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Prevention of harms associated with volatile substance abuse

*Prevention research
evaluation report*

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Centre for Youth Drug Studies



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Preventing harms associated with volatile substance abuse

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Recently, a group of children was observed at a train station, sniffing paint that had been sprayed into plastic bags. A passenger informed a railways employee located at the station, but was advised that "It's legal and we are powerless to stop it".

The public nature of this form of youth substance use and the expectation that the community should be active in addressing it have led to increasing policy consideration in recent years. In this eleventh Prevention Research Evaluation Report for the DrugInfo Clearinghouse, we examine the issue of volatile substance abuse, focusing on the prospects for well-coordinated community prevention. In common with previous reports, literature review work has been supplemented with findings from interviews with practitioners. Practitioners interviewed worked in a variety of sectors, and these included product suppliers, youth workers, community workers and emergency service (police and ambulance) workers.

Definitions

An important review exploring the issues surrounding volatile substance abuse has recently been completed for the Victorian Parliament by the Drugs and Crime Prevention Committee (DCPC 2002). Its report on the *Inquiry into the Inhalation of Volatile Substances* provides a valuable compilation of current knowledge. Much of the background for the present report borrows from that document and is directed at exploring the implications for coordinated community action that extends from that report.

Volatile substance abuse refers to the "deliberate inhalation of a volatile substance to achieve a change in mental state" (ACMD 1995, p. 14 cited in DCPC 2002). Implicit in this definition is the broad range of substances that are inhaled to achieve intoxication, including chrome-based paints, glue, butane gas (for example, lighter refills), propane gas (BBQ gas cylinders), petrol, aerosol spray cans and correction fluid. Volatile substances are often

referred to as "inhalants", hence another common term for this practice is "inhalant abuse". The terms "sniffing", "chroming" and "huffing" are the street, or common, names for specific examples of volatile substance abuse. Glue and petrol "sniffing" refer to specific examples of volatile substance abuse in which vapours are inhaled directly from an open container.

In some cases in the United States of America, the container is heated (Kurtzman, Otsuka & Wahl 2001). "Huffing" has been observed in the United States literature (Kurtzman, Otsuka & Wahl 2001) and refers to the inhalation of vapours from a cloth soaked in the volatile substance and placed over the mouth. The term "chroming" refers to another specific form of volatile substance abuse. It involves spraying paint (in this case, chrome paint) from an aerosol can into a plastic bag and then breathing the vapours. In some instances in the United States, aerosols with an alcohol base, such as hairspray, are sprayed into a bag and following inhalation of the vapours, the alcohol has been drunk from the bag. The DCPC

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(2002, p.6) and others have adopted the term “volatile substance abuse” in an attempt to capture the breadth of the substances used and methods of administration. The use of this general term also seeks to reduce the potential to “glamourise” certain behaviours.

Epidemiology

Beauvais and Oetting (1987) have proposed a classification scheme which differentiates three main types of users. The largest number of users has been found in the 12–13-year age group, and these are mainly experimental or occasional users. Poly drug users at age 15– 16 years tend to engage in volatile substance abuse as part of a broader pattern of multiple drug use. Use in this group may be more frequent. The third and smallest group consists of adults dependent on various forms of volatile substances whose use may occur at a more continual level, with serious risks of harms.

In an empirical analysis of United States survey data, May and Del Vecchio (1997) found some evidence supporting the distinction between these three types of volatile substance users. Beauvais and Oetting (1987) differentiate users of substances such as volatile hydrocarbons (petrol, butane, glue etc.) from users of anaesthetic gases and of the amyl and butyl nitrites. Users of these different substances may differ on predisposing factors, levels of dysfunction and consequences of use.

In his examination, Ives (1994) points out a common problem with efforts to assess the prevalence of

volatile substance abuse: the tendency for young people to deny use as they grow older. As different to reports for other areas of substance use that tend to show increasing lifetime prevalence with age, youth samples are often less likely to report lifetime use as they grow older. In longitudinal studies, those who report use in younger years have also been found in later years to state that they have never used. It is unknown whether this is due to young people boasting about the use of solvents that never occurred, or due to forgetting at a later age, or due to denial of use that is subsequently regarded as childish.

There has been some survey work completed in Victoria, Australia relevant to volatile substance use among young people. Table 1 presents findings from surveys completed with representative samples of students by the Centre for Adolescent Health in 1999 and 2002.

