pure forms of methamphetamine on the market, namely ice and base. Specifically, the number of hospital admissions for stimulant psychosis rose from 200 in 1998/99 to 1028 in 1999/00 and 1252 in 2000/01. Although this rise in psychosis admissions is likely to be partly due to changes in coding procedures that

were implemented in 1999 (i.e., from ICD-9 to ICD-10), similarly large increases were not seen in admissions for psychosis due to other drugs (Jenner and McKetin, 2004). Moreover, this documented rise in hospital admissions coincided with health professionals reporting an increase in psychosis among the methamphetamine users with whom they had contact (Topp et al., 2002).

The rise of methamphetamine psychosis in Australia has been associated with considerable concern about the violent and aggressive nature of people who were experiencing aggressive and psychotic behaviour. This behaviour presented a serious challenge to frontline workers, such as police officers, ambulance workers and emergency department staff, who are often the first line of contact with people suffering from methamphetamine-induced psychosis. The implications of methamphetamine psychosis for frontline workers are discussed in the following chapters. The following sections of this chapter will focus on the experience of psychotic symptoms among regular users of the drug, the prevalence of these symptoms and to what extent methamphetamine users exhibit hostility while they are psychotic.

Psychotic symptoms experienced by methamphetamine users

Prevalence and nature of symptoms

Almost one-quarter of methamphetamine users (23%) had experienced a 'clinically significant' symptom of psychosis in the past year²⁸ (Table 47). A further 52% of methamphetamine users experienced only mild psychotic-like symptoms that would generally not be regarded as pathological (Lukoff et al., 1986), while only one-quarter of methamphetamine users were completely free of such symptoms during the past year.

The majority of clinically significant symptoms lasted less than three hours (52%, Table 48). In cases where the symptoms lasted more than two days, the methamphetamine user was more likely to have had a premorbid diagnosis of schizophrenia (29% vs. 8%, $\chi^2_{df=1} = 5.8$, $p = 0.02$).

Only 11% of methamphetamine users who experienced clinically significant symptoms (8 people) went to hospital as a result of their psychosis. The majority of methamphetamine users who had experienced psychosis would not have been taken to hospital because their symptoms were too brief to warrant psychiatric care. Five of the eight people that were taken to hospital had symptoms of psychosis lasting for more than two days.

The current study examined the prevalence and severity of the three most common symptoms reported in cases of methamphetamine psychosis: persecutory ideation, delusional thoughts, and hallucinations. Seventeen per cent of methamphetamine users had experienced a clinically significant hallucination during the past year, while 12% reported clinically significant levels of suspiciousness (Table 47). Delusions (i.e., clinically significant unusual beliefs) were less common (7%). The following section describes the prevalence and nature of both mild non-pathological symptoms through to moderate and severe symptoms of psychosis, within these three symptom domains.

²⁸ Clinically significant symptoms were defined as a score of four or greater on the BPRS. Only symptoms of suspiciousness, unusual thoughts and hallucinations were measured. Therefore, the reported prevalence rate does not reflect the prevalence of other symptoms of psychotic behaviour, such as thought disorder, among methamphetamine users.

Table 47. Proportion of regular methamphetamine users reporting psychotic symptoms in the past year.

Per cent reporting symptom (N = 310)	None	Mild	Clinically significant
Suspiciousness	41	47	12
Unusual thoughts	67	26	7
Hallucinations	54	30	17
Any symptom	25	52	23

Table 48. Duration of psychotic symptoms experienced by methamphetamine users.

Duration of psychotic symptoms	Per cent (n = 71)
Up to two hours	32
>2 to 3 hours	20
>3 to 48 hours	4
>2 days to one week	7
>1 week to one month	10
>1 to 3 months	6
>3 to 6 months	1
> 6 months	7
Ongoing ^a	13

^a Symptom duration could not be estimated because symptoms were still ongoing at the time of the interview.

Suspiciousness and persecutory ideation

Symptoms of suspiciousness ranged from feeling an unwarranted level of self-consciousness and wariness of other people to intense persecutory delusions. Suspiciousness was regarded as pathological or 'clinically significant' in cases where the person expressed beliefs that other people intended to harm them, or were talking about them in a malicious way, that could not be plausibly explained by the circumstances. This pathological suspiciousness, or persecutory ideation, could also be distinguished from non-pathological levels of suspiciousness by the person's level of pre-occupation with the perceived persecution. As persecutory ideation becomes more severe it can take on a delusional quality, although not all persecutory ideation is delusional in nature. For example, one person described feeling that there were cameras in the house where he was living and that the woman he was living with could watch what he was doing.

Clinically significant symptoms of suspiciousness (i.e., persecutory ideation) were experienced by 12% of regular methamphetamine users, and 7% of methamphetamine users held such a belief with delusional intensity (i.e., BPRS rating 6-7). The content of persecutory ideation often involved fear of police detection (29%, Table 49). For example, writing down the number plates of motor vehicles out of fear of being followed by undercover police or repeatedly changing the SIM card on a mobile phone because of a belief that phone calls were being intercepted by the police.

Although persecutory beliefs about police surveillance may be considered plausible in the context of an illicit drug using culture, people suffering from persecutory ideation had an uncharacteristic conviction and preoccupation about their beliefs, while their beliefs also tended not to be logically related to circumstantial factors.

The bulk of persecutory delusions involved more general themes of persecution or reference, such as being followed by people other than the police (24%) or being persecuted by their friends or their partner (21%). People described feeling that everyone around them was watching them and talking about them, feeling that people were going to hurt them, or feeling disliked and not trusted by other people. A small proportion of people experiencing persecutory ideation were overly concerned that other people would steal their drugs.

Table 49. Content of persecutory ideation experienced by methamphetamine users.

Content of persecutory ideation	Per cent (n = 38)
Being followed/caught by police	29
Being followed by persons other than police	24
Friends/partner turning against them	21
Worried that someone will take their drugs	5
Other/non-specific	24

Mild symptoms of suspiciousness that were not regarded as pathological were extremely common among methamphetamine users (47%), and consisted of feeling overly self-conscious in public, feeling as if people were watching the person or that they were being laughed at or criticised, or that other people were taking more notice of them than normal. Mild suspiciousness also included feeling that other people wanted to harm the person in situations where this may have been plausible. These mild symptoms did not have any substantial impact on day-to-day functioning and would be unlikely to come to the attention of other people. Mild symptoms of suspiciousness tended to be transient and often followed an episode of methamphetamine use. Methamphetamine users would often recognise that these feelings of suspiciousness were related to their drug use and 'ride-out' these symptoms, understanding that they would subside naturally.

Unusual thoughts and delusional beliefs

Unusual thought content can range from having atypical, eccentric or odd beliefs through to delusions where the person has a strong conviction or belief about their situation that is clearly false or bizarre. It was relatively common for methamphetamine users to have unusual or eccentric beliefs that did not qualify as being delusional, such as beliefs in psychic powers or unusual spiritual beliefs, or loosely held beliefs that people were giving them a hard time or 'out to get them'. These types of feelings were held by 26% of regular methamphetamine users. Delusional thoughts (i.e., unusual thoughts or beliefs that are clearly false) were less common, having been experienced by 7% of regular methamphetamine users in the past year.

Most delusions experienced by methamphetamine users were persecutory in nature. The following example describes a persecutory delusion experienced by a 33 year old male who was dependent on methamphetamine and typically injected ice twice a week. He began to believe that he could hear other people saying his name and talking about him, and thought people were out to get him

and were going to run him out of town. Because of this persecutory belief he was unable to go to work and remained inside his home for four days. His persecutory belief became progressively more intense over this time until he became convinced that people were going to bash him and hurt him. On the fourth night he confronted the people around him by taking a knife in his hand and telling them to 'get away'. He did not hurt anyone, but explained he would have used the knife on someone if they had attacked him. The police and ambulance were called to the place where he was staying and said he calmed down once the ambulance officers arrived. He was taken to an emergency ward and later transferred to a psychiatric facility where he was diagnosed with drug-induced psychosis and remained for eight days.

In the above example the persecutory delusion resulted in threats of violence toward bystanders; however, persecutory delusions may also result in self harm. A 35 year old male described being so convinced that he was being constantly followed by police he developed a delusion that the police had bugged him – 'him' being his actual body. He proceeded to try and cut the bugging device out of his arm, at which point the police were called and they took the man to an emergency department for treatment. He was later transferred to a psychiatric hospital. The entire experience lasted for four to five days, during which time he was intoxicated with ice. During the period leading up to the onset of the symptoms, the man described taking up to ten points of ice per day, and not having slept for 14 days.

Hallucinations

Hallucinations may consist of experiencing visual, auditory, tactile, olfactory or gustatory sensations in the absence of any external event. Clinically significant hallucinations were experienced by 17% of methamphetamine users. For a hallucination to be considered clinically significant a person had to have had a clearly formed sensory perception in the absence of any external stimulus while they were in a clear state of consciousness. Hallucinations may be perceived to be external or emanating from within the person's own mind (i.e., pseudo-hallucinations).

The majority of hallucinations experienced by methamphetamine users were auditory or visual in nature (Table 50). Tactile hallucinations were uncommon (8%), while no methamphetamine users reported clinically significant olfactory or gustatory hallucinations.

Table 50. Sensory modality of hallucinations experienced by methamphetamine users.

Sensory modality of hallucination	Per cent (n = 51)
Auditory	51
Visual	57
Olfactory	13
Tactile	0

Note. Participants could experience hallucinations in more than one sensory modality.

The content of hallucinations may reflect or reinforce persecutory beliefs held by the person. For example, some people explained that when they were using methamphetamine or coming down from the drug they may hear voices in their head making negative comments about them or believe that they can hear other people talking about them in a vindictive way. An example of how a visual hallucination may invoke persecutory feelings was given by one female methamphetamine

user who described having an hallucination of her ex-partner while driving. She became so frightened by the image of her ex-partner that she left her car, ran through the street, stopped a taxi and demanded to be taken home. Once at her home she barricaded the door, believing that her current partner was going to hurt her in the same way that her ex-partner had done in the past. This episode lasted for five hours during which time the woman was emotionally distraught.

While hallucinations could involve vivid images and voices as described above, more common were mild hallucinations that consisted of illusory-type experiences that were not regarded as clinically significant. Mild hallucinations had been experienced by 29% of regular methamphetamine users in the past year. Very mild symptoms of hallucinations manifested as misinterpretation of shadows, light or movement in a person's peripheral vision, while mild auditory hallucinations involved the person hearing their name called, hearing their mobile phone ring, or hearing non-distinct muffled voices when there was no one present. As perceptual disturbances became more intense, they took on the characteristics of hallucinations. For example, one person described how the arms of a jacket hanging on a hook began to move and his blanket took on the form of an eel and he could feel it moving over him. Mild hallucinations commonly involved inanimate objects changing form or moving; however, these experiences were typically fleeting, and the illusion would dissipate once the person focussed on the object or were told by another person that what they were looking at was an inanimate object. Usually methamphetamine users would have insight into these mild hallucinatory experiences and the hallucination would be so transient that it would not have a substantial impact on the person's day-to-day functioning.

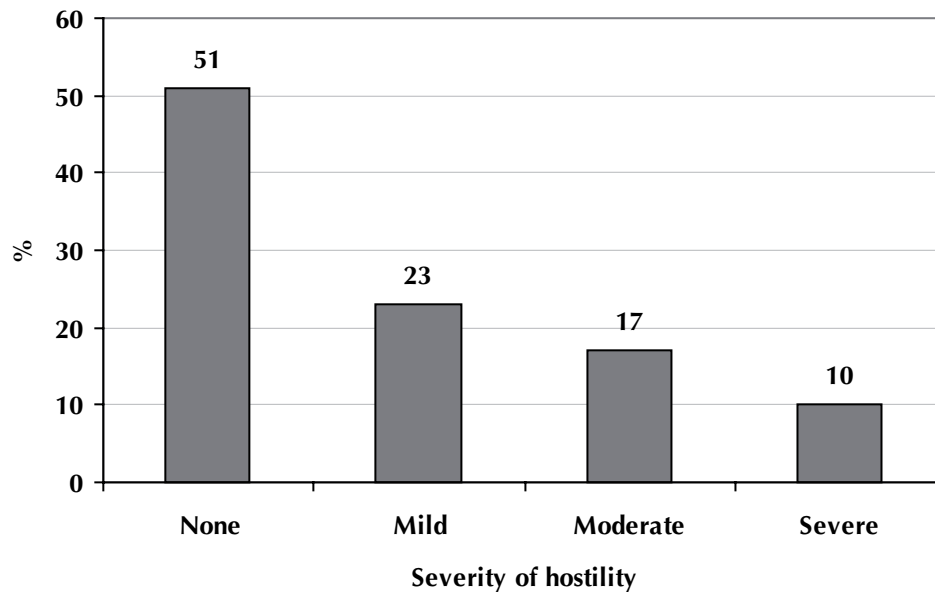
Tactile hallucinations were less common than auditory and visual hallucinations, and involved experiences like feeling bugs crawling on or within the person's skin. Tactile hallucinations and related delusions of parasitosis can result in self-injury including excessive skin picking (Zomer et al., 1998); however, self-injury resulting from delusions of parasitosis should be distinguished from pathological skin-picking behaviour that does not result from hallucinations or delusional beliefs. Pathological or compulsive skin-picking behaviour (also known as psychogenic excoriation, neurotic excoriation, acne excoriee, and dermatotillomania) is characterised by scratching and/or picking at minor irregularities on the skin and is associated with a variety of psychiatric conditions (Arnold et al., 2001; Wilhelm et al., 1999). This form of skin picking is more accurately conceived of as a form of compulsive behaviour (Wilhelm et al., 1999).

