Intervening early to reduce developmentally harmful substance use among youth populations

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ABSTRACT

- Early-onset or frequent substance use during adolescence increases the risk of developing mental health problems, as well as a range of other adverse outcomes (eg, alcohol or drug dependence, educational underachievement, health problems, social difficulties) during late adolescence and early adulthood.
- Increases in rates of risky drinking among young people are particularly concerning, suggesting that an effective, evidence-based alcohol policy and preventive framework needs to be developed.
- Restricting the supply of licit and illicit substances to adolescents, delaying the age that licit substances can be legally purchased, reducing positive media portrayals of substance use, and banning targeted promotions, should be universal, public prevention priorities.
- Mass-media campaigns need to deliver coherent and credible evidence-based messages to young people, utilising a broad array of dissemination strategies.
- Clear policy and guidelines for parents regarding appropriate alcohol use for adolescents also need to be developed.
- Prevention programs should target children and adolescents in families with parents who use drugs, young people who have been suspended from school, or those with mental health problems.
- Preventive screening and targeted brief interventions can be effectively delivered in a variety of settings by a range of health professionals.

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While experimentation with both licit and illicit substances is common among youth populations (Box 1),[1] early onset or frequent use is strongly associated with "developmental harm", characterised by increased risks for the development of mental health problems, as well as a range of other adverse outcomes, in late adolescence and early adulthood.[2-7] Indeed, teenagers who smoke tobacco regularly are more likely to have physical and mental health problems in older adolescence,[3,4] while early-onset regular cannabis use has been associated with educational underachievement,[5] psychosis,[5,6] depression, and anxiety.[7,8] Of particular concern is that around 90% of Australian youth (aged 18–24 years) have drinking patterns that place them at high risk of acute harm,[9] such as assault, sexual exploitation, and accidental injuries (including road trauma). Early use of tobacco, alcohol or cannabis in adolescence has also been associated with more frequent use during late adolescence, increased risk for later dependence, as well as other health problems in early adulthood (eg, accidental injuries, respiratory problems).[2-5,10] Early involvement with inhalants and polydrug use also appear to be markers of risk for later substance misuse.[3,11]

Despite robust evidence for a link between early-onset substance use and the development of problem use or other psychopathology in late adolescence and early adulthood, the mechanisms that underlie such associations are not fully understood.[12] The extent to which such relationships may be explained by individual, family and/or social characteristics, or the selective recruitment of troubled and at-risk youth into drug use, is yet to be determined. In addition, the neurobiological effects of substance use on the developing brain also requires consideration.[13] While research programs that investigate such issues are clearly warranted, the existing evidence for developmental harm as a result of adolescent substance use highlights the importance of prevention and early-intervention programs that focus on:

- Delaying the age of onset of drug experimentation;
- Reducing the number of young people who progress to regular or problem use; and
- Encouraging current users to minimise or reduce risky patterns of use.

This requires a multifaceted approach, incorporating a range of strategies (universal, indicated and targeted interventions) throughout childhood and adolescence (see Box 2).

Substance use prevention and early intervention strategies for youth populations

Community-based universal prevention strategies

Universal prevention programs target all young people in the community regardless of their level of risk, and include economic measures, social marketing, and regulatory control and law enforcement initiatives, as well as a range of psychosocial programs. Increasing the actual and perceived price of a specific substance is a particularly effective strategy for reducing substance use and related harms, with young people's behaviour being particularly sensitive to price.[14] Delaying the age that licit drugs can be legally purchased is also an effective strategy for reducing early-age substance use, regular adolescent use, and related harms, but often faces serious political barriers.[14]

Indeed, effective prevention strategies must be framed within the context of societal attitudes and policies. This is best exemplified by cigarette smoking, where recent intensive mass-media campaigns (eg, "Every cigarette is doing you damage") have been accompanied by tighter regulatory controls on advertising, sponsorship, price, and smoking in public places.[2] Such measures have affected public resolve to increase tobacco prices and regulatory measures, as well as reducing the acceptability and "coolness" of cigarette use among young people, as reflected by an overall population decrease in smoking rates among Australian secondary school students over recent years.[15]