The data in Table 1 for 2002 are from the International Youth Development Study (IYDS) (www.iyds.org). The IYDS recruited a representative sample of Victorian students in primary school Grade 5, and high school Years 7 and 9 (approximately 1000 were surveyed in each school year-level). After being asked questions regarding smoking and marijuana use, the Grade 5 primary school respondents were asked whether they had ever “sniffed, breathed, or inhaled anything else in order to get high”. Those responding “yes, 3 or more times in the last year” were defined as recent users. Year 7 and 9 students were asked whether they had “sniffed glue, breathed the contents of an aerosol spray can,

Table 1: Percentage of Victorian school students (in different year levels) reporting various forms of volatile substance use in 2002 and 1999

	Males				Females			
	Grade 5	Year 7	Year 9	Year 11	Grade 5	Year 7	Year 9	Year 11
2002								
Lifetime	3.9	8.7	4.9		2.5	13.0	6.0	
Recent	0.7	3.7	1.2		0.2	6.8	2.5	
1999								
Lifetime		5.5	6.7	5.3		3.7	8.5	6.7
Recent		1.8	1.9	0.5		1.2	1.6	1.1

Unweighted percentages

or inhaled other gases or sprays, in order to get high”.

The 1999 data are from the Health and Wellbeing Survey (HWBS) (Bond, Thomas, Toumbourou, Patton & Catalano 2000). This study involved a representative sample of Victorian high school students from Years 7, 9 and 11 (around 3000 were surveyed in each year-level cohort). Students in the HWBS were asked whether they had used “solvents to get high (glue, gas refills, cleansing fluid, petrol)”. For both studies, recent use for the high school students referred to any use in the previous 30 days.

The percentages presented in Table 1 show some variation from 1999 to 2002 in the rates of volatile substance use. However, this may be due to the different questions that were asked in the different studies. Rates tended to peak in Year 7 in 2002, but this was not so evident in 1999, when the question focused more explicitly on solvent use. In both years, rates of use were higher for females than males.

The rates for Victoria appear to be generally lower than those reported by participants in the United States national Monitoring The Future student survey (www.monitoringthefuture.org). In that study, 21.6 per cent of Year 8 students reported some level of lifetime use in 1995, but these rates reduced to 15.8 per cent in 2003.

Consequences and harms of experimental and chronic use

The considerable variation in the substances that are inhaled, together with the different contexts of administration, complicate efforts to identify harms. Chalmers (1991), writing from an Australian perspective, has described the physical health effects for a variety of forms of volatile substance abuse. Around the mid-1980s there were around 16 deaths annually associated with volatile substance abuse across Australia. Although deaths are uncommon, over half the deaths occurred in the 15–20-year age group. The main substances causing deaths were fuel gases (associated with 27 per cent of deaths) mainly butane (for example, lighter refills) and propane (LPG gas cylinders); aerosol propellants (24 per cent of deaths) (halogenated compounds, spray paints);

petrol (14 per cent); anaesthetic gases 10 per cent (mainly nitrous oxide and chloroform) and solvents and others 25 per cent (for example, cleaning fluids).

A Victorian investigation examining records held by the state Coroner’s Court and the Institute of Forensic Medicine identified 38 deaths associated with volatile substances between 1991 and 2000. Of these deaths, 14 were related to the toxicity of inhaled substances, eight to accidents related to intoxication, 12 involved suspected suicides, in which substance inhalation had played some role, and four in which a previous history of volatile substance abuse was indicated. The Committee noted that although spray paint inhalation was relatively common, in the cases in which the toxicity of volatile substances had contributed to death, butane lighter refills and LPG gas cylinders were most commonly implicated (DCPC 2002, pp. 94–105).

In the same report, Victorian ambulance data was examined, revealing attendances for 337 volatile substance-related cases between August 1998 and March 2001. Three quarters of these cases had been males and 64 per cent were under age 20 (DCPC 2002, pp. 107–108).

Flanagan and Ives (1994) report that the United Kingdom (UK) has the only reliable information regarding deaths related to volatile substance abuse. They estimated the annual death rate was 40 deaths for approximately 180 000 users (0.02 per cent) aged 14 to 16 years. This age group represented 40 per cent of all sudden deaths associated with volatile substance abuse. An increase in sudden deaths attributed to volatile substance abuse occurred in the UK through the 1980s, largely related to fuel gases and lighter fluids. Death from solvents in glues was reduced slightly in the early 1990s in the UK following the introduction of legislation aimed at preventing sales to abusers. Kurtzman, Otsuka and Wahl (2001) provide a United States review of physical effects and harms.

According to Chalmers (1991), death can occur in four ways in those who inhale:

1. Sudden death is usually caused by the volatile substance interfering with the heart rhythm, causing the heart to stop beating. This can occur

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in first-time as well as chronic users, and cannot be anticipated or predicted.

2. Suffocation can occur when substances are inhaled through a plastic bag, especially if the bag completely covers the head, thereby restricting oxygen and resulting in re-breathing of carbon dioxide.
3. Accident or trauma can occur due to impaired judgement when a person is "high", and can result in death.
4. Organ failure (such as liver failure) and the triggering of secondary health disorders (neurological disorders) have sometimes been observed with heavy chronic users. It is often difficult to establish the direct contribution of volatile substance use as a cause of death, as physical health vulnerability can be pre-existing and other problems such as harmful alcohol use may also be present.

