

Alcohol, tobacco and cannabis use among Nova Scotia adolescents: implications for prevention and harm reduction

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Abstract

Objective: To characterize adolescent drug use in terms of a risk continuum and to explore the rationale for harm reduction as a potential approach for school-based drug prevention.

Design: Self-reported surveys, in 1991 and 1996, of adolescent students concerning their use of drugs, especially alcohol, tobacco and cannabis, and the harmful consequences of such use.

Setting: Nova Scotia.

Participants: A total of 3452 (in 1991) and 3790 (in 1996) junior and high school students in randomly selected classes in the public school system.

Outcome measures: Prevalence of drug use and patterns of multiple drug use and of alcohol- and drug-related problems; independent risk factors for multiple drug use. The risk continuum for the response to alcohol problems was used as a policy framework.

Results: The prevalence of cigarette smoking and the use of hallucinogens and stimulants was markedly higher in 1996 than in 1991. Over one-fifth (21.9%) of the students reported multiple drug use of alcohol and tobacco and cannabis in the 12 months before the 1996 survey. The 3 main subgroups — nonusers, users of alcohol only and users of multiple drugs — had distinct patterns of use, numbers of problems and risk factors. In all, 27.1% of the students had experienced at least 1 alcohol-related problem and 6% had experienced at least 1 drug-related problem in the 12 months before the 1996 survey.

Conclusion: There is a need for integrated school- and community-based drug prevention programs, with goals, strategies and outcome measures capturing the full spectrum of patterns of use and levels of risk among subgroups of the adolescent student population.

Résumé

Objectif : Définir l'usage des drogues chez les adolescents en fonction d'un continuum de risque et analyser la justification de la réduction du préjudice comme stratégie possible de prévention scolaire de la toxicomanie.

Conception : Enquêtes réalisées en 1991 et 1996, fondées sur les déclarations des étudiants adolescents intéressés au sujet de leur utilisation des drogues, et surtout de l'alcool, du tabac et du cannabis, ainsi que sur les conséquences préjudiciables de cette pratique.

Contexte : Nouvelle-Écosse.

Participants : Au total, 3452 (en 1991) et 3790 (en 1996) étudiants du premier et du deuxième cycle du secondaire dans des classes choisies au hasard du système scolaire public.

Mesures des résultats : Prévalence de la toxicomanie et tendances de la polytoxicomanie et des problèmes liés à l'alcool et aux drogues; facteurs indépendants de risque de polytoxicomanie. On a utilisé comme cadre stratégique le continuum de risque en ce qui concerne la réaction aux problèmes d'alcool.

Résultats : La prévalence du tabagisme et l'utilisation d'hallucinogènes et de stimulants ont été beaucoup plus élevées en 1996 qu'en 1991. Plus du cinquième



Evidence

Études

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(21,9 %) des étudiants ont déclaré avoir consommé à la fois de l'alcool, du tabac et du cannabis au cours des 12 mois qui ont précédé l'enquête de 1996. Chez 3 principaux sous-groupes — non-consommateurs, consommateurs d'alcool seulement et consommateurs de drogues multiples — on a constaté des tendances à l'utilisation, des problèmes et des facteurs de risques distincts. Au total, 27,1 % des étudiants avaient eu au moins 1 problème d'alcool et 6 %, au moins 1 problème de drogue, au cours des 12 mois précédant l'enquête de 1996.

Conclusion : Il y a un besoin de programmes scolaires et communautaires intégrés de prévention de la toxicomanie, dont les buts, les stratégies et les mesures des résultats saisiront l'éventail complet des tendances de l'utilisation et des niveaux de risques parmi des sous-groupes de la population étudiante adolescente.