Hostility among methamphetamine users experiencing psychotic symptoms

As noted in the introduction to this section, methamphetamine psychosis is often associated with an intense emotional state that can result in hostile behaviour and acts of violence. Half of the methamphetamine users who experienced clinically significant symptoms of psychosis were feeling hostile at the time of the symptom episode and one-quarter exhibited overtly hostile behaviour (Figure 30).

Hostility ranged from being irritable or argumentative (23%) to overt acts of hostility, such as yelling at people, hitting people or breaking objects (27%). Ten per cent of people experiencing clinically significant symptoms of psychosis became severely hostile. Severe hostility included throwing or breaking furniture, threatening people and assaulting people physically or with a weapon. There was only one case where a methamphetamine user who was experiencing psychosis actually harmed another person, while in one further case a delusion resulted in self harm.

Methamphetamine users who experienced hostility while they were psychotic were more likely to be suffering from a clinically significant delusion (43% vs. 19%; $\chi^2_{df=1} = 4.5$, $p = 0.03$), and have symptoms that lasted more than two days (63% vs. 25%; $\chi^2_{df=1} = 10.3$, $p = 0.001$). There were no other significant predictors of hostility found in the current study.

Figure 30. Severity of hostility reported during clinically significant psychotic symptoms

Predictors of psychosis among methamphetamine users

Methamphetamine users who had experienced symptoms of psychosis in the past year were far more likely than other methamphetamine users to have a history of mental health problems (59% vs. 42%); specifically, a history of schizophrenia²⁹ (17% vs. 1%). The proportion of methamphetamine users who reported having been diagnosed with schizophrenia was 5%, which is far higher than the general population prevalence rate of schizophrenia which is less than 2% (Robins et al., 1991). Obviously people suffering from schizophrenia are at risk of experiencing psychotic symptoms regardless of their drug use; however, methamphetamine use does increase the risk of symptom relapse among people suffering from this disorder (Curran et al., 2004).

Heavy methamphetamine use was also a strong risk factor for having experienced psychosis among people who used the drug. After controlling for premorbid schizophrenia, dependent methamphetamine users were three times as likely to experience psychotic symptoms (Table 51). Using methamphetamine more than twice weekly was also a significant risk factor for psychosis (OR = 2.5, 95% CI: 1.4-4.3), although frequency of use was highly correlated with methamphetamine dependence and was therefore omitted from the regression model shown in Table 51. There was a non-significant trend for ice use to predict psychosis (OR = 2.3, 95% CI: 0.9-5.4); this effect due largely to the association between ice use and increased levels of dependence³⁰ (see *Methamphetamine use in Sydney*). Neither age nor sex were found to be predictive of psychosis, while no other drug use patterns were found to significantly predict psychosis.³¹

²⁹ The relationship between psychotic symptoms and having had any history of a mental disorder was attributable to having a history of schizophrenia. After controlling for a history of schizophrenia, there was no relationship between other mental disorders and psychosis (OR = 0.7, CI: 0.4-1.2).

³⁰ Controlling for methamphetamine dependence attenuated the relationship between ice use and psychosis (OR = 1.7: 95% CI: 0.7-4.1).

³¹ Note that the current study did not aim to assess the relationship between other patterns of drug use and psychosis, and did not include measures of cannabis and alcohol dependence, which have previously been found to be associated with psychosis (Degenhardt & Hall, 2001).

Table 51. Predictors of psychotic symptoms among methamphetamine users.

	Odds Ratio	95% Confidence interval		p
		Lower	Upper	
Methamphetamine dependent	3.1	1.7	5.8	0.004
History of schizophrenia	15.2	4.0	57.6	0.000

Table 52 shows the prevalence of clinically significant psychotic symptoms among sub-groups of users who were at higher risk of experiencing psychosis. Thirty-one per cent of those who were dependent on the drug, or using more the twice weekly, had experienced psychosis in the past year. Unsurprisingly, most of those participants who had a diagnosis of schizophrenia had experienced a clinically significant symptom of psychosis in the past year. Of more relevance was that one in five methamphetamine users who had no history of schizophrenia had experienced a clinically significant psychotic symptom during this time.

Table 52. Prevalence of psychosis among high-risk sub-populations of methamphetamine users.

	Past year prevalence of clinically significant symptoms (%)
Dependent on methamphetamine	
No (n = 137)	13
Yes (n = 173)	31
Use methamphetamine more than twice weekly	
No (n = 166)	16
Yes (n = 144)	31
Diagnosis of schizophrenia	
No (n = 293)	20
Yes (n = 15)	80

Defining methamphetamine psychosis

It has been shown in the previous sections that a substantial proportion of methamphetamine users experience psychotic symptoms. However, not all psychotic symptoms were attributable to methamphetamine use, with a proportion of people being likely to have experienced psychotic symptoms because they had a premorbid diagnosis of schizophrenia. This section looks at the prevalence of psychotic episodes that are caused by methamphetamine (i.e., methamphetamine-induced psychosis) as distinct from the overall prevalence of psychotic symptoms observed among people using the drug. The two most commonly used diagnostic criteria for assessing drug-induced psychosis are:

- the International Classification of Diseases Version 10 (ICD-10, World Health Organisation, 1993), and
- the Diagnostic and Statistical Manual of Mental Disorders Version Four - Technical Revision (DSM-IV-TR, American Psychiatric Association, 2000).

The prevalence of methamphetamine psychosis according to these criteria is presented below.

ICD-10 criteria

In order to meet criteria for methamphetamine psychosis under the ICD-10, symptoms of psychosis must:

- i. occur during or within two weeks of methamphetamine use,
- ii. persist for more than 48 hours, and
- iii. not exceed 6 months duration.

According to these criteria, 5% of methamphetamine users had experienced psychosis due to methamphetamine use during the past year. However, these criteria excluded 56% of the cases involving clinically significant psychotic symptoms because the duration of symptoms in these cases was less than two days. Conversely, 25% of psychotic episodes that were deemed to be methamphetamine-induced were experienced by a person who had been diagnosed with schizophrenia, many of whom had experienced the onset of psychotic symptoms before they initiated methamphetamine use.

These ICD-10 criteria are clearly problematic in that they include cases where psychotic symptoms are due to schizophrenia while they exclude over half of cases involving clinically significant symptoms of psychosis that have occurred in the context of methamphetamine use.

DSM-IV-TR criteria

The DSM-IV-TR provides different criteria for defining psychosis due to substance use than those used by the ICD-10. Under the DSM-IV-TR the criteria for substance-induced psychosis are:

- i. prominent hallucinations or delusions;
- ii. evidence that either (a) symptoms developed during or within a month of substance intoxication or withdrawal, or that (b) medication use is etiologically related to the disturbance;
- iii. the disturbance is not better accounted for by a psychotic disorder that is not substance-induced, such as (a) symptoms preceding onset of substance use; (b) symptoms persist for a substantial period of time (e.g., one month) after the offset of symptoms or are in excess of what would be expected given the substance use history; or (c) evidence of an independent non-substance-induced psychotic disorder; and
- iv. the disturbance does not occur exclusively during the course of a delirium.

Using the above criteria³² it was estimated that 11% of all methamphetamine users met criteria for methamphetamine psychosis in the past year.

The DSM-IV criteria are preferable to the ICD-10 criteria because they exclude cases of psychosis that are likely to be caused by a premorbid psychotic illness. Methamphetamine psychosis was also significantly more common among those who were dependent on the drug, as would be

³² Criteria (i): inclusion of clinically significant persecutory ideation, delusional thoughts and hallucinations. Criteria (ii): cases were excluded where there was no methamphetamine use within the two weeks prior to the onset of the psychotic symptoms. Criteria (iii): cases were excluded where (a) psychotic symptoms were reported to precede the onset of methamphetamine use OR (b) there was previous diagnosis of schizophrenia OR (c) symptoms had occurred for at least one month in the absence of methamphetamine use, OR (d) the symptom episode persisted for longer than one month; Criteria (iv): although difficult to confirm based on retrospective self-report, symptoms primarily occurred in a lucid state of mind and not in the course of a delirium. Symptoms that resulted from taking hallucinogenic drugs were excluded.

expected, whereas this was not the case when using ICD-10 criteria (Table 53). Although DSM-IV criteria appear to more accurately reflect psychosis due to methamphetamine use, these criteria do include cases where symptoms are very brief and may not be sufficiently long-lasting to demand psychiatric care.

Table 53. Prevalence of methamphetamine-induced psychosis according to ICD-10 and DSM-IV criteria.

Criteria used	Dependent on methamphetamine		Total sample (N = 310)
	No (n = 137)	Yes (n = 173)	
ICD-10	4	6	5
DSM-IV	5	16**	11

**p < .01, $\chi^2_{(1)} = 8.5$.

A comparison with the general population

In addition to measuring the severity of psychotic symptoms experienced by methamphetamine users using the BPRS, the current study also employed a screening instrument for psychosis that has been previously used to assess the prevalence of psychosis among the Australian population. Although this instrument has limited utility in the assessment of psychotic symptoms (unpublished data, Degenhardt, 2001), it does provide a comparison of the prevalence of psychosis among methamphetamine users in the current sample with that of the Australian general population. Using this screening instrument, the National Survey of Mental Health and Well-being found that 1.2% of the Australian general population aged less than 50 years screened positively for psychosis in the past 12 months (Degenhardt and Hall, 2001). The same instrument in the current study found that 13% of regular methamphetamine users screened positively for psychosis in the past year. This indicates that the prevalence of psychosis among regular methamphetamine users was 11 times higher than that seen in the general population.

Conclusion

The prevalence of psychosis among methamphetamine users was 11 times higher than that found among the general population. Just over one in five regular methamphetamine users had experienced a clinically significant symptom of psychosis in the past year. Only a small proportion of methamphetamine users who experienced psychosis attended hospital (11%), this being because most psychotic symptoms among this population subsided naturally within two to three hours. Methamphetamine users who attended hospital as a result of their psychosis were more likely to have had symptoms that lasted for more than two days.

Having a history of schizophrenia was a key predictor of psychosis among methamphetamine users, and the prevalence of self-reported schizophrenia was higher among methamphetamine users than among the general population (5% vs. 1.5% among the general population). Previous research has demonstrated that (i) stimulant use can induce psychotic symptoms in schizophrenic patients, (ii) symptoms of stimulant-induced psychosis are more pronounced among people experiencing acute schizophrenia, and (iii) that symptoms in this context do not respond well to antipsychotic medication (Curran et al., 2004). It is therefore likely that people suffering from schizophrenia who use methamphetamine will have a disproportionately high impact on psychiatric services, and also on frontline services that are called on to manage people suffering

from acute psychosis. To minimise the burden of methamphetamine-induced psychotic symptoms, particular attention needs to focus on reducing methamphetamine use among people with schizophrenia, and abstinence from stimulant use should be encouraged among this portion of the population.

Methamphetamine users were still at risk of developing methamphetamine psychosis even if they did not have a history of schizophrenia. One in five of methamphetamine users who did not have a history of schizophrenia had experienced a clinically significant psychotic symptom during the past year. The strongest predictors of experiencing psychosis, besides having a history of schizophrenia, were being dependent on methamphetamine and frequent use of the drug. Ice users were found to be at elevated risk of psychosis; however, this risk appeared to be mediated by their being more dependent on methamphetamine. Given that dependence on methamphetamine is a key risk factor for the development of psychotic symptoms, treatment for methamphetamine dependence, and harm reduction strategies aimed at reducing the frequency of methamphetamine use, would be likely to reduce the incidence of psychosis among this population.

Half of the methamphetamine users who had experienced psychotic symptoms felt hostile at the time, and one-quarter exhibited overtly hostile behaviour, such as verbally abusing people, throwing objects at people or breaking furniture. Only a couple of people reported injuring other people or hurting themselves, although where these situations did arise, they could be very serious (e.g., self-injury included cutting limbs open). The threat to bystanders and health workers in these contexts was obviously augmented if the person experiencing psychosis had access to a weapon. People that were hostile were likely to be in a delusional state and had also experienced psychotic symptoms for a reasonably long period of time (e.g., days rather than hours). This finding is consistent with Ellinwood's (1971) observation that delusional thinking is an important antecedent to violence associated with methamphetamine psychosis.

The high levels of psychosis observed among methamphetamine users, together with the levels of hostility expressed in the context of psychosis, have drastic implications for health services that need to manage people with drug-induced psychosis. The brunt of this impact will be felt among frontline health services that are called to assist people exhibiting psychotic behaviour and manage their acute care prior to hospitalisation. The following sections examine the impact that methamphetamine psychosis has on frontline workers, specifically police, ambulance and emergency personnel.

The impact of methamphetamine psychosis on policing

Rebecca McKetin, Jennifer McLaren and Erin Kelly³³

Key points

- Methamphetamine users have an extremely high level of contact with police officers, both because of offences that they have committed and also in other situations where they have not been involved in an offence. Four in ten methamphetamine users had had contact with police within the past month, of whom 39% indicated that this contact was outside the context of an offence.
- Almost two-thirds of methamphetamine users were intoxicated on the last occasion when they were approached by police, and one-quarter were intoxicated with methamphetamine. One-third of methamphetamine users were feeling some level of hostility at the time they were approached.
- Aggressive behaviour among methamphetamine users occurred in the context of psychotic symptoms that had been brought on by the drug. Symptoms that police used to identify methamphetamine psychosis included rapid and incoherent speech, agitation, anger and rapid mood swings, and erratic and irrational behaviour. These behaviours occurred in the context of methamphetamine's physiological effects, such as dilated pupils, bulging eyes and sweating.
- People suffering from methamphetamine psychosis who were exhibiting aggressive behaviour were very dangerous because they were unpredictable, impulsive, and irrational as well as being extremely hostile. They exhibited high levels of sustained energy and were very alert, which made them extremely intimidating and difficult to restrain.
- The main occupational health and safety risk to police dealing with methamphetamine users exhibiting aggressive psychotic behaviour was being assaulted while trying to restrain the person.
- A further risk associated with apprehending psychotic methamphetamine users was the transmission of infectious disease. This was a particular risk when the person being apprehended resisted restraint and search procedures.
- Police may have contact with people suffering from methamphetamine psychosis in a range of contexts, and incidents involving these people were often unanticipated. Procedures to manage people suffering from methamphetamine psychosis need to take into account the urgent and unplanned nature of these encounters.

