Methamphetamines

POSITION PAPER

Introduction

Methamphetamine use has become an increasing concern in Australia over the past few years. There has been rising methamphetamine-related problems impacting on both health and law enforcement services. Like all drug problems, responding to the methamphetamine problem requires a balanced and coordinated approach that encompasses supply reduction, prevention, treatment, and reducing harms associated with the drug. To this end, many of the necessary responses to address methamphetamine use are already in place in the form of existing government and non-government treatment agencies, HIV prevention initiatives, and current law enforcement efforts.

However, methamphetamine use is also accompanied by many effects and consequences that differ from other drugs, including methamphetamine-induced psychosis. As a result, some existing responses need to be adapted whilst some further specific responses to methamphetamines are also warranted.

Recent initiatives to improve responses to methamphetamine-specific issues include: (a) guidelines on the frontline management of intoxicated individuals; (b) guidelines on the management of methamphetamine dependence, including psychosocial treatment approaches; and (c) coordinated national initiatives to reduce the availability of precursor chemicals used in methamphetamine manufacture. Nevertheless, further work is still needed to improve the capacity of sectors responding to methamphetamine-specific issues, such as ensuring the implementation of existing guidelines and improving the access to quality care among people who are affected by this drug.

In summary, tackling the methamphetamine issue will require continued support of current initiatives, together with further efforts to improve the capacity of the health and law enforcement sectors to respond to methamphetamine-specific issues.

Background

The methamphetamine situation in Australia forms part of a broader trend toward increasing supply, use and problems related to the drug across Southeast and East Asia. Methamphetamine is an addictive synthetic stimulant that can be swallowed, snorted, injected or smoked (also known as ‘chasing’). In Australia, methamphetamine is sold under a variety of street names, including ‘speed’, ‘base’, ‘pure’, ‘meth’, ‘paste’, ‘amphetamines’, ‘crystal meth’ and ‘ice’ (1) with crystal methamphetamine or ‘ice’ being the strongest form available.

Almost one-in-ten Australians (9.1%) have tried methamphetamine at least once, and around half-a-million Australians have used it in the past year (2). Most current users take the drug infrequently, although it has been estimated that there are approximately 73,000 dependent methamphetamine users in Australia (3) — almost double the estimated 45,000 regular heroin users in the country (4). These dependent users typically inject or smoke the drug.

The major public health consequences related to methamphetamine use occur disproportionately among people who are dependent on the drug. Harms associated with heavy methamphetamine use include psychotic symptoms (paranoia and hallucinations), crime (drug dealing, property crime), aggression or violent behaviour (particularly during drug-induced psychosis), deterioration in social functioning, and a range of physical health problems (stroke, cardiovascular pathology, dental problems).

Fatalities from methamphetamine use are not common, and less likely than for heroin use, for example (5). However, methamphetamine does increase the risk of stroke and cardiac failure (6,7), and a notable number of methamphetamine-related deaths have been documented in parts of the US where the drug’s use is common. In Australia there are currently around 50 deaths a year that are attributed directly to the use of psychostimulant drugs, including methamphetamine (8).
Methamphetamine use is a long-standing trend in Australia, but there has been a significant up-surge in problems related to its use since the late 1990s. This increase in methamphetamine-related problems is likely to be due to the culmination of several factors, including a growing number of long-term users of the drug, a shift from amphetamine to methamphetamine manufacture in the mid-1990s, and recent increases in the availability of high purity imported methamphetamine (i.e., ‘crystal meth’ or ‘ice’) (9). The rise in crystalline methamphetamine is a particular concern, with a rapid increase in the popularity of smoking this drug among non-injecting recreational drug users, and elevated levels of dependence among this group (10).

Responding to the methamphetamine situation

It is difficult to anticipate the impact of methamphetamine use on Australia, although key concerns include elevated levels of psychosis, increases in homicide and other serious violent crimes, and the risk of HIV transmission. These high profile concerns should not detract from the broader, but less clearly defined, impact that methamphetamine use is likely to have on individual health and well-being, social and occupational functioning, and on the nature of service provision within the drug and alcohol and law enforcement sectors.

Australia has a strong evidence base for responding to the methamphetamine situation, and a number of interventions have already been undertaken to improve capacity to manage methamphetamine-related problems. These include a review of the evidence on the management of psychostimulant dependence, clinical guidelines on treating methamphetamine dependence, and guidelines on the identification and management of intoxication for frontline health and law enforcement personnel. There has also been considerable effort devoted to reducing the availability of precursor chemicals used in the manufacture of methamphetamine through coordinated national and regional initiatives.

In addition, efforts to respond to the methamphetamine problem need to acknowledge and continue to support measures that are already in place to reduce methamphetamine-related harm, including existing drug-treatment responses through both the government and non-government sectors, drug prevention programs, initiatives to reduce the spread of HIV and other blood borne viruses, and law enforcement efforts to reduce the supply of the drug.

Further steps that need to be taken to reduce the impending problems from methamphetamine use are prioritised below.

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**IMPROVING TREATMENT COVERAGE FOR METHAMPHETAMINE DEPENDENCE SHOULD BE A FIRST PRIORITY. REDUCING THE NUMBER OF PEOPLE WHO ARE DEPENDENT ON THE DRUG WILL REDUCE THE INCIDENCE OF PSYCHOSIS, CRIME, AND VIOLENT BEHAVIOUR ASSOCIATED WITH METHAMPHETAMINE USE.**

**Treatment for methamphetamine dependence**

Improving treatment coverage for methamphetamine dependence should be a first priority. Reducing the number of people who are dependent on the drug will reduce the incidence of psychosis, crime, and violent behaviour associated with methamphetamine use. We have effective treatments for methamphetamine dependence, which have been developed and evaluated in Australia, and these should be implemented broadly and in a way that is readily accessible to methamphetamine users. New treatments also need to be developed and evaluated, but this should not occur at the expense of implementing the treatments which are already known to be effective.