An upward trend in substance use among adolescents has been noted recently in Canada, the United Kingdom and the United States.¹⁻⁴ In Ontario the rates of drug use in this group steadily declined during the 1980s;^{1,2} however, between 1993 and 1995 they increased significantly.² For example, the prevalence of cannabis use by adolescent students in that province nearly doubled, from 11.7% in 1991 to 22.7% in 1995.^{1,2}

The reasons for this upward trend are unknown. However, the widespread evidence supporting a societal trend in increased drug use suggests that there is no unique or simple cause. With this upward trend in drug use, the policy imperative becomes not only the prevalence of use but also the harmful consequences of use. Given that most adolescents use at least 1 drug (alcohol), the underlying principle of only 2 choices — abstinence or abuse — is being challenged. Increasingly, there has been a call for the integration of harm-reduction strategies into school-based drug education and prevention programs.⁵⁻¹⁰

In Nova Scotia a comparison of 2 province-wide surveys conducted in 1991 and 1996 revealed marked increases in the prevalence of drug use among adolescent students.^{11,12} We conducted the present study to characterize drug use in this population in terms of a risk continuum and to explore the rationale for harm reduction as a potential approach for school-based drug prevention.

Methods

The data that formed the basis of our study were obtained from 2 self-reported surveys conducted in Nova Scotia in 1991 and 1996 that determined drug use by students in grades 7, 9, 10 and 12 in the public school system.^{11,12} Participation was anonymous and confidential. The sample design for both surveys was a single-stage stratified cluster sample of randomly selected classes in the 4 grades in each of the province's 4 health regions.

The 1996 Nova Scotia survey was part of a coordinated initiative that also involved New Brunswick, Prince

Edward Island and Newfoundland. Each province performed its own survey in the spring of 1996, adhering to a standard protocol developed and pilot tested in 1994-95.¹³ The 1996 questionnaire comprised 99 items and 1 open-ended question. Information was requested on demographic characteristics, social environment, use of alcohol, tobacco, cannabis and 10 other drugs, problems related to alcohol and other drug use, sexual behaviour related to alcohol and other drug use, help-seeking behaviour, gambling activity, and school drug education and policy. The items on drug use in the 1991 and 1996 questionnaires were identical.

On the basis of a study of the validity and reliability of the 1991 survey, the results of the 1995 pilot study and stringent procedures to ensure confidentiality, the 1996 survey protocol is thought to have minimized underreporting.¹¹⁻¹³ A question about a fictitious drug was inserted in both questionnaires to detect overreporting or "faking bad."

In this article, for alcohol, "any use" refers to use in the 12 months before the survey, ranging from less than once per month to daily use of alcohol. "Tobacco" refers only to cigarettes, and in this context "any use" refers to smoking more than 1 cigarette in the 12 months before the survey. For all other drugs, "any use" refers to use on 1 or more occasions during the 12 months before the survey.

Data were weighted during analysis to correct for the overall disproportionate sampling strategy. The estimated prevalence of drug use for both 1991 and 1996 and the corresponding 95% confidence intervals (CIs) take into account the Kish design effect arising from the cluster sampling design.¹⁴ The proportions of students reporting any use in 1996 were compared with the results from 1991 using logit regression with Huber's variance formula to correct for the cluster design.^{14,15}

Risk factors were identified for patterns of multiple drug use of alcohol, tobacco and cannabis versus no use of alcohol, tobacco and cannabis. We considered as potential risk factors age, sex and grade point average in school. We



identified independent risk factors for categories of drug use by using multinomial logistic regression analysis. After preliminary analyses, the categories “No use of alcohol, tobacco or cannabis, but some other drug use” and “No drug use whatsoever” were combined and used as the base category for comparisons.

The risk of harm was conceptualized using the risk continuum policy framework for the response to alcohol and drug problems.¹⁶ Students reported on 7 alcohol- and drug-related problems. The Stata computer program was used for all statistical analyses.¹⁷

Results

In 1991, 12% of the students in the 175 randomly selected classes were absent at the time the survey was conducted. A total of 95% of the students who were present participated; the responses of 39 (1.1%) were excluded because these students reported using a fictitious drug. The final sample was 3452 students, whose mean age was 15.2 years and of whom 51% were female.¹¹

The 1996 sampling numbers were similar to those in 1991: 13% of the students in 179 randomly selected classes were absent at the time of the survey, about 98% who were present participated, and 67 (1.7%) were excluded because they reported using a fictitious drug. The final sample was 3790 students, whose mean age was 15.2 years and of whom 50% were female.

