

**C. Finney Lamb, P. Dillon & J. Copeland**

**Investigating reasons for the cessation of  
volatile substances:  
A qualitative study**

**NDARC Technical Report No. 284**

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**INVESTIGATING REASONS FOR  
THE CESSATION OF VOLATILE  
SUBSTANCES:  
A QUALITATIVE STUDY**

**Cathryn Finney Lamb, Paul Dillon, Assoc Prof Jan  
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## EXECUTIVE SUMMARY

Little research has been conducted into inhalant user perceptions of their own motivations for use and cessation of inhalants. This study was conducted to inform interventions and identify appropriate prevention messages for volatile substance users. It aimed to identify and describe the motivations for inhalant use and cessation; patterns of use and perceptions of harms amongst inhalant users.

Due to the lack of research that has been conducted on this issue, qualitative methods are used to identify and describe factors that have previously been undocumented or unknown. Ten semi-structured interviews were conducted with young people or adults over the aged of 16 years, who had previously used inhalants in the context of polydrug use, but had not used an inhalant in the last 4 months. A thematic analysis was conducted on the transcript data and notes.

All participants reported polydrug use. Eight were current users of illicit drugs and 2 reported that they were not currently using illicit drugs. The average age of initiation of inhalant use was 13 years (ranging between 5 and 21 years). Nine of the ten participants reported using more than one inhalant. Five of these participants reported using at least one inhalant experimentally (less than 5 times), in addition to regular use of other inhalants.

Four types of inhalant use that were reported: aborted experiments; temporary use and cessation; episodic use; and everyday use. Motivations for initial use that were reported included curiosity, boredom, complying to friends' wishes to experiment, and substituting for other drugs that were not available. Reported motivations for ongoing use included fun, enhanced enjoyment of the high because inhalants are not illegal, cheapness and accessibility, substitution for drugs of preference, enhancing the 'high' of other drugs, boredom, social motivations and a desire to stay intoxicated.

This research also identified specific types of cessation of use that occurred within this group of polydrug users: final cessation of one inhalant; circumstantial cessation of the use of one inhalant; and cessation of regular use of all inhalants and other drugs.

Participants reported a range of factors contributed to their desire or decision to stop use of an inhalant. Deterrents to use included unpleasant aspects of use, dislike of acute experiences of use, such as headaches, nausea and vomiting, having no high or a 'bad high', perceived stigma, and beliefs about harms associated with use. Bad experiences, for example, inhalant-related accidents, and relationships with significant others also contributed to cessation.

Participants reported that they stopped using inhalants because drugs that they preferred were socially or physically available. Reasons for their preference for other drugs include having a dislike for the immediate effects of inhalants compared to other drugs, for

example, nausea; receiving a 'better high' from other drugs which is stronger and longer lasting, or in the case of injecting drugs 'instantaneous'; and having a preference for drugs that acted as 'uppers' rather than as a depressant. A change in the access to preferred drugs or to social patterns of drug use occurred when meeting someone who provided access to cannabis; a move away from a country town to another country town or to the city. Participants reported that in urban centres, drugs were cheaper and there was a wider range of illicit substances were available.

The findings of this study provide new information about the types of use and cessation of inhalant users amongst polydrug users, and motivations or deterrents to use that are specific to inhalant use. Reported motivations for the initial or ongoing use of a particular inhalant were similar to those reported for other drugs. However, some motivations appeared to be specific to the inhalant products. These included the products' low cost and accessibility, enhanced enjoyment because inhalants are not illegal, and substitution for drugs of preference.

Our findings suggest that multiple factors (e.g., unpleasant aspects of use or health beliefs about use) contribute to a desire to stop, or a preference for other drugs. However, several factors appeared to contribute directly to the final cessation of one inhalant, or all inhalants and/or other drugs. In the stories of inhalant users who participated in this research, final cessation appeared to be linked to a health scare which highlighted the users' own mortality, e.g., hospitalisation due to an overdose from another drug or for lung-related health problems. Termination of experimental use appeared to be due to an event in which the negative aspects of use (for example, a very bad headache) outweighed the perceived benefits, or when the substance does not induce the expected feelings of intoxication.

The results also provided insights into the following concepts regarding inhalants in the literature: such as treating inhalants as a one 'class' of drugs; the perception of inhalants as 'gutter drugs'; episodic patterns of inhalant use; sequence of initiation in drugs; reasons for inhalant cessation; motivations and deterrents for use; and patterns of use in rural and urban areas.

Given the small sample size, the research cannot be expected to capture the full range of factors (motivations and deterrents for inhalant use, and patterns of use) that exist within this group. The study encountered major difficulties in recruitment, particularly with young people who were not polydrug users. The recruitment issues encountered in this study need to be considered when conducting future research with inhalant users.



# 1. INTRODUCTION

## 1.1 What is volatile substance abuse?

Volatile substance abuse has been defined as the deliberate inhalation of a volatile substance to achieve a mental state (Advisory Council on the Misuse of Drugs, 1995). Volatile substances are products that give off vapours or gas at room temperature which can be inhaled to induce an intoxicated state (Drugs and Crime Prevention Committee, 2002). They are commonly referred to as inhalants, and include a very broad range of domestic products, including fuels, solvents, aerosols, glues, adhesives and paint thinners.

The Australian Standard Classification of Drugs of Concern (Australian Bureau of Statistics, 2000) classifies volatile substances by their chemical composition under three groups: volatile solvents, anaesthetics and volatile nitrates. It has been argued that the separation of 'inhalants' into these three subclasses is important because each of these groups of inhalants is used in a different social context and have different consequences of use (Beauvais and Oetting, 1987).

Volatile nitrates are often considered separately from other inhalants for a number of reasons. They have different physiological effects. They are not used in the same way as other inhalants because they are not marketed as domestic products, do not cause intoxication, are associated with the party scene, and have a different culture or social meanings surrounding their use (Advisory Council on the Misuse of Drugs, 1995; Drugs and Crime Prevention Committee, 2002). Nitrates are similar to other volatile substances in that they are inhaled. In this report, we examine nitrate use in the context of drug careers and polydrug use.

Several terms have been used in the literature to describe the abuse of particular volatile substances. These include glue sniffing, inhalant abuse, solvent abuse and chroming (Drugs and Crime Prevention Committee, 2002). The British Home Office's report of the Advisory Council on the Misuse of Drugs favours the use of the term 'volatile substance use', as these other terms do not capture the breadth of substances or methods employed (Drugs and Crime Prevention Committee, 2002). In Australia, the final report of the National Inhalant Abuse Taskforce used the term 'inhalant abuse' in presenting a national framework to address this issue (National Inhalant Abuse Taskforce, 2006). We use the terms 'volatile substances' and 'inhalants' interchangeably in this report.

Various demographic groups have been reported to engage in volatile substance abuse, and each of these are likely to have different patterns of inhalant use. Understanding the social context of volatile substance use in different social and demographic groups may provide insights into more holistic interventions (Rose, 2001). Demographic groups for which there may be specific patterns of volatile solvent use include young people, rural and urban Indigenous communities, as well as disadvantaged or homeless adolescents and adults (Drugs and Crime Prevention Committee, 2002). The use of anaesthetic gases has been observed in professional groups in the medical community (Chalmers, 1991;

Drugs and Crime Prevention Committee, 2002). Volatile nitrate use (amyl and butyl nitrites) has been reported in the gay community and also within the nightclub/dance party scene (Boys et al., 1997; French and Power, 1998; Drugs and Crime Prevention Committee, 2002; National Inhalant Abuse Taskforce, 2006).

Little is known about the natural history of inhalant use in the general population (Balster, 1998). Some researchers (Beauvais and Oetting, 1987; May and Del Vecchio, 1997) have proposed that there are at least three types of inhalant use: youthful experimental use, poly-substance use in adolescence, and chronic patterns of use (usually in adulthood). A final report of the National Inhalant Abuse Taskforce (National Inhalant Abuse Taskforce, 2006) prepared for the Intergovernmental Committee on Drugs (IGCD) identified the need to research 'inhalant use as part of polydrug use'. In this study, we examine volatile substance abuse amongst adolescents and young adults who are polydrug users.

## **1.2 Products and classification systems for volatile substances and their use**

The categorisation of inhalants has been problematic, because of the great range of substances available (Drugs and Crime Prevention Committee, 2002). In Australia, around 250 domestic products that could be potentially used as intoxicating and inhalable solvents have been identified in supermarkets, newsagencies and hardware stores (Drugs and Crime Prevention Committee, 2002). Many of these products can be cheaply and legally purchased in Australia, although there are restrictions on some products (Australian Institute of Criminology, 2005).

Inhalant products differ in their chemical composition. Volatile solvents include chemicals such as toluene, butane, propane, fluorocarbons, chlorinated hydrocarbons, and acetone (Australian Bureau of Statistics, 2000). Several chemical compounds make up the anaesthetics group (Australian Bureau of Statistics, 2000). The most commonly abused is nitrous oxide, also known as laughing gas (Drugs and Crime Prevention Committee, 2002). Volatile nitrates are a different group of substances including chemicals such as cyclohexyl nitrite, amyl nitrate and butyl nitrate (Australian Bureau of Statistics, 2000; National Institute on Drug Abuse, 2000).

The National Institute of Drug Abuse (NIDA) (National Institute on Drug Abuse, 2000) has proposed a categorisation system for inhalants that incorporates the physical aspects of the products. This classification system identifies four groups of volatile substances: solvents, aerosols, gases and nitrates. A description of the products that can be classified under each of these categories is outlined below (National Institute on Drug Abuse, 2000; Drugs and Crime Prevention Committee, 2002).

## Solvents

Liquids or semisolids such as glues that vaporise at room temperature are classified as solvents. Two types have been identified.

***Industrial or household solvents***, e.g., paint thinners and removers, degreasers, dry cleaning fluids, gasoline and glue.

***Art or office solvents***, e.g., correction fluids, felt tip marker fluid and electronic contact cleaner.

## Aerosols

Household aerosol propellants contain propellants and solvents. These include products such as spray paints, hair and deodorant sprays, insect sprays, vegetable oil sprays for cooking, fabric protector sprays and computer cleaning products.

## Gases

Gases can include household or commercial products, and medical anaesthetic gases.

***Gases used in household or commercial products*** can contain refrigerant gases, gas fuels, such as butane cigarette lighters, bottled domestic gas and cylinder propane gas, whipped cream aerosols and dispensers.

***Medical anaesthetic gases*** can include ether, chloroform, halothane and nitrous oxide.

## Nitrates

Nitrites are volatile liquids that are inhaled to produce a near instantaneous 'rush' that can last from a few seconds to five minutes. They are usually sold in glass vials and often referred to as 'poppers' by users. To avoid legal restrictions they can be sold as 'video head cleaners', 'room de-odourizers', or 'leather cleaners'.