Apart from death, there may be other harms associated with volatile substance use. Some of these harms are associated directly with the effects of chemical compounds on organs such as the lungs, liver and brain, some relate to injuries associated with the method of intoxication (for example, burns to the oral cavity from directly spraying into the mouth), and others are associated with the context in which use occurs (for example, falls, assaults). In general, research has not been able to clearly establish the health or social impacts associated with volatile substance use. This is partly due to the spread in the range of different substances involved and the different ways in which they are used.

Developmental harms occur when substance use undermines the healthy course of child development. This is of particular concern, given that children and young people are the populations with the highest rates of volatile substance use. Involvement in volatile substance use has been shown in longitudinal follow-up research to increase the likelihood that a young person will subsequently progress to illicit drug use. This effect was demonstrated in a United States study after controlling for the influence of a variety of other risk factors (Johnson, Schutz, Anthony & Ensminger 1995). Further research will be required to establish whether this finding applies in other

populations and after controlling for a wider variety of developmental risk factors.

Further research is required to better quantify the prevalence of harms. In some sub-populations, volatile substance use reaches epidemic proportions and in these contexts a high level of harm may be evident.

Risk and protective factors

There has been little research examining the risk and protective factors influencing the likelihood that children will engage in volatile substance use. A number of studies have examined specific populations such as young people in correctional settings.

It is unclear whether use is higher among young people incarcerated in juvenile justice facilities. In surveys of young people entering juvenile incarceration in Mexico City in 1992 (Tapia-Conyer, Cravioto, De La Rosa & Velez 1995), in the late 1990s in Virginia (McGarvey, Clavet, Mason & Waite 1999) and Winnipeg Canada (Young, Longstaffe & Tenenbein 1999), the prevalence of volatile substance use was found to be similar or lower, relative to the wider youth population. This may be due to young people who have progressed to other illicit drug use discounting their earlier use of volatile substances.

Tapia-Conyer *et al.* (1995) examined risk factors by comparing different samples of Mexican youth offenders entering juvenile detention. Cross-sectional analyses contrasted young people self-reporting volatile substance abuse with young people reporting no drug use. Those reporting involvement were differentiated by low socio-economic status, family disintegration and dysfunction, parental abuse, low levels of school completion and low IQ. More proximal predictors included gang involvement and being tattooed, while positive values and beliefs were protective.

McGarvey, Canterbury and Waite (1996) surveyed young people incarcerated in Virginia in the mid-1990s, comparing responses of those who did report previous volatile substance use against those who did not. Reported involvement was lower for minority young people than for non-minority young people. Users were more likely to report family problems

(they did not live with family, they reported fighting and trouble with parents, suicide among relatives). They were more likely to report having threatened to hurt people, and to have committed crimes while under the influence of drugs.

Although a strong relationship appears to exist between volatile substance abuse, educational failure and youth delinquency, studies in special settings such as juvenile justice may not be representative of the broader population of young people involved in volatile substance use. As the substances that are inhaled are commonly available in households and relatively inexpensive, they are therefore accessible to children who are too young or who lack the money necessary for involvement in other drug use (Anderson & Loomis 2003). The experimental involvement by children in volatile substance use may be a marker of a more general underlying interest in substance use (see below). This may be related to individual factors such as favourable attitudes towards drug use, curiosity and to social environmental factors including low parental supervision, access to volatile substances and peer involvement. Those engaging in volatile substance use often describe these substances as not their drug of choice. They prefer to use other drugs but the volatile substances are more accessible, they are cheap and legal, and for this reason they are often the substance used at an early stage by young people interested in drug use. The movement out of volatile substance use is often associated with finding a source of other drugs including cannabis and alcohol (DCPC 2002).

Peer relational networks can interact with availability within a local setting, and can result in an increase in young users. Within a local area, community observers often note that the phenomenon tends to come in cycles or waves. This may be related to social contagion processes with one or other peers instructing others within a social group on methods of obtaining volatile substances and the benefits of their use. As sources of supply diminish or peer cohorts move into other forms of drug use, volatile substance use may become less evident for a period within a particular locality (DCPC 2002).

When asked to report how often they had used volatile substances in their lifetime, student populations most frequently report either no use or use at low frequencies such as once or twice (see Table 2 on page 8). There is evidence that such experimental use is more likely among children with behavioural problems and delinquency (DCPC 2002, p. 32). There is evidence that experimental users tend to discount the risks associated with use. The fact that inhalation can result in a rush and a focused period of intoxication, and that recovery is relatively rapid, are reported by users to be among the attractions enabling them to return home after a period of use while remaining undetected (DCPC 2002).