During the 12 months before the 1996 survey 54.2% of

the students drank alcohol, 34.9% smoked cigarettes, and 32.1% used cannabis (Table 1). Use of lysergic acid diethylamide (LSD) was reported by 12.4%, and use of the remaining drugs was reported by less than 10%. The prevalence of use of 8 of the drugs increased significantly from 1991 to 1996. Of note, cigarette smoking increased by about 34% ($p < 0.001$) and any use of cannabis by 87% ($p < 0.001$). Furthermore, the prevalence of smoking more than 10 cigarettes per day increased from 4.8% to 7.2% ($p < 0.01$), and the prevalence of cannabis use more than once per month increased from 4.4% to 12.3% ($p < 0.001$).

Regarding patterns of multiple drug use of alcohol, tobacco and cannabis, significant changes in the prevalence of various patterns were observed between 1991 and 1996 (Table 2). Of note, the prevalence of the use of all 3 increased markedly, from 12.4% to 21.9% ($p < 0.001$). The prevalence of the use of only alcohol decreased significantly, from 24.9% to 16.8% ($p < 0.001$).

Fig. 1 depicts the 1996 prevalence of various patterns of multiple drug use as a Venn diagram with accurately

Table 1: Drug use reported by students in grades 7, 9, 10 and 12 in Nova Scotia in the 12 months before being surveyed, 1991 and 1996

Drug*	% of students (and 95% confidence interval [CI])	
	1991 <i>n</i> = 3452	1996 <i>n</i> = 3790
Alcohol	50.8 (46.9–54.7)	54.2 (50.5–57.9)
Tobacco	26.0 (23.5–28.5)	34.9‡ (32.5–37.4)
Cannabis	17.2 (14.9–19.5)	32.1‡ (29.2–34.9)
LSD	7.1 (5.8–8.4)	12.4‡ (10.9–14.0)
Stimulant, nonprescription	5.3 (4.4–6.2)	8.9§ (7.6–10.2)
Stimulant, prescription	3.2 (2.6–3.8)	4.9§ (4.2–5.6)
Psilocybin/mescaline	4.0 (2.9–5.1)	8.3‡ (7.1–9.5)
Inhalant	9.6 (8.1–11.0)	7.2 (6.3–8.2)
Tranquilizer, prescription	6.0 (5.1–6.9)	5.7 (4.9–6.5)
Tranquilizer, nonprescription	2.6 (2.0–3.2)	4.8§ (3.9–5.7)
Cocaine/crack	2.5 (1.9–3.2)	3.6 (2.9–4.2)
Anabolic steroid	NA†	2.8 (2.3–3.4)
PCP	1.1 (0.7–1.5)	2.6§ (2.0–3.3)
Heroin	1.6 (1.0–2.2)	2.1 (1.6–2.6)
Barbiturate, nonprescription	2.3 (1.7–2.9)	1.8 (1.3–2.2)
Barbiturate, prescription	1.8 (1.3–2.3)	1.3 (0.9–1.6)

*LSD = lysergic acid diethylamide, PCP = phencyclidine hydrochloride, “prescription” = drug used as prescribed, “nonprescription” = drug not prescribed or not used as prescribed.
 †NA = not available.
 ‡ $p < 0.001$.
 § $p < 0.01$.

Table 2: Use of alcohol, tobacco and cannabis reported by students

Drug*	% of students (and 95% CI)	
	1991	1996
Alcohol only	24.9 (22.5–27.4)	16.8† (15.2–18.4)
Alcohol and tobacco	10.1 (8.7–11.4)	7.7† (6.8–8.6)
Alcohol and cannabis	4.5 (3.6–5.5)	7.9† (6.8–9.0)
Tobacco only	3.3 (2.6–4.0)	3.7 (2.9–4.4)
Tobacco and cannabis	< 1.0 (NM‡)	1.5 (1.1–2.0)
Cannabis only	< 1.0 (NM)	< 1.0 (NM)
All 3 drugs	12.4 (10.6–14.2)	21.9† (19.8–24.1)
None	43.9 (40.1–47.7)	39.7 (36.1–43.3)

*Categories of alcohol, tobacco and cannabis use are mutually exclusive.
 † $p < 0.001$.
 ‡NM = not meaningful.