Almost all volatile substances act as central nervous system depressants. The user can experience a feeling of euphoria, not unlike the effects of alcohol. Other immediate effects are also similar to alcohol intoxication. Small doses cause a reduction in inhibitions, and may also induce delusions and hallucinations. Large doses may produce life threatening effects such as convulsions and coma (World Health Organization Substance Abuse Department, 1999).

Volatile nitrates are a separate group of volatile substances, as the physiological effects of nitrates differ from other volatile substances (Drugs and Crime Prevention Committee, 2002; National Inhalant Abuse Taskforce, 2006). Nitrites do not directly act on the central nervous system, but act primarily to dilate blood vessels and relax the muscles. They are used primarily as sexual enhancers, and have also been used to produce euphoria or alter mood.

### 1.3 Use of inhalants

The method of inhalation is usually determined by the physical nature of the substance and the mode of container that it is procured in (World Health Organization Substance Abuse Department, 1999). Three generic modes of inhalation are commonly described in the literature (National Institute on Drug Abuse, 2000; Brouette and Anton, 2001). These include:

- Inhaling a substance from a container ('sniffing' or 'snorting') by pouring the substance into a plastic bag and breathing the fumes ('bagging'). The re-breathing of exhaled air from the bag causes oxygen deficiency, which intensifies the effect.
- Spraying directly into the mouth from a container, or spraying the substance into a balloon and allowing the balloon to implode in the mouth.
- Saturating a rag or cloth with the substance and holding it over the nose and mouth whilst inhaling ('huffing').

### 1.4 Short-term effects

The intoxicating effects of volatile solvents are similar to those experienced with the use of alcohol (Chalmers, 1991; World Health Organization Substance Abuse Department, 1999). Inhalation provides rapid onset and relatively short duration of symptoms (Chalmers, 1991). Four stages of depression to the central nervous system may occur, with users' experiences varying according to a range of factors, including the dose (Drugs and Crime Prevention Committee, 2002).

**Initial** – effects experienced in this stage may include dizziness, exhilaration, visual and auditory hallucinations, and nausea

**Early central nervous system depression** – dullness, disorientation, loss of self control, and blurred vision

**Medium central nervous system depression** – drowsiness, lack of muscular coordination, and slurring

**Late central nervous system depression** – stupor, delirium, and epileptic type seizures

In addition to the short-term effects associated with intoxication, such as nausea, vomiting and unconsciousness, frequent use of volatile substances has been associated with nosebleeds, sores around the mouth and nose, flu-like symptoms, e.g., sneezing, coughing or a runny nose, and breath contaminated by the smell of the product (Drugs and Crime Prevention Committee, 2002; Australian Drug Foundation, 2006).

Since nitrates are not depressants, their effects differ to the use of other inhalants. Nitrates promote a floating sensation and increased skin perception, which is followed by reduced social and sexual inhibitions, heightened sexual arousal and prolonged orgasm

(Brouette and Anton, 2001). Short-term effects of nitrate use can also include headache, dizziness, palpitations, feeling faint, nausea, vomiting, weakness, restlessness, cold chills, and involuntary emptying of their bladder (Brouette and Anton, 2001).

## 1.5 Patterns of use

In Australia, within non-rural areas, the inhalation of these products has been reported, for the most part, to be a practice among non-indigenous youth (Drugs and Crime Prevention Committee, 2002). This report focuses primarily on patterns of volatile substance use amongst young people.

Policy documents describe volatile substance use for adolescents to be predominantly a passing phase: most adolescents who try inhalable products are believed to do so only a few times and not to move on to regular or problematic use (World Health Organization Substance Abuse Department, 1999; National Inhalant Abuse Taskforce, 2006).

Data from the National Strategy Drug Household Survey (Australian Institute of Health and Welfare, 2005) demonstrates that inhalant use in Australia is initiated at a young age. The average age of initiation of inhalant use was 13.4 years. This was the lowest age of initiation for any illicit drug and was equivalent to that for analgesics. Six percent of respondents (aged 14-19 years) reported that they had had been offered or had an opportunity to use inhalants in the last 12 months and 20.9 % of these reported that they had used them. Less than three in a hundred (2.4 %) young people aged 14-19 years reported lifetime use of inhalants, and 1.0 % of young people aged 14-19 years reported use in the last 12 months.

Figures from the National Drug Household Survey are likely to underestimate the prevalence of volatile substance use because most of this use occurs before the age of 14 years (Drugs and Crime Prevention Committee, 2002). The Australian Secondary Student's Alcohol and Drug (ASSAD) Survey may better reflect inhalant use among young people (Drugs and Crime Prevention Committee, 2002), although it does not capture young people who have dropped out of mainstream education and at higher risk of inhalant use or younger users still in primary school (National Inhalant Abuse Taskforce, 2006). In the 2002 ASSAD Survey, 23 % of 12-15 year olds reported that they had used inhalants in their lifetime (National Inhalant Abuse Taskforce, 2006). Reported lifetime use of inhalants decreased with age: 26 % of 12 year olds reported lifetime use of inhalants, compared to only 12 % of 17 years olds. This pattern of lower levels of reported lifetime use as adolescents age does not occur with other drugs. It is unknown whether decreasing lifetime use is due to boasting about substance use that never occurred, to forgetting its use at a later age, or denial of use that is subsequently regarded as childish (Toumbourou et al., 2004).

The National Drug Strategy Household Survey (Australian Institute of Health and Welfare, 2005) reports that 47 % of inhalant users reported that they usually obtained

inhalants from a shop, and 36.7% from a friend. The most common location for inhalant use is in the home (71%) with less than a third (30.9%) reporting use at parties.

The same survey reported that concurrent use of other drugs is common among volatile substance users. Recent users of inhalants were asked which other drugs they have used (on at least one occasion) at the same time as inhalants. Drugs that are commonly used concurrently with inhalants are alcohol (55.7%) and cannabis (40.9%), ecstasy (30.8%) and speed (24.3%). Twenty four per cent (23.9%) reported that they had not used another drug (31). A study conducted in Western Australia with 83 people who had been to a rave in the previous 6 months documented that nitrates were commonly combined with dance drugs (Boys et al., 1997).

Policy documents and reports in the Australian context have described the patterns of volatile solvent use at a community level to be episodic and cyclical, particularly in rural communities (Drugs and Crime Prevention Committee, 2002; National Inhalant Abuse Taskforce, 2006). In addition, preferences for particular inhalable products have been described to occur in cycles (National Inhalant Abuse Taskforce, 2006).

The inhalation of vapours from spray paint, known as chroming, seems to be the most popular form of inhalants in cities in Australia (Drugs and Crime Prevention Committee, 2002).

## **1.6. Harms**

The physiological and toxicological effects of volatile substances vary across the range of products. Many different chemical formulas are contained within the range of products that can be used as inhalants. Although some products may be chemically pure, others may consist of a mix of substances or have unknown formulations (Drugs and Crime Prevention Committee, 2002).

The severity of harm linked to the product's use may also vary according to the method of administration. For example, direct spraying into the mouth can have more serious health consequences than huffing from a rag (Drugs and Crime Prevention Committee, 2002).

Nevertheless, the following harms have been associated with volatile substance use in the literature.

### **1.6.1 Mortality**

Death from volatile substances can occur by a number of means. Studies indicate that sudden sniffing death syndrome can account for up to 50 percent of the deaths associated with volatile solvents (Anderson and Loomis, 2003). Mechanisms of sudden death include anoxia, (where there is not enough oxygen in the tissues), respiratory depression, cardiac arrhythmias and vagal inhibition (usually associated with spraying aerosols directly into the mouth) (Shepherd, 1989; Chalmers, 1991).

Inhalant-related deaths can also be caused by asphyxia (where oxygen is displaced from the lungs and then the central nervous system), suffocation (by blocking air from entering the lungs when inhaling fumes from a plastic bag over the head), convulsions, seizures or coma, choking from inhalation of vomit, and fatal injury, including motor vehicle fatalities, whilst intoxicated, fluid in the lungs and brain, and underlying allergic reactions (National Institute on Drug Abuse, 2000; Anderson and Loomis, 2003).

Volatile substance related mortality has been documented internationally, in the UK, USA and Australia, although most of this data is now over a decade old (Chalmers, 1991; Bowen et al., 1999; World Health Organization Substance Abuse Department, 1999; Brouette and Anton, 2001). Only two studies on inhalant related mortality have been conducted in Australia, and these were conducted prior to 1990 (Drugs and Crime Prevention Committee, 2002). An inquiry into volatile substance abuse in 1985 by the Senate Select Committee on Volatile Substance Fumes recorded 45 deaths between 1974 and 1985. A second study conducted by the National Drug Abuse Information Centre reported 121 deaths between 1980 and 1987 (National Drug Abuse Information Centre, 1988). More recently, in the United States the National Inhalant Prevention Coalition reported 240 inhalant-related deaths between 1996 and 1999 (Brouette and Anton, 2001).

### **1.6.2 Accidents and injury**

Accidents and injury can occur when a person is intoxicated. This can be due to fire or explosion from easily inflammable vapours, reckless behaviour whilst intoxicated, choking on vomit when unconscious, and suffocation whilst using plastic bags to inhale (Drugs and Crime Prevention Committee, 2002). Serious injuries can result from falls, burns and frostbite (Anderson and Loomis, 2003).

### **1.6.3 Damage to major organs and systems**

A couple of Australian reports review the literature that critiques the evidence base about inhalant-related harms (Chalmers, 1991; Drugs and Crime Prevention Committee, 2002; MacClean et al., 2005). These reports note that much of the evidence for harms has been gained from experimental or industrial toxicological research. Many of the available studies considered outcomes for long-term occupational exposure, and may not be able

to be generalised to deliberate users who use more intensely over a shorter period of time. Specific conditions have been associated with individual solvents or combinations of solvents, although mechanisms by which these solvents damage organs are not well understood (Chalmers, 1991).

Clinical reviews of volatile substances have identified the following adverse effects. Chronic use can cause damage to the cardiac, renal, hepatic, pulmonary and neurological systems and can cause serious harm to several of the body organs, including the brain, heart, lungs, kidneys, liver and bone marrow (Chalmers, 1991; Brouette and Anton, 2001; Kutzman et al., 2001; Anderson and Loomis, 2003; Filley et al., 2004; MacClean et al., 2005). Damage can also occur to the dermatological (skin), gastrointestinal (gut), and haematological (blood) systems (Brouette and Anton, 2001; Anderson and Loomis, 2003). Other non-specific complaints amongst long-term volatile substance users include memory loss, loss of hearing and smell, visual or optical changes and loss of hearing or a sense of smell (Anderson and Loomis, 2003).

