A B S T R A C T

Preliminary data are reported on the use of high-alcohol beer by underage drinkers in Ontario. Students in grades 11 and 12 with a valid driver's licence completed a questionnaire between January and May, 1994 (i.e., between three and seven months after the introduction of high-alcohol beer). About one-half of students who had drunk alcohol within the previous four weeks reported consuming high-alcohol beer within that period. In this group, males were much more likely to report high-alcohol beer consumption in the previous month. Both male and female high-alcohol beer consumers drank alcohol more frequently, got drunk more frequently, and drank five or more drinks on the same occasion more frequently than non-consumers. One reason for trying high-alcohol beer, "wanted a higher alcohol content", was endorsed by more than one-third of high-alcohol beer consumers. Our data suggest that the users of high-alcohol beer among this underage drinking sample tend to be heavier drinkers and more likely to experience alcohol-related problems.

A B R É G É

Cet article présente des données préliminaires sur la consommation de bière très alcoolisée chez des consommateurs d'âge mineur en Ontario. Des étudiants de 11e et 12e années, titulaires d'un permis de conduire en règle, ont rempli un questionnaire entre janvier et mai 1994 (soit entre trois et sept mois après l'arrivée des bières très alcoolisées sur le marché). Près de la moitié des étudiants qui avaient consommé de l'alcool au cours des quatre semaines précédentes ont déclaré avoir consommé de la bière très alcoolisée au cours de cette période. Dans ce groupe, les hommes ont beaucoup plus souvent que les femmes déclaré avoir consommé de la bière très alcoolisée au cours du mois précédent. Par rapport aux autres consommateurs, les étudiants des deux sexes qui consomment de la bière très alcoolisée boivent plus fréquemment, se saoulent plus souvent et boivent cinq boissons alcoolisées ou plus à la même occasion. Plus d'un tiers des consommateurs de bière très alcoolisée ont été d'accord pour dire qu'ils avaient essayé une bière très alcoolisée parce qu'ils voulaient une «teneur en alcool plus élevée». Les données en notre possession semblent indiquer que les consommateurs de bière très alcoolisée dans cet échantillon de consommateurs d'âge mineur tendent à être de plus gros buveurs et sont plus susceptibles de connaître des problèmes rattachés à l'alcoolisme.

Introduction of High-Alcohol Beer in Ontario: Preliminary Observations on Its Use by Underage Drinkers

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Alcohol use by young people continues to be a source of concern. Despite important reductions in alcohol use and related problems among Ontario students between 1979 and 1991, a large proportion of adolescents still report regular and heavy alcohol use and high-risk behaviours such as driving after drinking.¹ Alcohol-related accidents (traffic and otherwise) remain one of the major causes of fatalities and injuries among youth.

Legal and economic measures affecting the availability of alcohol have important influences on alcohol use and problems in the general population.²⁻⁴ Young people may be particularly sensitive to availability changes. In North America between the late 1960s and the 1980s, the drinking age in most jurisdictions was first lowered and subsequently raised again. Substantial research indicates that lowering the drinking age was associated with increases in youthful drinking and alcohol-related problems, whereas raising the drinking age reversed those trends.^{5,6} The relative price of alcohol appears to have a very important effect on young people's drinking. Young people tend to have less disposable income than older individuals, and thus their purchase of alcohol may be even more affected by its cost. As well, they seem more likely to consume beverages with a lower cost per unit of absolute alcohol.⁷

Most beer sold in Ontario has an alcohol content per volume of about 5%. Beers with a higher alcohol content have been available for some time, but at a higher

cost. In the fall of 1993, one of the major breweries introduced a beer with an alcohol content per volume of 7.1%. This brand of beer was aggressively marketed for several months, and the advertisements emphasized the higher alcohol content. Other major breweries soon introduced high-alcohol beers (HABs) of their own to compete with this brand. Concerns on the part of public health groups prompted the Canadian Brewers Association to introduce a voluntary code restricting the advertising of these products in January 1994.

These HABs are available at a price only slightly higher than that of regular beer. Thus, the price per unit of absolute alcohol is substantially less than that in regular beers with a 5% alcohol content. For example, we calculated the price per mL of alcohol for one HAB to be \$0.053, while the price per mL of alcohol for a leading product with a 5% alcohol content by the same brewer was \$0.069. That is, the price per unit of alcohol is about 23% lower for the HAB.

In view of the greater affordability per unit of alcohol for the HABs, one might predict that these products would be particularly attractive to young people. We report preliminary data on the use of HABs obtained in a survey of high school students in grades 11 and 12 with a valid driver's licence, carried out between January and May, 1994 (between three and seven months after the introduction of HABs).