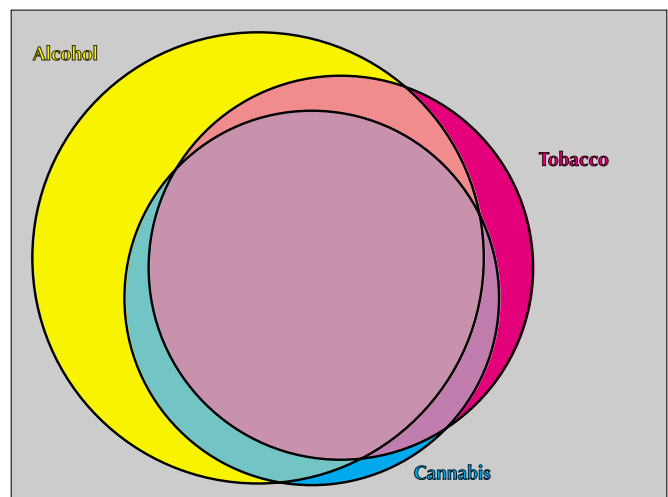


Fig. 1: Alcohol, tobacco and cannabis use by adolescent students in Nova Scotia in 1996. The grey area represents students who reported no drug use or who used 1 drug other than alcohol, tobacco or cannabis.

scaled areas for the rectangle, circles and overlapping surfaces. The grey area represents the students who did not use alcohol, tobacco or cannabis; it comprises those who used no drug whatsoever (36.8%) and those who used 1 drug other than alcohol, tobacco and cannabis (2.9%). Students rarely reported smoking cigarettes without drinking alcohol, and virtually all of those who reported using cannabis also drank alcohol.

Important similarities and differences in the students' characteristics, frequency of use, drunkenness and problem use emerged in relation to the various patterns of multiple drug use (Table 3). The 16.8% of students who reported using only alcohol tended to drink infrequently, not to get drunk and not to have alcohol-related problems. Increasing age was found to be an independent predictor of that pattern of use (Table 4).

In all, 21.9% of the students reported using alcohol and tobacco and cannabis. That pattern was associated with the most frequent use of cannabis and the largest number of cigarettes smoked daily (Table 3). These students had a median of 1 episode of drunkenness per month and of 1 alcohol-related problem. The pattern of

using all 3 drugs appeared to be associated with the highest risk of harm. Increasing age and a low grade-point average were found to be independent predictors for this pattern of use (Table 4).

The pattern involving alcohol and cannabis use but no tobacco use (reported by 7.9% of students) was similar to the pattern involving all 3 drugs in terms of alcohol use, drunkenness and alcohol-related problems (Table 3). Increasing age, a low grade-point average and male sex were independent predictors for this pattern (Table 4).

The students who reported using alcohol and tobacco but not cannabis (7.7% of students) exhibited a blend of the characteristics observed in the groups who reported using only alcohol or all 3 drugs (Table 3). Female sex was an independent risk factor for the drug use patterns that involved cigarette smoking but not cannabis use.

The 1996 survey asked if the respondents' own drug use had resulted in some harmful consequences. Among the 2037 students who reported drinking alcohol, the 7 specific alcohol-related problems were damaging things (24.2%), injuring themselves (23.1%), giving up buying things because of the cost of alcohol (18.0%), experienc-

Table 3: Characteristics of students by category of alcohol, tobacco and cannabis use reported in 1996

Characteristic	Drug use*					
	Alcohol only	Alcohol and tobacco	Alcohol and cannabis	Tobacco only	All 3 drugs	None
Age, yr						
Median	16	16	16	14	16	14
(25th/75th percentiles)	(15/17)	(15/17)	(15/18)	(13/16)	(15/18)	(13/15)
Sex						
% male	52.0	41.6	56.6	39.1	51.5	48.9
% female	48.0	58.4	43.4	60.8	48.5	51.1
% with grade point average						
≥ 60%	92.6	80.5	89.9	86.1	77.4	94.9
< 60%	7.4	19.5	10.1	13.9	22.6	5.1
Alcohol use						
Median	0.5 times/mo	0.5 times/mo	2.5 times/mo	NA	2.5 times/mo	NA
(25th/75th percentiles)	(0.5/2.5)	(0.5/2.5)	(0.5/4)		(2.5/4)	
Drunkenness						
Median	0 times/mo	0 times/mo	1 time/mo	NA	1 time/mo	NA
(25th/75th percentiles)	(0/1)	(0/1)	(0/2)		(0/2)	
No. of alcohol-related problems						
Median	0	0	1	NA	1	NA
(25th/75th percentiles)	(0/1)	(0/1)	(0/2)		(0/2)	
Tobacco use						
Median	NA†	1.5 cigs/d	NA	1.5 cigs/d	8 cigs/d	NA
(25th/75th percentiles)		(0.5/8)		(0.5/4)	(1.5/13)	
Cannabis use						
Median	NA	NA	3.5 times/yr	NA	10.5 times/yr	NA
(25th/75th percentiles)			(2/10.5)		(3.5/> 27)	

