

PUBLIC HEALTH

The burden and management of crystal meth use

Methamphetamine, a central nervous system stimulant, was first synthesized in 1919 as a synthetic substitute for ephedrine. Occult methamphetamine laboratories emerged in California in the 1960s, and its recreational use spread up and down the Pacific Coast. In the 1980s, d-methamphetamine hydrochloride (crystal methamphetamine, crystal meth; Box 1), which is a crystallized, smokable and more potent form, was developed.¹ Crystal meth is more likely to cause dependence than other forms of methamphetamine. It is cheap and readily available, which has led to media reports and public concern about the potential for its increased use among youth. We describe the effects, burden and management of methamphetamine and, in particular, crystal meth in Canada.

Effects of crystal meth

Crystal meth releases dopamine, which leads to feelings of euphoria (Box 2); however, the timing and intensity depend on how it is administered. If crystal meth is smoked or injected, it causes an almost immediate “rush,” but this takes about 20 minutes to occur if ingested orally. It may also be taken rectally or snorted. Compared with cocaine, crystal meth has a longer duration of action and can keep the user “up” for 12 hours. A user bingeing on crystal meth (on a “run”) may stay

awake for 10 days, often with little food or drink.

Users of crystal meth report initially feeling powerful and confident, endless energy, increased productivity, enhanced sexual performance and reduced appetite.² However, once the initial euphoric effects of the drug wear off, users may experience anxiety, depression, mental confusion, fatigue and headaches.

Long-term use of crystal meth increases the user’s tolerance such that larger and more frequent doses are necessary to achieve the desired effect. Its prolonged use causes irritability and psychosis known as “tweaking,” which may result in the user having numerous scabs from picking at imaginary insects crawling on or under his or her skin. Use of other stimulants, such as amphetamine and cocaine, can also result in tweaking. Extreme paranoia and violence may occur and the psychosis may become permanent or continue as flashbacks. Poor oral hygiene in combination with the oral effects of crystal meth use such as dry mouth, teeth grinding and jaw clenching can lead to advanced dental decay known as “meth mouth.”³ Other serious effects of crystal meth are profound weight loss,

Key points

- Crystal meth is highly addictive and has devastating effects on those who become dependent.
- Its reported use by students has declined since 1998 in Canada and the United States.
- Its use may be increasing among street youth and gay men.
- Treatment of crystal meth dependence is challenging because there are no effective medications, and behavioural and cognitive approaches have not shown long-term benefits.

seizures, cardiac arrhythmia, myocardial infarction, stroke and death.

Burden of crystal meth use

Nearly 25 million people worldwide are estimated to have used amphetamine and methamphetamine in the past 12 months. This is more than heroin or cocaine, and it makes amphetamine and methamphetamine the most widely used illicit drugs after cannabis.⁴ Comparing prevalence estimates and trends of crystal meth use through population surveys is challenging because of selection bias, underreporting and differences in age and terminology. Based on telephone interviews with randomly sampled people aged 15 years and older from each province, the 2004 Canadian Addiction Survey found that 6.4% of respondents reported lifetime use of “amphetamine type substances” and 0.8% of those had used in the past year.⁵ Similarly, in the United States, 5.2% of people over 12 years reported using methamphetamine and less than 1% reported using in the past year.⁶ Higher prevalence rates of methamphetamine and amphetamines use have been identified in Australia⁷ and parts of Europe⁸ (Table 1).

Despite growing media attention about crystal meth, the level of use reported by school youth over the past 8 years has declined in Canada^{9,10} and the

Box 2: Signs and long-term consequences of crystal meth use

Signs

- Euphoria
- Anxiety
- Depression
- Fatigue
- Violence
- Seizure
- Cardiac arrhythmia
- Myocardial infarction

Long-term consequences

- Dental decay
- Weight loss
- Psychosis, paranoia
- Picking at skin, scabs
- Irritability

Box 1: Common street names of crystal meth

- | | |
|-----------|---------|
| • Crystal | • Crank |
| • Jib | • Tina |
| • Meth | • Ice |
| • Speed | • Glass |

United States.¹¹ However, one should remember that youth with recurrent crystal meth use are unlikely to be in school. The 2005 Ontario Student Drug Use Survey found that 2.2% of grade 7–12 students admitted using methamphetamine in the last year, which was down significantly from 5.3% in 1999.⁹ A similar decline in reported lifetime use of amphetamines (speed, crystal meth) was found in British Columbia (down from 5% in 1998 to 4% in 2003) and only 1% reported using more than 3 times.¹⁰ A 2006 nonrandom sample in Vancouver, British Columbia, found that 5.2% of youth aged 16–18 years and 16.5% of those aged 19–25 years reported ever using crystal meth.¹² Students who self-identified as gay or bisexual were 26 times (95% confidence interval 6–113) more likely than those who identified as heterosexual to have used crystal meth in the previous year.¹³ Crystal meth use was reported by 6.6% of street youth in the 2003 Canadian Street Youth Survey but by 67% of street youth in British Columbia in another study.¹⁴