Experimental volatile substance use may be a marker of risk for other forms of substance abuse. In one of the few longitudinal studies that have examined this issue, inhalant use by age 16 was a unique predictor of heroin use by age 32 (Johnson *et al.* 1995). Dinwiddie, Reich and Cloninger (1991a) found that young people who had previously engaged in volatile substance abuse had a three-fold risk of also reporting involvement in injecting drug use. Dinwiddie, Reigh and Cloninger (1991b) examined the possibility that volatile substance abuse may act as a gateway drug for involvement in illicit drug use. However, the finding in this study was that the age of initiation for different drugs varied considerably. In some cases, volatile substance use started before other types of illicit drug use, while in other cases such use followed initiation to other forms of illicit drug use.

Chronic (frequent) use is associated with risk factors that include social developmental problems, social disadvantage and marginalisation, boredom and extreme feelings of worthlessness. In Indigenous Australian communities, chronic use has been associated with cultural disruption to family structures due to colonisation and dispossession. Chronic users are often described as having deeper social and emotional developmental problems. They tend to have difficulties at an early age in social backgrounds and family backgrounds. There is evidence that they tend to be socially marginalised (DCPC 2002, p. 37). Volatile substance users are often considered to be

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undesirable in the broader peer group hierarchy, and there may be some deliberate attempt among those involved to self-identify with a small, socially marginalised group. In other cases, volatile substance use at a chronic level is seen as self-medicating, a way of temporarily relieving pain and emotional distress (DCPC 2002).

Risk factors in the United States include low socio-economic background, family breakdown, family dysfunction and abuse. Use has been associated with depression and suicidal thoughts, and may predict poly drug and injecting drug use. The association with physical violence and weapon carrying is unclear (Kurtzman, Otsuka & Wahl 2001).

Dinwiddie *et al.* (1991a) reported volatile substance abuse to be associated with antisocial personality disorder and with suicide attempts. Whitehead (1974) reported on one of the early studies demonstrating high co-occurrence between solvent use and other forms of drug use.

In order to establish the relationship between volatile substance use and social developmental risk and protective factors, state-wide student data collected in Victoria in 1999 was re-analysed. Table 2 cross-tabulates findings for the Health and Wellbeing Study in which, in addition to describing their behaviour, students reported on 25 risk factors and 10 protective factors that previous longitudinal research had shown to be influential in predicting the progression to substance abuse (Bond *et al.* 2000).

Table 2: Relationship between the number of elevated risk factors and the number of lifetime occasions of volatile substance use

Number of occasions of lifetime use	Number of risk factors			
	0 to 9		10 +	
	n = 5843	%	n = 2446	%
0	5724	98.0	2052	83.9
1 to 2	83	1.4	230	9.4
3 to 5	16	0.3	69	2.8
6+	20	0.3	95	3.9

Unweighted data for Year 7, 9 & 11 students in Victoria in 1999. Previously unpublished data from Bond *et al.* (2000).

The data presented in Table 2 demonstrate that episodes of volatile substance use were rare among students who had fewer than ten social developmental risk factors. Working down the left column of Table 2, it can be seen that the vast majority of Victorian students reported no (0) occasions of lifetime solvent use. However, the percentage reporting no use was higher (98 per cent) for students with zero to nine elevated risk factors relative to students reporting ten or more (83.9 per cent).

Table 2 reveals that in Victoria in 1999, solvent use was mostly restricted to students who had a high number of developmental risk factors. Although there were a small number of lower risk students who reported that they had tried solvents once or twice, with rare exceptions more frequent use of three or more times was mostly confined to those reporting ten or more social developmental risk factors.

Risk and protective factors: Practitioners' views

Consistent with the research evidence, practitioners suggested that a number of risk factors were associated with volatile substance abuse. Practitioners stated that family conflict and breakdown, as well as domestic violence and abuse, were all issues that were common among volatile substance users. They also stated that being in "the system", such as being involved with the Department of Human Services, as a ward of the state, living out of home or in supported accommodation were risk factors for volatile substance abuse. In keeping with the literature, risk factors identified by practitioners were predominantly distal (early in life), and not proximal.

Consistent also with the research literature, practitioners stated that the effect of social marginalisation and isolation of young people, especially Indigenous Australians, was a significant predictor of volatile substance use. In particular, one practitioner stated that the marginalisation of young people from public spaces was becoming an issue for concern in the city areas, and thus contributed significantly to young people taking up or experimenting with volatile substances. He went on to say that:

The space in the city is often more and more alienating for young people and often it's patrolled and monitored in such a way or constructed in such a way that it excludes young people... and it puts them into places where they are out of view and potentially at risk of, I guess, experimenting with drug use.

In keeping with Mexican and United States research, several practitioners suggested that volatile substance abuse was more prevalent among individuals who could be categorised as having a low socio-economic status. Practitioners suggested that this association could be linked with people in lower socio-economic brackets generally not being able to afford to participate in recreational and other youth activities. Subsequently, many young people in these economic brackets were said to be dislocated from many common social processes.