*The categories "tobacco and cannabis" and "cannabis only" are not included because the numbers were too small for analysis. Categories of alcohol, tobacco and cannabis use are mutually exclusive.

†NA = not applicable.



ing tensions with family or friends (15.3%), being in trouble with police (7.6%), having problems with school work or exams (5.3%) and having a motor vehicle accident as the driver after consuming 2 or more drinks (1.4%) (the problems were not mutually exclusive). Among the 1584 students who reported using drugs other than alcohol and tobacco, the most commonly reported drug-related problems were experiencing tensions with family or friends (18.4%) and giving up buying things because of the cost of drugs (18.3%). The least commonly reported problems were being in trouble with police (4.7%) and having a motor vehicle accident as the driver within 1 hour after using a drug other than alcohol (less than 1%).

The prevalence of harmful consequences is a key outcome measure for harm-reduction strategies. The pro-

portion of students who consumed alcohol and had or did not have alcohol-related problems can be presented in terms of a risk continuum at the population level (Fig. 2). In 1996, 45.8% of the students did not consume alcohol and therefore were not at risk of self-induced harm from alcohol. The 27.1% who drank but did not have alcohol-related problems were considered at low risk of harm. However, 27.1% reported at least 1 alcohol-related problem, and 7.0% reported 3 or more problems. These last 2 subgroups consumed alcohol in a manner that presumably placed them at moderate to high risk of harm. Finally, about 6% of the students reported having had at least 1 drug-related problem in the 12 months before the 1996 survey. Presumably, they were using drugs in a manner that placed them at least at moderate risk of harm.

Table 4: Patterns of alcohol, tobacco and cannabis use versus no alcohol, tobacco or cannabis use, in 1996, as determined by multivariate regression analysis

Variable	Drug use; relative risk (and 95% CI)				
	Alcohol only	Alcohol and tobacco	Alcohol and cannabis	Tobacco only	All 3 drugs
Age (for each additional year)	1.57* (1.48–1.66)	1.51* (1.41–1.62)	1.77* (1.65–1.91)	1.05 (0.95–1.16)	1.72* (1.63–1.82)
Female sex	0.87 (0.71–1.06)	1.47† (1.13–1.93)	0.74‡ (0.56–0.96)	1.62† (1.12–2.33)	1.02 (0.84–1.23)
Grade point average < 60%	1.30 (0.88–1.93)	4.33* (2.93–6.41)	1.76‡ (1.11–2.79)	3.11* (1.78–5.42)	4.86* (3.58–6.60)