**Preventing harms from methamphetamine use**

A second priority is preventing the up-take of methamphetamine use, particularly patterns of use that are likely to lead to dependence and related health problems. One of the real opportunities in the area of prevention is to halt the up-take of smoking crystalline methamphetamine in Australia, which is a relatively new trend. This pattern of drug use carries a far greater risk of dependence than other non-injecting routes of administration. Further preventative measures should target those groups most at risk of developing dependence or other adverse consequence? (e.g., psychosis) from their drug use. Continued efforts are also needed to reduce the risk of blood-borne virus transmission among this group (e.g., access to sterile injecting equipment and information on hepatitis C transmission), while HIV prevention efforts should be expanded to reduce the risk of sexual transmission.
Reducing the availability of high purity methamphetamine

Undoubtedly, the high prevalence of methamphetamine use in Australia, and the escalation of crystalline methamphetamine use, has been influenced by the widespread availability and low cost of the drug. Efforts to limit methamphetamine supply need to increasingly focus on the importation of the drug and its precursor chemicals. Supply reduction efforts also need to preempt and minimise undesirable consequential shifts in the drug market (e.g., transitions to heroin use).

Improving the capacity of frontline workers to respond

Finally, there is a real need to put into practice existing guidelines on the management of methamphetamine dependence and related problems (e.g., toxicity and psychosis), and ensure that frontline health and law enforcement workers have the capacity to safely and effectively manage methamphetamine-related presentations. Further guidelines need to be developed on the treatment of methamphetamine psychosis, and on the prescribing of psychiatric medication to methamphetamine users who are experiencing withdrawal symptoms and/or co-morbid mental health problems.

Patterns of use

Methamphetamine use patterns typically consist of consuming a half to one gram of low purity powder methamphetamine (‘speed’), or a ‘point’ (approximately 0.1 grams) of the so-called ‘base’ methamphetamine or crystalline methamphetamine, or ‘ice’. Depending on the form of drug being used it can be swallowed, injected, snorted, inserted or smoked. Methamphetamine is usually taken in a home environment together with close friends or acquaintances, and use patterns vary from infrequent snorting or swallowing of the drug through to daily injection of methamphetamine.

Smoking methamphetamine has emerged as a trend in Australia since the increased availability of crystalline methamphetamine in 1999. Methamphetamine vaporizes when heated, and when inhaled, is rapidly absorbed into the pulmonary blood flow, giving an almost instant and intense drug effect (11). Crystalline methamphetamine is typically smoked using a glass pipe, but it can be smoked using a ‘bong’ (water pipe used for smoking cannabis) or using a non-flammable surface. Methamphetamine is often smoked in social situations, where the methamphetamine pipe is passed among friends (1).

Methamphetamine is a drug that is taken by a wide-variety of people and is associated with a range of use patterns. Of the 1.5 million Australians who have tried methamphetamine, the majority has snorted or swallowed the drug on only a small number of occasions (2), and is unlikely to have experienced any significant problems from their methamphetamine use. Nonetheless, methamphetamine is a highly addictive substance, and a proportion of people who try the drug move on to take methamphetamine regularly, often making the transition to the more efficient routes of smoking or injecting the drug. Most people who use methamphetamine on a regular basis also use a variety of other drugs, ranging from cannabis and other synthetics stimulants through to heroin (12).
There are 3 major identifiable groups of regular methamphetamine users:

- A core group of regular methamphetamine users whom regard methamphetamine as their drug of choice. They typically inject the drug several days per week, using between one and three ‘points’ of ‘base’ or crystalline methamphetamine per day. They are typically introduced to snorting or swallowing methamphetamine use by a friend when they are in their teens, and have made the progression to regular injection over a number of years. A large proportion smoke cannabis daily, while alcohol is a concern for a smaller proportion. They also use a variety of other drugs on a less frequent basis (12).

- An interesting recent phenomenon is the uptake of methamphetamine injection among heroin injectors in the wake of the 2001 Australian heroin shortage. This trend has occurred among both active heroin users and a proportion of people who are enrolled in opioid maintenance therapy. Transitions between methamphetamine and heroin injection are bi-directional and well-documented in Australia (13). Such transitions highlight the need to consider polydrug use when attempting to reduce patterns of dependent drug use.

- A third and somewhat new group of methamphetamine users are those people who smoke the drug. In Australia, crystalline methamphetamine users tend to be younger, less experienced, drug users in comparison with people who inject methamphetamine; they have lower levels of heavy polydrug use, and little history of drug treatment or drug-related arrests (12). Despite their younger age, and having used the drug for fewer years, the frequency of methamphetamine use and level of dependence among those who smoke the drug rival that seen among injectors. Conversely, the likelihood of methamphetamine dependence among this group is over double that seen among other non-injecting methamphetamine users (10).

Psychosis

Methamphetamine use can induce a brief toxic psychosis characterised by persecutory delusions and hallucinations. Other manifestations of psychosis can include stereotyped repetitive behaviour (‘punding’), disorganised speech and illogical tangential thoughts (14).

