



# Clinical Practice Guidelines: Toxicology and toxinology/Inhalant misuse

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<b>Date</b>	February, 2021
<b>Purpose</b>	To ensure a consistent approach to patients who have been exposed to inhalant misuse.
<b>Scope</b>	Applies to Queensland Ambulance Service (QAS) clinical staff.
<b>Health care setting</b>	Pre-hospital assessment and treatment.
<b>Population</b>	Applies to all ages unless stated otherwise.
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Inhalant misuse is the deliberate inhalation of volatile substances to achieve mind altering effects. It is a world-wide problem with numerous studies demonstrating significant mental health and behavioural comorbidities among patients who are inhalant abusers.<sup>[1]</sup>

Techniques used in inhalant misuse include:<sup>[2]</sup>

- ‘*chroming*’ – inhaling the fumes of substances such as glue or paint, usually by sniffing them from a paper bag or bottle, with the aim of becoming intoxicated;
- ‘*sniffing*’ or ‘*snorting*’ – direct inhalation of fumes;
- ‘*bagging*’ – inhalation of substances via a plastic or paper bag reservoir;
- ‘*huffing*’ – breathing through a substance-soaked rag or cloth;
- ‘*dusting*’ – direct spraying of aerosol cleaners in the mouth or nose.

The 2016 National Drug Strategy Household Survey<sup>[3]</sup> identified that 4.2% of Australians aged over 14 years have experienced inhalant misuse, with usage increasing from 0.4% in 2001 to 1% in 2016. While the sale of volatile substances to young people is illegal in most states, inhaling solvents itself is not illegal.<sup>[4,5]</sup>

There are two main categories of commonly misused inhalants:

- Hydrocarbons
- Nitrous oxide

## Hydrocarbons

Hydrocarbons include solvents and other household chemicals which produce short term psychotropic effects when inhaled. Commonly misused hydrocarbons include aerosols (paints, deodorants), solvents (paint thinner, petrol, glues), or gases (propane, butane). These agents are well absorbed when inhaled, leading to the rapid onset of CNS effects which are short-lived, prompting repeated use to maintain intoxication.

## Nitrous Oxide

Nitrous Oxide (N<sub>2</sub>O) has been used therapeutically for its analgesic properties since the mid-1800s.<sup>[6]</sup> It is thought the euphoric effects of N<sub>2</sub>O are related to inhibition of the NMDA receptor.<sup>[7]</sup> Inhaling nitrous oxide is commonly achieved by discharging the contents of a nitrous gas cartridge (also known as ‘nangs’, ‘bulbs’, or ‘whippets’) into a balloon, plastic bag, or directly into the mouth and inhaling.

## Clinical features



### Hydrocarbons

Short-lived CNS effects occur rapidly following inhalation and include;

- Euphoria
- Dizziness
- Headache
- Ataxia
- Disorientation
- Altered level of consciousness
- Seizure
- Coma

Hypoxia can occur due to asphyxiation (as the oxygen is displaced by the hydrocarbon).

Cardiovascular toxicity can occur with ventricular arrhythmia causing cardiac arrest in some people.

This is thought to be due to increased sensitisation of the myocardium to catecholamines, making the heart more prone to arrhythmias if there is a surge of adrenaline, for example, following a struggle with emergency services.<sup>[8]</sup>

Certain compounds have other specific effects including;

- renal tubular acidosis with toluene containing compounds, for example, paint thinner.
- carbon monoxide poisoning with methylene chloride containing compounds, for example, paint stripper.

## Clinical features (cont.)



### Nitrous Oxide

Short-lived CNS effects occur rapidly following inhalation and include;

- Euphoria
- Dizziness
- Disorientation
- Altered level of consciousness
- Weakness
- Ataxia

Cold burns may occur if the parts of the body are in contact with the rapidly expanding gas as it is discharged from its canister.

Hypoxia can occur due to asphyxiation (due to the oxygen being displaced).

Chronic use of large amounts of nitrous can cause significant neurotoxicity including psychosis, irreversible spinal cord damage and brain injury.





## Risk assessment

- Patients inhaling solvents are at risk of arrhythmias if exposed to stressful stimuli. Rapid de-escalation with chemical restraint is preferred over prolonged physical restraint in patients with suspected inhalation misuse.
- Volatile substance misuse frequently goes undetected. Clues include chemical odours on the breath, skin or clothes and the presence of empty containers.<sup>[3]</sup>
- The majority of patients do not seek or always require medical attention; however, in some situations inhalant abuse can cause serious illness or death.
- The calmative effects of inhalants and other over-the-counter or prescription drugs can be unpredictable and dangerous.
- Numerous studies have demonstrated significant mental health and behavioural comorbidities among patients who are inhalant abusers.<sup>[6]</sup>