Particular harms have been associated with inhalable anaesthetics and nitrates. The toxicity of anaesthetics relates mostly to hepatic injury, cardiac arrhythmias and nephrotoxicity (Chalmers, 1991). Nitrite use can result in burns, anoxia, haemolytic anaemia, lymphocyte function and methaemoglobinaemia, and vasomotor collapse (Chalmers, 1991; Brouette and Anton, 2001).

There can be additional health problems associated with the consumption of chemical compounds that are contained within the products, such as lead copper, zinc, lead, tin and vinyl chloride (Drugs and Crime Prevention Committee, 2002).

The most significant damage that may occur with volatile solvent use is the possibility of long-term damage to the brain, affecting cognition, movement, vision, and hearing, although the extent to which recovery is possible remains unclear (MacClean et al., 2005).

#### **1.6.4 Dependence and withdrawal**

A representative national sample of American adults reported that approximately one in five of inhalant users progressed to an inhalant use disorder (Wu and Howard, 2007). There is a general recognition amongst those working with inhalant users in Australia that psychological dependence can occur with the regular use of volatile substances (Drugs and Crime Prevention Committee, 2002). Reviews of inhalant-related research note that a couple of studies have documented a withdrawal syndrome for volatile substances, similar to that of alcohol and benzodiazepines, with symptoms such as sleep disturbance, nausea, and tremors, lasting for 2 to 5 days that were not residual intoxication (Brouette and Anton, 2001; Anderson and Loomis, 2003).



### **1.6.5 Increased risk of other drug use or psychosocial problems**

Many young people may not go on to abuse volatile substances, or become dependent on them. The relationship between early use of inhalants and later use of illicit or polydrug use has been examined in many studies (Schutz et al., 1994; Johnson et al., 1995; Young et al., 1999; Bennett et al., 2000; Novins et al., 2001; Novins and Baron, 2004; Walker et al., 2004; Storr et al., 2005; Wu et al., 2005). These studies conclude that volatile substance use can be an early vulnerability marker for later illicit drug use or abuse.

Studies also link chronic use of volatile substances with psychosocial problems and mental health problems, such as anxiety, depression, psychosis, dropping out of school, and criminal activities (Best et al., 2004; MacClean et al., 2005). Recent analyses of the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions, a nationally representative sample of American adults reported that inhalant users had high lifetime prevalence of DSM-IV mood, anxiety and personality disorders, particularly among female users (Wu and Howard, 2007).

## **1.7 Motivations for using volatile substances**

There are few qualitative studies that describe motivations for using volatile substances and patterns of use (Drugs and Crime Prevention Committee, 2002).

Both internationally and in Australia, policy documents about volatile solvents (World Health Organization Substance Abuse Department, 1999; Drugs and Crime Prevention Committee, 2002) and numerous websites document a remarkably similar list of motivations that are believed to underlie volatile substance use. These are generally based on field observations or consultations with community workers. Common motivations cited in these reports include the following:

- Having fun within their peer group;
- Curiosity, experimenting with new physical sensations (eg hallucinations);
- Excitement and risk taking;
- Boredom;
- Shocking adults, challenging authority figures, symbolic of rebellion against established social order;
- Hallucinations enabling you to escape;
- Escaping from the real world (particularly poverty and deprivation/young people living on the street);
- Dulling the pain of abuse or hunger;

- Availability, cheap, easy to steal;
- Providing an alternative to alcohol; and
- Dependency on these substances.

In the Australian context, MacClean has conducted qualitative research exploring young people's motivations for inhalant use. The first paper explores the role of pleasure in young people's decision to use inhalants. In-depth interviews were conducted with 26 young people in Melbourne who used inhalants. A second (non-peer reviewed) report explores motivations for use amongst 33 indigenous and non-indigenous inhalant users in Australia. A range of motivations for inhalant use were identified in these studies; including 'the buzz', hallucinogenic effect, sociability (being sociable), shock value, numbing, alleviating boredom, and satisfying dependence (MacClean, 2005; MacClean et al., 2005).

Potential deterrents to inhalant use have also been discussed in policy documents in Australia (Drugs and Crime Prevention Committee, 2002). Factors that may act as a deterrent to the use of volatile substances (Bellhouse et al., 2000; Rose, 2001) are thought to include the following:

- Negative aspects of use, such as an unpleasant smell (for most products), irritation to the eyes, nose and mouth, headaches and nausea;
- Some of the effects of intoxication can be frightening and disorientating;
- Fear of harm, particularly brain and organ damage. Short-term effects can mimic permanent brain damage and may enhance this fear;
- Other drugs, such as alcohol, tobacco and cannabis may displace inhalants as they grow older; and
- Perception of inhalants as 'gutter drugs' or disapproval of their use by society or peers.

In particular, it has been proposed that the perception of volatile substances as 'gutter drugs' by most young people can be a protective factor that may prevent adolescents from initiating use of inhalants, or deter continued use (Bellhouse et al., 2000). In contrast, it has been suggested that the reputation of inhalants as gutter drugs may make them attractive to some users, allowing users to reinforce their non-conforming image (Houghton et al., 1998). MacClean (MacClean, 2003) suggests that once a young person has become a chronic user, the perceived status of inhalants as gutter drugs may become a risk factor because the stigma surrounding its use may prevent the person from seeking help. It may also reinforce their marginalised status (Bellhouse et al., 2000).

Whilst most of the information about deterrents remains at the anecdotal level, MacClean's research has begun to provide qualitative data to support these propositions. Her research has described several factors that can act as deterrents for some users: unpalatable taste or smell, irritation of mouth and nasal passages, and nausea and

vomiting (MacClean et al., 2005). She reports that young people often say that they would prefer other drugs to inhalants if they could afford them, due to the messiness, fears about the impact on the health and future, and stigma (MacClean, 2003; MacClean, 2005). Unpublished results from her research identify three other reasons for quitting volatile substance use: moving out of state foster care, moving onto other drugs, and re-engaging with the family (MacClean, 2006).

## **1.8 Study rationale**

This research was conducted to inform interventions and identify appropriate prevention messages for volatile substance users. Drug prevention messages are more effective if based on knowledge of what young people actually think about their drugs they use. Currently there is little specific information about user perceptions about why they stop using inhalants, or progress unto another drug.

This study aims to identify and describe the motivations for inhalant use and cessation; patterns of use and perceptions of harms amongst inhalant users. Due to the lack of research that has been conducted on this issue, qualitative methods are used to identify and describe factors that have previously been undocumented or unknown.

## **2. METHODS**

### **2.1 Study design**

A qualitative study design was employed, in which 10 in-depth semi-structured interviews were conducted with young people or adults over the aged of 16 years, who had previously used inhalants in the context of polydrug use, but had not used an inhalant in the last 4 months.

The initial study design employed a stratified sampling strategy to enable a comparison of the motivations for use and cessation of inhalants within the sample. The initial selection criteria included young people (aged 16-20 years) who had ceased inhalant use and who had been:

- Experimental users; less than 5 times (10 users)
- Regular users of inhalants; more than 20 times; who were
- Young people who are current users of illicit drugs (10 users)
- Young people who are NOT current users of illicit drugs (10 users)

Due to major difficulties in the recruitment process, the selection criteria were changed to include: young people and adults aged 16 years and over that had ever used inhalants and had not used an inhalant in the last 4 months.

## **2.2 Recruitment procedures**

Two recruitment strategies were employed in this study. The first was a media strategy via street press to advertise participation in the study. Three advertisements were placed in a clubbing magazine (3D world), and one interview was conducted on the radio.

A second recruitment strategy aimed to obtain participants through non-government organizations that offered a range of health and welfare support to young people. Thirty-seven non government agencies who work with young people were contacted over a period of 4 months (mid January to May, 2006) and asked to help with recruitment. Community workers were asked to verbally advertise the study and distribute fliers and information sheets to group members. They received a verbal briefing about the recruitment on the telephone, and this information was reinforced by sending them a recruitment instruction sheet.

A lengthy time period of networking with non-government agencies (3-4 months) produced a very small sample: 5 inhalants users only were recruited through this means. Most of the community workers who were contacted reported that they were not aware of past inhalant use amongst any of their clients. A couple of community workers knew young people who were current users of inhalants (and did not meet the criteria of not having used an inhalant in the last 4 months).

Participants were reimbursed \$30 for travel and related costs. The study had received approval of the University of New South Wales Human Ethics Committee.

Whilst we aimed to recruit 30 participants for the study (10 experimental users and 20 regular users of inhalants), the recruitment process was not successful in achieving this. No experimental users were recruited. Ten participants who had previously been regular users of inhalants were recruited to the study.

## **2.3 Interview procedure and analysis**

All interviews were conducted face to face, except one interview that was done on the phone. The interview protocol included the following topics: motivations for initial and continued use, patterns of use (including use of other drugs), a description of attempts made to stop use and reasons for cessation. A short questionnaire was administered at the end of these interviews collecting basic demographic information, information about inhalant substances used, the number of times they were used, and other drugs use.

The interviewer took notes of what the participant said during the interview and typed them up immediately after completion of the interview. Interviews were taped, except in situations in which the interviews were conducted on the phone (n=1) or the participant did not give permission for this to occur (n=1). Due to problems with the tape recording equipment, a full transcript could not be produced for all interviews. Comprehensive notes of the interview were made by listening to the tape, and comparing this to notes taken during the interview.

The qualitative analysis software program NVIVO, was used to conduct a thematic analysis on the interview notes. The demographic questionnaires were analysed using descriptive statistics.

## 2.4 Characteristics of sample

Ten people participated in the study: nine males and one female. All participants reported polydrug use. Eight were current users of illicit drugs and 2 reported that they were not currently using illicit drugs. The average age of participants was 22.5 years (range 16 to 42 years). Seven were born in Australia, and the remaining three were born in Samoa, Israel and New Zealand.

The average age of initiation to inhalant use was 13 years (range 5 to 21 years). Only one participant reported the use of one inhalant (paint). The other nine participants reported using more than one inhalant. Five of these participants reported using at least one inhalant experimentally (less than 5 times), in addition to regular use of other inhalants (see Table 1). Of the six participants who reported use of amyl nitrate/nitrous oxide, 5 participants also reported use of other inhalants.

**Table 1: Number of participants who used various inhalants**

<b>Drug</b>	<b>Use &lt; 5 times</b>	<b>Use &gt; 5 times</b>
Glue	1	1
Paint	2	4
Thinners	0	1
Petrol	1	4
Lighter fluid	2	0
Aerosols	1	1
Amol nitrate	1	3
Nitrous oxide	1	5

## **3. RESULTS**

### **3.1 Descriptions of use**

#### **3.1.1 Initial use of inhalants**

All of the participants in this study were polydrug users, and initiated use of inhalants within the context of experimenting with a range of drugs.