Symptoms typically last hours to days, and subside without intervention after blood levels of methamphetamine subside (15,16). In some instances, symptoms can run a more chronic course, lasting up to several months, and recur in the absence of drug intoxication (17). In these cases, it could be argued that methamphetamine has triggered a brief psychotic episode, and that the person may have a lasting vulnerability to re-experience psychotic symptoms.

Methamphetamine psychosis is perhaps the most concerning aspect of the current methamphetamine situation. The number of hospital presentations for methamphetamine psychosis has steadily increased over the past five years from 1,028 in 1999/00 to 1,510 in 2004/05 (18). Presentations often involve severe agitation, can require chemical and physical restraint, and in some cases, police intervention is necessary.

Who is affected?

It has been estimated that the prevalence of psychosis is 11 times higher among regular methamphetamine users than among the general population, and that 23% of regular users of the drug will experience symptoms of psychosis within a given year (19).

Sub-groups of methamphetamine users who are at particularly high risk of methamphetamine psychosis include:

- chronic dependent users of the drug
- people who are vulnerable to psychosis (e.g., family history of schizophrenia)
- people who have a chronic psychotic disorder (e.g., schizophrenia, mania)

Because psychotic symptoms are elevated predominantly among people who are dependent on methamphetamine (cf. infrequent users), improving drug treatment coverage is likely to reduce the incidence of methamphetamine psychosis. Treating methamphetamine use among people with a chronic psychotic disorder, or a history of drug-induced psychosis, should be a key priority, because these people are disproportionately represented among hospital presentations of methamphetamine psychosis.

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Managing psychosis

Treatment of methamphetamine psychosis is usually symptomatic. In cases where methamphetamine intoxication is apparent, sedation with benzodiazepines can be used to ease agitation until methamphetamine intoxication and paranoia subside. In more severe cases, or where symptoms of psychosis persist beyond intoxication, antipsychotic medication may be indicated. There is currently insufficient knowledge about appropriate medication for psychotic symptoms among methamphetamine users to suggest a specific model of care (20).

For pragmatic reasons, severe episodes of methamphetamine psychosis that are seen within emergency medical settings are usually managed using standard emergency psychiatric protocols. Diagnosis of drug-induced psychosis may not be possible until the acute psychotic symptoms have receded and the patient’s drug and psychiatric history can be assessed.

Methamphetamine psychosis is sometimes accompanied by hostility and violent behaviour. Aggressive behaviour is one of the most challenging aspects of the frontline management of methamphetamine psychosis. Violence is related to persecutory ideation, and often occurs because the patient interprets their environment in a threatening way. For this reason, physical restraint and law enforcement intervention, although sometimes necessary, can exacerbate hostility and the risk of violent behaviour.

Managing the agitation and hostility associated with methamphetamine psychosis can involve physical and chemical restraint. In this situation, people intoxicated with methamphetamine, particularly chronic users of the drug, are at an elevated risk of cardiac failure, stroke, hyperthermia, or respiratory failure because of their intoxication with methamphetamine. They may also be at increased risk of other adverse events from chemical restraint (e.g., respiratory failure, serotonin toxicity) because of concurrent intoxication with benzodiazepines, heroin and/or alcohol.

Guidelines on the emergency management of methamphetamine psychosis have been developed specifically for police, ambulance workers and emergency departments (21–24). These guidelines include draft protocols which need to be actively disseminated, evaluated and refined where necessary.

Individuals who present with methamphetamine psychosis are at a high risk of relapse if they continue to use methamphetamine. These people need to be actively referred to drug treatment and, if necessary, follow-up psychiatric care.

RECOMMENDATIONS

1. Clinical guidelines on the treatment of psychotic symptoms among methamphetamine users need to be developed and disseminated. Such guidelines should consider both pharmacological and behavioural strategies to reduce the incidence and severity of psychotic symptoms among methamphetamine users.

2. Methamphetamine users who present to emergency medical services with psychotic symptoms should receive a drug and alcohol assessment prior to discharge, and be provided with appropriate referral to drug treatment and/or psychiatric care.

3. Existing guidelines on management of methamphetamine toxicity for police, ambulance workers and emergency departments need to be actively disseminated. Adequate resources need to be made available to frontline emergency services to ensure that they can safely manage methamphetamine psychosis presentations.
Crime and violence

The majority of methamphetamine users can afford their drug use within the constraints of their legitimate income, spending around $50–$100 per week on the drug. However, people who are dependent on methamphetamine can spend upward and over $200 per week, and are more likely to turn to crime to fund their drug use, as is the case with most dependent illicit drug use (12).

Certainly high levels of crime are seen among regular methamphetamine users, with a significant proportion of people apprehended for crimes testing positive to methamphetamine. According to Drug Use Monitoring in Australia (DUMA), which undertakes urine toxicology on police detainees, 39% of female detainees and 25% of male detainees surveyed tested positive for the drug in 2005. The proportion of detainees testing positive to methamphetamine varies considerably between geographic regions within Australia, although there has been an increase across all jurisdictions up until 2004, which has since stabilised (25).

Selling drugs to support their drug habit is the most common type of crime methamphetamine users commit, but some users do resort to property crime or other illicit means of income. Property crime, fraud and violent crime tend to be limited to heavy methamphetamine users, particularly those who are heavy polydrug users.

Drug use can also be incidental to a criminal lifestyle, and there are a proportion of methamphetamine users who engage in criminal activity irrespective of a need to fund drug use (26,27). A common scenario is a hybrid of these two situations, where drug users undertake crime (particularly drug dealing) to maintain a desirable lifestyle at the same time as supporting their illicit drug use (12).