In contrast, despite acknowledgement of the substantial costs associated with alcohol misuse within Australia, there have not been serious attempts to reduce alcohol harms using the major levers of mass-marketing campaigns, accompanied by significant changes to alcohol price and regulatory controls. Instead, the political power of the alcohol industry has ensured that access to alcohol, as well as

1 Rates of substance use among Australians aged 14–19 and 20–29 years in 2004[1]

Substance use	Aged 14–19 (n = 2880)*	Aged 20–29 (n = 4800)*
Tobacco		
Regular smoker	10.7%	23.5%
Occasional smoker (weekly or less)	2.8%	6.1%
Ex-smoker	3.3%	13.6%
Never smoked	83.3%	56.9%
Alcohol		
Current drinker	71.0%	89.4%
Risk of short-term harm (eg, binge drinking at least monthly)	27.6%	40.5%
Risk of long-term harm	10.0%	14.7%
Illicit drugs used in last 12 months		
Cannabis	17.9%	26%
Meth/amphetamines	4.4%	10.7%
Ecstasy	4.3%	12.0%
Inhalants	1.0%	1.1%
Injecting drugs	0.5%	1.0%
Heroin	0.6%	0.7%

* Estimated by dividing total sample by population proportions.[1] ◆

specific targeting of youth populations, has not been restricted. Thus, young people continue to be given conflicting messages regarding the social acceptability of consuming alcohol (eg, alcohol industry sponsorship of major events, media and sporting personalities celebrated for their drinking habits, and parents offering to supply alcohol to their under-age teenagers[16]). It is therefore not surprising that rates of early-onset binge drinking have increased over recent years.[15] Such findings confirm that alcohol policy and prevention deserve more attention than they currently receive (especially compared with the less prevalent illicit drugs).

Psychosocial prevention and early intervention strategies

Delaying the age of onset of drug use

A number of universal psychosocial interventions aimed at improving developmental outcomes for children and their families have been shown to reduce the likelihood of substance use and harm (Box 2).[2] Universal school-based drug education programs have been found to be effective in preventing and delaying the onset of drug use and reducing drug consumption over the short term,[17] but their long-term effectiveness is yet to be determined. Of particular concern are data suggesting that poorly conceptualised programs may actually be harmful and increase levels of adolescent substance use.[17] The Gatehouse Project has been developed in Australia as an enhancement program for use in the secondary school environment. It incorporates professional training for teachers and an emotional competence curriculum for students. A recent randomised trial suggested exposure to the program led to overall reductions in early alcohol, tobacco and drug use.[18]

A number of indicated prevention programs, which target children and young people at risk for a range of psychosocial problems, are also available.[2] These include programs that target childhood risk factors for the development of harmful substance use during adolescence, and also focus on strengthening relevant protective factors. Risk factors linked to developmentally harmful substance use during adolescence include:

- level of community drug use;[19]
- availability of drugs within the community;[19]
- genetic vulnerability;[20]
- maternal smoking and alcohol use;[21]
- extreme social disadvantage;[22]
- child abuse and neglect;[20,23]
- family breakdown;[21]
- early school failure;[19]
- childhood conduct disorder or aggression;[22]
- sensation-seeking personality trait;[23]
- behavioural disinhibition;[24]
- favourable parental attitudes to drug use;[22] and
- substance use by peers.[25]

High-risk populations for adolescent substance misuse include children and adolescents in families with parents who use drugs, as well as young people who have been suspended from school or have mental health problems. Several family-oriented interventions delivered during childhood and early adolescence have been developed (Box 2),[26] although few long-term follow-up studies have been conducted. A number of school-based programs encouraging prosocial development, improved school performance, and reduced drug use have also been developed for students at high risk of school dropout.[27]

Reducing the number of young people who progress to regular or problem use

Preventive screening and health promotion are key early intervention strategies that can be readily applied within primary care or other health settings to encourage more moderate patterns of youth substance use. Asking young people about their substance use identifies the issue as a health-risk behaviour, and assists in the detection of early-onset users who are at risk of regular, problem use. Once identified, targeted, brief interventions that address substance use can be effectively delivered in a variety of settings by a range of heath professionals,[28,29] although care should be taken not to stigmatise such young people.

