

Executive summary

This review examines published and unpublished literature about interventions designed to combat volatile substance misuse (VSM), defined as the deliberate inhalation of a volatile substance in order to achieve a change in mental state. The review is an updated edition of one initially published by the Cooperative Research Centre for Aboriginal and Tropical Health¹ as *Petrol Sniffing in Aboriginal Communities: a Review of Interventions* (d'Abbs & MacLean, 2000). Whereas the earlier review was restricted in scope to petrol sniffing, the updated review covers other forms of VSM such as inhalation of aerosol paints, and other settings besides remote Indigenous communities.

In this executive summary, findings about specific interventions are itemised. In reality, the impact of any intervention is in part a function of the context in which it occurs. This caveat should be kept in mind when considering all findings presented here.

Volatile substances (also known as inhalants) are usually classified into four groups:

- solvents—liquids or semi-liquids that vaporise at room temperature, such as glues and petrol;
- gases—medical anaesthetics and fuel gases, such as lighter fuels;
- aerosols—sprays containing propellants and solvents, such as aerosol paints;
- nitrites—amyl nitrite or cyclohexyl nitrite found in room deodorizers.

This review covers the first three categories. While nitrites are volatile substances, they do not directly affect the central nervous system and are generally used to enhance sexual experience.

The review is divided into three parts. The first—entitled ‘VSM as a problem’—covers prevalence, patterns, causes and consequences of VSM. Part Two is concerned with interventions, which are grouped under four categories:

- *supply reduction*—actions taken to limit the availability of volatile substances, either by restricting their accessibility or by substituting products with less toxic alternatives;
- *demand reduction*—measures aiming at discouraging VSM;
- *harm reduction*—measures which reduce the risk of harm from VSM, without necessarily reducing its prevalence; and
- *law enforcement*—statutory and community-based measures aimed at enforcing laws, by-laws or other sanctions relating to VSM.

¹ The Cooperative Research Centre for Aboriginal and Tropical Health has since been superseded by the Cooperative Research Centre for Aboriginal Health.

Part Three, entitled ‘From interventions to strategies’, integrates findings from Part Two into a framework which provides a basis for planning interventions.

VSM as a problem: prevalence, causes, consequences

Data on VSM are often of poor quality, partly because VSM is not a criminal offence, partly because it is often a clandestine activity, and partly because many users are below the minimum age covered by drug use surveys.

Around the world, VSM most commonly occurs among young people from poor (often indigenous minority) groups. It is likely that poverty and marginalisation, rather than cultural attributes of particular groups, account for most VSM. In remote Indigenous communities in Australia, petrol sniffing is the most common form of VSM, whereas in urban and regional centres sniffing aerosol paints (‘chroming’) is the preferred form of VSM among both Indigenous and non-Indigenous youths.

A distinction is normally made between ‘occasional’ (or ‘experimental’ or ‘recreational’) and ‘chronic’ VSM, although none of these terms has a standardised usage. Among urban young people VSM appears to involve a relatively large number of experimental users and a smaller number of chronic users. In Aboriginal communities, however, the sniffing population often contains a high proportion of chronic sniffers, particularly among older age groups.

Australian studies reveal similar age and gender-related patterns of VSM to those found in the UK and US. As elsewhere, prevalence peaks early compared to other drug use, being highest among 12–14 year olds and diminishing thereafter. National surveys indicate a low prevalence of VSM within the Australian population. In 2004 only 2.5% of people aged over 14 years acknowledged ever using inhalants, with 0.4% saying they had done so within the preceding 12 months (Australian Institute of Health and Welfare, 2005). School-based studies, however, indicate that a significant minority is involved. In 2002, 21% of Australian 12–17 year old students surveyed reported ever having used inhalants, compared with 25% reporting having used cannabis (White & Hayman, 2004).

A survey of petrol sniffing in remote Indigenous communities conducted between 2005 and early 2007 indicated that just under 5% of persons aged between 5 and 40 years were current users.

In Australia since 1994 the prevalence of petrol sniffing in some Indigenous communities where it has been present for a long time, especially in Central Australia, appears to have declined. This has occurred alongside reports of increasing VSM in regional and urban centres.