Participants who used several inhalants reported that they initiated the use of different inhalants across the duration of their drug-using career. This included initiating use in the early stages of drug experimentation, e.g., in small groups during primary school or junior high school, as well as in the midst of heavy drug use later in their career. One example of late initiation of inhalant use was the use of petrol alongside other drug use whilst living on the streets. Another participant reported that the experimental use of nitrous oxide and amyl nitrate began later in their drug-using career, after making a move to the city and being offered it.

#### **3.1.2 Types of use**

Various patterns of inhalant use were reported: aborted experiments, temporary use and cessation, episodic use and dependent everyday use.

##### *3.1.2.1 Aborted experiments*

Some participants reported that they only used inhalants experimentally for a short period of time, after which they discontinued use. For example, they may have experimented with paint, petrol or aerosols, once or twice, or over a period of several days.

##### *3.1.2.2 Temporary use and cessation*

Some participants reported that they used inhalants for a period of time within a specific context, e.g., hanging out with a group of friends who were using a particular drug, and that they stopped using when they were no longer in this situation.

### *3.1.2.3 Episodic use*

Participants also reported repetitive use of one inhalant over a period of time, in an episodic fashion. They may have repetitively used an inhalant to replace their drug of choice when it was not available, or to enhance other drug use. One participant also reported that they habitually used inhalants alongside other drugs in the context of polydrug use and a desire to 'be stoned'. This type of use did not have a defined end point in the participant's drug using stories.

### *3.1.2.4 Dependent everyday use*

After using paint in an episodic fashion for some time, two participants reported that they subsequently became dependent on the product, using it everyday.

## **3.2 Reported motivations for use**

### **3.2.1 Motivations for initial use**

Participants reported that their motivations for initial use included curiosity, boredom, complying with friends' wishes to experiment, and substituting for other drugs that were not available.

#### *3.2.1.1 Curiosity*

Participants reported that they initially chose to use an inhalant because they were curious to see what the experience would be like. In some cases, participants initiated use because the product was readily available to them, e.g., a friend offered it to them or a product (such as paint) was 'just there' and they decided to experiment.

In other cases, participants initiated use because they had heard about the substance and organised to use it for themselves. For example, one participant reported that he had seen a documentary about 'chroming' and that he subsequently experimented with metallic paint because it looked like fun.

Curiosity was also a motivator for experimental use of nitrous oxide and amyl nitrate. Several participants reported that they initially used 'rush' or 'poppers' (amyl nitrate) when they were offered them by friends in the party scene. Participants also reported experimenting with poppers in small groups.

### 3.2.1.2 Boredom

Social and personal boredom were reported as motivations for the initial use of inhalants. For example, social boredom amongst groups of teenagers playing truant was reported to be a motivator for experimenting with petrol. One participant reported that he thought that personal boredom had sub-consciously driven his inhalant experimentation.

*“Boredom (was the) main reason... it was just the urge to have a go, it was not peer pressure or anything.”*

### 3.2.1.3 Complying with friends' wishes to experiment

Participants who associated with a group of peers experimenting with inhalants reported that they first used the products because their friends wanted them to do it.

One participant reported that he chose to experiment with lighter fluid because his friend dared him to. The excitement derived from this risk-taking behaviour helped to drive subsequent behaviour.

*“I think the first time I did it, I was in my friend's caravan. Three to four people were sitting around. It was new to me, they were saying look at this you can take that. None of them wanted to take it, but they were all daring me to try it out. I was saying, ok whatever, we were all a bit out of it at the time. He showed me how to do it. You poke it through your teeth and breathe it in your lungs for a little while, and slowly breathe it in. I got pretty fazed out from it, I was pretty off my face, they were all having a laugh at the effects that it had on me, we were laughing together. I remember that while I was doing it, this other guy next to me lit a lighter right next to me, which was really dangerous .. and they all jumped and said don't be stupid which added to the excitement of it all. That was the first time.”*

### 3.2.1.4 Substitution for other drugs

A motivation for initial use was the need to substitute inhalants for other drugs they were unable to access at the time. For example, one participant reported that he first tried petrol because he had no money or alcohol at the time. Another participant improvised with aerosols when he was unable to obtain cannabis, and he wanted to get intoxicated.

*“When we were doing the aerosols the main reason we did it was because of the Koories. They said if you can't do the pot, you can do this, and we didn't care, we just wanted to get off our heads and enjoy ourselves and have a bit of fun. We didn't think twice.”*



### *3.2.1.5 Stigma – a deterrent for initial use*

A couple of comments suggested that these participants would not experiment with some inhalants due to the perceived stigma associated with them. For example, one participant thought petrol sniffing was the lowest type of drug use, while another believed that the use of paint was linked to a range of social problems, e.g., bad living conditions, financial difficulties and homelessness.

## **3.2.2 Motivations for ongoing use**

### *3.2.2.1 Fun*

Some participants reported that they enjoyed the high they experienced when using inhalants and that this was a motivation for ongoing use. However, others reported that they did not enjoy the experience or that the pleasure associated with use ‘wore off’ and that they continued to use the product for other reasons, e.g., drug substitution.

### *3.2.2.2 Enhanced enjoyment because inhalants are not illegal*

One participant reported that he enjoyed using inhalants more than illegal drugs because he did not end up having the use of an illicit substance on his conscience.

### *3.2.2.3 Cheapness or accessibility*

Inhalants could be seen as a favourable alternative to other substances because they were cheap or could be easily stolen, e.g., by walking into the local supermarket. Other drugs are expensive in comparison. Even alcohol can be difficult for many young people to afford.

One participant reported that paint was more accessible than other drugs as it could be found lying around the house. Another participant reported that it was easy to access nitrous oxide because it was sold in large quantities in their local store.

Inhalant products were also perceived to be far more easily accessible in small country towns, places where it could be far more difficult to obtain illicit drugs.

#### 3.2.2.4 *Substitution for drugs of preference*

Inhalants were seen as a substitute for the participant's actual drug of choice. In particular, participants reported that inhalants were a good substitute for other depressant drugs such as alcohol and cannabis.

This motivation was intensified when dependence was identified. For example, one participant reported that she used paint everyday because she was addicted, and did not have enough money for cannabis. Another participant reported that he had improvised with glue or aerosols when he could not access cannabis because he felt a need to stay intoxicated.

*“The main reason we used it before was because we couldn't get in pot or alcohol”.*

*“The only reason is to escape, to go into a different reality. I couldn't go without, so I had to improvise with inhalants and deodorant cans and thinners. I lived in a small town. They were the most available things that I had at that time.”*

#### 3.2.2.5 *Enhancing the 'high' of other drugs*

Some participants used inhalants to intensify the 'high' they received from other drugs. In particular, several participants reported that they used paint to intensify the high with alcohol and/or cannabis.

One participant reported that he ritualistically used paint with alcohol and/or cannabis, even though he preferred the high he would get from using those drugs alone.

Paint was used to enhance the high gained from alcohol when cannabis became difficult to access. Whilst drinking alcohol, one participant liked to also use cannabis because it gave her 'a better hit'. She would use paint instead when cannabis became unavailable. One person reported that they did not like the high of using paint alone, and that it was not worth using the product unless it was used with other drugs.

Petrol could also be used in conjunction with other substances. One participant reported that he had experimented with petrol and cannabis several times. For example, one participant used petrol as a part of a mix of drugs including cannabis, speed, and heroin.

A couple of participants reported that people used poppers to intensify the high received from LSD or ecstasy in the nightclub/dance party scene. One participant reported that the use of a nitrous oxide bulb combined with LSD intensified the effects so that he became physically incapacitated (e.g., loss of balance, slurred speech, changes in voice, and hallucinations). Another used amyl an hour after using ecstasy to bring on the 'rush' again.

### *3.2.2.6 Boredom*

Two types of boredom were identified by participants as reasons for the ongoing use of inhalants. The first involved groups of friends who had nothing to do, whilst the second related to individuals experiencing boredom whilst being unemployed and needing to find a way to pass the time.

### *3.2.2.7 Social context of drug use*

Some participants reported that they used an inhalant because the friends with whom they were associating with for a period of time, wanted to use them. In some cases, participants were not really interested in using a particular inhalant, but wanted to participate in what was going on. One person reported that his friends were more interested in using petrol than he was, and that he joined them in using it for 2-3 weeks, even though it made him nauseous.

A preference for a particular social context of inhalant use could also contribute to the desire to use a particular drug. One participant reported that she preferred paint to petrol, because she had preferred the social context in which she had used it. She had taken petrol with a much larger group of 10 people, whereas paint had been used by a much smaller group of only three friends.

### *3.2.2.8 Desire to stay intoxicated*

Participants who used a substance everyday reported that their desire to remain intoxicated was a reason for continued use. Two reported that they had become psychologically dependent on a specific substance (paint), with one of these stating that she used all day, even though she only felt high for a couple of minutes, because she had no money for pot.

## **3.3 Types of cessation**

### **3.3.1 Termination of experimental use**

Participants reported that, in some cases, they ceased experimental use of an inhalant after a short period of time because they lost interest, or decided that they no longer wanted to use that particular product. A couple of participants reported that they had experimented with an inhalant such as lighter fluid or bulbs, whilst being part of a group of young teenagers, but had lost interest, and forgotten about it since that time. Others reported that they had tried a particular inhalant once or twice but had not liked the experience and did not want to use it again.

### 3.3.2 Cessation of temporary use

In some situations, participants reported that they ceased use of a particular inhalant because they had been removed from the social or geographical context in which they had previously used.

Participants reported that they ceased use of a particular inhalant because they had moved from one country town to another, or into the city, or were no longer hanging out with a friend, or group of friends, who used that particular product. One participant associated the use of poppers and bulbs with his time in the nightclub/dance party scene.

### 3.3.3 Decision to cease use of a particular inhalant, but not others

One participant reported that he had made a decision to cease use of one particular inhalant (petrol) after using it regularly for a period of time, because of a bad experience. A friend, with whom he had been sniffing petrol, had died due to its use and he was blamed for his death. However, he reported that he continued to use other inhalant products as well as other drugs.

### 3.3.4 'Moving on' to other drugs

One participant reported that he had 'moved onto' other drugs. He viewed inhalants as a 'toy stage' to needles.

*"I thought it was a bit ridiculous after doing it, I grew out of it. It was like the toy stage. And pot came, and then I got into the needles. Basically after the needles, I was not much into the inhalants, I was into needles more."*

I: *"Why was that?"*

*"More, more, more high, more rush, more high, more feel for it. It is not about sticking the needle in, it is about what happens when you pull it out."*

One participant who used paint everyday reported that she had stopped doing this because she now had the money to buy cannabis.