Young people who seek treatment for mental health issues are a particularly important at-risk population, given the high rates of co-occurring substance-use disorders among those with established psychiatric illnesses, as well as the impact of substance use on clinical and functional outcomes.[30,31] These individuals can be provided with information regarding the link between mental illness and substance use, as well as brief interventions that discourage regular use. Such approaches provide a valuable opportunity for primary prevention of secondary substance use disorders.[32]

Encouraging current users to minimise or reduce risky patterns of use

There is a well established evidence base for the efficacy of brief interventions for alcohol use among young people.[33] While few brief intervention studies have been conducted that address smoking or illicit drug use among adolescents, there is some evidence for the efficacy of brief, motivational interventions for drug use in young adults,[34] and similar harm reduction and motivational enhancement principles apply. There is also growing evidence that cognitive behaviour therapy is effective in the treatment of problematic substance use in young people,[35] and increasing recognition that cognitive behaviour therapy may also

be useful in the treatment of young people with co-occurring mental health disorders, particularly when delivered in an integrated fashion (one intervention addressing both disorders simultaneously).[36]

There is solid empirical support for the use of family therapy in the treatment of adolescent substance misuse.[37] While there are many theoretical approaches, most programs incorporate several common components, such as psychoeducation, parent management training, and enhancing communication skills. Disease and abstinence-based 12-step approaches for the treatment of adolescent substance misuse (eg, Alcoholics Anonymous) are also available, but are yet to be systematically evaluated.

The following groups provide a particular challenge to services: young people with substance misuse and behavioural disorders; those who have dropped out or been expelled from school; those who come from families with multiple problems; and those who are homeless or reside in state-funded care or juvenile justice settings. Multisystemic therapy, which provides interventions in a variety of systems (eg, individual, family), has previously been shown to be efficacious in reducing substance misuse and drug-related arrests in juvenile offenders, although the results of a recent meta-analysis were equivocal.[38]

2 Early intervention strategies for substance use in young people

Treatment type/ target population	Potential interventions
Primary prevention	
Universal	
All young people regardless of substance use history	• Economic measures (eg, increase the price of licit substances) • Social marketing (including sophisticated youth-focused Internet campaigns) • Regulatory controls (eg, delaying the age of licit purchases) • Law enforcement • School-based drug education (eg, SHAHRP: http://www.ndri.curtin.edu.au/) • Parent education (eg, Triple P: http://www.triplep.net/) • Health promotion
Indicated	
At-risk children and adolescents in families with parents who use drugs, as well as young people suspended from school	• Family home visiting • Parent education • Family intervention
Targeted: primary prevention of secondary disorders	
Early-onset mental health problems	• Preventive screening • Brief interventions (eg, education materials regarding link between mental illness and substance use, motivational interviewing)
Early intervention	
At risk	
Experimental substance use, with few problems arising	• Preventive screening • Brief, opportunistic interventions (one session of feedback and educational materials)
Acute/recurrent	
Regular substance use	• Brief interventions (one to three sessions of assessment, feedback and motivational interviewing techniques aimed at reducing substance use)
Regular substance misuse	• Brief interventions • Family therapy • Contingency management • Multisystemic therapy
Co-occurring substance misuse and mental health disorders	• Optimise management of mental health disorder • Pharmacotherapy (eg, antidepressant or antipsychotic treatment) • Cognitive behaviour therapy (eg, cognitive therapy, coping skills training, social skills training, cue exposure, relapse prevention) • Family intervention • Twelve-step programs (eg, Alcoholics Anonymous) • Multisystemic therapy
Regular substance misuse, and family, peer, educational and vocational problems	• Detoxification • Pharmacotherapy (eg, methadone for opiate dependence) • Cognitive behaviour therapy • Family intervention • Multisystemic therapy

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Competing interests

None identified.