Violent crime

Methamphetamine use has often been associated with violent crime, and the drug has a strong reputation for inducing violent behaviour (28–30). When understanding the relationship between violent crime and methamphetamine use, a distinction must be made between economically motivated violent crime (e.g., armed robbery to obtain money to fund drug use) and violent behaviour associated with chronic use and intoxication, which may lead to assault or homicide.

Methamphetamine users are most at risk of economically motivated violent crime if they are encumbered with high expenditure on illicit drugs (e.g., very heavy use of methamphetamine and/or use of heroin or other expensive drugs) and have a personality pre-disposed toward criminality. Levels of violent crime, such as robbery, do not appear to be higher among methamphetamine users than among other heavy illicit drug users (31). Having said this, methamphetamine use could exacerbate violent behaviour during the commission of a pre-meditated violent crime (12).

The reputed relationship between methamphetamine use and violence stems primarily from behavioural data on aggression among users of the drug (9, 16, 32). Violent behaviour is most likely to occur among chronic methamphetamine users when they experience drug-induced paranoia (9). Within this context, the person can believe that they are in danger, and this, coupled with other personality, polydrug use, and circumstantial factors, can trigger seemingly irrational acts of violence, including homicide (33).

A re-assuring research finding is that taking a single dose of methamphetamine does not induce violent behaviour (9). For this reason, we can be reasonably confident that violent behaviour will be circumscribed to the smaller group of chronic dependent users of the drug.

It is not clear to what extent aggressive behaviour among methamphetamine users translates into violent crimes, such as assault or homicide (9). Higher levels of violent crime are seen among methamphetamine users compared to the general population, but it should be borne in mind that methamphetamine users are only likely to be implicated in a small proportion of violent crimes in our society (34). Even among those methamphetamine users who do commit violent crime, there are a range of additional factors that contribute to their violent behaviour (e.g., need to fund drug use, violence inherent in the drug market) (35).

RECOMMENDATIONS

4. There is a need for an improved understanding of whether, or to what extent, methamphetamine use will increase violent crime. Such inferences need to take into account the risk factors for violence that are inherently associated with illicit drug use (e.g., economic need, pre-existing personality tendencies).

5. Utilising existing police and court diversion programs, as well as drug testing programs for drivers to target methamphetamine users for referral into treatment should be encouraged as a way of reducing methamphetamine use and its associated crime and violent behaviour.
Supply

Over three-quarters of the world’s methamphetamine seizures occur in Southeast and East Asia, and the capacity for large-scale manufacturing plants in the region has the potential to outstrip demand for the drug within Southeast and East Asian countries. Australia has already become a lucrative destination market for Southeast Asian methamphetamine (12). The trend toward methamphetamine manufacture in the region has been fuelled by the availability and low cost of precursor drugs in Southeast and East Asia, opportunities to utilise existing infrastructure to develop and conceal large-scale methamphetamine manufacturing plants, and the existence of trans-national criminal syndicates who are involved with the trafficking of drugs and other commodities within the region (36,37).

On the local market, a significant shift has been the importation of high purity crystalline methamphetamine from Southeast and East Asia, which has supplemented supply from local clandestine methamphetamine production facilities. The introduction of imported crystalline methamphetamine to Australia as been associated with a number of undesirable changes to the local market, including an overall increase in the purity of the drug at a street level, and shift to selling the drug in smaller, more affordable, purchase units (i.e., ‘points’, or approximately 0.1 g, for around $40–50). High purity methamphetamine has also been associated with increased demand for methamphetamine among certain sub-groups of the population (e.g., the up-take of smoking crystalline methamphetamine among non-injecting drug users) (12), and increased health problems (1), including higher levels of dependence (10). However, although crystalline methamphetamine is generally imported into Australia, the majority of methamphetamine (other than ice) is supplied through domestic clandestine laboratory manufacture. This is an important distinction, as ice makes up a smaller portion of the methamphetamine market in Australia.

One of the significant challenges in controlling the supply of methamphetamine is reducing the availability of precursor chemicals used in the manufacture of the drug. Over the past decade there have been several nationally coordinated initiatives to reduce the availability of precursor chemicals used in the manufacture of methamphetamine. This tightening of domestic precursor controls is likely to increase pressure on both methamphetamine and precursor supply from importation. The importation of precursor chemicals is already recognised as a lucrative endeavour in its own right, due to their cheap cost and ready availability in countries neighbouring Australia, together with less stringent border controls on precursor chemicals relative to methamphetamine. Monitoring of precursor importation is currently limited by the diverse and often inadvertent nature of these importations, together with their importation for a range of legitimate purchases. This in itself will be a barrier to identifying channels for precursor importations destined for illicit methamphetamine manufacture. However, it has been noted that the recent tightening of Australian domestic precursor controls (such as the rescheduling of pseudoephedrine in April 2006) may have an impact on increased precursor importation, controls on importation of precursors have also recently been reinforced. The Law and Justice Legislation Amendment (Serious Drug Offences and Other Measures) Act 2005 amended the Criminal Code Act 1995 to introduce new offences (and corresponding penalties) dealing with the importation and domestic possession, manufacture and trafficking of precursor chemicals.