VSM has been linked with a number of markers of deprivation and marginalisation. Inhalant users have been found to exhibit relatively high rates of psychological disorders, including depression, anxiety, stress, anti-social personality disorder and poor self esteem. They are disproportionately involved in petty crime and more likely than other young people to be incarcerated. VSM has been identified as both a cause and a consequence of poor schooling outcomes and early school leaving (Allanson, 1979; Bates, Plemons, Jumper-Thurman, &

Beauvais, 1997; Best et al., 2004; Chadwick, Yule, & Anderson, 1990). It has also been linked with both co-occurring and future drug use (especially alcohol and cannabis), family alcohol dependence or other problematic drug use, childhood physical or sexual abuse, and homelessness or over-crowded housing.

Although VSM has been shown to correlate with these and other indicators of disadvantage, the causal pathways linking indicators with VSM remain poorly understood. Young people have reported using inhalant-induced intoxication to block hunger pains and to dull both physical and emotional pain, or as an escape from otherwise unbearable life situations. One often overlooked reason why young people, Aboriginal and non-Aboriginal, use drugs is because it is exciting and *pleasurable*. VSM products are easily accessible and cheap compared with other drugs, and produce hallucinations that can be both frightening and entertaining.

The consequences of VSM are experienced not only by users themselves, but by their families, communities, and the wider society. For individual sniffers, VSM poses significant threats to health, both short- and long-term, which require preventative and rehabilitative interventions. It can and does also result in death. For the families and carers of sniffers, VSM is often extremely distressing and adds to difficulties and hardships already being experienced by those families. (Interventions should at best enhance, and at the least not undermine, these capacities of family and kinship systems.) For Aboriginal communities, petrol sniffing by young people poses challenges both to traditional authority and cultural patterns and to more ‘Westernised’ authority systems. Finally, VSM generates demands on the juvenile justice and health systems of the wider society.

As a problem, VSM cuts across the work of a range of Commonwealth and state/territory departments, as well as that of many local community councils and non-government organisations.

Interventions: supply reduction

Compared with frameworks in place for regulating supply of other legal drugs such as alcohol or tobacco, there is currently little regulation of inhalant product availability in Australia.

One objection frequently raised to reducing supply of volatile substances is that users will simply substitute other, possibly more harmful, sources of intoxication. This concern is not without foundation. In the UK, the introduction of legislation and education targeting sales of glue products was followed by an increase in deaths from more dangerous butane and aerosol misuse.

Three approaches to VSM supply reduction can be distinguished: product modification; locking up supplies of petrol; and measures (both statutory and voluntary) restricting sales of inhalants.

Product modification

Product modification in turn can take three forms: **replacement of harmful or psychoactive components of inhalants**; addition of deterrent chemicals; and package modification.

The limited evidence available suggests that the most successful of these is the first—that is, reformulating products by replacing particularly harmful chemical components with more benign alternatives. However, not all products can be reformulated in this way.

One well documented example of product modification has been the use of a low-hydrocarbon vehicle fuel, known as Opal, and introduced as part of a Commonwealth-funded Petrol Sniffing Prevention Program in more than 70 Australian Aboriginal communities. Opal cannot be sniffed for intoxication. Anecdotal evidence suggests that, since its introduction early in 2005, it has led to a reduction in petrol sniffing. A formal evaluation of the impact of Opal is currently underway.

Prior to the introduction of Opal, some communities used aviation fuel (known as Avgas) as an alternative to vehicle fuel. Like Opal, Avgas contained low levels of aromatic hydrocarbons, making it unsuitable for sniffing. In 1998 the Commonwealth Government introduced a scheme, known as the Comgas Scheme, under which the use of Avgas as a petrol sniffing prevention measure was partially subsidised. However, Avgas contained high levels of lead, as a result of which it had to be phased out for environmental reasons. An evaluation of the Comgas Scheme found that its introduction was associated with reduced petrol sniffing and associated harms, particularly when implemented alongside other measures.

Product substitution measures for volatile substances commonly misused in urban areas should be further investigated; for instance, restricting spray paint sales to relatively low-toxicity products.

The two remaining ways of modifying inhalants—by adding deterrent chemicals or packaging so as to deter misuse—have both been tried in various settings, without evidence of success.

Evidence suggests that product modification has maximum effect on early and/or occasional users, rather than chronic users.