**p* < 0.001.
 †*p* < 0.01.
 ‡*p* < 0.05.

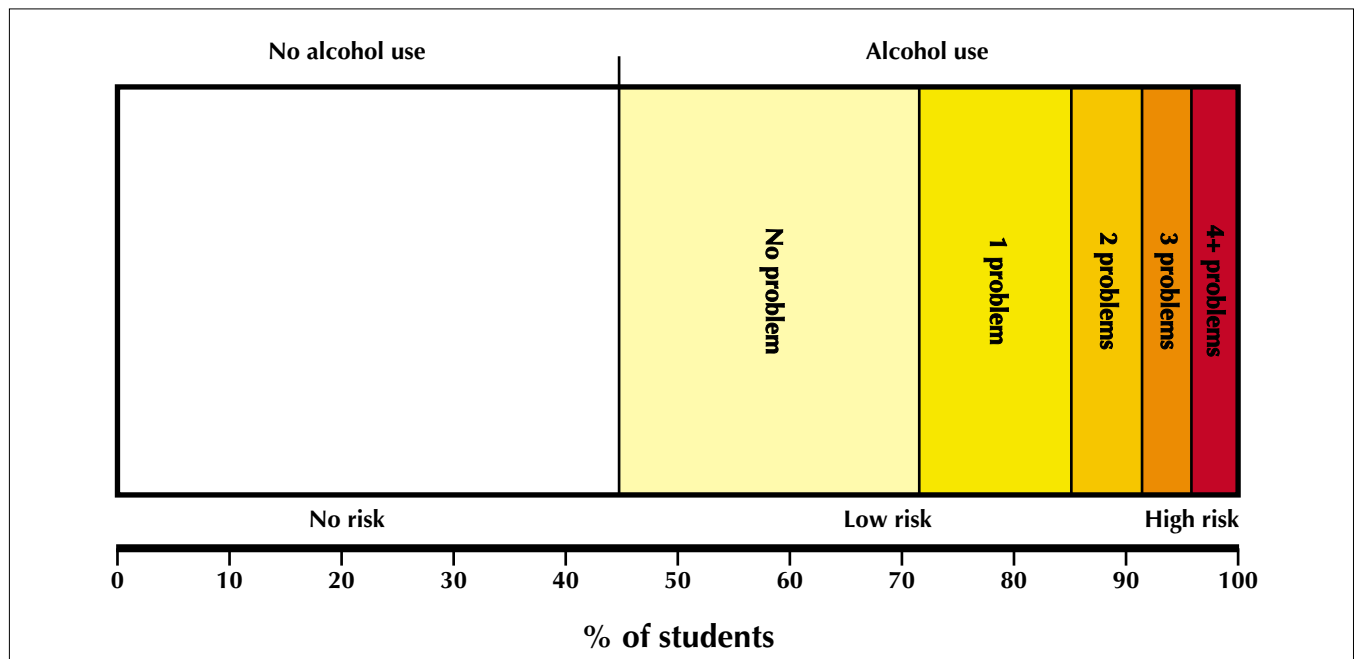


Fig. 2: Risk continuum for alcohol use and alcohol-related problems among students in 1996.



Discussion

The use of tobacco and of hallucinogens and stimulants increased markedly among Nova Scotia's adolescent students from 1991 to 1996. The use of cannabis more often than once per month and smoking more than 10 cigarettes per day, which signify drug use behaviours beyond the stage of experimentation, also increased significantly over the 5 years. Multiple drug use of alcohol, tobacco and cannabis also increased in prevalence. In particular, the multiple use of all 3 surpassed the use of alcohol only. On a positive note, the use of alcohol and of 7 other drugs included in the surveys did not change significantly from 1991 to 1996.

Such an upswing in drug use is not unique to Nova Scotia. In 1996 a large proportion of students in the Atlantic provinces reported using cannabis, up substantially from the proportion in 1991. In New Brunswick 17% reported cannabis use in 1992 and 29% in 1996.^{18,19} Furthermore, according to the 1996 survey results, about 23% of students in Newfoundland and Labrador and in Prince Edward Island used cannabis in the course of a year.^{20,21}

A complex set of factors influences the risk associated with alcohol and other drug use, including the characteristics of the user, the nature of the drug, and the level and context of use. In our study the students essentially fell into 1 of 3 major subgroups: nonusers, users of alcohol only and users of multiple drugs. These subgroups are characterized by distinct patterns of use, numbers of problems and risk factors.

Our findings illustrate the risk continuum for alcohol use among adolescent students in Nova Scotia. For the 46% of students who reported no use of alcohol, continued effort focusing on the primary prevention of alcohol use *per se* appears to be a reasonable school-based strategy. For the 27% whose use of alcohol was not associated with any problems, their low-risk pattern of use appears compatible with the transition from childhood to adulthood. Indeed, it has been argued that experimental drug use is a normative part of adolescent development and that experimenters are psychologically healthier than either abstainers or frequent users.²² However, for the 27% of students with at least 1 alcohol-related problem, particularly those with multiple problems, harm reduction clearly would be more relevant than continued attempts at the primary prevention of use.