Efforts to control the supply of methamphetamine need to consider their broader impact on patterns of drug use. Historically, there have been remarkable shifts in patterns of drug use among injecting drug users in Australia in the face of changing availability of drugs. For example, in the mid-1990s methamphetamine injectors shifted to injecting heroin when it became relatively cheap and available. Conversely, there was a strong up-take of methamphetamine injection in the wake of the 2001 heroin shortage. For this reason, strategies to reduce the supply of methamphetamine should be implemented in tandem with supply and demand reduction strategies to limit the transition from dependent methamphetamine use to other patterns of dependent drug use.
RECOMMENDATIONS

6. The coordinated national responses between various law enforcement agencies and industry need to be maintained to restrict the availability of precursor chemicals used in the manufacture of methamphetamine. Resultant shifts in the sourcing of precursor chemicals needs to be monitored.

7. Tight border controls need to be maintained to counteract the impending demand for imported precursor chemicals, and to reduce the potential for methamphetamine supply from Southeast and East Asian countries.

8. Australian law enforcement agencies need to work collaboratively with authorities within the region to tackle the high and increasing level of methamphetamine and precursor availability and trafficking across Southeast and East Asia.

9. Efforts to reduce methamphetamine availability should be integrated with other supply and demand reduction initiatives to minimise unintended negative consequences, such as shifts to other drug use patterns (e.g., substitution with heroin).

10. Appropriate programs that serve to address methamphetamine issues and enhance the partnership approach between health and law enforcement personnel on drug use issues should be further encouraged.

Prevention

Prevention strategies reduce the extent of drug-related harm by reducing the number of people who take-up drug use. This reduces the number of people who experience harms associated with acute intoxication, and the number of people at risk of progressing to drug dependence.

Prevention strategies can also be used to delay the onset of drug use and prevent transitions into problematic patterns of drug use. These types of strategies include education, early intervention programs and preventing the up-take of injecting drug use. Or, they can be used to minimise harms among people who are already regular drug users, for example, to reduce the spread of HIV among injecting drug users, or to reduce the risk of fatal drug overdose.

The means of implementing prevention strategies varies from strengthening societal infrastructure (e.g., providing opportunities for education, employment and recreation), educating young people about the harmful effects of drugs (e.g., school-based prevention programs), to early interventions and peer-based outreach programs aimed at reducing problematic patterns of drug use (e.g., injecting drug use and HIV risk behaviour). Media campaigns have also been used successfully to reduce a range of unhealthy behaviours, including drug use.

The sections below outline several drug prevention strategies, which can be applied to methamphetamine use.

Media campaigns

Media campaigns have been used successfully to reduce unhealthy behaviours (e.g., tobacco smoking), but their application in relation to illicit drug use is limited and unfortunately not well evaluated (38). Successful media campaigns are also expensive and require substantial planning and research. In particular, they require a segmented marketing strategy that identifies and successfully targets the ‘at-risk’ audience (e.g., use media channels that are accessed by drug users and a delivery that is appealing to this audience), research on the target audience to understand their attitudes, beliefs and values (including pre-testing of media campaigns), and most importantly, the campaign must receive adequate and sustained coverage (38). Media campaigns run the risk of unintended increases in drug use if they are not adequately researched and focus tested.
School-based interventions

School-based prevention programs are used to reduce the uptake of drug use among young people, and more recently, prevent harms among those already using drugs. School-based prevention programs that entail education about illicit drug use alone (including harms from drug use and fear campaigns) tend to be unsuccessful. Far more promising are programs that teach resilience to young people, including normative information on drug use, refusal skills and more generic personal self-management and social skills (39). These types of programs have lead to reduced incidence of drug use among young people, and even though they are generic to all drugs, they also reduce methamphetamine use (40). School-based prevention programs should also be reinforced by broader community drug prevention efforts, and the drug-related messages portrayed through these community initiatives need to be consistent with those delivered within the school system. Research is currently underway in Australia to develop and evaluate the impact of a school-based prevention package on psychostimulant use.

High-risk groups

The onset of drug dependence is greatest among those aged 12–20 years, and is most likely to occur among individuals who have several risk factors for drug dependence (e.g., depression, academic failure, deviant peer bonding) and who have few protective factors that guard against drug use. Prevention strategies that target high risk groups tend to focus on young people, who are showing the early warning signs for drug abuse, but do not meet criteria for drug dependence (41).

Interventions that target high-risk groups for drug use work best when they address the range of factors, both individual and societal, that increase the risk of drug dependence (42). These interventions can be school-based, they usually involve peer-support strategies, and they can also include developing the individual’s personal skills to minimise psychological and social risk factors for drug dependence (e.g., coping skills, self-esteem and negotiation skills).

Drug-related harms

A further aspect of prevention among high-risk groups is reducing specific drug-related harms (e.g., overdose), or high-risk drug use practices (e.g., injecting) among drug users. Often harm reduction strategies consist of providing information on the harms related to drug use. To this end, there is an abundance of information on methamphetamine available on the internet and contained in information brochures that target users of the drug.

Aside from providing general information to drug users, information campaigns can also be used to target specific problem drug-related behaviours (e.g., response to drug overdoses). In the context of the current methamphetamine situation, there are opportunities to use education campaigns to reduce the incidence of specific methamphetamine-related harms (e.g., psychosis), reduce the transition to smoking and injecting methamphetamine, and improve contact with drug treatment and other health care services. Like any good prevention campaign, these interventions should use appropriate communication strategies (e.g., peer educators, posters or booklets), and consider the various social, cultural and individual values surrounding specific risk behaviours. Education about harms also needs to be matched with appropriate community strategies to address specific drug-related harms (e.g., ensure health services are accessible to methamphetamine users).