Background

There were over one thousand amphetamine-related offences³⁴ in Sydney during 2003, double that of 1997 (Figure 31). Most of these people were likely to have been methamphetamine users who would be at risk of showing signs of methamphetamine psychosis and related aggressive

³³ National Drug and Alcohol Research Centre, University of New South Wales.

³⁴ Includes all incidents pertaining to a person of interest where the offence was use, possession, dealing, trafficking and import of amphetamines, but excluding offences relating to ecstasy and other stimulants.

behaviour. Offences relating to methamphetamine that occurred in Sydney were concentrated within the inner region of Sydney and to a lesser extent within the Western regions of Sydney (Table 54). When the population of geographic areas within Sydney was taken into account, the rate of offences remained highest within the inner and Western regions (Figure 32).

Drug tests carried out among arrestees show that recent use of methamphetamine is also common among people arrested for a broad range of offences, not only those arrested for methamphetamine use, possession or supply. During the third quarter of 2003, 22% of detainees at Parramatta police station and 14% of detainees at Bankstown police station, who were surveyed through the DUMA program, tested positive for methamphetamine (Milner et al., 2004).

Figure 31. Number of amphetamine-related offences in Sydney and NSW, 1997-2003

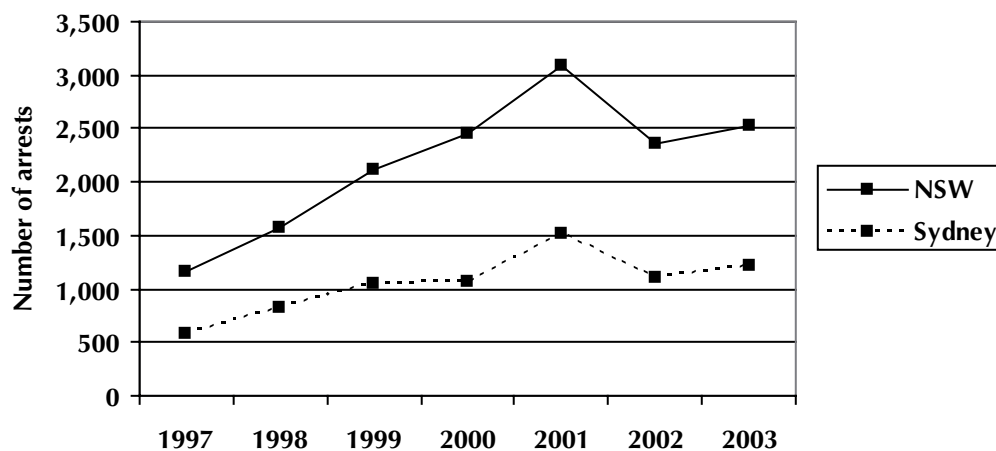


Table 54. Number of amphetamine-related offences within Sydney by Statistical Subdivision, 1997-2003.

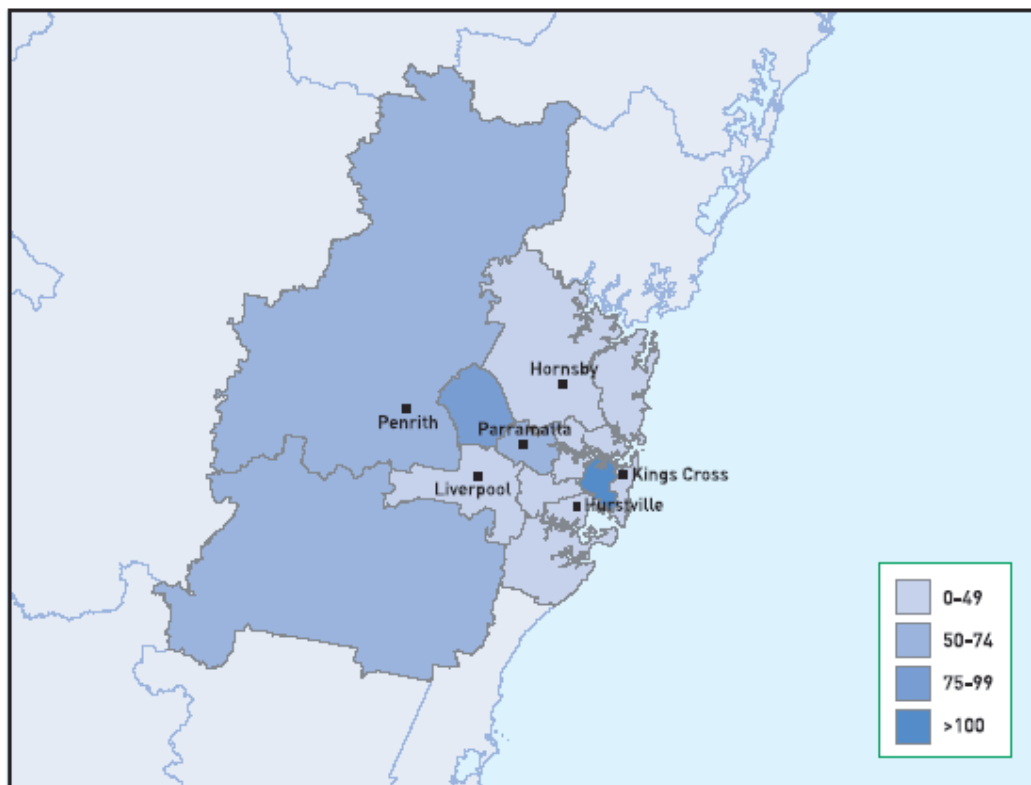
	Number of arrests						
	1997	1998	1999	2000	2001	2002	2003
Northern Beaches	12	17	28	29	52	39	35
Central Northern Sydney	37	45	54	53	68	62	67
Lower Northern Sydney	28	51	51	61	53	16	54
Inner Sydney	128	213	199	261	379	306	327
Eastern Suburbs	52	38	42	31	68	37	54
St George-Sutherland	70	70	80	88	128	108	54
Inner Western Sydney	22	20	24	21	35	39	15
Central Western Sydney	42	68	107	94	130	84	105
Blacktown	85	118	170	136	189	117	146
Canterbury-Bankstown	17	16	51	36	82	27	46

Table 54 continued.

	Number of arrests						
	1997	1998	1999	2000	2001	2002	2003
Fairfield-Liverpool	32	44	79	76	99	79	89
Outer South Western Sydney	43	47	68	67	118	84	95
Outer Western Sydney	68	112	125	145	145	118	148
Total	636	859	1078	1098	1546	1116	1235

Note. Offences include possession/use, deal/traffic and import of amphetamine or methamphetamine only.

Figure 32. Rate per 100,000 population of amphetamine-related offences among those aged 15-59 years in Sydney by Statistical Subdivision, 2003



Contact that methamphetamine users have with police

High levels of contact between police and methamphetamine users were also reflected in the findings from the survey of methamphetamine users. Regular methamphetamine users not only had contact with police because they had committed offences, but also for other reasons (e.g., witness to a crime, victim of a crime, or they were in the company of an offender that was being questioned by police). In total, 43% of methamphetamine users had contact with police in the past month, of whom 61% were approached by police because of something they had done. The remaining 39% had contact with the police for other reasons as noted above. This finding shows that police have a high degree of contact with methamphetamine users outside the context of police arresting them for offences.

Among methamphetamine users who had been approached by police during the past year (49%), most were approached in relation to drug use or supply (e.g., being searched for drugs). Methamphetamine users were also often approached in the context of being checked for outstanding warrants or general questioning, traffic incidents and violence (e.g., being questioned after assaulting someone). Theft, fare evasion and loitering/trespassing were other less common reasons for police contact. One in four (26%) methamphetamine users who had contact with police in the past year were arrested as a result, but more often they were questioned, fined or given a warning (51%).

Most methamphetamine users (62%) were under the influence of drugs or alcohol at the time of their last contact with police (Table 55).³⁵ One in four participants who had police contact in the past year were under the influence of methamphetamine at the time, while intoxication with cannabis and/or alcohol was also common. Almost one quarter (23%) were withdrawing from drugs or alcohol at the time: almost all of these were withdrawing from methamphetamine (Table 55).

Around one third of methamphetamine users (35%) reported feeling some degree of hostility at the time they were apprehended by police. Eleven per cent exhibited overt hostility such as yelling or abusing people, assaulting others or damaging property, and a small proportion (4%) reported having been restrained by police. Methamphetamine users rarely reported initiating a physical assault against a police officer (1% of cases).

Table 55. Drug intoxication among methamphetamine users during their most recent contact with police during the past year.

	Intoxicated (%) (n = 155)	Withdrawing (%) (n = 155)
Any drug	62	23
Drug type		
Methamphetamine	25	14
Cannabis	20	2
Alcohol	13	1
Heroin	11	3
Methadone	11	1
Benzodiazepines	8	1
Ecstasy	6	1
Other drugs	1	1

Note. Based on the reports of 152 methamphetamine users of whom 94 were intoxicated and 34 were withdrawing from drugs or alcohol. Participants could report intoxication with more than one drug.

³⁵ Only half of the methamphetamine users surveyed (N = 152) were questioned about their drug intoxication/withdrawal and hostility when they were last apprehended by police.

Methamphetamine psychosis: the experience of police

Recognizing psychotic behaviour among methamphetamine users

Police who dealt with aggressive behaviour among methamphetamine users almost all worked in the inner region of Sydney. The majority of cases involving severe uncontrollable aggressive behaviour occurred among injecting drug users following their use of ice. Cases were also observed among recreational users of the drug; however, these cases appeared less likely to come to the attention of police, who spent more time in contact with the lower socio-economic group of injecting drug users who frequented the inner region of Sydney.

Police learned to identify ice intoxication by the psychotic behaviours exhibited by users of the drug coupled with the drug's acute physical and psychological effects. The most common observable symptoms of ice intoxication to police were:

- agitation, jumpy and over-reactive behaviour, and being hyper-alert to physical stimuli;
- being angry or irritable, yelling at people or being aggressive for no apparent reason;
- rapid speech, rapid thought processes, shifting from one topic of conversation to another, and not being able to maintain a coherent train of thought;
- behaviour indicative of hallucinations or delusional beliefs, such as talking to people who were not present or arguing with people for no apparent reason; and
- dilated pupils, widened eyes and sweating.

Methamphetamine intoxication could also be identified by its contrast to intoxication with other drug types. For example, methamphetamine did not cause the motor impairment associated with alcohol, and people who were intoxicated with methamphetamine were alert and often agitated, whereas people intoxicated with cannabis or heroin were relatively passive. Methamphetamine use was also associated with dilated pupils whereas someone intoxicated with heroin would have constricted (pinned) pupils, and red eyes were usually associated with cannabis intoxication. It was more difficult to distinguish the effects of methamphetamine from cocaine as both drugs are stimulants and have overlapping effects. Most police officers distinguished methamphetamine from cocaine by the agitation that methamphetamine caused and the emergence of psychotic symptoms.

"I liken it to someone who's intoxicated but without the delayed reactions and things like that. They're very unstable. They're on edge and they jump from one thing to another. It could also be mistaken for forms of mental illness. You can really tell, they're so irrational, and they go from one thing to the next. They'll be talking down one line, and then all of a sudden the conversation will have turned into something completely different. And their movements and actions will tell you, they're very, they can go from being very passive and friendly, to all of a sudden being, and I mean like that, being exceptionally aggressive. Standing over, standing over you, and then the next thing they're... 'Sorry you're a good person, you're a good, you're just doing your job' and then all of a sudden it comes back on again. And it goes, it seems to go through like a wave, waves you know, one moment they're okay and then the next minute they're, yeah they want to, the aggression takes over and yeah."

"Ice is bad because it's just a total change in their behaviour. Normal people that, most of the prostitutes up here, you know when they're on their coke or whatever, but as soon as they started switching to ice, there was a huge change. Aggressive, didn't really, they were talking to themselves, always clenching their jaws like they normally do with a lot of other drugs, but just really angry, really out of character. ...Just, you would just associate them

with a crazy person if you see them talking to themselves, and big arm actions telling a story to nobody. Getting angry but not even looking at you. Like if you're there they get angry but I don't think it's directed at you, it's just because they're just angry. ...Also when they were off it, and you would speak to them, if they were on something else, they would always say ice is so bad, it's made me crazy, it really does a bad thing for me, and you can see it, so much. When we have good base up here, it's the same, but I just know my view is ice is the worst."

"There's a real distinction between your standard methamphetamine user and your ice or crystal methamphetamine user. You wouldn't, most of the time you wouldn't know someone is on amphetamine, as opposed to someone who's on ice, who, you can tell virtually straight away once you know what it is that you're looking for."

In some cases methamphetamine users who exhibited this type of aggressive and psychotic behaviour did have an underlying mental illness. In these cases methamphetamine may have exacerbated an existing mental health problem or triggered a psychotic episode. However, in most cases where police attributed symptoms of psychotic and aggressive behaviour to ice use there was a clear contingency between the two events. Specifically, police attributed psychotic behaviour to ice because (a) the person exhibiting the psychotic behaviour was a known user of the drug; (b) the police officer knew the person and thought that the psychotic or aggressive behaviour was 'out-of-character'; (c) the incidence of aggressive psychotic behaviour was specific to those people who had been using ice; (d) there was a temporal relationship between ice use and this type of behaviour; and (e) the person exhibiting the behaviour would confess to having taken ice following the episode of psychotic behaviour.