However, some practitioners did not share the view that socio-economic status was a risk factor. These practitioners suggested that low socio-economic status may occur alongside volatile substance abuse, but that it is not necessarily causally related. Confirming findings in the literature, these practitioners stated that the lack of recreational activities in the community and the disengagement of young people from their communities often led to boredom, elevating engagement in negative activities. One practitioner went on to say that this notion could be supported by a marked rise in volatile substance abuse during school holidays.

No practitioner reiterated the research literature which suggested that low IQ was a potential risk factor for volatile substance abuse; however, practitioners supported the idea that low levels of school completion and problems at school were significant risk factors associated with volatile substance abuse. Peer pressure was also suggested to be a potential risk factor. Issues such as mental health, helplessness and hopelessness among youth cohorts were also identified by practitioners as potential risk factors.

Although the research literature does not extensively describe factors that may protect young people from volatile substance abuse, practitioners suggested

a variety of protective elements. Factors included having good family and community connections, having support from school teachers and parents, and young people having access to recreation and counselling.

Consistent with the research evidence, essentially practitioners indicated that environments that promote and build resilience were the best protective factor for young people from volatile substance abuse. They also suggested that building self-esteem and self-awareness in young people and responding to their mental health issues all served as protective factors against the harms associated with volatile substance abuse. One practitioner said:

So protecting is a strange thing really... how do we protect young people... we can't wrap them up in cottonwool but we can give them opportunities to see that there is assistance for them, there is a light at the end of the tunnel... a lot of people that we work with feel really negative about their environment because they are not heard or seen, so for us it's about building self-esteem... The more aware they [young people] are, that they are viable individuals, the more likely they are to move from their substances.

The importance of social influences as a protective factor was also suggested by practitioners. Practitioners argued that the majority of young people's interactions occurred in schools, and thus the use of positive mentors and leaders in schools were possible ways of promoting healthy choices.

A few practitioners stated the benefits of using a harm minimisation approach to reduce the harms associated with volatile substance abuse. They suggested that the harm minimisation approaches provided access to services, peer networks and safer using information. Harm minimisation approaches have recently been conceptualised to operate as protective factors, by reducing harm in high-risk populations without necessarily reducing risk factors or drug use (Loxley, Toumbourou, Stockwell, Haines *et al.* 2004). It was also stated that the absence of risk factors in a young person's life also acted to

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protect him or her from the harms associated with volatile substance abuse.

As mentioned in the previous section of this report, the research literature suggests that experimental involvement in volatile substance abuse is possibly a marker of an underlying interest in substance abuse. There were mixed reactions among practitioners about the accuracy of this statement. For example, one practitioner who disagreed with the statement suggested curiosity, accessibility and peer pressure as reasons for experimental involvement with volatile substances.

In contrast, a practitioner who agreed with the statement suggested that this theory was common to all types of drug use, not just volatile substance abuse. He went on to say that:

I think you will have a lot of youth whether they experiment with illicit drug taking, or whether they experiment with alcohol, whether they experiment with smoking cigarettes, it's always going to be a measure that is prone to them.

Similarly, another practitioner who partly disagreed said:

I mean, it's probably true if you go backwards... you know like going to Port Phillip prison and saying, 'How many people here have been through the juvenile justice system?', 95 per cent of people stick up their hands. But if you go to and look at all the people who were involved with the juvenile justice system at [age] 15 and then say, 'Now how many of you have gone on to offend and end up in an adult prison?' you might only get 10 per cent or 5 per cent.

The same practitioner went on to say that he believed the evidence suggested that volatile substance abuse was a marker for another factor. He believed that experimental involvement with volatile substances was attributable to a tendency to engage in risk-taking behaviour, not a general interest in drug use.

In summary, with the exception of IQ, comments above suggest that practitioners' views of risk factors associated with volatile substance abuse were in line with those suggested in the literature. Practitioners also identified mental health and peer-related issues

as also being significant risk factors, a point that was briefly touched on in the literature.

Practitioners also recognised that, while the research evidence does not suggest a causal relationship between risk factors and volatile substance abuse, they were significantly linked to volatile substance abuse. The overall protective factors suggested by the practitioners were aimed towards building a healthy environment and resilience in young people. Their views were also in keeping with those suggested in the literature. The views of the practitioners regarding volatile substance abuse as a marker of interest in other forms of substance use were mixed. While most recognised that experimental involvement could be a marker for an underlying interest in substance abuse, many disagreed with the statement as being too generalised.

Prevention and early intervention for experimental and chronic use

At this stage there have been no definitive evaluations of preventative programs that have successfully addressed problems associated with volatile solvent use. Reviewers generally acknowledge that intervention efforts over the past two decades have had little preventative impact (Chalmers 1991; Ives 1994) and treatment programs remain poorly equipped to treat volatile substance abuse (Anderson & Loomis 2003). The DCPC (2002) review described a range of programs that had incorporated good-practice features and, in some cases, communities have observed reductions in volatile substance abuse over time following the introduction of intervention efforts.