The harms caused by chronic methamphetamine use upon the families and friends of the user also need to be recognised and addressed. Anecdotal reports of disturbance and distress amongst these families suggest that greater levels of information and support are required.

RECOMMENDATIONS

11. Media campaigns to reduce methamphetamine use should utilise segmented marketing strategies and be well researched, focus tested and thoughtfully implemented to ensure that they do not lead to an unintended increase in methamphetamine use or related harms.

12. Effective school-based prevention strategies need to be promoted and implemented in Australia. These do not need to target methamphetamine specifically; instead they need to be holistic in approach in order to be effective in reducing methamphetamine use.

13. The utility of education/information strategies should be explored to address specific methamphetamine-related issues (e.g., psychosis, access to treatment), including those for the families and friends of methamphetamine users.
Treatment

Providing effective treatment for methamphetamine dependence is a critical aspect of addressing the methamphetamine use problem. This is because most of the harms from the drug occur among dependent users, and treatment will reduce the number of people who are dependent on the drug. The principles underpinning drug dependence are common to all drugs, and apply equally to methamphetamines. For this reason, people experiencing dependence on methamphetamine can be treated using the same format as that used in existing psychosocial treatment programs, such as counselling, therapeutic communities and other various rehabilitation programs.

In 2004/05 there were 14,780 drug treatment episodes for methamphetamine or amphetamine use in Australia (43). Treatment for methamphetamine dependence typically involves counselling, residential rehabilitation, and/or withdrawal management (43). Maintenance pharmacotherapy (e.g., dexamphetamine substitution) is not routinely available in Australia. However, medications are often used to manage methamphetamine withdrawal and co-morbid mental health disorders.

Currently few treatment approaches for methamphetamine dependence have been comprehensively evaluated. The following sections review the existing evidence for psychosocial and pharmacological approaches to treating methamphetamine dependence.

Psychosocial

Current evidence suggests that the best way to treat methamphetamine dependence is using Cognitive-Behavioural Therapy (CBT) or Contingency Management (i.e., providing monetary or other rewards for abstinence) (44,45). Brief CBT-based psychosocial interventions have been trialled in Australia, and significantly reduce levels of methamphetamine use, increase abstinence rates, and alleviate methamphetamine-related harms (46). Other psychosocial approaches either have only equivocal evidence or have not been adequately evaluated (44).

Guidelines have been published on how to undertake a brief CBT-based treatment for methamphetamine users (47) and these guidelines have been disseminated. It is not clear to what extent the approach has been implemented within drug and alcohol treatment centres.

Anecdotal reports suggest that the level of psychosocial treatment for chronic users of methamphetamines undertaken within the NGO sector and in particular within therapeutic communities and residential care services, is increasing with some centres reporting more than half their clients having methamphetamines as their primary drug of concern.

Pharmacotherapy

Dexamphetamine substitution therapy is the most widely implemented and evaluated pharmacotherapy for methamphetamine dependence (48). Evidence supporting dexamphetamine substitution is poor, and evaluation of this treatment modality in the United Kingdom found that modest post-treatment improvements were offset by the increased risk of psychosis, continued illicit use of the drug, and diversion of prescribed dexamphetamine (49). Having said this, the implementation of dexamphetamine substitution has seen few controlled trials to test its efficacy and limitations (50).

Pilot trials are currently underway to examine the feasibility of the novel wakefulness agent, modafinil, as an alternative pharmacotherapy. This medication is promising because it has a pharmacological profile which suggests lower abuse potential than dexamphetamine, and less risk of adverse affects when used among people with psychiatric comorbidity. Nonetheless, it still does carry some risk of cardiac complications and adverse reactions when taken with antidepressant drugs. It also impairs the efficacy of oral contraceptive medication and is contraindicated during pregnancy, which limits its utility in women.

Several other agonist therapies (drugs that mimic the action of psychostimulants on the brain) have been trialled in the treatment of cocaine dependence (the anti-Parkinsonian drug pergolide mesylate, amantadine and bromocriptine) (49), but these were no more effective than placebo (51,52) and were associated with a range of unpleasant side-effects (53).

Anti-depressant medication (e.g., Selective Serotonin Re-uptake Inhibitors, SSRIs) has also been used to treat methamphetamine dependence, but the evidence in favour of this approach is poor (49,54). In fact, popular SSRI antidepressant medications can be contraindicated for methamphetamine treatment (55). Trials are currently underway in Australia to determine whether the novel antidepressants (Mirtazapine\(^1\) and Venlafaxine\(^2\)) are more effective in the management of methamphetamine withdrawal.

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\(^1\) Mirtazapine is a noradrenergic and specific serotonergic antidepressant (NaSSA)

\(^2\) Venlafaxine is a serotonin noradrenergic reuptake inhibitor (SNaRI) used in the treatment of depression.
Medications are also often prescribed to methamphetamine users entering in-patient treatment facilities to manage methamphetamine withdrawal symptoms, and stabilise clients prior to engaging them in psychosocial therapies. Most research suggests that sedation with benzodiazepines is sufficient in this context, and cautions against the use of antipsychotic agents and antidepressants (56). In practice, both antipsychotic and antidepressant medication are often used to treat agitation, depression and mild psychotic symptoms among methamphetamine users entering drug treatment. Several pilot trials are currently underway in Australia to examine the utility of various medications (including modafinil, mirtazapine, venlafaxine, and buproprion) for treating methamphetamine withdrawal symptoms. There is a need for more thorough evaluation of medications that are currently being prescribed to treat methamphetamine withdrawal symptoms, and for clinical guidelines in this area.