"...seeing the people out on the streets and knowing that they're on speed, and they tell us 'you know, we're on, take speed'. And some get very violent, the younger ones seem, on speed, there's one particular guy, they get really aggressive. And you can tell with this particular young guy that when he's on it and when he's not on it. When he's off it he's a really nice guy, you can, you know, talk to him, have a good conversation, he's trying to get work. And then when he's on it again, he commits crimes again to pay for it. And he gets really, really aggressive."

People intoxicated with methamphetamine were particularly intimidating because they were well coordinated and physically alert. Methamphetamine intoxication did not have any deleterious effects on the offender's ability to fight that would normally be seen in people who were intoxicated with alcohol, cannabis or heroin. If anything, methamphetamine enhanced the offender's ability to fight and maintain resistance. Moreover, violent tendencies associated with methamphetamine psychosis were unpredictable and irrational. People exhibiting methamphetamine psychosis had rapid changes in their emotions and behaved very erratically and impulsively.

"When they're on the grog, you know they got the maybe the slurred speech and they're physically not as well coordinated. Whereas in his case he was quite well coordinated, it's not like he was hampered by alcohol, do you know what I mean? So he appeared to be more physically alert I guess. And in his case possibly more of a danger, because he was, he was, you know a person on alcohol is sort of slowed a little bit, and because they're not well coordinated you know they might miss you when they're aiming, whereas there was no question that he'd hit you if he tried."

"Their physical behaviour was threatening, not as if to throw a punch, but you know just real in your face type stuff. And getting close, invading your space, that type of thing. The man, he was, I don't think he actually made any threats, but again his physical

demeanour was physically threatening. ...Again without putting his hand up to punch us, you know standing really tall, everything was flexed the whole time. He appeared to be ready to attack. Look if you think of a dog that's going to attack someone, that's what it was like. Without him actually saying "I'm going to do it" or without his fists raised. But it's the same feeling you get when an animal's going to attack you."

Most people suffering from the effects of methamphetamine psychosis and related hostility tended to only experience these symptoms for a short period of time. Once they were no longer psychotic they were often confused about what had happened to them and remorseful about the trouble they had caused. This observation emphasises the erratic and impulsive nature of violent behaviour associated with methamphetamine psychosis.

"...after they've been arrested, they come down and actually become normal people. Just asking questions 'What happened, you know like what did I do? Why am I here?' You'll say, 'Look you've assaulted, you know, me or a partner, or you did something', and they'll be apologetic about it. And, but it's sort of a very distinct, I mean the persons' fight, fight all the way to the police station, still carry it on in the cell, their aggressiveness. They then go through a quiet stage, and then after a while they start, you say, you know you might ask them 'Are you all right etc?' You check on them. And they start saying 'Well why am I here?' And some crooks are like that, they fight but they still, ...but they won't ask you what happened. You can sort of tell the difference whether they've been under the effects or whether they haven't been under the effects."

Situations where police encountered methamphetamine psychosis and related aggressive behaviour

Aggressive or violent behaviour among methamphetamine users could be encountered by police in different situations depending on the role of the police officer. In some situations police would be called in specifically to respond to a person who was exhibiting signs of methamphetamine psychosis. However, in many situations contact with psychotic methamphetamine users was unexpected and incidental to the duties being performed by the police officer. For instance, police officers performing general duties may encounter someone who was intoxicated with methamphetamine and behaving aggressively and be required to intervene. Similarly, plain clothes police could also be confronted with an unwarranted degree of hostility when interacting with methamphetamine users. Police would also come into contact with methamphetamine users when apprehending people for the possession or use of methamphetamine, although methamphetamine users in this context may not necessarily be exhibiting overt psychotic or hostile behaviour. In general, officers who policed highly visible drug use areas where ice was prevalent appeared to have the highest level of contact with people showing signs of methamphetamine psychosis. The following quotes provide examples of the various situations in which police encountered aggressive or psychotic behaviour that they attributed to methamphetamine use.

"He'd rung the police because his sister had been assaulted, right? And we arrived and we're trying to take details of that and he's in the front yard next door yelling and screaming and carrying on, and sort of inflaming the situation. So the police told him, look we'll speak to you in a few minutes, just stay over there. And he wanted to come and get involved, wouldn't obey directions, tried to keep him back. We eventually had to physically force him back, get him on the ground and handcuff him. He was still yelling and screaming and carrying on. Now I mean he's the one who called us. And we had to actually physically remove him, get him into a police car just so that it wouldn't inflame what had already happened. He got in the car, he's kicking the doors and, you know, bent one of the doors, and then we got here, he's whacked me, you know (hit) my arm, and again he was on speed."

"Just generally if you stop someone, you'll see somebody on the street, they'll obviously appear to be drug-affected. They'll be wandering on the footpath, and then when you stop and talk to them their speech is erratic, fast. You can tell by the pupils of their eyes, they can't stand still, and they're very, very argumentative. And depending on then how things go, for some of them it's just a routine, being stopped by the police and being spoken to and they'll handle it okay. But sometimes for others they can just, if they don't like the way things are going, they'll run, or try and attack you or, yeah they'll do anything."

"I just approached him, and I said hello, I told him my name, I was a plainclothes police officer, I identified myself. And I've started to speak to him as I would anyone else. Just hello what's your name? What are you doing here? And once I identified myself, he sort of knew what was going on and he was a bit aggie, and his eyes were flicking around... He was obviously off his face and I said look what is it that you've got wrapped in the shirt? He pulled out the crowbar and started waving it around. And then I talked him down, I said look calm down, calm down and I calmed him down, and he put the crowbar down on the ground. ...and his mood was erratic. He was, he started to cry, he started to scream and cry and carry on."

"When there's times when he was on it and his family's phoned up and said 'ah, he's taking speed and he's getting really aggressive at home can we please come and sort it out'. We go down there and as soon as he sees the police, he will attack them. But then when he's not on it and he's been off it for a while, he'll see you and say hi, you know, and talk to you, a hundred percent the other way round."

In other contexts, police may be called in to assist ambulance officers who are having difficulty managing methamphetamine users who are exhibiting aggressive or violent behaviour. In these situations the police may have to travel in the ambulance with the ambulance officers to help restrain the violent person. In situations where the person was too dangerous to be transported in an ambulance, they may have to be restrained and transported in the back of a police van.

"Most of the time the ambos' are there just to check, if someone says someone's laying unconscious on the ground or something. They go, say "Are you all right?" He jumps up and wants to fight and carry on, they back up and they say look, you know, and then sometimes they may even just leave, if they know he's all right, they'll just leave him be. They can't do anything. But sometimes if he just wants to tackle or something like that, they'll call for urgent assistance, or even just assistance if there's other people, there might be other people laying down that they have to check out and this other bloke just be giving them a hard time while they're trying to look after other people."

"And we'll escort him to the hospital in the ambulance. ...The ambulance will put him on the bed and put some restraints on him. Just for the safety of everybody inside the ambulance whilst he's being conveyed."

Managing methamphetamine psychosis and related aggressive behaviour

The threat of being approached by a police officer and the fear of being arrested appeared to trigger a violent reaction from people who were intoxicated with methamphetamine and who were already agitated or psychotic. A common strategy for dealing with people exhibiting aggressive or psychotic behaviour was to try and approach the person in a non-threatening way and to 'talk them down' if they did show signs of agitation. This appeared to work successfully for a number of the police officers who participated in the current study; however, the success of this technique depended on whether it was possible to communicate with the person and other situational factors.

"I try and talk to them first and try and calm them down. But, I've never had any major drama with them. ...it depends how much they've used. But it's the way you bring yourself across to them initially, so that's my opinion. I try not to let it get that far. ...I try and talk to people first, I don't want it to escalate. But you can normally see the signs before they come and you can just try and talk your way out of things."

"Unless you sort of control the situation people become uncontrollable. It just affects them that much that it's, they're very difficult to deal with. ...they don't want to be spoken to, so you've got to try and get in, you know, try and work your way into talking to them in their sort of way. It's very difficult, and they're off on a different tangent."

"We're dealing with people who are affected by all sorts of things all the time, and quite often that might include violence and you just have to do what has to be done to resolve the situation. If it's a physical struggle, that can happen, if it's a matter of talking to them, placating them through words, that's good, preferable."

The most volatile situations arose when police were called in to deal with a person who was already experiencing severe psychosis and exhibiting violent behaviour. When people were experiencing severe psychotic symptoms their perception of events going on around them was distorted, and they may be distracted by the symptoms of their psychosis (i.e., hallucinations) or preoccupied with delusional beliefs, which made it difficult to communicate with them. In these situations de-escalation techniques were either not a feasible option or not sufficient to manage the situation.

"Because you try and talk to them, the ambos' are here to help you, they by that time they're not listening they just want to fight everyone. Say they're not getting arrested, whatever happens, or you know, sometimes they calm down, take off or whatever, just depends what happens."

"He appeared to be responding to stimuli that was not myself or my partner, sometimes. But we'd be talking to him, and his attention would be diverted to something else when nothing apparently had happened. And it appeared, I wondered whether he was hearing voices or whatever."

"I'd call it psychotic. What I've seen, like just, just angry and maybe I don't know what they're seeing, but maybe they're seeing things. You know you just can't talk to them, they're off their brains, just really. Yeah you can't communicate and just really angry and in another world."

"All we know is there'd been a bit of a blue, a bit of a scuffle, and so we put him in a cab and sent him out of the area. So we think well okay we'll take his details, we'll put him in a cab and send him out of the area. Generally that works but what he's done, he's caught the cab around the block and got out of the car. He's come back, he's walked into a Pizza Shop, he's walked in, jumped the counter, grabbed a pizza cutter, and starts chasing people randomly up and down the street."

These types of situations were pressured because the police needed to apprehend the violent person for the safety of bystanders and also for the safety of the person exhibiting the psychotic behaviour themselves. Confrontation with the police could further inflame the offender's hostility and also lead the offender to act violently toward the police officers. Offenders in this state would usually not cooperate with police and would have to be forcibly restrained before they could be taken into police custody, and police could be kicked or punched by the offender during this process. In extreme cases, several police officers were necessary to successfully restrain the offender.

"He was attempted to be arrested by three officers, and competent officers at that. ...and they were having a lot of difficulty dealing with his level of aggression, fighting. ...they were having trouble, and considering the police truck was right there, and they couldn't even get him in the police truck, or handcuff him. And he wasn't overly big, but he was still a sizeable fellow. And then I went over to help as well and the four of us still had trouble with him, four police. Eventually we got him into the back of the truck, in, well, we eventually had to crash-tackle him into the back of the truck, to push him in, there was that level of aggression, he was kicking us. I ended up in the back of the truck with him, which isn't what we're meant to do, but we just ended up, because it was the only way we could get him in there, he was that violent. ...such was the violent confrontation they had (capsicum spray) and it didn't do much for him, he just shook it off. Anyway they eventually got him in the back of the truck and we got the door shut and took him back to the police station here. He was still, as soon as we let him out, about six police had to get him out, he was still aggressive back here, carried on."

Once the offender had been taken into police custody they often remained resistant to police procedures and this posed a further threat to the police who were trying to search them. Police officers were particularly vulnerable when searching aggressive psychotic methamphetamine users. Police had difficulty obtaining the offenders' compliance with search procedures and this was made worse by not being able to communicate with the offender because of their psychotic state. In these situations the police had to forcibly restrain the offender to search them before the police could put the offender into the cell.

"The other danger is we have to search these people before we put them in cars and cells in case if they've got something on them, hurt themselves. So if you're trying to search someone like that, you know you've got to, you might have them standing up with hands (cuffed), you've got to kneel down beside them, so you can put your hands up and (search) them or whatever, I mean if they want to whack you in the head you're in a vulnerable position. And you've generally got a partner there who's watching them, or might be holding their hands or something, but you are vulnerable. The option there is don't search them, which means once they've got a weapon on them, and they're in the back of the truck with you or a knife on them, they slit their own wrists in there. So we, you know, occasionally they're playing up so much you just can't search them. But if you don't and then they injure themselves, we're you know, 'Why didn't you search them?' You've got a duty, you need to make sure they can't do that. So searching is an issue, and often those types of people, they'll carry needles or sharp things on them too, so in searching you might get a needle stick injury, though I haven't had that."

"And they just do everything, they do everything possible to hit, kick at you, spit at you, bite. Where others will usually fight with you, and as soon as you sort of contain them, they sort of, like they run out of energy and you know, they'll sort of seek defeat, yeah, you know 'A copper grabbed me'. But these blokes want to keep fighting. They fight when you bring them back, they fight during the strip search. At times you have to lay them on, you have them face to the floor and four or five coppers search them, because they're so aggressive. You have to have coppers actually physically hold them on the ground while one police officer searches, because we don't know what's on them, and we don't search them at the scene because they're too aggressive."

Offenders sometimes continued to exhibit violent and self-destructive behaviours after they were detained in the police cell, such as punching, kicking or head butting the walls of the cell, as well as being verbally abusive. Police officers reported having to regularly check on offenders who were exhibiting this style of behaviour to monitor whether they were in need of medical attention.

Ambulance officers would be called into the cell to provide medical support if the offender had injured themselves or were experiencing other serious health problems, such as palpitations or delirium. If appropriate, the person may need to be taken to a hospital for treatment. However, sometimes the person was so violent that it was not safe for either the police or ambulance staff to approach the offender. The following description was provided by an ambulance officer who was called to a police cell to treat an offender who was exhibiting aggressive psychotic behaviour. This description demonstrates that attempting to approach and treat an offender who is in an aggressive psychotic state may exacerbate the potential for injury to both the offender and to the officers present.