In its fullest sense, harm reduction is "the philosophical and practical development of strategies so that the outcomes of drug use are as safe as is situationally possible. It involves the provision of factual information, resources, education, skills and the development of attitude change, in order that the consequences of drug use for the users, the community and the culture have minimal negative impact."²³

In contrast, school-based drug education and prevention programs generally focus on drug use itself, with an explicit or implicit goal of reducing the prevalence of use. Although such programs increase knowledge, their effectiveness in preventing alcohol and other drug use has repeatedly been shown to be equivocal or short-lived.^{5-7,24-27} Explications of the decaying effects of school-based drug prevention are numerous, including insufficient implementation, inappropriate expectations or messages, a narrow focus on the individual, conflict with the norms of adult behaviour and denial of the benefits of drug use or experimentation.^{5,6}

Given the large numbers of adolescents who do or will use at least 1 drug, the large numbers who are at risk and the impracticality of targeting programs to subgroups of adolescents, harm reduction has been advocated as a broad strategy appropriate for all youths.⁹

Alternatively, harm reduction could be targeted to subgroups on the basis of risk factors. In our study, age, sex and poor school performance were found to be independent risk factors for various patterns of drug use. However, these risk factors have limited usefulness for the targeting of programs, primarily because they account for less than 10% of the observed variability in drug use patterns. Smoking itself identifies a subgroup of the population at increased risk of other drug use.^{28,29} Because it is not necessarily a stigma among adolescents, smoking could serve as a means of identifying and inviting those at risk to participate in harm-reduction strategies.

Over the last decade harm reduction has gained increasing acceptance as a valid public health strategy. Harm reduction as pertains to adolescent students' use of alcohol and other drugs is relatively new in the educational field. However, educators have experience with harm reduction as it applies to sexual behaviour in this group. For example, the inclusion of promoting condom use in school sex education programs does not condone sexual activity; instead, it recognizes that sexual activity is the reality among adolescents and helps them choose safer — less dangerous — options.

Traditionally, school-based drug education and prevention programs have been premised on a dichotomy of choices — abstinence or abuse — and have sanctioned only one option — abstinence. Integrating harm reduction into school-based drug prevention programs would represent a paradigm shift, from the "problem of use," as viewed by adults, to the "problems with use," as experienced by adolescents. The controversial nature of harm reduction for youths largely arises from issues surrounding adolescents' autonomy, the legal proscriptions concerning minors' access to alcohol and tobacco, and the illicit status of cannabis.

We have attempted to look beyond the question of the



prevalence of drug use by adolescents to the issues arising from that drug use. In particular, in what direction should school-based drug prevention programs evolve? Should the traditional focus — the prevention of drug use *per se* — be subsumed by a broader harm-reduction approach? The most important policy implication emerging from the present epidemiological evidence is the need for drug prevention programs with goals, strategies and outcome measures capturing the full spectrum of patterns of use and levels of risk in subgroups of the adolescent student population.

Two important issues remain unresolved. First, the success of drug prevention interventions depends on an integration of school- and community-based approaches. Therefore, adolescents, parents, professionals in health, education and law, and communities need to examine and come to terms with their values concerning alcohol and other drug use by adolescents. Second, little evidence currently exists about the effectiveness of school-based harm-reduction programs; therefore, well-designed demonstration projects are imperative.

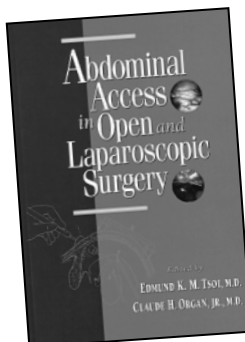
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References