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References

1 Australian Institute of Health and Welfare. 2004 National Drug Strategy Household Survey: detailed findings. Canberra: AIHW, 2005. (AIHW Catalogue No. PHE 66.) http://www.aihw.gov.au/publications/index.cfm/title/10190 (accessed Jun 2007).
2 Loxley W, Toumbourou J, Stockwell T, et al. The prevention of substance use, risk and harm in Australia: a review of the evidence. Canberra: The National Drug Research Centre and the Centre for Adolescent Health, 2004. http://www.health.gov.au/internet/wcms/publishing.nsf/content/health-pubhlth-publicat-document-mono_prevention-cnt.htm (accessed Jun 2007).
3 Newcomb MD, Bentler PM. Impact of adolescent drug use and social support on problems of young adults: a longitudinal study. *J Abnorm Psychol* 1988; 97: 64-75.
4 Mathers M, Toumbourou JW, Catalano RF, et al. Consequences of youth tobacco use: a review of prospective behavioural studies. *Addiction* 2006; 101: 948-958.
5 Hall WD. Cannabis use and the mental health of young people. *Aust N Z J Psychiatry* 2006; 40: 105-113.
6 Arseneault L, Cannon M, Witton J, Murray RM. Causal association between cannabis and psychosis: examination of the evidence. *Br J Psychiatry* 2004; 184: 110-117.
7 Patton GC, Coffey C, Carlin JB, et al. Cannabis use and mental health in young people: cohort study. *BMJ* 2002; 325: 1195-1198.
8 Degenhardt L, Hall W, Lynskey M. Exploring the association between cannabis use and depression. *Addiction* 2003; 98: 1493-1504.
9 Heale P, Stockwell T, Dietze P, et al. Patterns of alcohol consumption in Australia, 1998. National Alcohol Indicators Project Bulletin No. 3. Perth: National Drug Research Institute, 2000.
10 Bonomo YA, Bowes G, Coffey C, et al. Teenage drinking and the onset of alcohol dependence: a cohort study over seven years. *Addiction* 2004; 99: 1520-1528.
11 Lubman DI, Hides L, Yücel M. Inhalant misuse in youth: the need for a coordinated response. *Med J Aust* 2006; 185: 327-330.
12 Macleod J, Oakes R, Copello A, et al. Psychological and social sequelae of cannabis and other illicit drug use by young people: a systematic review of longitudinal, general population studies. *Lancet* 2004; 363: 1579-1588.
13 Lubman DI, Yücel M, Hall WD. Substances and the adolescent brain: a toxic combination? *J Psychopharmacol* 2007. In press.
14 Stockwell T, Gruenewald P, Toumbourou JW, Loxley W. Recommendations for new directions in the prevention of risky substance use and related harms. In: Stockwell T, Gruenewald P, Toumbourou JW, et al, editors. Preventing harmful substance use: the evidence base for policy and practice. London: Wiley, 2005: 443-464.
15 White V, Hayman J. Australian secondary students' use of over-the-counter and illicit substances in 2002. National Drug Strategy Monograph Series No. 56. Canberra: Australian Government Department of Health and Ageing, 2004.
16 Bonomo YA. Adolescent alcohol problems: whose responsibility is it anyway? *Med J Aust* 2005; 183: 430-432.
17 Midford R, Snow P, Lenton S. School-based illicit drug education programs: a critical review and analysis. Literature review prepared for the Department of Employment, Training and Youth Affairs. Melbourne: Centre for Youth Drug Studies, Australian Drug Foundation, 2001.
18 Bond L, Patton G, Glover S, et al. The Gatehouse Project: can a multilevel school intervention affect emotional wellbeing and health risk behaviours? *J Epidemiol Community Health* 2004; 58: 997-1003.
19 Hawkins JD, Catalano RF, Miller JY. Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychol Bull* 1992; 112: 64-105.