"...I went to a jail cell, in Surry Hills and we got called because this guy was unconscious. When I arrived he was conscious but...when I went to talk to him he started to get all aggressive, and I said I can't go near him because he's just going crazy. I just said one word to him and he started jumping all over, inside the cell. He was breathing really fast, really heavily and he was just in a state that just wasn't, you know normal for anybody to be in. He was, medically if we were thinking he was a diabetic, you know confused, and can at times be aggressive, but most of the time they're manageable. They've still, you know, got a bit of sense in them. This guy you couldn't talk to him, you couldn't keep eye contact with him, he was going on different tangents as well. So I'm talking like, you know when they say climbing off the walls, that's basically what he was doing. He was actually jumping on the seat trying to get out through the corners of the cell, you know. Where there was no escape anyway, but he was just trying you know to get his way out, like a cat stuck in a box or something like that. And it was interesting the fact that they called us because he was unconscious, and there was the fact that he was breathing so quickly, he was hyperventilating and knocking himself out. As soon as he was able to get his composure back he'd get up again and start all over again. So anyway in this instance we had to make a plan, he had to go to hospital, he was too aggressive for us once again. We had the police open up the cell, put him on the ground, handcuff him, and then we had to put him onto our stretcher, to take him to hospital. And because of the fact that we were concerned about being bitten and also spat at, we put him face down on the ground. When they opened the cell, all the officers were ready, they grabbed him, put him on the ground, and grabbed a blanket, put it under his face, put his head on it so that he wouldn't hurt his head as well as not spit or do things to us. So we just held him there, still being able to look after his airway, we grabbed him, put him onto our stretcher and took him to hospital."

A further risk associated with apprehending psychotic methamphetamine users was the contraction of blood-borne viruses and other communicable diseases. Many of the offenders in these situations were injecting methamphetamine users who had a high risk of being infected with blood-borne viruses and other transmissible infections and were also likely to be carrying injecting equipment. Offenders exhibiting psychotic and aggressive behaviour presented a greater risk than with other drug users because: (a) they did not necessarily submit to the search procedures; (b) they were not in a sufficiently lucid or rational state to warn police officers about the presence of injecting equipment; (c) there was a risk of contact with blood or saliva transmitted while trying to restrain the offender, when the offender may bite, spit or scratch; and (d) the police would need to hold the offender's hands or forearms during restraint procedures which were likely to be covered with injection sites. For these reasons, police officers expressed the importance of wearing gloves that would prevent transmission of infection while restraining and searching methamphetamine users. However, sometimes the urgency or unpredictability of encounters with people exhibiting methamphetamine psychosis made it difficult to ensure that gloves were worn.

"I suppose the main one is ...provisions for rubber gloves and washing equipment ...when they get sores and the sores are weeping, things like that. You know, it's very hard, especially if you haven't had a chance to put on gloves or anything and you've got to grab this person, I mean you turn up, and it's happening, and you know you don't get a chance to get gloves on, that can be an occupational safety issue. Other times they do have other things on them like needles and that, just because they're doing one drug and they they're dealing another. You know they may have needles from heroin or whatever on them, and that's probably really about it. Some of the conditions they live in are a bit dodgy. I mean we've got needle-stick proof gloves and things like that. But at the same time it's mostly just infectious diseases you worry about."

"I would say that normally if you were to arrest them they would say 'Oh that's in my bag, be careful if you put your hand in', or 'I've got this that you have to be worried about', where you can communicate with them. ...when you can't communicate like you normally would with them, and talk to them about what's happening and that you're going to take their bag to search it."

In some of the situations described above, offenders needed to be transported to a psychiatric facility for assessment. When this occurred, police would usually wait until the patient had been assessed by psychiatric staff. As already discussed, police were also called in to assist ambulance officers when ambulance staff had difficulty managing aggressive or violent behaviour among people who were intoxicated with methamphetamine. The impact of methamphetamine psychosis on ambulance and emergency services is covered in the following chapter.

Conclusion

Aggressive and violent behaviour among methamphetamine users occurred in the context of psychotic symptoms that were brought on by the drug. Not all people intoxicated with methamphetamine will exhibit psychosis or related aggressive behaviour. However, it was this aggressive psychotic behaviour that was most salient to police officers. People suffering from methamphetamine psychosis who exhibited aggressive behaviour were very dangerous because they were unpredictable, impulsive and irrational as well as being extremely hostile. They exhibited a high level of sustained energy and were hyper-alert, which made forced restraint extremely difficult and risky. Previous research has demonstrated that people experiencing methamphetamine psychosis are capable of assaulting other people, and the current research has highlighted this risk in the context of policing. The risk of injury was the major occupational health and safety issue faced by police when managing methamphetamine users who were exhibiting aggressive and psychotic behaviour.

The second main occupational health and safety risk that police encountered when dealing with aggressive psychotic behaviour among methamphetamine users was the risk of contracting infectious diseases. Methamphetamine users who were aggressive and psychotic posed a greater risk of disease transmission than other drug users because of the close physical contact necessary during restraint procedures and because of their resistant behaviour when being searched. The urgency and unpredictability of situations involving aggressive psychotic methamphetamine users made it difficult to pre-empt risks associated with infectious disease transmission and take appropriate risk-prevention measures.

Methamphetamine users have a high level of contact with police officers, both because of offences they have committed, but also in other situations where the methamphetamine user had not been involved in an offence. Specifically, around one-in-five arrests made by police involved

someone who was intoxicated with methamphetamine. Conversely, four in ten methamphetamine users had had contact with police within the past month, of whom 39% indicated that this contact was outside the context of an offence. The high level of contact between police and methamphetamine users outside the context of offences means that police are exposed to the risk of psychotic aggressive behaviour not only among those people they are apprehending, but also from methamphetamine users they come into contact within other contexts (e.g., bystanders). Reports from police officers also indicated that methamphetamine psychosis was encountered in a wide variety of situations, and these encounters were often unexpected and incidental to the duties being performed by the police officer. Any strategies put in place to manage people exhibiting signs of methamphetamine psychosis need to consider the wide variety of situations in which these encounters may occur and that these encounters are often unexpected.

The majority of people suffering from the effects of methamphetamine psychosis and related hostility tended to only experience these symptoms for a short period of time (i.e., up to three hours, see *Psychosis among methamphetamine users*). If symptoms of psychosis are recognised by a police officer when they are approaching an offender, it may be prudent to postpone contact with the offender until the psychotic symptoms have subsided. Clearly in situations where it is possible to control the timing of an offender being apprehended, it would make sense to avoid apprehending someone while they were in a drug-induced psychotic state. If it is necessary to apprehend a person with methamphetamine psychosis who is exhibiting aggressive behaviour, then extreme caution should be taken in the approach to the person. Specifically, if a person is suspected of being intoxicated with methamphetamine, an indirect non-threatening approach would be preferable, and engaging the person first to assess their mental state prior to attempting to make an arrest. If it becomes clear that the person is in an agitated drug-induced state, then the risks of apprehending the person in this state need to be weighed against the benefits of taking the person into police custody. However, often people in a psychotic state need to be apprehended because their behaviour poses a threat to both themselves and other people. It is these situations that pose the greatest risk to the safety of the police officers.

The impact of methamphetamine psychosis on frontline health workers

Rebecca McKetin, Erin Kelly and Jennifer McLaren³⁶

Key points

- The number of recorded hospital admissions due to stimulant use has increased steadily in NSW between 1998/99 and 2002/03. Approximately three in ten of these admissions involved a psychotic disorder that was thought to be due to stimulant use.
- There are currently no adequate data to monitor methamphetamine psychosis presentations to ambulance and emergency services, because the corresponding data collection systems do not include diagnostic or procedural codes that accurately identify these presentations.
- The majority of methamphetamine-related presentations to frontline services do not involve treatment of methamphetamine use per se, but treatment for a range of other drug-related and general health problems.
- A large proportion of methamphetamine users were intoxicated with drugs or alcohol when they came into contact with ambulance and emergency staff, while around one quarter were feeling hostile at the time.
- Most interaction that methamphetamine users had with ambulance and emergency staff occurred without any visible level of hostility; however, when presentations did involve methamphetamine psychosis and aggressive behaviour they were extremely difficult to manage and presented a serious safety risk to frontline health workers.
- The main occupational health and safety risks posed to frontline health workers when managing methamphetamine psychosis were the risk of injury and transmission of diseases through contact with blood and other bodily fluids. Safety protocols that had been implemented to manage methamphetamine psychosis appeared to substantially reduce the occupational health and safety risks associated with these presentations.
- Presentations involving methamphetamine psychosis were high-risk and extremely resource-intensive to manage. Resources need to be directed toward ensuring that frontline workers can recognise methamphetamine psychosis and are familiar with the health and occupational safety issues around the management of these patients.

Introduction

There has been a steady rise in the number of stimulant admissions to hospitals within NSW over the past few years (Figure 33).³⁷ These data include admissions where stimulants were the primary reason for admission and include all stimulant drugs other than cocaine. The sharp rise in stimulant admissions seen between 1998/99 and 1999/00 is likely to be partly attributable to changes from ICD-9 to ICD-10 coding procedures that took effect in 1999. However, it is noteworthy that this

³⁶ National Drug and Alcohol Research Centre, University of New South Wales.

³⁷ Primary diagnosis of “Mental and behavioural disorders due to use of other stimulants, including caffeine (ICD-10 codes F15.x), incorporating the subset of “Psychotic disorder” (ICD-10 codes F15.5); and “Poisoning by psychotropic drugs, not elsewhere classified – Psychostimulants with potential for use disorder” (ICD-10 code T43.6).

increasing trend has been sustained until 2002/03 when there were a total of 1,194 hospital admissions where the primary diagnosis was stimulant-related. Approximately three in every ten of these admissions involved a psychotic disorder that was due to the use of stimulants (Figure 33).

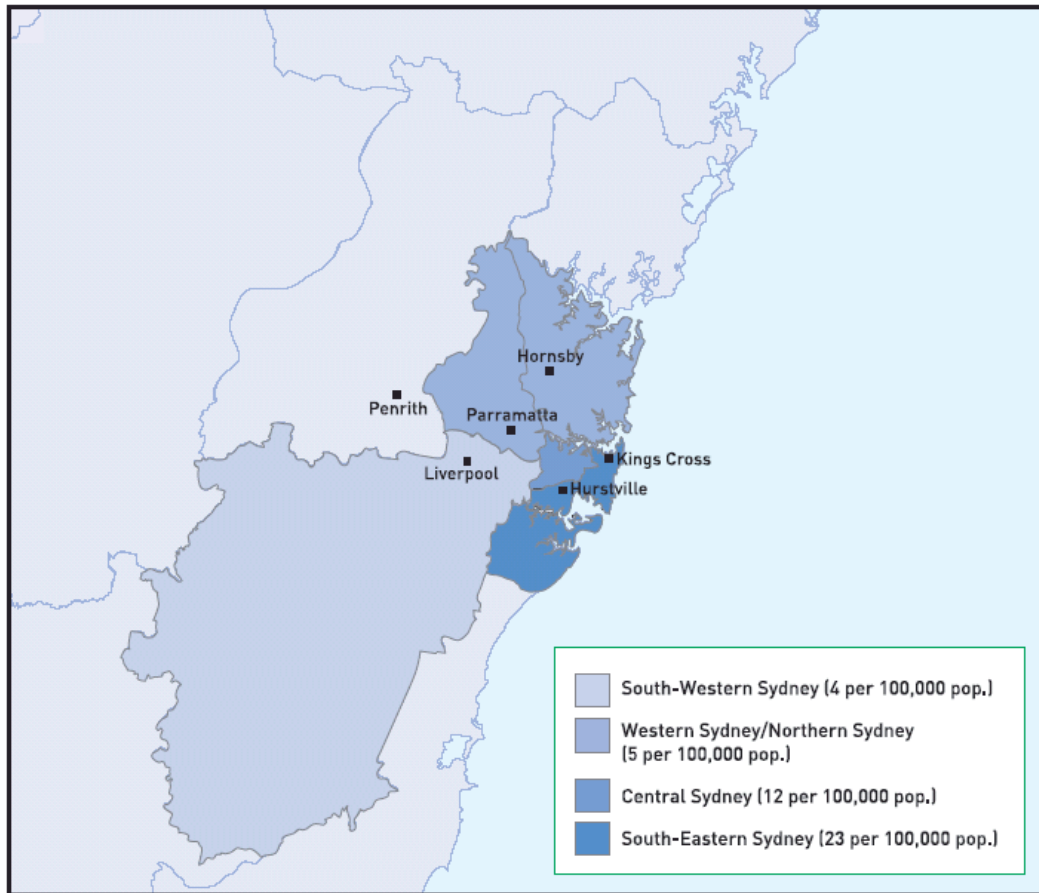
Figure 33. Number of hospital admissions due to stimulants in NSW among those aged 15-59 years



The number of stimulant psychosis presentations to emergency departments in Sydney is less clear. Emergency departments do keep statistics on the number and type of attendances; however, there are several inherent limitations with emergency data and it under-represents drug related presentations (Barker et al., 2003). Specifically, the coding system used within the emergency setting is based on the out-dated ICD-9 diagnostic system which does not include a category for stimulant-induced psychosis. Data that are available on the number of emergency attendances for '*drug dependence – amphetamine and other psychostimulant*' or '*poisoning by psychotropic agents – psychostimulants*' indicate a high concentration of these presentations in the inner region of the city (Figure 34).³⁸

³⁸ There was no comparable data for the outer western region of Sydney because data collected from most hospitals in this region relied on a different data collection system that was not compatible with that used in the metropolitan region of Sydney.