The DCPC (2002) recommendations for advancing intervention efforts called for a coordinated, multi-level approach incorporating:

- improved data collection
- legislative changes to provide civil apprehension and detention for intoxicated persons
- police powers to seize and confiscate materials related to volatile substance abuse
- increased resources for state coordination
- the development of community networks and local protocols

- education in the context of Occupational Health and Safety training
- educational interventions for teachers, parents, police, emergency service personnel, youth and community health workers, and community members
- specific responses for Indigenous Australian communities
- a media protocol
- industry participation to develop safer spray products.

(DCPC 2002)

In the period following the publication of the DCPC (2002) report, there has been action to implement a number of the recommendations. Relevant actions include:

- State Government participation on the National Inhalant Abuse Taskforce to get volatile substance abuse recognised in national and state drug policy frameworks
- new laws implemented from 1 July, 2004 by amendment to the Drugs, Poisons and Controlled Substances Act 1981 (Vic.) introduced new police powers to intervene "in the best interests" of young people (under age 18) impaired through volatile substance intoxication, by searching, seizing substances, detaining young people and placing them into care options
- research commissioned through the CSIRO investigating the feasibility of using bittering agents and other options to make the most harmful volatile substances less attractive and/or available for inhalation
- production and distribution of 3000 copies of a Retailers Kit (Department of Human Services 2002b) incorporating information, voluntary industry guidelines for the display and sale of volatile substances, and store notices
- production and dissemination of guidelines for treatment and youth services for detection of volatile substance abuse and intervention
- development of a Koori community education package incorporating information for community workers, professionals and parents (Department of Human Services 2002a).

(Tomaszewski & Tudor 2003)

The DCPC (2002) identified the need to approach education campaigns directed at children with caution, because of the possibility of encouraging experimentation. Campaigns that describe volatile substance use, even in the context of teaching about harms, risk increasing young people's involvement in these behaviours (DCPC 2002). Reporting on educational approaches in the UK in the 1980s, Lee (1989) stated that volatile substance abuse was covered in a general way as part of the health education curricula. There is some evidence that school drug education based on a Life-Skills approach may have a positive impact on a variety of forms of drug use with high-risk young people. A follow-up in the United States of high-risk New York students who had been exposed to a whole-school application of the Life-Skills drug education approach demonstrated a small but significantly reduced prevalence of volatile substance use, relative to students randomly assigned to the control condition (Griffin, Botvin, Nichols & Doyle 2003).

As stated above, risk and protective factors influencing involvement in volatile substance abuse are still inadequately understood. Based on current knowledge, it appears that involvement in volatile substance abuse may be a marker along developmental pathways progressing toward poly drug and illicit drug use (Johnson *et al.* 1995). Given that volatile substance abuse has been associated with problems in early development including child abuse and developmental deficits including low IQ, and family breakdown, it is likely that early home visitation and other programs which offer one-to-one support for vulnerable families may reduce early developmental risk factors (Olds, Henderson, Kitzman, Eckenrode *et al.* 1999).

In the UK it has been found that laws aimed at prosecuting and restricting suppliers of volatile substance products did not reduce volatile substance abuse, but instead resulted in users switching from glue sniffing to the more dangerous practice of butane inhalation (Ives 1994). In the UK, the sale of butane lighter refills has been restricted to people over age 18, but there is as yet no evaluation on the effectiveness of this measure. Authorities' efforts to restrict sales of volatile substance to juveniles

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face a number of difficulties, including the large range of products that can be used, the possibility that products may be stolen if they cannot be bought and the possibility that some traders may be uncooperative (DCPC 2002).

Evidence presented in this report reveals that social developmental risk factors for substance abuse are highly correlated with students' use of volatile substances in Victoria. This evidence suggests that community efforts to reduce locally elevated risk factors and increase depressed protective factors within specific communities (for example, Toumbourou, Rowland, Williams, Hemphill & Farrell 2002) may result in lower rates of volatile substance abuse.

In preparing more specific community responses to address volatile substance abuse, local community networks could work to develop agreed protocols that guide local intervention. At a minimum, such protocols could cover:

- educational interventions for teachers, parents, police, emergency service personnel, youth and community health workers, and community members
- the role of police and emergency service personnel in intervening with young people actively engaged in volatile substance abuse
- coordination and intervention aimed at the reduction of supply
- the involvement of parents and carers
- harm-minimisation educational interventions for targeted young people
- the use of multisystemic treatment programs which aim to address the developmental needs of targeted young people over time.

(DCPC 2002)

Volatile substance abuse use may be an indicator of the need for early intervention to address the subsequent development of substance use problems. In Victoria, the new police powers for intervention have the potential to assist in building links to broader assessment, early intervention and care options. Police involvement in assessment and referral for at-risk young people has been reported previously in Gippsland (Anders & Gye 2000).