**Addressing co-morbid mental health problems**

Co-morbid mental health disorders are common among methamphetamine users entering drug treatment services (57). Co-morbid mental health disorders predict poor treatment outcomes, and often require treatment in their own right. Depression and psychosis deserve particular attention among methamphetamine treatment entrants, but there are a range of other mental disorders that treatment providers need to identify and address (e.g., anxiety disorders, Post-Traumatic Stress Disorder, personality disorders).

Medication of psychiatric disorders (e.g., major depression) and symptoms of psychosis can be problematic because of the potential interaction of medications with illicit drug use (e.g., serotonin toxicity). Psychosocial therapies can provide an alternative approach to addressing co-morbid depression; however, these approaches are unlikely to be sufficient for treating chronic psychotic disorders (e.g., mania and bipolar). There has been little research addressing the potential for toxic side-effects from concurrent use of psychiatric medications and methamphetamine use, and this is an area that deserves further attention.

High levels of depression, psychosis and other mental health problems among methamphetamine treatment entrants also indicate that treatment providers need to be familiar with various psychiatric disorders and their diagnosis. Drug treatment providers need to have the capacity to treat both substance use and other psychiatric disorders, and/or refer clients to appropriate mental health services.

**Treatment access**

For drug treatment to substantially reduce the harms associated with methamphetamine use, the majority of dependent methamphetamine users must receive treatment. Treatment access is poor for methamphetamine dependence in Australia. Recent estimates suggest that less than one-third of dependent methamphetamine users receive treatment (58).

Whether or not someone receives treatment for their methamphetamine use is related to their motivation to reduce methamphetamine use, the severity of their concurrent psychological, social and physical health problems (59–61), and their socio-demographic characteristics (e.g., being female, relationship status, ethnicity) (58). Some researchers suggest that methamphetamine users do not perceive treatment services to be appropriate to their needs because most treatment services are tailored toward alcohol and opioid problems (62,63), (though the ANCD understands that some therapeutic communities and residential care services are attracting increasing numbers of methamphetamines users, particularly due to the unavailability of any pharmacological treatment options for chronic and problematic users of methamphetamines) or that they avoid seeking treatment because of social/cultural attitudes toward drug use and treatment (e.g., stigma) (64). There are also structural barriers that are likely to impede treatment access for methamphetamine users, such as awareness of existing services, availability of treatment places, and the cost of private services.

Treatment coverage could be improved by increasing the range of treatment options available for methamphetamine use and allowing greater flexibility in the types of interventions that are provided. Treatment coverage can also be improved by taking advantage of the potential modalities of treatment delivery (e.g., internet, telephone) and facilitating referral into treatment (e.g., via general practitioners).

**RECOMMENDATIONS**

14. Improve understanding of barriers to drug treatment among methamphetamine users and actively develop and evaluate treatment modalities that improve access to treatment.

15. Increase awareness of evidence-based psychosocial treatment options for methamphetamine use, and existing training guidelines for these interventions, and improve the capacity of treatment providers to use these types of treatments.

16. Further build the capacity and evidence base for the treatment provided by therapeutic communities and residential care services for methamphetamine use, including its effectiveness and the type of additional support required by these services to manage and treat methamphetamine users.
17. Ensure that drug treatment services have the capacity to identify and treat or refer patients who have co-morbid mental health problems. This could involve having on-site psychiatric staff and/or clinical psychologists, and where appropriate, integrating psychiatric and drug treatment services.

18. Develop and disseminate clinical guidelines on appropriate prescribing of psychiatric medication to treat psychiatric co-morbidity among methamphetamine treatment entrants. Such guidelines should consider the use of non-pharmacological interventions where the use of medication is contraindicated.

19. Continue to evaluate novel pharmacological agents which have the potential to alleviate methamphetamine craving and withdrawal symptoms, and that are not contraindicated for concurrent use with illicit methamphetamine or psychiatric medication (e.g., antidepressant and antipsychotic medication). Clinical guidelines also need to be developed in this area.

**HIV and blood-borne virus transmission**

Methamphetamine use can increase the risk of HIV transmission through risky sexual behaviour and sharing used needles when injecting methamphetamine. These two modes of HIV transmission can have a synergistic effect on HIV incidence. For example, an outbreak of HIV among injecting methamphetamine users could lead to secondary transmission of the virus through risky sexual behaviour.

**Sexual-risk behaviour and HIV**

Methamphetamine use increases sexual arousal, and some users take the drug specifically to enhance sex (65,66). Around half of users report that they are more likely to engage in high-risk sexual activities while intoxicated with methamphetamine (65).

Methamphetamine using men who have sex with men (MSM) are a high risk group for HIV seroconversion. Methamphetamine use is consistently higher among MSM who engage in risky sexual practices and those with HIV (67,68). MSM who use methamphetamines also show elevated incidence of HIV seroconversion (69,70). Levels of HIV are particularly high among homosexual males who inject drugs in Australia (20.8% in 2005) (71), indicating a need to address both sexual and injecting risk behaviour among methamphetamine injecting MSM.

Elevated levels of sexual activity and risky sexual behaviour have also been noted among both male and female hetero-sexual methamphetamine users (72–75). In some cases, this phenomenon is accompanied by a low perceived risk of contracting sexually transmitted infections (76). Of importance, elevated levels of sexual risk taking are also found among injecting methamphetamine users (76–80), and this provides an avenue for secondary HIV transmission.