Figure 34. Rate per 100,000 population of psychostimulant-related presentations to emergency departments in Sydney by Area Health Service among those aged 15-59, 2003



Ambulance officers are another sector of frontline workers who are likely to deal with methamphetamine presentations; however, the current ambulance data collection procedures do not routinely include information on methamphetamine-related presentations. Methamphetamine-related ambulance presentations are subsumed under a generic diagnosis of 'overdose/ingestion/poisoning' or could be diagnosed according to the presenting problem (e.g., 'behavioural/psychiatric' in the case of psychosis, 'chest pains' in the case of cardiac problems related to methamphetamine use). There did not appear to be any procedural codes that identified methamphetamine-related presentations in ambulance patient records, akin to procedural codes used to identify opioid overdose. Ambulance patient records do include open-ended case notes, which may reveal information about the involvement of methamphetamine, to the extent to which ambulance officers ask about methamphetamine use and record this information. However, gleaning information on methamphetamine presentations from these open-ended notes would require a manual review of all patient records: a time consuming process that was not possible to undertake in the present study.³⁹

³⁹ Permission was sought from NSW Health to undertake a manual review of ambulance records to determine the proportion of presentations where methamphetamine was mentioned and identify any procedural codes that may act as a proxy for methamphetamine use and/or methamphetamine psychosis presentations. Permission was declined on the understanding that the level and quality of information that could be obtained would not be sufficient to justify the imposition on the privacy of ambulance patients that was required to undertake a manual record review.

The following section examines emergency data in detail through a manual review of emergency records at a specific hospital within inner Sydney. This review was undertaken to understand the nature of methamphetamine-related presentations within this emergency department, and to learn to what extent these presentations are captured through the current emergency data collection system.

A review of methamphetamine-related emergency presentations

Methamphetamine-related presentations at a busy inner-Sydney hospital were identified by a manual review of all emergency records during January 2004 (N=2905). Methamphetamine-related presentations were identified as those where methamphetamine use was mentioned in relation to the current presentation or where the emergency record indicated that the patient was a current methamphetamine user. Terms used to identify methamphetamine mentions were amphetamine and methamphetamine and the common street terms for these drugs (e.g., ice, crystal meth, speed; see *Methodology* for further details).

There were 86 emergency presentations during the one-month period that mentioned methamphetamine use, representing 3% of all emergency presentations (Table 56). This equates to two to three methamphetamine related presentations per day, or 19 per week. Presentations were lowest on Tuesday and Wednesday (less than two per day on average), and tended to be concentrated from Thursday through to Monday (2-5 per day on average). People presenting to the emergency department who had methamphetamine use noted in their record were younger than other emergency patients (median age 30 yrs vs. 37 yrs, $\chi^2_{df=1} = 29.0$, $p = 0.0001$) and slightly more likely to be male (70% vs. 61%, $\chi^2_{df=1} = 2.7$, $p = 0.10$).

In the majority of the presentations where methamphetamine use was mentioned, methamphetamine use per se was not the primary reason for the emergency department attendance. Only 15% of methamphetamine users presenting to the emergency department received a diagnosis of psychostimulant dependence (ICD-9 Code 969.7) or psychostimulant poisoning (ICD-9 Code 304.40). Primary diagnoses among this group were spread across a range of other drug-related diagnoses, mental disorders, physical conditions related to either injecting drug use (e.g., cellulitis and abscesses), physical side-effects of methamphetamine intoxication (e.g., palpitations, chest pain, sleep disturbance) and a range of other general illnesses and injuries. Polydrug use was ubiquitous among methamphetamine users presenting to the emergency department: 30% of cases also mentioned ecstasy, 29% other opioids (i.e., heroin, methadone, buprenorphine or morphine), and 28% mentioned alcohol.

Seventeen per cent of presentations that involved methamphetamine, or 15 presentations, also involved concurrent psychotic symptoms (less than 1% of all emergency department presentations). This equates to three to four cases per week involving methamphetamine users who presented to the emergency department with psychotic symptoms. Almost all of these presentations involved injecting ice use, and often the patient reported not having slept for several days prior to the admission as a consequence of their use of the drug. Most patients presented with persecutory ideation that sometimes co-occurred with hallucinations. There were two reports of milder psychotic symptoms and agitation following non-injecting ice use. Of the 15 psychosis presentations, four involved a history of schizophrenic illness, and two presentations involved a readmission of the same schizophrenic patient. In these cases methamphetamine was likely to have exacerbated or precipitated the pre-existing illness. The psychotic symptoms appeared to be far more severe in people who had a history of schizophrenia, who were suffering severe persecutory delusions and exhibiting bizarre behaviour.

Table 56. Emergency presentations mentioning methamphetamine and receiving a related ICD-9 diagnosis.

	Number of presentations (% of all presentations)	Number of presentations with a primary diagnosis	
		Psycho-stimulant dependence or poisoning	Drug induced psychosis
Any mention of methamphetamine	86 (3.0%)	13	7
With psychosis	15 (0.5%)	1	4
Other presenting problems	71 (2.4%)	12	3

Note. Psychostimulant dependence and poisoning defined as ICD-9 codes 304.40 and 969.7. Drug induced psychosis defined as ICD-9 code 292.x.

As mentioned above, only 15% of the presentations that mentioned methamphetamine received a primary diagnosis of psychostimulant dependence or poisoning (ICD-9 codes 304.40 and 969.7). Conversely, among the 20 presentations that involved a primary diagnosis of psychostimulant dependence or poisoning, only 13 mentioned methamphetamine, with ecstasy being mentioned in the remaining cases. Therefore, routinely collected emergency room data are likely to seriously under-represent the true number of methamphetamine-related presentations to emergency departments while these data will also reflect trends in ecstasy presentations.

Recording of drug-induced psychosis was more specific to presentations of psychosis where methamphetamine was implicated. Specifically, there were seven presentations where the primary diagnosis was drug-induced psychosis, and all seven of these presentations included mention of methamphetamine use. However, only one-quarter of methamphetamine-related presentations that involved psychotic behaviour received a diagnosis of drug induced psychosis. Of the 15 psychosis cases involving methamphetamine use, four received a diagnosis of drug-induced psychosis, one received a diagnosis of schizophrenia, and a further four received diagnoses of other/unspecified psychotic disorders. The remaining presentations were diagnosed according to other presenting problems (e.g., homicide/assault, injury due to legal intervention, sleep disturbances, neurotic disorder).

Contact that methamphetamine users have with frontline health services

The survey of methamphetamine users found that just under one third (31%) of methamphetamine users had received help from an emergency department in the past year, and 19% had received help from an ambulance officer during this time. Consistent with the review of emergency room records undertaken in the previous section, only around one-quarter of methamphetamine users who received help from emergency or ambulance services did so for a methamphetamine-related problem (23% and 25% respectively). The majority received help for other drug-related problems (e.g., injection-related problems, polydrug overdoses) or non-specific medical problems caused by accidents or illness (e.g., loss of consciousness, low blood pressure, pneumonia, injuries caused by assaults).

The majority of methamphetamine users had been under the influence of a drug or alcohol on their last contact with ambulance or emergency staff (70% and 60% respectively), and were not only likely to be intoxicated with methamphetamine (24% and 21% respectively), but also heroin,

methadone, benzodiazepines and alcohol. Approximately one in five methamphetamine users reported that they were 'coming-down' or withdrawing from drugs last time they had contact with ambulance or emergency services (22% and 17% respectively), most commonly from methamphetamine or alcohol.

One quarter of methamphetamine users reported feeling some degree of hostility last time they received help from an ambulance or an emergency department.⁴⁰ Hostility mostly involved shouting, being angry and argumentative with staff, being overly agitated, and did appear to involve some situations where the person was suffering from methamphetamine psychosis and had to be restrained by ambulance officers and/or police.

Methamphetamine psychosis: the experience of frontline health professionals

Ambulance and emergency workers described the behavioural sequelae associated with methamphetamine psychosis as consisting of extreme agitation, anger, and impulsive and irrational behaviour. Ambulance and emergency staff could recognise the signs of psychosis in these patients and could also recognise the physiological symptoms of methamphetamine intoxication, which helped them to distinguish methamphetamine psychosis from schizophrenia or other psychotic illnesses. Cases of methamphetamine psychosis seen by frontline health workers were similarly spectacular to those seen by police.

"They're all very, very different. A lot of them display varying levels of anxiety. Can't sit still, talking a million miles an hour, can't get their thoughts straight, certainly can't listen to you. Hate being put in the back of a small confined space like an ambulance. So yeah it's, the main thing is anxiety and hyperventilation. ...The first thing I ask them is "When was the last time you slept?" And as soon as they say 'Wow it's been like, you know, two or three or four days.' Then you know you can start talking on the same wavelength as them, and they suddenly understand where the problem is, and they seem to relate a lot better to the ambulance officer. ...the psychosis might present with a paranoia like everyone is out to get them, and naturally, and then you turn up in a uniform and you're just another member of the KGB, or the CIA or ASIO or someone. So yeah you need to sometimes drag those people down and hold them down and have them scheduled, or take them away against their will."

"...as I open the door this guy comes running towards me, with the, you know angry face, you know his neck veins popping out, he's clenching his fists, you know, red-faced, and he comes 'Oh it's you'. And I don't know this guy, you know I've never seen him before in my life. ...I tried to close the door, and he's just managed to ...open(s) the door, and starts grabbing at me, starts attacking me, you know. ...he went to my partner's side, when he was in the car and started punching the window. "... (he) tried to break the window to hit him in the head sort of thing. And he's punching it like, you know, as hard as he could. Sure he's injured his hands somehow and broken bones and things, but he just didn't feel it, just kept going. ...Some people tried to calm him down, but he was just too psychotic, he was just really angry, just had so much energy, so much strength you could tell. ...he wasn't a big, big guy, he was my size, but just the strength of the guy. And that's another thing that you think somebody's on something."

⁴⁰ Only half of the methamphetamine users surveyed (N = 152).

The major health and safety implication for ambulance and emergency officers when dealing with methamphetamine psychosis was being assaulted, both intentionally and unintentionally, as was the case for police. There was also significant risk of disease transmission, both in the context of treating injuries, and also more generally through bodily contact with the patient. Patients exhibiting severe hostility were often bleeding from injuries and may inadvertently hit or struggle against ambulance and emergency workers or assault them. Other hazards for the transmission of infectious disease included the patient spitting and vomiting, as well contact with blood and body fluids while treating the patient. Ambulance officers were at particularly high risk when confined in the ambulance with the patient. The confined space inside the ambulance could aggravate people suffering from methamphetamine psychosis, while objects within the ambulance also posed a risk of injury to the patient if they became uncontrollable.

"I had one young bloke who was twenty-five, and he just couldn't sit still and couldn't keep himself still. He was flailing his arms around, but not in what I would consider a violent or purposefully aggressive type fashion, so it didn't require police, I was very happy to go with him as is. But he was just unable to sit still, and he'd fling his arms out and he'd just hit whatever was in the road. Now obviously inside an ambulance there's metal walls and cabinets and he was continually smacking, so then I got to go and try and keep his arms down. So once you start grabbing someone, that presents a problem in itself, they start to feel like they're being restrained, or being attacked or being, you know accosted, and that could provoke an unfavourable response from them. And then if I am actually having to hang on to someone, I can't do anything else for them, so it just nullifies everything. So it becomes this one big mess. Plus if they go and vomit somewhere, there's an infection problem there, a contamination problem."

"...And so anyway we walked into the ambulance, there were two police officers in the back, like he was handcuffed behind his back. We laid him down on the stretcher...got him into the ambulance, the back doors were open, the side door were open, two coppers were in the back and I was standing outside, but at the back doors. And he was sort of just muttering, not doing anything in particular. ...and he just snapped, absolutely snapped. And he went off in the back of the ambulance, like I thought he was going to break all the windows. He was very tall and like he was bringing his legs up and over his head and then splitting them apart and swinging them back down and around. And he managed to hit the police officer that was near his feet, he hit him about three times in the process. And he was spitting and he had blood on him. The ambulance started rocking, and I went, and the police officer at the back turned around to me and went, in a very desperate voice, just went, 'Go and get help'. ...my partner and all the other coppers were running back towards me, and they're going "What happened, we can hear the ambulance rocking from in the house". Like it was that loud...the whole ambulance was shaking and that's what they could hear in the house. ...So we had I think three police officers in the back, he's, when his feet went over his head one time we caught them, and actually strapped them down to the bed that way, so he was transported with both his legs over his head. ...he had to be sedated on our stretcher before they could even move him over to a hospital bed to be properly restrained. It was just crazy, but yeah that sort of psychosis and that was, they decided that was a drug-induced psychosis. ...what he did to the ambulance was just, I thought he was just going to go through it, the strength that was in his body from that psychosis was just 'oh my God'. It scared the shit out of me."

In situations where patients were too aggressive to be safely transported in the ambulance, it was necessary for ambulance officers to call for police assistance. Either the police would help restrain the person within the ambulance (e.g., handcuff them to the bed) or they would restrain them and transport them in the back of the police vehicle. In the latter instance, the ambulance would follow

the police vehicle to provide medical support should this be required. Once the police vehicle had arrived at the hospital the patient would be escorted by security staff at the emergency department. Security staff would assist in restraining the patient, and would search patients with a metal detector prior to their admission to ensure that they were not carrying items that could be used to assault staff, other patients or to harm themselves.

"The police will stay with the patient, especially if they're aggressive, they'll stay until the patient's sedated and they'll help to restrain the patient. They won't kind of turn up at the door and then walk away. ...if ambulance patrol are bringing in a patient that's very aggressive, they'll phone us before they arrive to tell us that they're coming, so we'll all ready and security's ready. Anytime a very aggressive patient's being brought to the hospital by police or ambulance we'll be notified in advance to have security on standby. And we're very lucky, we have a very good security service here, well-trained."

"Get security straight away. Also when they go into the rooms, security do a security search on everybody that goes in there, because ...we had one gentleman, he had an ice psychosis and he'd taken a Stanley knife to his leg, because he thought he had scorpions in his leg and he'd cut his leg open down to the bone. That was before we had the metal detector and they got searched."