### 3.3.5 Cessation from ‘heavy’ or everyday use

Several participants reported that they were dependent on paint, and that they had ceased ‘heavy’ or everyday use. One person made a decision to enter rehabilitation to assist him in ceasing use of the product. A second participant reported that he had ceased the heavy use of cannabis and paint after parental intervention.

### 3.3.6 Decision to cease use of all drugs

One participant reported that his decision to cease use of all drugs led to the cessation of inhalant use. This decision had been made in response to having an overdose of another drug (Datura) which had led to hospitalisation.

## 3.4 Description of factors that contributed to a desire or decision to stop

A broad range of factors contributed to a desire or decisions to stop using inhalants. These included negative aspects of use, beliefs about harms, bad experiences and events, the availability of preferred drugs, as well as a range of social factors.

### 3.4.1 Negative experiences of use

#### 3.4.1.1 *Not experiencing a high*

Some inhalants were not effective in producing an intoxicated state, and participants reported that it was not worth continuing to use them.

*“I tried a deodorant can once, but that did nothing. Apparently some people say that there is a high there, but I never felt anything.”*

#### 3.4.1.2 *Unpleasant aspects of use*

Unpleasant aspects of use were reported as a deterrent of use. These included the following:

**Smell and taste:** Participants reported disliking particular inhalants because of their taste or smell. Individual participants reported that they did not like the smell of hairspray, paint and petrol. However, this was a matter of personal preference: some liked the smell of paint, and others didn’t.

*“Petrol is a nice smell, but paint isn’t.”*

**Getting paint in your mouth and on your face and clothes:** Participants reported that an unpleasant aspect of use was getting paint on their clothes which was difficult to get off, getting paint over their mouth and nose, and coughing up paint.

*“You get paint all over your mouth, and on your nose, you wake up next morning and you cough up and spit up paint. Yuk.”*

**Burning on the face:** One person also reported that he experienced a burning on his face whilst using inhalants.

*“After taking a certain amount of them you can feel it on your face, you can be getting stoned and you can be feeling the burning on your face ....”*

**Frozen fingers:** One participant reported that he lost interest in using bulbs because he cut his fingers because the cylinders that were storing the gas were freezing cold.

#### 3.4.1.3 Bad High

Participants reported that they disliked the acute effects of inhalant use, such as the severe headaches, nausea and being sick, and a range of facial symptoms.

**Severe headaches:** Several participants reported that when they used inhalants, they experienced severe headaches – the *“whole head throbbing ..”*, and that this effect was not responsive to painkillers. One person reported that he used butane less often than nitrous oxide and amyl nitrate because he did not like the headaches.

**Nausea and vomiting:** Feeling nauseous and vomiting were reported as reasons why participants contemplated stopping a range of inhalants, including lighter fluid, petrol and paint. One participant also reported that she felt sick when she used petrol experimentally because it was ran down her throat.

**Facial symptoms:** Cold sores, cracked lips and having a permanent black mark on your face were reported as undesirable symptoms of inhalant use.

*“You know how you see the cold sore stuff and cracked lips, if you see it in the nose, you know they are doing thinners. Even the little black ring on the inside of your nose, that is what it is.”*

*“Yeah, it looked very, very disgusting man. You could look someone in the face and when they look at you in the sun, the same person, you see the big ring around their nose and mouth and stuff where they have been sniffing and shit.”*

Participants commented that there was a threshold where the negative effects associated with use, eg., headaches, nausea, and vomiting outweighed the perceived benefits of use. At this point, a couple of participants reported that the experience was not worth having.

*“I just did it out of curiosity, to see if it actually worked and it gave me the biggest headache that I ever had in my life. I started spinning around, I had no control at all, I felt like I was going to faint. It was the biggest rush. Oh it was the worst feeling that I ever had. I would never do that again. I don’t know how people can do that. Yeah, it just made me feel really sick.”*

This was made worse by not feeling a high at all.

*“You never got stoned, mainly it gave you a headache and made you feel a little bit dizzy. That was mainly it, it mainly made you feel worse than what you were.”*

### **3.4.2 Beliefs about harms**

The following harms were identified by participants as being associated with inhalant use and could contribute to a desire to stop using the products.

#### *3.4.2.1 Inhalants are bad for you*

Some of the sensations that participants experienced when using inhalants led them to conclude that inhalants were damaging their body. This was particularly true in relation to the impact of inhalant use on the brain. One participant concluded that the intense experience associated with the use of poppers meant that they assumed that it did damage to their body.

Some comments indicated that participants believed inhalants were not good for you because they were unnatural or ‘full of poisons’. One participant reported that inhalants are not meant to be a drug, but were made for other purposes, e.g., whipped cream or to put into racing cars.

One participant reported that he sensed the damage that bulbs were doing to him because the intoxication associated with nitrous oxide use was very short-lived and intense. Another participant reported that he had heard that amyl nitrate had been a chemical made in backyard laboratories, although another participant reported that he did not think nitrous oxide contained these poisons as it did not cloud up his brain.

Accompanying these concepts about inhalants, there was a belief that other drugs are healthier. For example, cannabis did not have the same effects on the brain.

*“Lighter fluid is more full of poisons than anything else. That is what I thought at the time, I don’t really know. It actually made you feel hung over from the lighter fluid, like a little sick afterwards. You would not get be that clear cut feeling that you would get from nitrous oxide.”*

#### 3.4.2.2 Specific health beliefs

Participants cited specific health beliefs that made them want to cease using inhalants. Comments suggested that health beliefs were primarily based on personal experience or observations of others. One participant was also exposed to health education about inhalants within their occupation, i.e., whilst spraying painting cars.

**Losing brain cells:** Particular effects of inhalant use led some participants to believe that the products were damaging their brain, and in particular, their intelligence. These acute effects included an inability to think clearly during use, a sensation of floating in the head, being sent into a head spin, an inability to sustain hand eye coordination in sporting activities, inability to function at school, and loss of memory.

*“Paint is worse than alcohol. It sends you into a head spin and makes you feel like you are doing something bad to you.”*

*“I felt like I was losing brain cells.”*

*I: What gave you that impression?*

*“It makes you float in your head and stuff. People who use paint a lot seem really dumb, some of them talk to themselves. I don’t want to end up like that, talking to themselves, mumbling to themselves.”*

A couple of participants expressed concern that inhalant use caused the loss of brain cells. One participant reported that they had heard rumours that nitrous oxide bulbs kill large numbers of brain cells.

**Coughing:** Symptoms related to the throat and respiratory system such as coughing or swollen glands were also reported as effects which could contribute to someone ceasing inhalant use.

*“Just tightness, making me want to cough, like there would be a feather or something in your lungs.”*



*“And some days you would wake and you knew the glands in your throat would be swollen. And you wouldn’t be able to talk properly.”*

**Choking:** One participant also reported that he thought there were particular risks associated with the use of aerosols, e.g., choking on a bubble in the throat.

*“It was kind of a nozzle that comes up that is really narrow. It has to be pressed down to come out. You have to take it really slowly, because if it goes too fast, it can create a bubble in your throat and can cause some really bad effect that can make you choke. You put it in between your teeth and it goes through the cracks in you teeth slowly, it pours down and it kind of just seeps down.”*

**Gut rot:** Vomiting also led one participant to conclude that the use of thinners and paint had an effect on the digestive system.

*“It eats your guts out.. Sometimes you won’t just throw and vomit, you will have more blood and there are lots more gut rot with thinners and turps and stuff ... But I am not sure.”*

**Cancer:** One participant reported that he received specific occupational education on inhalants, i.e., the use of spray cans causing cancer.

### 3.4.2.3 Attitudes to harm

Participants had different attitudes to inhalant-related harms. Some reported that their concerns about the impact of inhalant use on their health had led to a number of serious attempts to cease use. Personal experiences of harms or underlying health issues increased this motivation to stop use. A couple of participants reported that inhalants and other drug use affected their memory or broader thought processes, and that this was a motivator to stop use. Underlying health issues, such as asthma or allergies, also contributed to the participant’s motivation to stop inhalant use. Others felt that the long-term health impact of inhalant use was overstated and any negative effects that were experienced were temporary. If it did become a problem, this only occurred when inhalants were abused.

One person who used paint everyday denied that inhalant use contributed to health problems.

#### 3.4.2.4 Beliefs about how far to go

One participant reported that the experimental use of drugs had a social component, and that drug use which was purely ‘for fun’ went beyond this boundary. This ethic influenced his decision to cease his use of inhalants. For example, he considered the use of bulbs and poppers to be in this category because he used them just for fun.

I: *“Was it a bad experience?”*

*“I think at the time ... my conscience was working over time about how bad, past the experimental stage, I had friends at the time who were actually addicted to it. The fact that I was saying that was in the back of my head.”*

*“Basically there was no reason for me to take it, there was no peer pressure, we were not in the situation where we were having heaps of fun, like at a party with a group of girls or whatever. There was no really good justified reason for me to take it just then, except that I know what it felt like and I wanted that feeling again.”*

Another participant reported that he thought that drug use had gone too far when you were no longer getting personal enjoyment from the rest of your life.

### 3.4.3 Bad experiences and events

#### 3.4.3.1 Inhalant-related accidents

Bad experiences were also a deterrent for use. One participant reported two bad experiences that led him to stop using petrol. The first experience involved him blowing up a caravan whilst sniffing petrol. In the second, a friend with whom he shared the petrol sniffing experience, died from complications and he himself was blamed for the death.

*“If my friend was still alive now, I would probably still be sniffing petrol. There was a time when I was sniffing petrol in my caravan and I fell asleep in bed with the blankets over me, had a petrol can in between my knees, and I fell asleep. I woke up and there was petrol all over me, and I lit a cigarette and I blew out of my caravan window, and my caravan went up in fire.”*

*“If my friend was still alive now, I would probably still be sniffing petrol”.*

A second participant who was using poppers and bulbs reported an incident he had whilst experimenting with helium that made him realise he could seriously damage

himself and possibly die. He had inhaled helium from a balloon, got a hit, became intensely dizzy and finally passed out on the floor.

#### *3.4.3.2 Hospitalisation and health scares*

A couple of participants reported a hospitalisation for a drug overdose or inhalant-related lung problems that had threatened their life. This had frightened them and motivated them to cease using drugs altogether. However, both participants reported that they struggled to do this over the next couple of years.