Locking up petrol

Although many attempts have been made to prevent petrol sniffing by restricting access to supplies, especially in remote communities, evidence suggests that such efforts are almost invariably unsuccessful.

Statutory and voluntary restrictions on sales of VSM products

Most Australian jurisdictions prohibit the sale of specified VSM products where the vendor could reasonably be expected to know the goods are intended for misuse.

A number of jurisdictions have also introduced statutory restrictions on supply of specified VSM products to persons under 18 years. The effects of legislating to restrict sales of volatile products are unclear.

Several local attempts to reduce VSM prevalence have entailed efforts to reduce supply through voluntary agreements with retailers. The limited evidence indicates that targeting retailers has been an effective strategy when introduced through a local community development process entailing retailer education.

Interventions: demand reduction

Measures to reduce demand for inhalants include preventive programs such as educational and recreation-oriented interventions, counselling and family support, and treatment and rehabilitation services. In addition, over the past 20 years several multi-faceted, community-based approaches to preventing and managing VSM have also been implemented, in both remote and urban/regional centres.

Community-based programs

Evidence from community-based programs in remote regions suggests that:

- There are benefits to be derived from adopting a regional approach, and complementing service provision with brokerage and advocacy activities aimed at promoting local community capacity.
- Remote communities can benefit from dedicated town-based staff who are able to visit to provide support, education, advocacy and information about VSM. Drug and alcohol workers placed in remote communities very often require support and backup from others with specific skills in working with people who use volatile substances.
- Successful community-based interventions in remote communities require support from non-Aboriginal agencies such as police, clinics and schools, as well as Aboriginal agencies and groups.

Effective community campaigns in urban and rural locations have included:

- involvement of a range of community members and agency representatives;
- research and consultation to determine specific features of VSM within the local area;
- improvement of communication mechanisms between local service providers (for instance, police and welfare agencies);
- community education to increase parental and worker sensitivity to the issue;
- retailer education; and
- targeting VSM ‘hotspots’.

Education

Australian educational authorities continue to pursue a policy of not providing education about VSM under school-based drug education programs, on the grounds that such education may inadvertently encourage experimentation with inhalants. Some information about volatile substances is provided through occupational health and safety training. In England and Wales, by contrast, schools are required to include information about solvents in drug education programs. The UK Government is currently funding a five-year follow up study of the impact of school-based drug education on subsequent drug use.

Education targeting known inhalants appears to be ineffective when it adopts scare tactics. However, education highlighting the potential impact of VSM on valued activities, such as capacity to play sport, may be useful.

Education about inhalants for parents and professional people likely to come into contact with VSM, such as teachers and welfare workers, and for communities where VSM occurs, has been shown to be of value.

Several innovative programs have been developed using Indigenous cultural practices as vehicles for combating VSM, in particular through art forms, story telling and restoration of important caring relationships. The impact of such activities is difficult to determine, and few initiatives have been evaluated.

Skills training, remedial education and employment have all been shown to contribute to reducing VSM.

Recreation and youth programs

Recreational activities that are sufficiently exciting to provide an alternative to sniffing, and are available out of hours, can help to prevent VSM, although they are unlikely to attract chronic users.

Successful programs:

- include measures to avoid stigmatising drug users;
- focus on skill and capacity development;
- offer a range of activities including opportunities for risk-taking;
- are offered on a flexible basis;
- utilise local resources; and
- are sustainable.

Youth and recreation programs should not be the primary component of an anti-VSM program in communities with high proportions of chronic sniffers.

Youth work in remote communities is challenging and requires diverse skills, such as operating 4WD vehicles, hunting, painting, crisis support, sporting activities, and applying for grants. Activities must be run during evenings, nights, on weekends and through holidays.

Little research has been conducted into the impact of recreational programs on VSM in urban and regional centres. However, there is some evidence to suggest that they are most effective with young people among whom VSM has not become entrenched.

Clinical management of VSM

There is limited literature to guide clinical management of VSM, and much of what is available warns of poor outcomes compared with other substance misuse.

Thorough client assessment is recommended, to include assessment of family function, co-occurring poly-drug use, co-occurring mental health disorders and a thorough medical examination including screening for cognitive impairment which may impede treatment. The effect of the person's family and social situation on their drug use should also be assessed. For chronic users an assessment of neurological impairment is advised, with follow-up testing to check for improvement during treatment.