The reasons why people use crystal meth vary by the user group. Women are more likely than men to seek weight loss, and men report improved sexual performance as a motivator. Crystal meth can provide the energy to dance for hours and increase libido, and its use by gay men is associated with high-risk sexual behaviour.¹⁵ Street youth report using crystal meth as a coping strategy; it

allows them to stay awake to protect their belongings, suppresses their appetite so they do not feel the need to eat and helps them cope with negative emotions.¹⁶

Treatment of methamphetamine dependence

A consensus panel at the 2004 Western Canadian Summit on methamphetamine identified the need for a continuum of services from prevention to treatment to aftercare that addresses individual needs within a range of harm-reduction strategies.¹⁷ A dopamine-blocking agent such as haloperidol may be used for patients with hyperactivity or agitation, and behavioural and psychiatric intoxication related to methamphetamine use may be treated with diazepam.¹⁸

Treatment of methamphetamine dependence is challenging because of the high rates of drop out and relapse, ongoing episodes of psychosis, severe craving and anhedonia. No medication has been demonstrated to be effective for the treatment of methamphetamine abuse and dependence; therefore, the mainstays of treatment are contingency management and cognitive behavioural therapy, including the Matrix model of treatment (Box 3).

Pharmacological strategies, consisting of the administration of agonists, antagonists and symptomatic

Box 3: Treatment options for methamphetamine use

Acute symptoms

- Hyperactivity or agitation may be treated with a dopamine-blocking agent (e.g., haloperidol).¹⁸
- Behavioural and psychiatric intoxication may be treated with diazepam.¹⁸

Methamphetamine dependence

- Contingency management (based on the premise that a behaviour is more likely to be repeated if it is followed by positive consequences).¹⁹
- Cognitive behavioural therapy (e.g., the Matrix model, which incorporates cognitive behavioural therapy principles, education about addiction and relapse prevention, 12-step or self-help programs, and weekly urine monitoring).²⁰

treatment for withdrawal effects, have evolved from studies about treatment of cocaine dependence. However, these strategies have not been found effective.²¹ A Cochrane review of randomized and clinical controlled trials found that antidepressants had no long-term effect on treatment outcome.²²

Contingency management is based on the operant conditioning principle that a behaviour is more likely to be repeated when followed by positive consequences. Participants receive rewards for achieving certain goals, such as drug abstinence. In a trial that compared contingency management and usual treatment, those in the contingency-management group submitted more negative drug samples and had a longer mean duration of drug abstinence.¹⁹ However, there was no difference in drug abstinence between the groups at 3-month and 6-month follow-up.

Cognitive behavioural therapy focuses on understanding the role of substance abuse in a person's life and fosters the development of coping skills to avoid addiction relapse. The Matrix model is a structured, multi-faceted and manualized approach that incorporates cognitive behavioural therapy principles, individual and family education about addiction and relapse prevention,

Table 1: Use of amphetamines* reported in population-based surveys

Country	Year of report	Age of respondents	Ever used, % of respondents	Used in the past year, % of respondents
Canada ⁵	2004	≥ 15	6.4	0.8
United States ⁶	2005	≥ 12	4.3	0.5
Australia ⁷	2004	≥ 14	9.1	3.2
Europe ⁸	2006	15-64	3.1	0.6
		15-34	4.8	1.4
England and Wales ⁸	2006	15-64	11.2	nr
		15-34	16.5	2.7
Denmark ⁸	2006	15-64	5.9	nr
		15-34	9.6	3.1

Note: nr = not reported.

*Includes both methamphetamine and amphetamine.

participation in 12-step or self-help programs or both, and weekly urine monitoring for drug use. One large-scale, multisite study found that the Matrix model produced superior benefits during treatment, but differences between the 2 groups were not observed at discharge or 6-month follow-up.²³

Conclusion

Crystal meth is a highly addictive synthetic stimulant. Although reported use among school students has declined, it has devastating effects on those who become dependent. Use appears to be increasing in the difficult-to-study high-risk groups such as street youth and gay men. Treatment is challenging because there is currently no effective medication, and behavioural and cognitive approaches, although effective during treatment, have not shown long-term benefits.

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Two further articles on the theme of methamphetamine use will appear in the June 17 issue.



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