Medical staff were able to sedate the patient once they were restrained, which attenuated their aggressive behaviour. However, the patient's medical status needed to be assessed prior to sedation to ensure that their aggressive psychotic behaviour was not being caused by another medical problem (e.g., meningitis, head injury or diabetes). This could be difficult to achieve while the patient was restrained and uncooperative, and sometimes the patient had to be sedated before these routine medical procedures could be safely undertaken. One emergency department had purpose built rooms to house psychiatric patients. These rooms were sound proofed to remove any external noise stimulation and were also free of any objects that the person could use to hurt themselves. Emergency staff were also trained in how to manage psychiatric patients, such as speaking to them in a calm and steady voice and not provoking them.

"You just try and talk to them and try and calm them down as best you can, and not to, I mean the more aggressive staff get, the more aggressive they're going to get, it just snowballs. Sometimes it works, sometimes it doesn't. And that's not just with, you know, overdoses, it's anybody, and you just try and control it that way. No point yelling at them, because they're only going to yell back. That's not going to work. So, and then I stay out of arms reach the best I can."

"It is often very difficult because the thing is you have to, there's a real need to exclude that for example someone hasn't got meningitis. ...somebody could be a diabetic and have a very low blood sugar and that might be why they're trying to fight someone, or they might have a low oxygen level so (that's) why they're aggressive. ...and then you'd always be concerned, especially when there was any sign or history of trauma, you'd always be concerned about intra-cranial bleeding, so brain damage, but you do have to sometimes physically restrain the people until you can sedate them to then facilitate all of the investigations."

Patients that were restrained and sedated could still try to escape from the restraints (one patient tried to chew through the restraints) and may still manage to kick, bite or punch if not restrained or not restrained properly. Patients who woke after being sedated may still be in a state of psychosis, and reinstate aggressive behaviour. This possibility meant that security staff needed to remain with the patient for the duration of their stay to circumvent any problems from recurring violence.

"I think they're, the biggest thing is that they're unpredictable in their behaviour, they often go in phases, in and out, and once they're sedated they can still wake up psychotic, so there's always that, they're psychotic aggressive, or even more aggressive, so there's always that risk of not being prepared for when they come out of some sort of sedating process..."

"He had to be sedated chemically, and he had to be physically restrained, to stop him hurting himself or other people. And he wasn't restrained properly on the legs, and his mood started to elevate again, and he had become threatening, and threatened staff, so I went to grab his restraints that he was trying to tie himself out of, and he managed to kick me... And we had to sedate him again and properly tie him down. He was also physically abusive, (and) fighting with security staff, and managed to whip off his CB radio off his belt and flung it across the room."

Managing patients suffering from methamphetamine psychosis, particularly those exhibiting violent behaviour, was a very resource-intensive task. These patients required devoted nursing staff and security staff in addition to the attention of other medical officers and psychiatric nurses. Sometimes a clinical pharmacologist was also needed to assist with sedation. It was the intense nature of methamphetamine psychosis presentations, rather than their frequency, that posed a significant challenge to frontline health services.

"Yeah a lot of services, using up staff resources. And then obviously personnel and other medical personnel, nursing staff. We usually have to have a one-on-one nurse looking after this person. Twenty-four seven while they're at risk, while they're (under the Mental Health Act, if they're scheduled, we have to by law have a nurse supervise them twenty-four seven."

"They're incredibly, incredibly manpower intensive cases, they just tie up a doctor and a nurse and security guys for hours and hours. ...when one comes through ...you know what's going on within a few minutes usually, you see how the next two hours of your life are going to be, you know what's going to happen, and your heart sinks. This is going to just be the usual, sort of long, difficult, resource-intensive thing. You're not dealing with a reason, you're not dealing with a sickness where you can just say okay you've got a broken leg, I'll put it in a plaster."

Ambulance and emergency workers may not have sufficient contact with patients to verify whether the psychotic behaviour was drug-induced psychosis or resulting from precipitation of a pre-existing psychotic disorder. Therefore it is difficult to verify to what extent reports of aggressive psychotic behaviour reflected methamphetamine psychosis per se, as distinct from other psychiatric conditions or intoxication with other drugs or alcohol. This fact, coupled with lack of reliable data on methamphetamine-presentations to emergency and ambulance services, presents a barrier in assessing and monitoring the true impact of methamphetamine psychosis on frontline services.

Conclusion

The majority of methamphetamine users who received help from emergency and ambulance services were not receiving treatment for methamphetamine use per se, but for a range of general health problems that were related to their drug use generally or poor state of health. A proportion of methamphetamine users (approximately one in seven) were intoxicated with methamphetamine at the time they had contact with frontline health service staff and one-quarter were feeling some

level of hostility (e.g., angry or irritable). The majority of interactions that methamphetamine users had with frontline health services did not involve visibly hostile behaviour. However, when methamphetamine users were experiencing psychosis with concurrent aggression, their behaviour posed serious risks to the health workers treating them.

The main occupational health and safety risks to both ambulance and emergency workers were (i) the risk of injury from the patient assaulting them or inadvertently hitting them, and (ii) an increased risk of disease transmission because of the uncontrollable behaviour of the patient coupled with the possibility that the patient was likely to be injured and bleeding. Overall, health workers were well equipped to recognise the symptoms of methamphetamine psychosis and protocols that had been put in place to manage these extremely volatile situations appeared to substantially reduce the risks to staff. In particular, the use of sedation appeared to dramatically improve the management of uncontrollable situations. In the development of occupational health and safety protocols for frontline workers, particular attention needs to be paid to the risk associated with restraining psychotic patients prior to their being sedated, risk of infectious disease transmission when using intravenous sedation techniques, and management of patients while they are being transported within an ambulance. These are not the only high-risk situations associated with the management of methamphetamine psychosis, but those where it was difficult to avoid the risks to frontline health workers.

Methamphetamine psychosis was an extremely resource-intensive and stressful problem to manage. Although the actual number of methamphetamine psychosis presentations may be relatively low, when they do occur they take up a disproportionate use of health resources. Within an emergency department these patients engage several medical staff and often require constant one-on-one nursing and security supervision for the duration of their stay. These presentations also engage the resources of police who may be called to assist ambulance workers in restraining and transporting the person to hospital, and who will often remain with the ambulance or emergency workers to assist with restraining the patient.

Any further increase in the incidence of methamphetamine psychosis will have a disproportionate impact on frontline services. In order to understand the impact of methamphetamine psychosis and direct appropriate resources toward this problem, it is essential that the monitoring of methamphetamine psychosis presentations to frontline services be improved. In the interim, hospital data on stimulant related admissions are probably the most accurate way of monitoring trends in methamphetamine psychosis presentations within the health sector and would provide a proxy for assessing the impact of methamphetamine psychosis on ambulance and emergency services.

Conclusion

Overview of findings

The Sydney methamphetamine market is supplied by a confluence of imported and domestically produced methamphetamine. These two important supply channels are mirrored in the availability of domestic and imported ice within different geographic regions of Sydney. The more pure forms of ice and base now make up over two-thirds of the market for methamphetamine, while an additional unknown amount of methamphetamine ends up on the ecstasy market being sold as 'pills'.

The shifts in the methamphetamine market over recent years have drastic social and health implications. The diversification of methamphetamine forms introduces a far broader segment of the population into the methamphetamine market. The more pure forms of methamphetamine, particularly ice, are likely to lead to an increase in dependent methamphetamine use. The trend toward smoking ice is a particular concern, as it has the potential to introduce a younger, less drug involved population of people into a very risky pattern of drug use. The likely net effect of these changes will be to increase the breadth of population who use methamphetamine, and also the number of dependent methamphetamine users who are likely to place a burden on health services and the criminal justice system.

The current research has shown that methamphetamine is far from a benign drug, with a substantial proportion of methamphetamine users experiencing dependence and other mental and physical health problems related to their methamphetamine use. A proportion of methamphetamine users had also become criminally involved to support their drug use, and, in general, methamphetamine users had very high levels of contact with the criminal justice system.

The most conspicuous problem associated with heavy methamphetamine use is the risk of experiencing psychosis. Psychosis is a very serious and disabling mental health condition, and although episodes of psychosis among methamphetamine users can be brief, the prevalence of psychosis among methamphetamine users was over eleven times higher than that seen in the general population. The behavioural sequelae associated with methamphetamine psychosis often includes hostile behaviour, which presents a serious challenge for frontline workers who are required to apprehend and/or deliver these people to health services. Managing methamphetamine psychosis was found to be a very resource-intensive task that was accompanied by serious occupational health and safety risks.

Dependence on methamphetamine is the key predictor of the major harms associated with the drug's use, including psychosis, poor mental and physical well-being, and HIV risk behaviour. As mentioned above, dependence on methamphetamine was related to using the more pure forms of methamphetamine, and also injecting or smoking the drug. Recent population size estimates suggest that the scale of dependent methamphetamine use in Sydney and Australia is in excess of that associated with regular heroin use, and in the same league as dependent heroin use during the peak of the heroin problem in the late 1990s (McKetin et al., 2005). Methamphetamine dependence is associated with different harms to heroin use, but nonetheless has very serious consequences both for the individual and society.

The scale of dependent methamphetamine use not only has important implications in its own right, but also in terms of its potential to translate into other drug use problems. Dependent drug use of any form is amenable to polydrug use, and, once established, a population of dependent drug users is liable to absorb drugs that become readily available. This phenomenon has been

previously observed in Australia during the mid 1990s, when an emerging amphetamine epidemic rapidly shifted to a heroin use problem as many young amphetamine injectors made a transition to injecting heroin use when heroin became cheap and readily available (Darke et al., 1999).

Improving treatment coverage for methamphetamine dependence is essential to reduce the problems associated with the use of this drug. Currently there are few, if any, evidenced-based treatment protocols for methamphetamine use (Baker et al., 2004) and treatment coverage for this population is very low (Kelly et al., in preparation). This highlights the need to both implement existing protocols for methamphetamine treatment more broadly and undertake further development and evaluation of treatment approaches for psychostimulant use, particularly among people who have mental health problems (e.g., psychosis) that may be exacerbated by methamphetamine use.

There is an urgent need to raise public awareness of the problems associated with methamphetamine use, while efforts also need to be directed toward preventing the up-take of high-risk patterns of methamphetamine use, notably smoking and injecting the drug. In particular, efforts need to be urgently directed toward stemming the up-take of ice smoking among young non-injecting drug users, and increasing public awareness of the potential harms associated with this pattern of drug use.

Any further increase in problematic methamphetamine use in Australia is likely to have a disproportionate impact on frontline health and law enforcement services. Appropriate resources need to be directed toward training frontline workers in the identification of methamphetamine psychosis and also toward the development of safety protocols to manage people suffering from methamphetamine psychosis where such protocols do not currently exist.

Limitations

The current report presents a view of the methamphetamine market based on regular methamphetamine users and dealers, and key experts, recruited from across Sydney. Most routine data sources used in the study also reflect methamphetamine-related events in Sydney. For these reasons, the findings from the study do not necessarily reflect the broader methamphetamine situation in Australia. Also, the survey data used in the current study was collected in 2003/04, and all routine data sources used predate 2004. The reader is advised to consult reports from the Illicit Drug Reporting System and the Party Drugs Initiative to obtain up-to-date information on the methamphetamine situation, and information on trends in other Australian cities. These reports can be obtained through the National Drug and Alcohol Research Centre website: <http://ndarc.med.unsw.edu.au/ndarc.nsf>.

It is also important to understand that the nature of drug markets is likely to vary considerably depending on their geographic locality, local socio-demographic and political factors, and the existence of local established criminal networks. Therefore, the drug market findings from the current study should not be extrapolated to other drug markets within Australia, or to the market for other types of drugs within Sydney. On the other hand, findings about the harms associated with methamphetamine use, including dependence on methamphetamine, are more likely to generalise to other geographic settings, because these phenomenon are observed on an individual level and are less affected by social and cultural factors than drug market structures.

The current study examines illegal behaviour, including drug use, drug dealing and other forms of crime. One of the methodological challenges encountered when researching illegal behaviour is that people who engage in these behaviours do not always willingly report on their activities. For this reason, it is not possible to identify all people who engage in these illicit activities

and randomly select a representative sample of illicit drug users for the purposes of research. Unfortunately, the type of people who engage in heavy drug use and crime also tend to be poorly-represented in large-scale representative surveys of the general population, because: (a) these behaviours are not prevalent within general society; (b) people may not admit to undertaking illegal activities; and (c) these people are under-sampled because of the lifestyle factors associated with drug use and crime (e.g., may be in prison or drug treatment).

For these reasons, researchers rely heavily on surveys of drug users recruited through the community to learn about drug using behaviours and related activities. The sampling biases that occur in non-random surveys are minimised by having a large sample, recruiting drug users through a variety of methods, and recruiting participants from across the targeted geographic area. This ensures that the sample reflects a reasonably broad segment of the target population, and that survey findings are unlikely to result from idiosyncratic sampling characteristics.

Because much of the current research was based on a community sample of drug users, it is not possible to conclusively establish the generality of the findings to all methamphetamine users or dealers, even within the Sydney metropolitan region. The current study has undertaken all measures possible to minimise sampling bias, and ensure robust survey findings, including obtaining a large sample of methamphetamine users from across Sydney. However, the survey of methamphetamine users in the current study was still likely to over-represent English-speaking Australians, those who were unemployed, and injecting drug users, because of the methods used to recruit participants.

Similarly, trends in methamphetamine supply documented in this report are based on the expert opinion of law enforcement personnel and interviews with methamphetamine dealers. These views are necessarily biased by the perspectives of law enforcement agencies, while reports from drug dealers necessarily reflect their own personal experience with the drug market, and may not reflect the experience of all drug dealers. The various data sources in the current report are also subject to limitations and biases, as outlined in the *Methodology* chapter of this report.

Implications for responding to the methamphetamine problem

Following is a list of implications from the current research for addressing the methamphetamine problem. This list includes suggested responses from health and law enforcement services, ways to improve monitoring the methamphetamine market in the future, and potential areas for further research. These suggestions focus on the current research and therefore necessarily exclude some of the research and responses needed to address the methamphetamine problem.