Some researchers argue that as intensive VSM is a marker of 'global vulnerability' or part of a 'risk behaviour syndrome', interventions should address the constellation of risks or associated problems, rather than focusing specifically on VSM. Many people engaged in VSM treatment are poly-drug users and treatment attention should not focus solely on one substance.

The requirement for detoxification from VSM is contested. No pharmacotherapies are available to treat inhalant dependence, although anti-depressive and anti-psychotic medications are often used to treat co-occurring mental health concerns.

Some studies argue that developing therapeutic relationships with young people who use volatile substances is particularly important as a precursor to any useful intervention. These kinds of relationships often take time to establish.

Recommendations for clinical management and treatment of VSM focusing on Indigenous youth include investigating the young person's sense of cultural identity and belonging, ensuring access to culturally appropriate services, role models and opportunities to learn about and participate in cultural activities.

The Central Australian Rural Practitioners Association (CARPA) Standard Treatment Manual includes advice for health staff on acute and ongoing care of petrol sniffers.

Counselling, family interventions and after-care

Counselling is the most common form of intervention in response to VSM by Australian alcohol and other drug agencies, although there is little evidence to guide intervention approaches. Inclusion of users' families in counselling interventions is recommended in both Indigenous and non-Indigenous contexts, as is the need for outreach and provision of diversionary activities.

Published guidelines for working with inhalant users stress the need to use counselling techniques such as motivational interviewing, self-monitoring strategies, relapse prevention and goal setting, and skill development in areas such as managing emotions, decision-making and communication.

Difficulties in working with VSM users, particularly in employing cognitive therapies with very young users, and assisting clients to change their behaviour, can lead to despondency among health workers.

Volatile substance users are likely to require intensive after-care and monitoring for relapse. After-care is often provided through an outreach model, focusing on monitoring and reinforcing skills learned in treatment.

Residential treatment and rehabilitation

Several Australian states and territories have recently established residential facilities for VSM. The most developed residential treatment models for VSM are found in Canada, where treatment consists of a blend of Native American and Western treatment strategies aiming to increase young people's resilience. Most Canadian facilities are well funded, operate under Indigenous control, have structured programs, and emphasise formal education as a means of returning clients to active participation in society.

Outcome studies of Canadian programs point to mixed results. No recent evaluations of Australian residential programs have been published.

Care for people with acquired brain injury (ABI)

Few options are available for long-term care of young people who have become severely disabled as a result of petrol sniffing or other forms of VSM, and their care generally falls to family members.

Homeland centres (outstations)

The strategy of sending sniffers to homeland centres, or outstations, has been used by some Aboriginal communities as a means of culturally appropriate banishment, inculcating behaviour change, and providing relief for communities themselves.

To be successful, such programs require adequate resources, a sustainable model of intervention, and community involvement both in the outstation programs themselves, and in providing after-care programs in the communities.

Homeland centres are not equipped to meet the complex medical and psychological needs of some VSM users. The use of homeland centres for VSM intervention has also been criticised on the grounds that they do not provide clients with skills necessary to engage with the wider society, such as education and training.

Interventions: harm reduction

The application of harm reduction approaches to VSM is controversial, insofar as its primary objective is not reducing drug use *per se*, but rather reducing risk of adverse consequences among those who choose to engage in VSM. However, precisely because VSM does entail such a high risk of serious, including fatal, consequences, there is a strong case for making inhalant users aware of harm reduction options.

Two main harm reduction strategies are available: minimising risk associated with the *settings* in which VSM occurs, and adopting *practices* when sniffing that reduce the risk of accidental harm.

Options relating to settings include:

- avoiding small, enclosed spaces where reduced oxygen supply may lead to loss of consciousness;
- avoiding areas near busy roads, or other places where an accidental fall may have dangerous consequences;
- being in the presence of someone who is not intoxicated, and who can therefore seek help if necessary.

Another strategy—supervising people who will not otherwise desist from VSM while they inhale—is highly contentious.

Options relating to sniffing practices include:

- choosing small containers with small surface areas from which to inhale;
- avoiding covering the head with a plastic bag to intensify exposure;
- avoiding concurrent use of other drugs.