METHOD

Data were collected from students between January and May, 1994, in four secondary schools in north-eastern Ontario and two in the southern region of Ontario.

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The schools in both regions served a mix of urban and rural students. The sampling of schools was not random; instead schools were selected on the basis of a willingness to allow follow-up information to be collected in the future.

Surveys were administered to all high school students in grades 11 and 12 who had had a driver's licence (including learner's permit) for not more than two years. The survey administrator made brief announcements describing the study and eligibility criteria to students at either the grade 11 and 12 classes or at school assemblies. Parental consent forms describing the study together with the questionnaires were distributed to eligible students. Students were required to return signed parental consents and completed questionnaires to the study administrator during the following three days at a particular location in the school. Upon submission of the parental consents and questionnaires, students were paid \$5.00 for their participation. Those who returned completed questionnaires (890) made up 72.5% of eligible respondents.

The questionnaire took approximately 30 minutes to complete and elicited information on the following areas: demographic variables; driving behaviour; use of different modes of transportation; drinking and drug use behaviour; drinking-driving behaviour; riding with drinking-drivers; avoidance of drinking-driving; prevention of others drinking-driving; knowledge and attitudes about drinking-driving; and attitudinal factors that may influence drinking and driving.

The sample selected for analysis consisted of 405 students (227 males and 178 females), under the age of 19 (the legal drinking age in Ontario), who had drunk alcohol within the previous four weeks, and had indicated whether they had drunk HAB (e.g., Maximum Ice, Labatt Breweries; XXX, Molson Breweries) within that period.

RESULTS

About one half of students (51%) who had drunk alcohol in the previous four weeks reported having consumed HAB within that period. The proportion of male

	Male HAB (n=147) %	Male Non-HAB (n=80) %	χ^2	Female HAB (n=60) %	Female Non-HAB (n=118) %	χ^2
Age						
16	37	30		40	33	
17	43	55		45	51	
18	20	15		15	16	
			n.s.			n.s.
Region of Ontario						
North	47	61		28	55	
South	53	39		72	45	
			4.25*			11.46†
Location of residence						
Rural	32	40		27	46	
Urban	69	60		73	54	
			n.s.			5.93*
Frequency of public transit use						
One or more times/week	23	23		38	31	
< Once/week	63	48		48	46	
Not available	14	30		13	23	
			9.23*			n.s.

HAB: Respondents who reported drinking high-alcohol beer in the previous four weeks.
 Non-HAB: Respondents who reported drinking an alcoholic beverage, but not high-alcohol beer, in the previous four weeks.
 * $p < 0.05$
 † $p < 0.01$

drinkers who had consumed HAB (65%) was almost double that of females (34%).

Table I presents demographic characteristics of students by sex and by high-alcohol beer consumption. Age was not found to differ between HAB consumers and non-consumers; the majority of both the males and females were 16 to 17 years old, which is consistent with the eligibility criteria of being in grade 11 or 12. We found significant regional differences for both males and females. A larger proportion of drinkers in the southern region of the province were HAB consumers. Female HAB consumers were more likely to live in urban areas than were female non-consumers. Male HAB consumers were less likely to report that they had no public transit available than male non-consumers.

Measures of drinking behaviour differed substantially between students who did and did not consume HAB (Table II). Significant differences for both males and females were found on frequency of drinking, frequency of being drunk and frequency of drinking five or more drinks on a single occasion in the previous four weeks. In all cases, HAB consumers were heavier or more frequent users of alcohol than non-

consumers. On behaviours and problems related to alcohol, the same pattern was observed, particularly for males. Male HAB consumers drove significantly more often after consuming any alcohol and after consuming two or more drinks, in the previous 12 months. As well, on the alcohol problem scale used in the Ontario Student Drug Use Survey¹ both male and female HAB consumers reported more problems related to alcohol than did non-consumers.

Data on places where students had consumed alcohol within the previous 12 months are presented in Table III. Male HAB consumers were significantly more likely than non-consumers to have consumed alcohol in a bar, tavern or pub, at someone else's home, at a wedding, at a dance, at a dance club, at a house party, at a keg party, at a house party with an admission fee, at a bush party, at a rave, or in a motor vehicle. Female HAB consumers were significantly more likely than non-consumers to have consumed alcohol in a bar, tavern or pub, at a restaurant, at someone else's home, at a dance club, at a house party, at a keg party, at a house party with an admission fee, in a motor vehicle, at a public event, or outdoors.