*“I don’t take drugs anymore. I stopped because of this one traumatising experience that kind of put me off all drugs. It was like I had a glimpse of what I could become, I came close to death, and I found myself in hospital the next morning.*

*The experience I had was Datura – it is a really hallucinogenic drug, it just grows out in your garden, it was the strongest drug, it was really scary.*

*I: What was it about that experience?*

*It was like I had a glimpse of what I could become, I came close to death, and I found myself in hospital the morning, and I had no recollection and someone had to tell me about it, which was really embarrassing. And I had my mum, and my family there and they were all worried for me. And the worse thing about it was that when I woke up in the hospital, I was really hallucinating. It was like you are supposed to be better, but the hallucinations stay for about two days.”*

#### *3.4.3.3 Social harms related to use*

One participant reported that he had been taken advantage of in a group sex situation whilst using amyl nitrite and that he no longer used this product because of this bad experience.

### **3.4.4 Preferences for other drugs**

#### *3.4.4.1 Preferences for uppers*

Some preferred to use drugs that provide energy, rather than a depressant. One participant reported that he preferred to use uppers in the party scene because it helped him dance.

*“Don’t like glue, I like speed, it doesn’t motivate you as much.”*

#### *3.4.4.2 Dislike of immediate effects compared to other drugs*

One participant reported that he preferred other drugs because paint obstructed his hand-eye coordination.

*“Yeab, that hand eye coordination – you can’t throw a ball up into the air, you cannot do that while you are using paint.”*

Another participant reported a cluster of values as reasons why she preferred cannabis to inhalant use – “it lasts longer, tastes nicer, doesn’t make me sick and nauseous, and it is a better high.”

#### *3.4.4.3 Better high*

Participants reported that the high that they got from inhalants was not as good as the one that they received from other drugs.

Several participants reported that they received a better high from cannabis, compared to paint. They preferred cannabis to paint, as the effects from cannabis lasted several hours, whereas the effect of paint only lasted a few minutes. They also reported that paint ‘stays in your head’.

A couple of participants reported that other drugs gave them a better escape from pain. Shooting up speed or heroin can result in an instantaneous, stronger and longer lasting high.

“Because you get stoned better ... welcome to the love of pot, and the love of heroin is similar..”

### **3.4.5 Change in the social availability of and patterns of drug use**

#### *3.4.5.1 Change in the social patterns of use*

Changes in access to particular drugs and norms in drug use occurred with a different social context.

*“A different crowd, different drugs”*

A change of social patterns of drug use was often associated with a move away from a country town. Different inhalant products and illicit drugs could be accessed and used in a different country town, as well as in the city. A couple of participants also said that they stopped use of nitrous oxide or amyl nitrate because they had moved out of the party scene.

Participants reported that not only are drugs cheaper in city areas but a wider range of illicit substances is available in urban centres. After moving to the city, participants were able to experiment with a range of new drugs, such as amyl nitrate. They were also able to access their drugs of choice more easily.

*“I had never heard about amyl nitrate until I came up here.”*

*“I moved here and it is gourmet, everything is in front of you”*

*“As I said, different mates, different drugs, there is a lot wider range of drugs up here. When you are hanging out you can go and get morphine tablets for \$25, \$10 or for \$40. ... and they will get you more smashed than any paint thing or any aerosol I know of anyway.”*

#### *3.4.5.2 Meeting someone who provided access to cannabis*

One participant reported that he stopped using inhalants because he met someone who provided unlimited access to his preferred drug, cannabis.

*“I struck an oil mine of pot”..*

#### *3.4.5.3 Lack of someone to use paint or petrol with*

A couple of participants reported that they had found it difficult to find a social companion to do paint or petrol with after moving to the city. In one case, this problem had not resulted in a reduction in paint use. Instead the participant reported that she began to use paint alone, become dependent on the product and used it everyday.

## 3.5 Factors that facilitated stopping inhalant use

### 3.5.1 Impact of significant others on the decision to stop

#### 3.5.1.1 Intervention by a friend or parent

A couple of participants reported that an intervention by a friend or family member helped them to cease all drug use. One participant reported that his parents had started getting angry about his drug use. He had stopped using paint because it would be too easy for his parents to discover he was using that product.

Another participant reported that one of the factors that led to her stopping the use of paint everyday was that a friend had moved her out of her flat, and taken the product away from her.

#### 3.5.1.2 Guilt about parents and the need to earn respect

Two participants reported that their parents' reaction to discovering their drug use motivated them to want to give up their drug use. One participant reported that he was motivated to give up the heavy use of all drugs, in order to earn the respect of his mother.

*“All those different feelings all smashed together. I think the hardest thing was trying to prove to my mum that I believed I could. It was like she lost her pride in me. Of course she did not say it, she would say good on you D... I want you to try it, but I could just tell that connection that you get from your mum. It was gone. She did not really believe that I could really do it. For myself, I had to prove it that I could really do it to everyone around me.”*

The other participant reported that feelings of guilt over his mother's reaction to his drug use contributed to his desire to stop.

#### 3.5.1.3 Relationships with a partner and child

A participant reported that making a promise to a girlfriend and cleaning up his act for a child contributed to his motivation to seek treatment for his dependency on paint.

#### *3.5.1.4 Older people's stories*

Older people's stories about the negative effects of inhalants, e.g., losing interest in life, or health impacts, were reported by some participants as influencing the decision-making of those who were contemplating or attempting to cease use of inhalants. One participant who had sought treatment for dependency on paint and had been considering re-using, changed his mind after speaking to someone who told him what it had been like to live long term with a dependency on paint.

Coming to terms with your own mortality by facing the fact that a parent is dying, or recognising the impact of drug or inhalant use on other people were also reported as motivators to make people want to stop.

### **3.5.2 Service provision**

One person reported that he was sent on a course to help him stop use (although it had not worked), and was currently in a rehabilitation service for people with dependency on paint.

### **3.5.3 Level of addiction**

One person reported that it was easier to stop using paint than cannabis. He regarded paint as 'not addictive', but had personally experienced cannabis dependence.

### **3.5.4 Geographical context of drug use**

Two participants reported that a geographical move away from the social context in which they used inhalants helped them to stop use. One of these reported that he had found it difficult to stop drug use (including inhalants) whilst remaining in his home town because of peer pressure from older friends.

## **4. DISCUSSION**

The findings of this study provide new information about the types of use and cessation of inhalant users amongst polydrug users, and motivations or deterrents to use that are specific to inhalant use. The results also provide insights into the following concepts regarding inhalants in the literature: such as treating inhalants as a one 'class' of drugs; the perception of inhalants as 'gutter drugs'; episodic patterns of inhalant use; sequence of initiation in drugs; reasons for inhalant cessation; motivations and deterrents for use; and patterns of use in rural and urban areas. In addition to these topics, we discuss the recruitment difficulties encountered in this research, limitations of the study and implications of the results for future research and prevention.

### **4.1 Types of use**

Several patterns of use were identified amongst polydrug users: aborted experiments, temporary use and cessation, episodic use, and dependent everyday use. Further research would be required to demonstrate the prevalence of these types of inhalant use in the different population groups.

In the inhalant literature, the term 'experimental use' refers to a group of users who use inhalants a number of times and then cease use after a short period of time. The use of the term may not be helpful as it masks experimental use that can occur within other groups of people who use inhalants episodically, or regularly. Within this group of polydrug users, initiation of experimental use of inhalants continued throughout their drug-using career. In some cases, experiments were aborted, and in others the user continued to inhale the volatile substance.

### **4.2 Motivations for use**

Findings about motivations for inhalant use need to be placed in the context of the complex social and individual determinants of drug use amongst disadvantaged youth (Drugs and Crime Prevention Committee, 2002). Whilst descriptions of cognitive (motivational) processes that contribute to inhalant use do not explain all the reasons for use, an understanding of these motivations is important for the development of prevention strategies and messages.

Reported motivations for the initial use of a particular inhalant (i.e., curiosity, boredom and complying with a friend's wishes to experiment) were similar to those reported for other drugs, except for that of substitution for other drugs.



Some motivations for ongoing use are also similar to those reported for other drugs, including pleasure, enhancing the high of other drug use, boredom, social motivations and a desire to stay intoxicated. Other motivations that were identified appeared to be specific to the inhalant product, namely the products' low cost and accessibility, enhanced enjoyment because inhalants are not illegal, and substitution for drugs of preference.

Some participants reported that a motive for the use of paint or petrol was to enhance the high gained from alcohol or cannabis. These findings provide some specific reasons for 'concurrent' drug use with inhalants that has been described by the National Drug Strategy Household Survey (Australian Institute of Health and Welfare, 2005).

### 4.3 Cessation and deterrents of use

This research identified six specific types of cessation of use that occurred within this group of polydrug users. These types of cessation can be re-classified into three groups, on the basis of their finality of use of one or more volatile substances.

1. **Final cessation** of **one** inhalant ('aborted experiments' or a 'decision to cease use a particular inhalant')
2. **Circumstantial cessation** of the use of **one** inhalant (including 'temporary use and cessation' and 'moving onto other drugs')
3. **Cessation** of regular use of **all** inhalants and other drugs ('cessation from heavy use' or 'decision to cease all use')

Despite the small sample, the results of this study confirm some of the factors that researchers or fieldworkers have previously proposed may act as deterrents to inhalant use; namely unpleasant aspects of use, health beliefs, and displacement by other drugs (Bellhouse et al., 2000; Rose, 2001). In addition, this research demonstrates specific life experiences can contribute to the cessation of inhalant use, such as removal from a geographical or social situation in which inhalants are used, parental reactions to discovering inhalant use, and crisis situations, such as overdoses, inhalant-related accidents or hospitalisations, or the death of a mate using inhalants.

Our findings suggest that each of these factors or deterrents is an insufficient explanation alone as to why younger people cease use of one or all inhalants. Rather, our findings suggest that multiple factors (e.g., unpleasant aspects of use or health beliefs about use) contribute to a desire to stop, or a preference for other drugs.

There were several factors that appeared to contribute directly to the final cessation of one inhalant, or all inhalants and/or other drugs. In the stories of inhalant users who

participated in this research, final cessation appeared to be linked to a health scare which highlighted the users' own mortality, e.g., hospitalisation due to an overdose from another drug or for lung-related health problems. Termination of experimental use appeared to be due to an event in which the negative aspects of use (for example, a very bad headache) outweighed the perceived benefits, or when the substance does not induce the expected feelings of intoxication.

The stories of these users suggest that unpleasant aspects of inhalant use and perceptions about the health impact of these substances may contribute to the users' preference for other drugs. This preference, as well as changes in the social accessibility of these drugs, were underlying some forms of cessation, such as the temporary use and cessation of inhalants, or 'moving on' to other drugs.

The results demonstrate that folk health beliefs about the impact of inhalant use can be based on users' own experience of symptoms or short-term effects of use. Little information exists about the specific health beliefs that are commonly held by inhalant users regarding their drug of choice. The results of this study document a number of health beliefs that can be tied to their symptoms of use: 'losing brain cells'; respiratory problems (coughing or choking); and the impact on the digestive system. MacClean has also described a belief amongst inhalant users who participated in her study that chroming kills brain cells (MacClean, 2003). Others have also noted that the some short-term effects of inhalant use mimic brain damage (Rose, 2001). Further research is required to document whether these beliefs are commonly held amongst inhalant users.