Precautions should be taken against asphyxia resulting from sniffers falling asleep with containers against their faces or blankets over their heads, choking on vomit, accidental burning, and suddenly alarming sniffers.

Whether or not sniffers should be advised that some inhalants are more or less dangerous than other inhalants is a matter of controversy.

Interventions: law enforcement

While VSM is widely acknowledged to be a health and welfare issue, rather than a criminal justice issue, the high risk that inhalant users pose to themselves and others means that it is also an issue for law enforcement agencies.

VSM is not a criminal offence in any Australian jurisdiction. In recent years several Australian jurisdictions have amended police powers to intervene in VSM episodes, in two main ways: by authorising police to confiscate inhalants and related equipment; to apprehend young people engaged in VSM and release them into the care of a responsible person or a place of safety.

An evaluation of the ‘places of safety’ measures in Queensland in 2005 found that, while the facilities had provided a safe haven for inhalant users, they had not been extensively used by police as a custodial option.

A number of Aboriginal communities and organisations have imposed sanctions on VSM in the form of by-laws. However, in some places the effectiveness of these has been compromised by a lack of suitable places to which apprehended inhalant users can be taken, and/or by an absence of police to enforce the by-laws.

Aboriginal community-based police liaison officers can play a useful role in complementing sworn police officers; however, their capacity to act is sometimes constrained by local cultural factors, and they should not be seen as an alternative to sworn police officers.

Community patrols, also known as night patrols and street patrols, can provide an important mechanism for communities themselves to maintain peace, mediate conflicts and reduce harm related to VSM and other substance misuse. Their effectiveness is dependent upon a number of factors, including clear and mutually satisfactory relationships with local police, and adequate funding.

In order for law enforcement agencies to work effectively against VSM, a number of pre-conditions must be met. These include an adequate police presence, appropriate short-term custodial options, appropriate sentencing options, trained and supported community-based agencies such as night patrols, and clearly defined relationships linking police with health and welfare agencies.

From interventions to strategies

The development of a strategy involves a number of steps:

- identifying and describing a problem or problems;
- clarifying and prioritising objectives;
- identifying resources available, and resources needed, in order to pursue those objectives;
- selecting the best interventions for pursuing prioritised objectives;
- implementing the interventions;
- identifying and addressing barriers to implementation that arise in the course of the program;
- identifying and addressing unforeseen consequences;

- monitoring implementation processes and outcomes;
- feeding-back information obtained to relevant stakeholders; and
- modifying the strategy in light of information gathered.

How each of these steps is undertaken is no less important than *what* is decided.

This review demonstrates that when communities have been successful in doing something about VSM, a number of conditions have been present. **First, there has been sufficiently strong community resolve for families and community decision-making structures to act cohesively in deciding on and supporting strategies, and community members and key agency representatives have been actively involved in implementing them.**

Second, not one but a range of interventions must be put in place. The ways in which mind-altering drugs, including volatile substances, are used in any given context, and the consequences of those usage patterns, are a product of the inter-related effects of three factors: pharmacological-toxicological properties of the drug; attributes of the drug user; and aspects of the social and physical environments in which drug use takes place (Zinberg, 1984). Strategies against VSM are most likely to be effective when they comprise interventions designed to influence each of these three factors.

Interventions addressing VSM are too rarely critically evaluated. Sensitive program evaluation is essential to ensure a rational deployment of effort and allocation of resources.

The majority of VSM interventions have focused on individual users and/or their families. These include education, counselling, residential treatment, removal of sniffers to homeland centres or outstations, and some harm reduction measures. These interventions have a useful role to play but need to be complemented by other measures to reduce the availability or toxicity of substances and provide an environment where VSM becomes less attractive to potential users.

Three main ways of changing the settings in which VSM occurs are identified:

- restricting the availability of inhalants;
- providing recreational, training and/or employment programs;
- imposing legal sanctions and/or community-based sanctions.

Although more resources are available today for VSM interventions, and although governments in Australia have committed themselves to a national policy framework for addressing VSM, many interventions even today are not evaluated, and the quality of morbidity and mortality data on VSM remains deficient.

Ultimately, the most effective interventions into VSM are likely be those activities that redress social and economic disadvantage and enhance the opportunities, capacities and confidence of young people.