Although the prevalence of HIV is low among heterosexuals in Australia, recent increases in the heterosexual transmission of HIV warn against complacency (71). More of an immediate concern is the potential for methamphetamine use to fuel the already epidemic spread of bacterial sexually transmitted diseases, such as Chlamydia (71).

Drug treatment has been advocated as a direct approach to reducing HIV incidence among methamphetamine users. Levels of sexual risk-taking among methamphetamine users are reduced following drug treatment (81), and the efficacy of reducing sexual risk behaviour among gay and bisexual men with tailored CBT-based methamphetamine treatment has been demonstrated using a randomised controlled trial (82).

There are a range of other risk factors for sexual transmission of HIV that should be considered when developing HIV prevention strategies. These include the need to target particularly high risk sex behaviours, the elevated risk of HIV transmission associated with bacterial STD infection, concurrent drug injecting, polydrug and alcohol use, and individual factors that predict HIV risk taking behaviour (e.g., low coping self-efficacy, depression) (68).

**Hepatitis C and injecting drug use**

Methamphetamine injection represents a serious risk factor for the transmission of hepatitis C and other blood-borne viruses in Australia because the majority of dependent methamphetamine users inject the drug. The proportion of injecting drug users who report methamphetamine injection increased subsequent to the heroin shortage of 2001, and has since remained stable at around 32–33% (Figure 1) (83,84). Although HIV remains low and stable among injecting drug users in Australia (68), hepatitis C infection is endemic (61% in 2005) (71). Injecting drug use is the major cause for hepatitis C transmission in Australia. Injecting risk behaviour and hepatitis prevalence among methamphetamine users is similar to that seen among opioid injectors (72,76,85,86).
RECOMMENDATIONS

20. HIV prevention strategies for injecting drug users should address both injecting-risk behaviour and sexual-risk behaviour. These strategies should aggressively target HIV risk behaviour among MSM who inject methamphetamine. Among the broader injecting drug using community, strategies should focus on the more prevalent problems of hepatitis C and bacterial sexually transmitted diseases.

21. Methamphetamine treatment strategies also tailored to address HIV risk behaviour should be used to reduce HIV transmission among methamphetamine-using men who have sex with men (MSM).

22. Existing efforts to reduce the spread of blood-borne viruses through injecting drug use, such as needle and syringe programs, need to be maintained.
List of recommendations

1. Clinical guidelines on the treatment of psychotic symptoms among methamphetamine users need to be developed and disseminated. Such guidelines should consider both pharmacological and behavioural strategies to reduce the incidence and severity of psychotic symptoms among methamphetamine users.

2. Methamphetamine users who present to emergency medical services with psychotic symptoms should receive a drug and alcohol assessment prior to discharge, and be provided with appropriate referral to drug treatment and/or psychiatric care.

3. Existing guidelines on management of methamphetamine toxicity for police, ambulance workers and emergency departments need to be actively disseminated. Adequate resources need to be made available to frontline emergency services to ensure that they can safely manage methamphetamine psychosis presentations.

4. There is a need for an improved understanding of whether, or to what extent, methamphetamine use will increase violent crime. Such inferences need to take into account the risk factors for violence that are inherently associated with illicit drug use (e.g., economic need, pre-existing personality tendencies).

5. Utilising existing police and court diversion programs, as well as drug testing programs for drivers to target methamphetamine users for referral into treatment should be encouraged as a way of reducing methamphetamine use and its associated crime and violent behaviour.

6. The coordinated national responses between various law enforcement agencies and industry need to be maintained to restrict the availability of precursor chemicals used in the manufacture of methamphetamine. Resultant shifts in the sourcing of precursor chemicals needs to be monitored.

7. Tight border controls need to be maintained to counteract the impending demand for imported precursor chemicals, and to reduce the potential for methamphetamine supply from Southeast and East Asian countries.

8. Australian law enforcement agencies need to work collaboratively with authorities within the region to tackle the high and increasing level of methamphetamine and precursor availability and trafficking across Southeast and East Asia.

9. Efforts to reduce methamphetamine availability should be integrated with other supply and demand reduction initiatives to minimise unintended negative consequences, such as shifts to other drug use patterns (e.g., substitution with heroin).

10. Appropriate programs that serve to address methamphetamine issues and enhance the partnership approach between health and law enforcement personnel on drug use issues should be further encouraged.

11. Media campaigns to reduce methamphetamine use should utilise segmented marketing strategies and be well researched, focus tested and thoughtfully implemented to ensure that they do not lead to an unintended increase in methamphetamine use or related harms.

12. Effective school-based prevention strategies need to be promoted and implemented in Australia. These do not need to target methamphetamine specifically; instead they need to be holistic in approach in order to be effective in reducing methamphetamine use.

13. The utility of education/information strategies should be explored to address specific methamphetamine-related issues (e.g., psychosis, access to treatment), including those for the families and friends of methamphetamine users.

14. Improve understanding of barriers to drug treatment among methamphetamine users and actively develop and evaluate treatment modalities that improve access to treatment.

15. Increase awareness of evidence-based psychosocial treatment options for methamphetamine use, and existing training guidelines for these interventions, and improve the capacity of treatment providers to use these types of treatments.

16. Further build the capacity and evidence base for the treatment provided by therapeutic communities and residential care services for methamphetamine use, including its effectiveness and the type of additional support required by these services to manage and treat methamphetamine users.
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References


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