The unpleasant aspects of inhalant use reported as deterrents in this study are commonly recognised in the literature about inhalants: unpleasant smell and taste, getting paint on your mouth and clothes, severe headaches, nausea, vomiting and facial symptoms, such as cold sores, cracked lips and irritation (burning) on the face, and frozen fingers (when using bulbs). In addition, one participant also reported that a permanent black ring developed in the pores of his face with a range of inhalant products, and that this was undesirable.

## **4.4 Insights into the current literature**

This study's findings complement the findings of other studies on inhalant use.

### **4.4.1 User perceptions of 'inhalants' as a class of drugs**

The literature often treats inhalants as one whole group, with the possible exceptions of petrol and metallic paints. Petrol is dealt with separately as it has a high incidence of use in a particular context, i.e., remote Indigenous communities, and metallic paints have received widespread media attention in Australia due to 'chroming'.

However, the nature of inhalants and the findings of this research suggest that different inhalant products should be examined separately. Inhalants are used in different ways and in different contexts. Their physiological and toxicological effects are not the same. The findings of this study also demonstrate that users perceive each individual inhalant differently. They illustrate that the identified deterrents for use, such as stigma associated with inhalant use, or perceptions of unpleasant aspects of use, could be attached to one inhalant and not necessarily to others. In addition, participants reported that they ceased use of one specific inhalant product that they were using at a particular time, but did not necessarily stop using other inhalants.

#### **4.4.2 Gutter drugs**

It has been suggested that the perception of inhalants as ‘gutter drugs’ by young people may be a protective factor that will prevent them from initiating or continuing use of inhalants (Drugs and Crime Prevention Committee, 2002). Perception of inhalants as gutter drugs is supported by data in this study, although not all inhalants are regarded to be at that ‘same level’. Comments made by participants in this study about the gutter status of inhalants show that they may only perceive one inhalant as a gutter drug, and this appeared to prevent uptake of that particular inhalant, but not other inhalants or drugs. In addition, individual participants in this study viewed different inhalant products as a gutter drug. There was no information about this negative perception of inhalants as a deterrent for ongoing use.

#### **4.4.3 Episodic use**

Australian literature has proposed that volatile substance use may be episodic, particularly in country towns (Drugs and Crime Prevention Committee, 2002). This description of ‘episodic use’ refers to cyclic use of inhalants that has been observed at a community level. It has also been proposed that this reflects social ‘fads’ or favouritism for a particular inhalant product (Rose, 2001). These findings suggest that individual patterns of ‘episodic use’ or ‘temporary use and cessation’ may be underlying this. Examining the reasons underlying individual patterns of episodic use may further illuminate the reasons for these cycles.

#### **4.4.4 Sequence of drug initiation**

Often described as the ‘gateway theory’, studies that have examined the sequence of drug initiation amongst young people have concluded that in general, inhalant use precedes the initiation of illicit drugs and can be a vulnerability marker for their later use or abuse (Schutz et al., 1994; Johnson et al., 1995; Young et al., 1999; Novins et al., 2001; Novins and Baron, 2004; Walker et al., 2004; Storr et al., 2005). Several studies, however, have shown that the use of inhalant products can occur after the use of other drugs, including heroin (Dinwiddie, 1994). One study conducted in the United States found that young

people who are regular drug users are more likely to have followed an atypical sequence of drug initiation (Mackesy-Amiti et al., 1997).

The findings in this study provide support for the proposition that ‘youth at risk’ may initiate the use of inhalants after other drug use has occurred, rather than the reverse. They also explain a possible mechanism by which this can occur: the desire of the drug user to be intoxicated and the lack of availability of other drugs to achieve this.

#### **4.4.5 Moving onto other drugs**

It has been proposed that moving onto other drugs is a reason for cessation of inhalant use amongst polydrug users (Bellhouse et al., 2000; Rose, 2001). The findings in this study suggest that moving onto other drugs will not preclude the re-uptake of an inhalant as a substitute for a preferred drug in circumstances where this drug is not accessible. The results also indicate that inhalants can be used opportunistically to enhance the high received from other drugs or as a part of the drug mix in polydrug use. It is therefore unlikely to lead to final cessation of a particular inhalant.

#### **4.4.6 Unpleasant effects and motivations for use**

It has been proposed that unpleasant aspects of use may be a reason for the cessation of inhalant use (Rose, 2001). The findings in this research support this proposition. They suggested that unpleasant aspects of use contributed the cessation of experimental use, to a preference for other drugs and the final cessation of use.

Inhalant use may continue to provide a pleasurable experience for some, despite these unpleasant aspects of use. Focusing on the unpleasant aspects of inhalant use without examining how they interact with perceived positive benefits of use does not give a complete picture of how motivations and deterrents interact with each other to determine the use and cessation of inhalant use. MacClean (MacClean, 2005) notes that there is a danger in overlooking the role of ‘pleasure’ in motivating inhalant use. In that study on chroming and pleasure, it was reported that long term users reported a decrease in the pleasurable effects of inhalants as they perceived their dependence on chroming to escalate. Further, participants in that study reported that pleasures are often deeply marred by an acute sense of shame.

The findings of this study suggest that when pleasure of inhalant use is diminished by unpleasant aspects of use, such as vomiting and nausea, other motivations for use may still prevail (for example, substitution for other drugs when there is a desire to remain intoxicated).

#### **4.4.7 Patterns of use in rural and urban areas**

There seems to be little research available that differentiates between patterns of inhalant abuse in rural or regional areas, as opposed to city and metropolitan districts (Drugs and Crime Prevention Committee, 2002). The geographical and social context of inhalant use is different in these settings, and different patterns of use are likely to emerge. These findings suggest that inhalant use is more likely to occur in rural areas, in situations where polydrug users are not be able to access other drugs of preference. Different social norms surrounding the use of inhalants may emerge in rural areas in response to differences in the availability of other drugs.

#### **4.5 Study limitations**

The group examined in this study were polydrug users, in their late teens (16 years and older) and adulthood, who had abused volatile substances in conjunction with a range of drugs. There are likely to be similarities as well as differences between this group and other groups who use inhalants, such as the experimental users in early adolescence, chronic adult users, indigenous communities, and members of the gay community. In particular, factors that contribute to the cessation of experimental use during the early teenage years may differ from the factors that are documented in this report.

Given the small sample size, the research cannot be expected to capture the full range of factors (motivations and deterrents for inhalant use, and patterns of use) that exist within this group. Saturation of themes within this study was not achieved. However, it does document factors that had been previously undescribed in the literature.

#### **4.6 Recruitment issues**

The study encountered major difficulties in recruitment. Despite contacting 37 non-government agencies that had contact with young people over 4 months, this strategy was only successful in recruiting 5 young people. An additional 5 interviews were obtained through three press advertisements in 3D world, and one radio interview.

The community workers who were requested to help in recruitment reported that they did not know anyone who was currently using inhalants, or had used inhalants. Some reported that they believed the young people in Sydney did not need to use inhalants because they had easy access to cannabis.

Other reasons may also explain this low recruitment rate. Young people may not discuss their past or current inhalant use with frontline health or community workers because there is a greater stigma associated with its use than with other drugs. Current users may

also not view their inhalant use as problematic, particularly if it is not their drug of choice and they do not use it regularly. Inhalant use may be less visible in the city, than in rural areas. It is possible that the prevalence of inhalant use is higher in rural areas when young people find it difficult to access drugs of preference (i.e., alcohol and cannabis).

Street press advertisements and radio (with a \$30 reimbursement) did not attract young people who had experimentally used inhalants in the past. There are a number of reasons why the recruitment strategy may have been ineffective in recruiting young people who experimented with inhalants in early adolescence, but do not currently use inhalants or other illicit drugs. Young people who have used inhalants experimentally in early adolescence (at 12-13 years) may have ‘forgotten’ their use by the age of 16 or 17 years, or view it as a bit of childhood fun rather than as ‘drug use’. In addition, this group of young people may not be ‘youth at risk’, and so may not be in touch with youth or community centres. They may not have the same incentives to participate in the research as current polydrug users. A more proactive mainstream approach may be required to recruit these young people, possibly through schools. This of course would raise a range of other ethical issues and barriers.

This study set out to examine the reasons for the final cessation of inhalants. The inclusion criterion for participation in the study was that an inhalant user had not used a volatile substance in the previous four months. However, episodic patterns of inhalant use suggest that this is an artificial marker of cessation. Except in the case where a conscious decision had been taken to cease one inhalant (e.g., aborted experiments) or all drug use (including inhalants), cessation appeared to be circumstantial. Reported motivations for inhalant use in this study suggest that the user is likely to take up inhalant use again if circumstances permit (e.g. in a social context where others are using it, or where the drug of preference is not available).

#### **4.7 Implications for prevention**

This research was conducted to inform the development of prevention messages targeting young people who may be at risk of using volatile substances in the future. One of the barriers to broad base prevention programs dealing with volatile substances is that formal education sessions dealing with inhalant use is not encouraged, because the ease of availability of inhalant products may encourage possible ‘copycat’ behaviour.

One approach to teaching about inhalants recommends that solvents be referred to as ‘poisons’ rather than ‘drugs’. Rather than teach specifically about volatile substance use, teachers should ensure that prevention messages are linked to topics such as poisons, product safety, first aid and fire safety. For example, prevention messages promote an awareness that common household and industrial products such as cigarette lighter gas, aerosol sprays, petrol, some glues, correction fluids, paint thinners, nail polish removers, nitrous oxide used in whipped cream dispensers and fire extinguishers may contain poisons, toxins, pollutants and in some cases, highly inflammable materials. This is appropriate particularly with primary school aged students but may be superfluous for secondary students who know about the dangers associated with such products.

Principles for effective drug education put forward by the Australian Government acknowledge that broad approaches to drug education which integrates the school, family, community and the media are likely to be more successful than a single component (Australian Government Department of Education Science and Training, 2004). If teachers know with certainty that a group of students is using inhalants regularly, schools should consider establishing an intersectoral committee with relevant community and government agencies to ensure an integrated response occurs.

The results of this study suggest that frontline health and community workers should consider the following issues when developing prevention strategies/messages around inhalant use:

Not all inhalants are the same. Although they are often dealt with as one group of drugs they are not necessarily regarded in the same way by all users. Not only are different products taken in different social contexts and have different harms associated with their use, they are also used in a variety of ways, with different paraphernalia. It is also important to remember that they are regarded as being different in terms of the 'drugs hierarchy'. As such, prevention messages need to be tailored for individual inhalants.