However, the implementation of these provisions will need to be closely monitored to ensure they do not have unintended consequences such as pushing vulnerable children into other forms of substance abuse.

In many states, including Victoria, legislation has been enacted which make it an offence to sell a substance if there is reasonable cause to believe that the substance will be used for the purposes of intoxication. As it is notoriously difficult to prove the intended use of a substance or that the person selling the substance had relevant knowledge of its intended use, such legislation has not been considered a successful method of reducing supply (DCPC 2002). It may be possible, however, that such legislation, along with active community campaigns, could be used to encourage retailers to change supply practices.

Previous reports in the present series have reviewed preventative interventions for parents and families. There are a number of evidence-based strategies that appear effective in improving outcomes for young people where parents and families have been targeted for intervention. A community response could offer parents and carers access to evidence-based parent education or family intervention (for summaries, see Toumbourou, Rowland, Leigh, Hemphill *et al.* 2003a, Toumbourou, Duff, Bamberg & Blyth 2003b).

The use of multisystemic treatment (MST) programs aimed over time at addressing the developmental needs of at-risk young people has evidence for efficacy in the context of United States juvenile justice interventions (for example, Henggeler, Melton & Smith 1992). An MST training site has recently been established in New Zealand, but as yet no Australian sites are available. A key feature of the MST approach is the payment of financial incentives to clinical staff to achieve clinical targets set in consultation with clients and their families. These may include goals such as re-entry to school, restoration of harmonious family relationships and participation in mentorship programs.

A review of petrol sniffing intervention projects has been undertaken by d'Abbs and MacLean (2000).

Although the existing information is limited, a number of interventions appear to have been effective, with the more promising ones, broadly focused to improve overall health and wellbeing. Indigenous Australian communities have used supply reduction strategies to reduce petrol sniffing and related harms. In communities in Central Australia and Arnhem Land, aviation fuel—which does not have the same psychoactive effects as petrol—has been successfully substituted for petrol (d'Abbs & MacLean 2000). This has been most effective when introduced in conjunction with other interventions, but can be undermined when petrol remains available from other sources. Another measure to reduce availability has been to lock petrol supplies in communities, but this has had virtually no success (d'Abbs & MacLean 2000).

Prevention and early intervention for experimental and chronic use: Practitioners' views

All practitioners agreed that a multisystemic approach was needed to advance interventions relating to volatile substance abuse. However, practitioners' views varied on what a multisystemic approach should consist of. It was suggested by most practitioners that an important element in this type of approach was the need to develop a system of support as well as to address all aspects of the person's situation, not just their substance use. In order to do this, it was suggested that practitioners look at the most pressing issue of the young person who is using volatile substances. As mentioned in the risk and protective section earlier, young people who use volatile substances were said to often have concerns relating to family, peers, living arrangements or mental health. One practitioner stated the following in relation to a multisystemic approach addressing volatile substance abuse:

Well it's better than doing nothing. Secondly, it's better than having either a health only or an enforcement only or a prohibition only approach, because it deals with all the different subtleties and aspects of it, it enhances and reinforces the roles of the stakeholder, of the service

stakeholders... it's everyone's issue as young people are everyone's asset.

Other suggestions by practitioners as necessary for a multisystemic approach included education and support for teachers, parents, youth workers and the general public regarding volatile substance abuse. Consistent with the DCPC (2002) report, it was also suggested that the coordination of responses between governments, councils, agencies, community and schools was essential. One practitioner stated that:

You need to look at not only state government-based policies but external agencies to the state government and again, you need measures in place with the community, local council, and also schools in general. And I suppose you're trying to say, well, address the issues, what are the issues relevant to why young kids and adolescents take drugs... and I think you really need to weigh up what are the risk factors and what are preventative measures that really can address these issues. I think you've also got to have community groups who support these activities; it's no point that the police are doing something or the state government or another agency is doing something, yet it's not supported at a local level.

To a lesser degree, the role of the emergency services sector and the industry involved in the sale of these substances were also addressed by practitioners. Inconsistent with the findings of the research literature, many practitioners did not believe that these organisations were essential to this approach. Several practitioners believed that the industry has done all that it can do to address the issue, and that restricting or banning the sale of volatile substances was not the answer. Product modification and restriction of sale was described as being too difficult due to the number of products involved, and that removal of such products would result in a shift of use from one product to another.

Consistent with the DCPC (2002) report, practitioners saw the police as an important part of a multisystemic approach. However, many practitioners shared the view that punishment was not the answer,

Prevention of harms associated with volatile substance abuse

and that police resources should concentrate more on preventing substance abuse by addressing the causes rather than the outcomes of volatile substance use. One practitioner suggested that changing legislation and increasing police powers was only a “band-aid” response to the problem, and indicated that he believed that it is much better to look at the conditions of people’s lives.