Table II
Alcohol Use Among Drinkers by Sex and High-Alcohol Beer Consumption

	Male			Female		
	HAB (n=147) %	Non-HAB (n=80) %	χ^2	HAB (n=60) %	Non-HAB (n=118) %	χ^2
Frequency of drinking (previous 4 weeks)						
Once or twice	47	79		70	86	
Once or twice/week	35	15		23	13	
3 or more times/week	18	6	21.65†	7	2	6.87*
Frequency of being drunk (previous 4 weeks)						
None	32	51		30	64	
Once	22	29		48	25	
Twice	21	8		12	6	
3 or more times	25	12	14.67*	10	4	18.74†
(n/a)	(4)	(4)		(3)		
Frequency of drinking 5+ drinks/ occasion (previous 4 weeks)						
None	19	38		25	59	
Once	22	20		35	27	
Twice	23	20		20	6	
3 or more times	35	23	9.24*	20	8	22.74†
(n/a)	(3)	(3)		(1)		
Times drinking-driving after 2+ drinks an hour (previous 12 months)						
Mean	1.97	0.42		0.67	0.20	
s.d.	5.85	1.29	$t_{169.6} = 3.08†$	2.72	0.99	$t = \text{n.s.}$
Times drinking-driving after any amount of alcohol (previous 12 months)						
Mean	3.26	1.44		0.63	0.33	
s.d.	8.52	4.71	$t_{224} = 2.07*$	1.41	1.23	$t = \text{n.s.}$
Alcohol Problem Scale						
Mean	1.52	0.68		1.40	0.53	
s.d.	1.94	1.13	$t_{223.1} = 4.13†$	1.79	1.19	$t_{176} = 5.45†$

* $p < 0.05$ † $p < 0.01$

Table IV presents use of other drugs within the previous 12 months by sex and high-alcohol beer consumption. Male and female HAB consumers were significantly more likely to have used tobacco, cannabis, stimulants, and tranquillizers. Female HAB consumers were significantly more likely to have used hallucinogens or opiates, and glue or solvents.

Data on the frequency of high-alcohol beer consumption, reasons for consumption, and attitudes toward consumption are presented for males and females in Table V. Males were more frequent consumers of HAB than females, and were more likely to report driving after drinking HAB than females.

The reasons most frequently endorsed by students for trying HAB were those related to the strength and lower cost per unit of alcohol of the beverage, and simple curiosity. The only significant difference between males and females was found for the reason "because of the advertisements", none of the females reporting this as a reason for consumption. About a third of the students agreed with the statement "The first time I drank a high alcohol beer, I found it hard to limit the amount to get the effect I wanted", while about half agreed with the statement "It's more likely that there will be trouble if people are drinking high alcohol beer rather than regular beer". No sex differences were found for the attitude measures.

DISCUSSION

The introduction of HABs has been greeted with some concern in Ontario. One of these concerns is that this beverage will be consumed disproportionately by those under the legal drinking age, since the beverage has a lower cost per unit of alcohol. Since the "unit" for consumption of beer is the bottle, young drinkers may drink HAB in the same quantities as they drink regular beer, thus increasing their risk of impairment and alcohol-related problems such as drinking and driving crashes.

Although the selection of participating schools was not based on any criteria that would be expected to bias the results (for example, a measure of alcohol problems in

Table III
Drinking Locations of Drinkers by Sex and High-Alcohol Beer Consumption

	Male			Female		
	HAB (n=147) %	Non-HAB (n=80) %	χ^2	HAB (n=60) %	Non-HAB (n=118) %	χ^2
Bar/tavern/pub	53	34	7.63†	53	32	7.86†
Restaurant	39	29	n.s.	50	35	3.98*
Own home	77	76	n.s.	77	75	n.s.
Other's home	90	80	5.14*	95	85	4.02*
Wedding	46	30	4.81*	47	46	n.s.
Dance	62	44	6.54*	41	45	n.s.
Dance club	47	23	12.43†	51	22	15.57†
House party	87	65	14.54†	88	66	10.31†
Keg party	31	15	6.77†	24	6	11.94†
House party with admission fee	26	10	8.08†	27	6	15.42†
Bush party	64	49	4.60*	47	39	n.s.
Rave	25	8	10.25†	4	9	n.s.
Vehicle	36	14	11.72†	29	11	8.72†
Public event	44	35	n.s.	42	18	11.66†
Outdoors	61	49	n.s.	41	22	6.39*

* $p < 0.05$ † $p < 0.01$

Table IV
Drug Use Among Drinkers by Sex and High-Alcohol Beer Consumption

	Male			Female		
	HAB (n=147)	Non-HAB (n=80)	χ^2	HAB (n=60)	Non-HAB (n=118)	χ^2
	%	%		%	%	
Tobacco	71	51	9.19†	88	51	24.11†
Cannabis	48	33	5.28*	55	24	17.27†
Stimulants	14	5	4.56*	23	11	4.69*
Tranquillizers	6	0	5.10*	13	2	10.16†
Hallucinogens/opiates	24	15	n.s.	25	9	9.00†
Glue/solvents	7	6	n.s.	8	2	4.64*
Cocaine	5	4	3.8	5	2	n.s.
Barbiturates	3	0	n.s.	5	3	n.s.
Other	2	5	n.s.	3	5	n.s.