The data suggests that initiation and reuptake of inhalant use can be linked to the lack of availability of other drugs. This has implications for workers who may have a good knowledge of current drug trends in their local community. For example, when workers in rural areas find the availability of cannabis is decreasing in their area, they may identify that there is a possibility that some cannabis users may return to inhalant use. Frontline health workers may not identify this as a possibility if they assume that inhalants are only an issue to 12 to 13 year olds.

For a message to be accepted by users it must appear credible and match their own experience. It is important for messages to address harms that have been identified by users themselves, and which are supported by scientific evidence. Effective prevention messages around inhalant use should, therefore, incorporate perceived harms that have been identified by users in this research, e.g., brain damage.

The results of this study affirmed the benefits of harnessing relevant personal stories from older inhalant users to help persuade young people to stop using. Frontline workers may find it is a helpful strategy to access ex-users of volatile substances who are willing to share their stories with young people at risk of future inhalant use.

## **4.8 Future research**

Further investigation of the following issues may be beneficial for understanding inhalant use in more depth and assisting in the development of more effective prevention programs.

- Rural-urban differences in patterns and motivations for use, including the displacement of inhalant use once young people have moved to the city.
- Differences in the motivations and deterrents for inhalant use between various groups of users, in particular, differences in motivations for use and cessation between young experimental users and polydrug users.
- The association between specific motivations and deterrents for use and patterns of use or cessation.
- An understanding of the predictors of inhalant dependence and the development, and evaluation, of early and brief interventions

Further research with a larger sample of polydrug users about motivations and deterrents for inhalant use and patterns of use would allow saturation of themes to occur and the full range of issues to be identified. However, such research may be hampered by similar recruitment difficulties that were experienced in this study.

## 5. CONCLUSION

This qualitative study explores patterns of inhalant use, including motivations and deterrents to use amongst a sample of polydrug users. The findings suggest that inhalants can remain a part of the drug mix of polydrug users in an episodic way. They suggest that whilst some polydrug users will use an inhalant experimentally and then move onto other drug use, others will continue to use one or more inhalants episodically throughout their drug using career. A sub-group of these may develop a dependent pattern of daily use. Many of the motivations for continuing or ongoing use related to role of inhalants in poly drug use, for example, cheapness or accessibility, substitution for the drug of preference, and enhancing the high of other drugs. Further research is needed to investigate the prevalence of these patterns of inhalant use, the role of inhalants in polydrug use, associated harms, and potential interventions among polydrug users.

The research results provide particular insights about current assumptions regarding inhalants and future directions for research.

- Not all inhalants may be viewed as a gutter drug by users.
- Moving onto other drugs does not necessarily preclude the uptake of an inhalant at a later stage or the continued use of inhalants.
- Cessation of inhalant use is just as likely to be ‘temporary’, rather than final. In this small sample of study participants, final cessation of inhalant use appeared to be associated with a decision to cease use of one inhalant because of a bad experience or to cease use of all inhalants and other drugs.



- Research and intervention strategies should not deal with inhalants as one group of drugs, as user perceptions of each individual type of inhalant differs.
- Any further exploration of inhalant use amongst young people who are not poly-drug users will need to utilise different recruitment strategies to those employed in this study, which access mainstream rather than marginalised youth.

## 6. REFERENCES

- Advisory Council on the Misuse of Drugs (1995). *Volatile Substance Abuse: a report*. London, Home Office.
- Anderson, C. E. and G. A. Loomis (2003). "Recognition and prevention of inhalant abuse." *American Family Physician* 68 (5), 869-876.
- Australian Bureau of Statistics (2000). *Australian Standard Classification of Drugs of Concern*. Canberra, Australian Bureau of Statistics, Commonwealth of Australia.
- Australian Drug Foundation (2006). *Drug facts - Inhalants*, Drug Information Clearing House.
- Australian Government Department of Education Science and Training (2004). *Principles for school drug education*. Canberra, ACT., Commonwealth of Australia.
- Australian Institute of Criminology (2005). *Illicit drugs and alcohol*, Australian Institute of Criminology, Australian Government.
- Australian Institute of Health and Welfare (2005). *2004 National Drug Strategy Household Survey: Detailed findings. Drug Statistics Series, Number 16*. Canberra, Australian Institute of Health and Welfare.
- Balster, R. L. (1998). Neural basis of inhalant use. *Drug and Alcohol Dependence* 51: 207-214.
- Beauvais, F. and E. R. Oetting (1987). "Towards a clear definition of inhalant abuse." *International Journal of Addictions* 22(8), 779-784.
- Bellhouse, R., G. Johnston, et al. (2000). *Fresh Air Clean Environment (FACE report)*. Melbourne, Department of Education, Victoria.
- Bennett, M. E., S. T. Walters, et al. (2000). Relationship of early inhalant use to substance use in college students. *Journal of Substance Abuse* 12, 227-240.
- Best, D., V. Manning, et al. (2004). "Adolescent psychological health problems and delinquency among volatile substance users in a school sample in South London." *Drugs: Education, Prevention and Policy* 11(6), 473-482.
- Bowen, S. E., J. Daniel, et al. (1999). Deaths associated with inhalant abuse in Virginia from 1987-1996. *Drug and Alcohol Dependence* 53 (3), 239-245.
- Boys, A., S. Lenton, et al. (1997). Polydrug use at raves by a Western Australian sample. *Drug and Alcohol Review* 16(3), 227-234.
- Brouette, T. and Anton, R. (2001). Clinical review of inhalants. *American Journal on Addictions* 10, 79-94.
- Chalmers, E. (1991). Volatile substance abuse. *Medical Journal of Australia* 154, 269-274.

- Dinwiddie, S. H. (1994). Abuse of inhalants: a review. *Addiction* 89 (8), 925-939.
- Drugs and Crime Prevention Committee (2002). *Inquiry into the inhalation of volatile substances: Final report*. Melbourne, DCPC: Parliament of Victoria.
- Filley, C. M., Halliday, W. and Kleinschmidt-Demasters, B.K (2004). The effects of Toluene on the Central Nervous System. *Journal of Neuropathology and Experimental Neurology* 63 (1), 1-12.
- French, R. and Power, R. (1998). A qualitative study of the social contextual use of alkyl nitrites (poppers) among targeted groups. *Journal of Drug Issues* 28 (1), 57-78.
- Houghton, S., Odgers, P. and Carroll, A. (1998). Reputations, self concepts, coping strategies of volatile substance users. *Journal of Drug Education* 28 (3), 199-210.
- Johnson, E. O., Schutz, C. G., Anthony, J.C and Ensminger, M.E. (1995). Inhalants to heroin: A prospective analysis from adolescence to adulthood. *Drug and Alcohol Dependence* 40 (2), 159-164.
- Kutzman, Y.L., Otsuka, K. and Wahl, R.A. (2001). Inhalant abuse by adolescents. *Journal of Adolescent Health* 28 (3), 170-180.
- MacClean, S. (2003). 'Just a dirty kind of drug': Young people's perceptions of chroming. *Proceedings of the Inhalant Use and Disorder Conference*. Townsville, July 7-8, 2003, Australian Institute of Criminology.
- MacClean, S. (2005). 'It might be a scummy-arsed drug but its a sick buzz': chroming and pleasure. *Contemporary Drug Problems* 32 (2), 295-318.
- MacClean, S. (2006). *Reasons for quitting inhalant use*. Melbourne.
- MacClean, S., d'Abbs, P. and Robertson-McMahon, J. (2005). *Impact of the Modification of Volatile Substance Products on the Behaviour of Inhalant Users*. Melbourne, The University of Melbourne.
- Mackesy-Amity, M. E., Fendrich, M and Goldstein, P.J. (1997). Sequence of drug use among serious drug users: typical versus atypical progression. *Drug and Alcohol Dependence* 45, 185-196.
- May, P. A. and Del Vecchio, A. M. (1997). Three common behavioural patterns of inhalant / solvent abuse: Selected findings and research issues. *Drugs and Society* 28 (3), 199-210.
- National Drug Abuse Information Centre (1988). *Deaths due to volatile substance abuse. Stat update 8*.
- National Inhalant Abuse Taskforce (2006). *National Directions on Inhalant Abuse*. Melbourne, Drugs Policy and Service Branch, Victorian Department of Human Services.
- National Institute on Drug Abuse (2000). *Research Report Series - Inhalant Abuse*. Maryland, USA, NIDA.

- Novins, D. K. and Baron. A.E. (2004). American Indian substance use: the hazards of substance use initiation and progression for adolescents aged 14 to 20 years. *Journal of the American Academy of Child and Adolescent Psychiatry* 43 (3), 316-324.
- Novins, D. K., Beals, J and Mitchell, C.M. (2001). Sequences of substance use among American Indian adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 40 (10), 1168-74.
- Rose, J. (2001). *Volatile Substance Abuse: Background Paper* prepared for the Western Australian Working Party on Solvents Abuse. Perth, Department of Health and Drug Alcohol Office, Government of Western Australia.
- Schutz, C. G., H. D. Chilcoat, et al. (1994). The association between sniffing inhalants and injecting drugs. *Comprehensive psychiatry* 35 (2), 99-105.
- Shepherd, R. T. (1989). Mechanisms of sudden death associated with volatile substance abuse. *Human toxicology* 8, 287-291.
- Storr, C. L., Westergaard, R. and Anthony, J.C. (2005). Early onset inhalant use and risk for opiate initiation by young adulthood. *Drug and Alcohol Dependence* 78 (3), 253-261.
- Toumbourou, J. W., Dimsey, L. and Rowland, B. (2004). Prevention of harms associated with volatile substance abuse. *Prevention Research Evaluation Report* 11, 1-17.
- Walker, D. D., Venner, K., Hill, D.E, Myers, R.T, and Miller, W.R. (2004). A comparison of alcohol and drug disorders: Is there evidence for a developmental sequence of drug abuse? *Addictive Behaviours* 29 (4), 817-823.
- World Health Organization Substance Abuse Department (1999). *Volatile Solvents Abuse: A global overview*. Geneva, World Health Organisation.
- Wu, L. T. and Howard, M. W. (2007). Psychiatric disorders in inhalant users: results from the National Epidemiological Survey on Alcohol and Related Conditions. *Drug and Alcohol Dependence* 88 (2-3), 146-155.
- Wu, L. T., Pilowsky, D., and Schlenger, W. (2005). High prevalence of substance use disorders among adolescents who use marijuana and inhalants. *Drug and Alcohol Dependence* 78 (1), 23-32.
- Young, S. J., Longstaffe, S. and Tenebein, M. (1999). Inhalant abuse and the abuse of other drugs. *American Journal of Drug and Alcohol Abuse* 25, 371-375.