- Adlaf EM, Ivis FJ, Smart RG, Walsh GW. *Ontario Student Drug Use Survey: 1977-1995*. Toronto: Addiction Research Foundation of Ontario; 1995.
- Adlaf EM, Ivis FJ, Smart RG, Walsh GW. Enduring resurgence or statistical blip? Recent trends from the Ontario Student Drug Use Survey. *Can J Public Health* 1996;87:189-92.
- Miller P McC, Plant M. Drinking, smoking and illicit drug use among 15 and 16 year olds in the United Kingdom. *BMJ* 1996;313:394-9.
- Substance Abuse and Mental Health Services Administration. *Preliminary estimates from the 1994 National Household Survey on Drug Abuse* [advance report no 10]. Washington: US Department of Health and Human Services; 1995.
- O'Connor J, Saunders B. Drug education: an appraisal of a popular preventive. *Int J Addict* 1992;27:165-85.
- Resnicow K, Botvin G. School-based substance use prevention programs: Why do effects decay? *Prev Med* 1993;22:484-90.
- Brown JH, Horowitz JE. Deviance and deviants. Why adolescent substance use prevention programs do not work. *Eval Rev* 1993;Oct:529-55.
- Duncan D, Nicholson T, Clifford P, Hawkins W, Petosa R. Harm reduction: an emerging new paradigm for drug education. *J Drug Educ* 1994;24:281-90.
- Kay J. Don't wait until it's too late. *Int J Drug Policy* 1994;5:166-76.
- Marlatt GA, Somers JM, Tapert SF. Harm reduction: application to alcohol abuse problems. *NIDA Res Monogr* 1993;137:147-66.
- Poulin C, MacNeil P, Mitic W. The validity of a province-wide student drug use survey: lessons in design. *Can J Public Health* 1993;84:259-4.
- Poulin C, Wilbur B. *Nova Scotia student drug use 1996* [technical report]. Halifax: Nova Scotia Department of Health and Dalhousie University; 1996.
- Poulin C, Clarke B, Balram C, Wilbur B, Bryant E. *Student drug use surveys in the Atlantic provinces: a standardized approach* [NHRDP grant no 6603-1402-DA]. Halifax: Dalhousie University; 1996.
- Kish L. *Survey sampling*. New York: John Wiley & Sons; 1965.
- Huber PJ. The behavior of maximum likelihood estimates under non-standard conditions. Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability 1967;1:221-33. [As cited in: *Stata statistical software: release 4*. College Station (TX): StataCorp; 1995:vol 2.]
- Caplan E. *A framework for the response to alcohol and drug problems in Ontario*. Toronto: Ontario Ministry of Health; 1988.
- Stata Statistical Software: release 4*. College Station (TX): StataCorp; 1995.
- Atkinson G. *Comprehensive report. 1992 provincial student drug use survey*. Fredericton: New Brunswick Department of Health and Community Services and Department of Education; 1992.
- New Brunswick student drug use 1996. Highlights report*. Fredericton: New Brunswick Department of Health and Community Services and Department of Education; 1992.
- Spurrell DC, Clarke B, MacDonald CA. *Newfoundland and Labrador student drug use 1996* [technical report]. St. John's: Government of Newfoundland and Labrador, Department of Health, Addictions Services; 1996.
- Van Til L, MacMillan H, Sweet L, Poulin C. *Prince Edward Island student drug use 1996* [technical report]. Charlottetown: Prince Edward Island Department of Health and Social Services; 1996.
- Shedler J, Block J. Adolescent drug use and psychological health: a longitudinal inquiry. *Am Psychol* 1990;45:612-30.
- Watson M. Harm reduction — Why do it? *Int J Drug Policy* 1991;2:13-5.
- Bangert-Downs RL. The effects of school-based substance abuse education: a meta-analysis. *J Drug Educ* 1988;18:243-64.
- The effectiveness of prevention and treatment programs for alcohol and other drugs problems: a review of evaluation studies* [a Canada's Drug Strategy baseline report]. Ottawa: Health and Welfare Canada; 1992. Cat no H39-241/1992E.
- Rundall TG, Bruvold WH. A meta-analysis of school-based smoking and alcohol use prevention programs. *Health Educ Q* 1988;15:317-44.
- Tobler NS. Meta-analysis of 143 adolescent drug prevention programs: quantitative outcome results of program participants compared to a control or comparison group. *J Drug Issues* 1986;16:537-67.
- Bailey SL. Adolescents' multisubstance use patterns: the role of heavy alcohol and cigarette use. *Am J Public Health* 1992;82:1220-4.
- Henningfield JE, Clayton R, Pollin W. Involvement of tobacco in alcoholism and illicit drug use. *Br J Addict* 1990;85:279-92.

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