

PUBLIC HEALTH

Inhalant use and addiction in Canada

Epidemiology: "Inhalant" is a term loosely applied to a diverse group of volatile, psychoactive substances found in a number of common products such as gasoline, nail-polish remover, typewriter correction fluid, paint stripper and adhesive glue. Most inhalants are relatively simple hydrocarbon compounds that are self-administered by "sniffing" (nasal inhalation), "huffing" (breathing fumes from a solvent-soaked rag stuffed into the mouth) or "bagging" (breathing fumes from substances placed in a plastic bag held tightly around the mouth).¹ Blood levels peak minutes after inhalation and the compounds are rapidly taken up into fat stores, including lipids within the central nervous system.²

Inhalants are placed in 3 groups according to their pharmacologic profiles:³ volatile alkyl nitrites (e.g., the antianginal amyl nitrite), nitrous oxide ("laughing gas") and volatile solvents (e.g., toluene). Very little is known about the cellular sites and mechanisms of toxicity. Nitrites cause smooth muscle relaxation and peripheral vasodilation, resulting in dramatically lowered blood pressure and feelings of warmth, flushing and lightheadedness. These physiological responses may explain the intoxicating effects of nitrites, although direct effects on the brain cannot be ruled out. There is some evidence that nitrous oxide affects the opiate system, involving direct action either on the lipid membrane or on hydrophobic sites of unspecified proteins. The third group, volatile solvents, appears to act by a variety of mechanisms, including enhancement of GABAergic inhibition and inhibition of glutamatergic neurotransmission.³

Inhalant use is common worldwide and is among the most prevalent forms of substance abuse in Mexico, Colombia and Japan.⁴ It is frequently a group activity. The typical user is an adolescent male with low self-esteem and a family background of alcoholism and physical aggression.⁴ Prevalence in North America is rising, with the United States reporting a 3-fold increase among youths aged 12–17, from 7.2 cases per 1000 in 1983 to 21.5 per 1000 in 1993.⁵ The proportion

of Canadian adolescents who have tried inhalants is in the range of 3%–5%,² although this summary statistic belies the fact that, among certain impoverished populations, such as the children in isolated Inuit and Aboriginal communities, inhalant use is ubiquitous and epidemic.

Clinical management: Clinically, intoxication from acute volatile substances resembles alcohol intoxication, producing stimulation and loss of inhibition, followed by depression at higher doses. Patients may present with perceptual distortions, headache, diplopia, tinnitus, palpitations, abdominal pain, flushing and hypersalivation.² Thermal burns, a characteristic papular eruption around the nose and mouth ("glue-sniffers rash") and traumatic injuries secondary to muscular incoordination while intoxicated are common accompanying features. Treatment for acute intoxication is supportive.

Evidence on the effects of chronic solvent abuse is scant and often muddled by the confounding influence of polydrug use. A review of 22 cases indicates chronic solvent abuse may cause paranoid psychosis, permanent epileptic foci and cognitive impairment.⁶ Of the 22 patients, 14 developed schizophreniform illnesses with atypical symptoms of visual hallucinations. Three patients (13.6%) experienced temporal lobe epilepsy that manifested as recurrent explosive behaviour; a decrease in intelligence quotient was noted in 2 patients. The 22 patients needed multiple and lengthy hospital admissions, demonstrating that the sequelae of such chronic abuse can be protracted and very costly.⁶

Prevention: As with other addictions, prevention of relapse of solvent abuse is difficult and disappointing. Because of the degree of comorbid psychopathology and polydrug use by many inhalant users, designing specific treatment programs for this population can be challenging. Few such programs exist and fewer still have been evaluated.

Inhalant use is socially determined. Canada's First Nations are afflicted with poverty, poor housing, high levels



Inhalant abuse is a serious problem in some Aboriginal and Inuit communities.

of unemployment and incarceration, emerging epidemics of diabetes and HIV/AIDS, high rates of disability and inadequate health care. In March 1999 the Assembly of First Nations (AFN) and the Health Services Branch of Health Canada held a joint health policy forum to discuss a new partnership with the Canadian government. In his opening remarks, Phil Fontaine, then national chief of the AFN, remarked that such a partnership is not really new, but an existing treaty relationship. He spoke of the difficulties First Nations people have in trusting their partner, the federal government, and in entertaining a new partnership when so many First Nations citizens live in extreme poverty.

He identified 3 national components that must be taken into account: poverty, the effects of poverty and actions to eradicate poverty.⁷ — *Erica Weir, CMAJ*

References

- McGarvey E, Clavet G, Mason W, Waite D. Adolescent inhalant abuse: environments of use. *Am J Drug Alcohol Abuse* 1999;25:731-41.
- Dinwiddie SH. Abuse of inhalants: a review. *Addiction* 1994;89:925-39.
- Balster R. Neural basis of inhalant abuse. *Drug Alcohol Depend* 1998;51:207-14.
- Howard M, Walker RD, Silk Walker P, Cottler L, Compton W. Inhalant use among urban American Indian youth. *Addiction* 1999;94:83-95.
- Neumark Y, Delva J, Anthony J. The epidemiology of adolescent inhalant drug involvement. *Arch Pediatr Adolesc Med* 1998;153:781-6.
- Byrne A, Kirby B, Zibin T, Ensminger S. Psychiatric and neurological effects of chronic solvent abuse. *Can J Psychiatry* 1991;36:735-8.
- Health Canada. *Summary Report of the AFN/MSB Joint Health Policy Forum*. Ottawa: March 1999. Available: www.hc-sc.gc.ca/english/index.htm (click on Aboriginal Peoples).