The efficacy of protocols involving police and the industry was questioned by several practitioners. Inconsistent with the research literature, supply reduction was seen by practitioners as being ineffective, as there was no possible way of removing all volatile substances, and the production of substances that were harmless was not foreseeable in the near future. Changes to police legislation was seen as possibly causing more harm, because it was suggested that it may push volatile substance use underground, resulting in more harmful consequences.

Consistent also with the DCPC (2002) report, the media was also mentioned as being an essential component in a multisystemic approach. It was suggested that volatile substance abuse needs to be demystified, and that the media could be used to promote this activity. In contrast, it was suggested that the media influences volatile substance use to a degree, as there has been evidence of use increasing when publicised in the media.

One practitioner suggested a three-level approach to dealing with volatile substance abuse. Level one would comprise the creation of healthy environments and building on parenting skills to reduce risk factors. The second level involved the introduction of drug education, and the third level addressed those people already using volatile substances by providing services and support for them.

Another practitioner detailed the protocols that need to be addressed in a multisystemic approach. Consistent with the research evidence, he suggested two levels of support. One level would be community based, involving support and advice for parents, teachers, community leaders and police. The other level would be service-based, involving operation and coordination of local outreach services such as youth drug and alcohol services, child protection and

mental health services. Overall, it involved working together at the community level and then having the organisations coordinating activities.

Generally, practitioners believed that it was important to put the right organisations in the right role, and that coordination and leadership was important to ensure everyone was appropriately involved when required:

I’m very positive about that sort of approach. Rather than State government set up a chomping service like a one-off sort of individual service, I think what you need is more of a system, rather than just another new service... but I think we’ve got the skills and the know-how on the ground; it’s just having the system to make it all work.

A number of practitioners referred to the “Inhalant Program” and the “Connecting Koori Kids” program currently being run in Gippsland as an example of effective multilevel approaches. Both these approaches consisted of a day program involving life-skills development, an outreach program and a program promoting recreation and primary health activities. Consistent with the literature, the effectiveness of such an approach was said to be that a life-skills drug education approach positively impacted on young people and was associated with a significant reduction in the prevalence of volatile substance abuse.

Despite the DCPC report (2002) proposing elements of a multisystemic approach, it says little about the limitations and/or hurdles associated with such an approach. Practitioners identified several hurdles, the primary one being a lack of resources. Specifically, limited funding was identified as a major hurdle that needed to be overcome in order to implement a multisystemic approach. It was noted that many concerns come into public attention and interventions are developed, and then they tend to drop away. Moreover, the programs lose funding and tend to be forgotten. It was said the interventions and approaches developed need to be continuing in order for a multisystemic approach to be viable.

It was also suggested that the coordination and matching of ideas, aims and protocols of the

different organisations was a hurdle that needed to be managed when implementing a multisystemic approach. It was suggested that such approaches rely heavily on organisations working well together and collaboratively channelling their efforts towards a common goal.

Practitioners were quick to point out that an inevitable issue in a multisystemic approach is the delegation of leadership. Within consortia and communities, a leader and/or coordinator is required. One practitioner suggested that there are always going to be one or two organisations that have a large workload, which puts a strain on the resources of that organisation. It was also suggested that this approach wouldn't necessarily work everywhere, as different communities have different resources available, "its not a one size fits all".

In summary, the multisystemic approach was considered by all practitioners to be the most viable and sensible way of tackling the issue of volatile substance abuse. Although views on what this approach should consist of varied, most of the opinions were in keeping with the research literature. An exception to this was the mixed views regarding the role of police and industry participation. The protocols and sectors suggested by the practitioners to guide local interventions were also in line with those suggested in the literature. However, again there were mixed opinions about the roles of police and industry, in relation to protocols. Practitioners believed that a multisystemic approach was attainable, if the nominated hurdles and limitations could be overcome.

As always, initial and continuing funding was reported to be the predominant limitation.

Conclusion

In conclusion, this report reveals that considerable work has been undertaken over recent years to better document the issues underlying involvement in volatile substance abuse and the potential for preventative intervention. Although the available research is limited, there is evidence that volatile substance use tends to involve a minority of young people who have higher levels of early risk factors that increase their likelihood of other developmental problems, including other forms of substance abuse. The present time is an active one in the development and implementation of new responses to this issue. Consultation with the practitioners interviewed for this report suggested that they were mostly up-to-date with developments in the research and literature. Conditions appear to be set for a novel social experiment in Victoria, where police are encouraged to play a greater role in early intervention with young people involved in volatile substance abuse. Over time it will be apparent whether operational police and health and service agencies are adequately prepared and resourced to be able to provide benefit to young people apprehended through this novel multisystemic model. Practitioners generally appear to understand this model and are prepared to assist its implementation. There is a need to carefully evaluate the success of new early intervention approaches. However, to ensure evaluation occurs, resources and expertise need to be allocated.

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