20 Lachman HM. An overview of the genetics of substance use disorders. *Curr Psychiatry Rep* 2006; 8: 133-143.
21 Fergusson DM, Horwood LJ, Lynskey M. The childhoods of multiple problem adolescents: a 15-year longitudinal study. *J Child Psychol Psychiatry* 1994; 35: 1123-1140.
22 Lynskey MT, Fergusson DM. Childhood conduct problems, attention deficit behaviors, and adolescent alcohol, tobacco, and illicit drug use. *J Abnorm Child Psychol* 1995; 23: 281-302.
23 Fergusson DM, Horwood LJ. Early onset cannabis use and psychosocial adjustment in young adults. *Addiction* 1997; 92: 279-296.
24 Tarter RE, Kirisci L, Mezzich A, et al. Neurobehavioral disinhibition in childhood predicts early age at onset of substance use disorder. *Am J Psychiatry* 2003; 160: 1078-1085.
25 Fergusson DM, Horwood LJ, Lynskey MT. The prevalence and risk factors associated with abusive or hazardous alcohol consumption in 16-year-olds. *Addiction* 1995; 90: 935-946.
26 Ashery RS, Robertson EB, Kumpfer KL, editors. Drug abuse prevention through family interventions. NIDA Research Monograph 177. Rockville, Md: National Institute on Drug Abuse, 1998.
27 Eggert LL, Thompson EA, Herting JR, et al. Preventing adolescent drug abuse and high school dropout through an intensive school-based social network development program. *Am J Health Promot* 1994; 8: 202-215.
28 Paperny DM, Hedberg VA. Computer-assisted health counsellor visits: a low-cost model for comprehensive adolescent preventive services. *Arch Pediatr Adolesc Med* 1999; 153: 63-67.
29 Werch CE, Anzalone DM, Brokiewicz LM, et al. An intervention for preventing alcohol use among inner-city middle school students. *Arch Fam Med* 1996; 5: 146-152.
30 Lambert M, Conus P, Lubman DI, et al. The impact of substance use disorders on clinical outcome in 643 patients with first-episode psychosis. *Acta Psychiatr Scand* 2005; 112: 141-148.
31 King RD, Gaines LS, Lambert EW, et al. The co-occurrence of psychiatric substance use diagnoses in adolescents in different service systems: frequency, recognition, cost, and outcomes. *J Behav Health Serv Res* 2000; 27: 417-430.
32 Kendall PC, Kessler RC. The impact of childhood psychopathology interventions on subsequent substance abuse: policy implications, comments and recommendations. *J Consult Clin Psychol* 2002; 70: 1303-1306.
33 Moyer A, Finney JW, Swearingen CE, Vergun P. Brief interventions for alcohol problems: a meta-analytic review of controlled investigations in treatment-seeking and non-treatment-seeking populations. *Addiction* 2002; 97: 279-292.
34 McCambridge J, Strang J. The efficacy of single-session motivational interviewing in reducing drug consumption and perceptions of drug-related risk and harm among young people: results from a multi-site cluster randomized trial. *Addiction* 2004; 99: 39-52.
35 Waldron HB, Kaminer Y. On the learning curve: the emerging evidence supporting cognitive-behavioral therapies for adolescent substance abuse. *Addiction* 2004; 99 Suppl 2: 93-105.
36 Riggs PD, Davies RD. A clinical approach to integrating treatment for adolescent depression and substance abuse. *J Am Acad Child Adolesc Psychiatry* 2002; 41: 1253-1255.
37 Ozechowski TJ, Liddle HA. Family-based therapy for adolescent drug abuse: knowns and unknowns. *Clin Child Fam Psychol Rev* 2000; 3: 269-298.
38 Littell JH, Popa M, Forsythe B. Multisystemic therapy for social, emotional and behavioral problems in youth aged 10-17. *Cochrane Database Syst Rev* 2005; (4): CD004797.

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