Demand reduction strategies

Dependence on methamphetamine is the key predictor of harms related to the use of the drug, including psychosis. Demand reduction strategies therefore need to address reducing methamphetamine use among existing dependent users and also preventing the up-take of methamphetamine use patterns associated with high levels of dependence – namely injecting methamphetamine and smoking ice.

1. Improve treatment coverage for methamphetamine dependence

Treatment approaches that are currently available for methamphetamine use (Baker et al., 2004) need to be broadly implemented and made far more accessible to methamphetamine users.

2. Treatment of methamphetamine use among mental health patients
Treatment and prevention approaches need to be developed for methamphetamine dependence among people with comorbid mental health problems, particularly psychotic disorders. Both drug and alcohol services and mental health services need to be equipped to educate methamphetamine users about the increased risk of psychosis associated with methamphetamine use, and the impact this drug has on their other mental health problems.
3. Education campaigns targeting ecstasy users to reduce the up-take of ice smoking
Education campaigns need to be urgently initiated to inform young non-injecting drug users about the harms related to ice use, particularly the increased risk of dependence associated with using this form of the drug, and the associated increased risk of psychosis.
4. Preventing the transition to injecting methamphetamine use
Methamphetamine injection is particularly common in Australia and is associated with high levels of dependence and a range of related problems. Interventions need to be developed and implemented that reduce the propensity for young non-injecting drug users to make a transition to injecting methamphetamine use.
5. Preventing the transmission of blood-borne viruses among methamphetamine injectors
Almost half of methamphetamine injectors obtained their clean needles from places other than Needle and Syringe Programs (e.g., pharmacies, vending machines or friends). Therefore information aimed at preventing the transmission of blood-borne viruses needs to be disseminated through a range of avenues besides Needle and Syringe Programs, including pharmacies, vending machines and through peer education.
6. Referring methamphetamine users to treatment and other health services
Mechanisms need to be developed to disseminate information about treatment and other health services that are available to methamphetamine users. Currently only a small proportion of methamphetamine users who are experiencing problems related to their drug use receive methamphetamine treatment or help for methamphetamine-related problems such as psychosis. Of particular interest, the current study found that methamphetamine users have higher levels of contact with police than they do with most health services. Police could play a crucial role in providing users with information on methamphetamine treatment and other relevant health services.

Supply reduction strategies

Supply reduction efforts should focus on reducing the supply of more pure forms of methamphetamine, as these more pure forms of the drug are responsible for the greatest harm associated with methamphetamine use. Specific efforts need to be directed at reducing the dispersion of imported ice into established drug markets within Australia, such as the ecstasy market. Any efforts to control methamphetamine use need to be balanced with sustained efforts to limit the supply of heroin to prevent a transition to heroin use among dependent methamphetamine users.

1. Reducing the supply of imported ice
Specific attention should be directed toward reducing the supply of imported ice, because reducing ice importation will not only decrease the availability of ice but will also reduce competition in the domestic market, and thereby reduce the likelihood of further increases in the purity of domestically produced methamphetamine.
2. Stemming the dispersion of ice into other established drug markets
Supply reduction efforts should aim to prevent imported ice from entering established domestic markets for methamphetamine and other drugs. Attention at a local level should particularly focus on the supply of ice through ecstasy dealers in inner and

northern regions of Sydney in an effort to reduce ice smoking among young ecstasy users. Conversely, efforts need to be directed at limiting the distribution of heroin into the market for domestic methamphetamine, to prevent a transition to heroin use among dependent methamphetamine users.

3. Monitoring the domestic production of ice
Mechanisms need to be developed to monitor the source of crystalline methamphetamine seized in Australia (e.g., chemical profiling). Regional cooperation would also facilitate the identification of the origin of methamphetamine seized in Australia.
4. Improved monitoring of precursors used in methamphetamine manufacture
Indicators need to be developed and/or improved to monitor the impact of changes in precursor legislation and identify shifts in the sourcing of precursors used in methamphetamine manufacture. Attention should be given to monitoring both the legitimate consumption/usage of precursors, as well as the illicit sourcing of precursors for use in methamphetamine production.
5. Examination of the impact of illegal precursor importation on the domestic methamphetamine market
Further investigation is needed into the importation of precursors, including where these precursors are destined, their likely impact on the domestic supply of methamphetamine, and also why there is only limited evidence of their use in domestic methamphetamine production despite their being detected in large quantities at the Australian border.

Capacity of frontline workers to respond to methamphetamine psychosis

One of the most serious harms related to methamphetamine use is the increased risk of psychosis, and the impact that this has on frontline health and law enforcement services. Clearly, frontline services need to have the capacity to respond to presentations of methamphetamine psychosis and they need to be provided with adequate resources to develop this capacity.

1. Improving the recognition of methamphetamine psychosis
Ambulance and police officers (particularly police on general duties) need to be able to recognise the symptoms of methamphetamine psychosis. Emergency department staff would benefit from specific training on differentiating methamphetamine psychosis from other psychotic disorders. Supportive mechanisms also need to be put in place within emergency departments to assist making a diagnosis of methamphetamine psychosis, including ways of undertaking on-the-spot toxicology to determine drug intoxication and record systems that allow rapid identification of patients with a history of chronic psychotic disorders.
2. Training of frontline workers in the management of people suffering from methamphetamine psychosis
Frontline health and law enforcement officers need to be trained in how to reduce the risk of confrontation with people experiencing methamphetamine psychosis, particularly through the use of de-escalation techniques. This is particularly important for police officers, because they were more likely to be perceived as threatening to people suffering from methamphetamine psychosis and provoke an aggressive response. Other policing strategies need to be considered that would reduce the risk of confrontation with people experiencing methamphetamine psychosis (e.g., policies and procedures for apprehending intoxicated people).
3. Implementation of occupational health and safety guidelines for methamphetamine psychosis
In areas where methamphetamine psychosis is prevalent, strategies need to be developed to minimise the risk of injury and blood-borne virus transmission during the apprehension, transport and treatment of people suffering from methamphetamine

psychosis. These protocols need to incorporate sedation procedures and minimise the risk of blood-borne virus transmission during sedation (e.g., using non-intravenous administration of sedatives). Particular attention also needs to be directed toward minimising the risk of injury and disease transmission prior to sedation, especially if the person suffering from psychosis needs to be transported in an un-sedated state.

4. Resourcing of services in high risk areas for methamphetamine psychosis.
Adequate resources need to be directed toward frontline services to ensure that they have (a) the human resource capacity to manage people suffering from methamphetamine psychosis, (b) adequate facilities to safely accommodate people suffering from methamphetamine psychosis for a sufficiently long time to ensure that these people are no longer a risk to themselves or the public when they are released, and (c) that the safety and routine operation of services is not adversely affected by the time and resources consumed by methamphetamine psychosis presentations.

Implications for monitoring the methamphetamine market

Australia has comprehensive monitoring of illicit drug markets through regular surveys of sentinel drug using populations (i.e., IDRS, PDI and DUMA). These systems provide data on the price, purity, and availability of methamphetamine as well as emerging trends in the drug's use. Data provided by these systems are broadly consistent with the findings from the current more detailed investigation of the Sydney methamphetamine market. It is unlikely that expanding an IDRS-type system to include a sample of primary methamphetamine users would yield substantially more information about the methamphetamine market than is already gained through existing monitoring systems. This is because methamphetamine use is not concentrated in any particular geographic region or within any particular sentinel population, and also because the market varies considerably across different geographic regions.

Monitoring the Australian methamphetamine market would better be served by a more integrated approach to drug monitoring that incorporated information on core indicators of drug use (e.g., prevalence, treatment demand, morbidity) together with local expertise on the drug situation. Such a system could also incorporate detailed investigation of specific methamphetamine-related issues through research as they arose, rather than undertaking comparable annual surveys of methamphetamine users. This would provide the type of geographically representative information that would be required to respond to the methamphetamine problem, and also the flexibility to direct active research at specific issues that deserved detailed investigation. This type of approach to monitoring the drug problem has been adopted in Europe and the United States of America, and need not be restricted to monitoring methamphetamine use. Such an approach would also complement the existing early warning monitoring systems such as the IDRS, the PDI and DUMA.

There are already several indicators of methamphetamine use that could be used to monitor the methamphetamine situation at a national level, including:

1. the prevalence of methamphetamine use through the triennial National Drug Strategy Household Survey and national school surveys;
2. treatment demand for methamphetamine use through the National Minimum Data Set on Alcohol and Other Drug Treatment Services;
3. the prevalence of methamphetamine injection among injecting drug users through the Australian Needle and Syringe Program Survey;
4. drug-related hospital presentations for methamphetamine psychosis or other stimulant-related disorders, through the National Hospital Morbidity Database; and
5. drug market trends monitored by the IDRS and the PDI.

It would also be desirable to develop additional indicators to monitor the impact of methamphetamine use on frontline workers, and to improve the utility of supply-side data to monitor shifts in the retail methamphetamine market. Several suggestions for improving monitoring of the methamphetamine market are outlined below.

1. Monitoring the various forms of methamphetamine
Monitoring the specific methamphetamine forms (i.e., ice, base and powder) should continue, but not replace monitoring methamphetamine use as a generic drug. Shifts in terminology are likely to continue and will impede our ability to monitor the market if methamphetamine is not monitored as a drug category that incorporates all of the different names under which the drug is sold.
2. Improved monitoring of methamphetamine psychosis presentations to frontline services
Monitoring of psychosis presentations to emergency services needs to be improved. Currently neither ambulance nor emergency data collection systems adequately capture methamphetamine psychosis presentations.
3. Using forensic data to monitor the drug market
Analysis of forensic seizure data (see *Methamphetamine: physical forms, purity and terminology*) was invaluable in understanding the nature of the methamphetamine market, and this type of data collection needs to be expanded to ensure the availability of comprehensive data on drug purity, form and composition at a national level. Monitoring residual constituents would also be helpful to understand whether there is evidence of adulterating methamphetamine with crystalline substances (e.g., alum) as has been found in other countries. Efforts also need to be directed at how to use this type of data to monitor drug markets.
4. Monitoring the retail drug market
The current research found that it was feasible to ask drug users about the types of drugs they could get from their dealer, other aspects of their drug purchasing behaviour, and their involvement in certain supply-side activities (e.g., precursor acquisition). These types of questions could provide a valuable source of information on the retail level drug market if included in routine drug monitoring systems, such as the Illicit Drug Reporting System.

Other research areas for further investigation

There are several issues that have arisen from the current research that would benefit from further investigation. These research suggestions are not intended to be either comprehensive or exclusive. It should also be noted that research is already underway in some of these suggested areas.

1. The development and evaluation of methamphetamine treatment approaches
Development of treatment approaches that are accessible to methamphetamine users is needed, alongside their evaluation within a community setting. Particular attention should be devoted to the development and evaluation of methamphetamine treatment approaches among people with comorbid mental health problems, such as psychosis and depression.
2. Mental health among methamphetamine users
Dependent methamphetamine users had particularly poor mental health functioning, and notably high self-reported rates of depression. This finding is consistent with previous research, and indicates a need to examine the prevalence of comorbid mental health disorders among dependent methamphetamine users, and how these disorders impact on continued drug use and treatment outcomes.

3. Physical health among methamphetamine users
Methamphetamine users reported a number of potentially serious physical health complaints related to their drug use, including symptoms of cardiac problems. Further research is needed to understand the cause and prevalence of these physical health problems and their likely long term implications.
4. Psychosis among methamphetamine users
Further research is necessary to better understand the risk factors for methamphetamine psychosis (e.g., alcohol and cannabis use) and its long term prognosis. There is a particular need to improve differentiation of methamphetamine-induced psychotic symptoms from schizophrenia, especially among younger drug users who are in the prodromal phase of schizophrenia. This has important clinical implications for the treatment of drug users presenting with psychotic symptoms.
5. Methamphetamine use and aggression
Further research is needed to understand whether aggression among methamphetamine users is specific to episodes of psychosis, and the contribution of alcohol use to violence among methamphetamine users. These factors will have important implications for how to manage and reduce aggressive behaviour among methamphetamine users.
6. Improving burden of disease estimates for methamphetamine use
Methamphetamine use is associated with serious health consequences that are not currently well captured by burden of disease estimates. Improved measures of methamphetamine prevalence (particularly heavy or dependent use) and rates of morbidity associated with methamphetamine use are needed to improve burden of disease estimates for methamphetamine use.
7. Development of cost estimates for methamphetamine psychosis presentations at emergency services
We need to improve our estimates of the specific resources required to manage methamphetamine psychosis at emergency departments and other frontline services, including the cost associated with these presentations. This is necessary to ensure that appropriate resources can be directed toward services that have a high number of methamphetamine psychosis presentations.
8. Sexual risk behaviour among methamphetamine users
The current study identified that dependent methamphetamine users were more likely to engage in unprotected sex than their non-dependent peers, but that unprotected sex was not related to intoxication with methamphetamine. Further research is needed to understand the relationship between methamphetamine dependence and sexual risk-taking behaviour.

The current research also found that it was feasible to survey drug users about drug supply. The research has also developed a methodological framework for investigating the retail level drug market through survey research. Surveying drug users provided a convenient way of accessing drug dealers and learning about their drug dealing behaviour. This type of information could improve our understanding of drug supply and also how law enforcement strategies impact on drug dealing behaviour. There is considerable scope for researching the retail level of the drug market through surveys of drug users and dealers, with relatively little academic research having been previously conducted in this area. Academic research has the potential to provide a broad perspective on the nature and structure of the illicit drug market and how it operates. Further consideration needs to be given to which aspects of supply should be monitored through surveys of drug users, and some of the ethical and safety issues related to asking drug users to provide information on drug supply.

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