* $p < 0.05$

† $p < 0.01$

Table V
Characteristics of High-Alcohol Beer Consumers by Sex

	Males (n=147)	Females (n=60)	Total (n=208)*
	%	%	%
Frequency of drinking high-alcohol beer			
once or twice	61	87	68
one or more times a week	40	13	32
	$\chi^2 = 13.39, p < 0.01$		
Driving within one hour of drinking high-alcohol beer	34	11	27
	$\chi^2 = 11.38, p < 0.01$		
Reason(s) for drinking high-alcohol beer:			
a) Friends were trying it	10	5	8
b) Because of the advertisements	6	0	4
	(p < 0.05, Fisher's Exact Test)		
c) Curious about the taste	31	30	31
d) Wanted higher alcohol content	36	45	39
e) Wanted more alcohol for same amount of money	18	10	16
f) Other reason	18	17	17
Attitudes:			
If I drink high alcohol beer, I adjust the amount I drink to get the same effect.	38	47	40
The first time I drank high alcohol beer, I found it hard to limit the amount to get the effect I wanted.	35	35	35
It's more likely that there will be trouble if people are drinking high alcohol beer rather than regular beer.	49	58	51
What strength the beer is doesn't make any difference in people's behaviour.	35	25	32

* One subject missing value for sex

the schools), the sample cannot be assumed to be representative of all Ontario students. Keeping this caveat in mind, the results do provide some valuable observations on the use of HAB in a sample of adolescents under the legal drinking age. First, it seems that this beverage has made substantial inroads in the underage drinker market. About half of students who had

drunk alcohol within the previous four weeks reported HAB consumption within that period. In this group, males were much more likely to report HAB consumption in the previous month, and at significantly greater frequency, than females. It is also interesting to note that students in the south of the province were more likely to have used the product than

students in the north. Whether these differences are related to marketing practices, product availability, or other factors is not known.

HAB consumers and non-consumers differed significantly on measures of drinking behaviour. Consumers of the product drank more frequently, got drunk more frequently, and drank five or more drinks on the same occasion more frequently than non-consumers. HAB drinkers also drank in more locations, and were more likely to use other drugs such as tobacco, cannabis, stimulants, and tranquillizers. Among males, HAB consumers reported a significantly greater frequency of driving after drinking within the previous 12 months than non-consumers. Also, male consumers reported a significantly higher level of driving after drinking high-alcohol beer than female consumers. These data demonstrate that HAB users tend to be heavier drinkers among this underage drinking sample and also more likely to engage in other high-risk behaviours. This suggestion is also supported by the significantly greater number of alcohol problems reported by high-alcohol beer consumers. Thus, the use of the product will likely serve to exacerbate the already high level of risk in this group.

The reasons for trying high-alcohol beer endorsed by consumers are consistent with the suggestion that young people will buy the product because of its lower cost per unit of alcohol. Another reason relevant to this suggestion, "wanted a higher alcohol content", was endorsed by more than one-third of high-alcohol beer consumers, while "wanted more alcohol for the same amount of money" was endorsed by almost 20% of males. Simple curiosity was endorsed by nearly a third of respondents.

However, caution is needed in identifying the reasons why such a high proportion of young people have tried this product. For example, although many young people do appear to have used HAB because of the lower price per unit of alcohol, others may have been deterred because of the higher absolute price. As well, the marketing strategy may have influenced a large number to sample the product, but not necessarily to continue using it. Monitoring of the use of HAB by young

people in the future will be important to assess the reasons for its attractiveness to this age group.

Attitudes regarding high-alcohol beer consumption were not found to be different between males and females. Only 40% of respondents reported that they adjust the amount of beer they consume because of its higher alcohol content. Thus, it appears that the majority of these underage students do not moderate their consumption when drinking the product, and could be driving with blood alcohol concentration levels much higher than they are used to.

The data described in this report are preliminary. Nevertheless, our findings suggest that, in this sample, use of high-alco-

hol beer has been adopted by that group of underage drinkers most at risk for problems related to alcohol. Thus, the higher alcohol content may contribute to an increase in alcohol-related problems in this portion of the population. Our evidence also supports the hypothesis that young drinkers are price sensitive.⁷ The use of the beverage by underage drinkers deserves further monitoring. We also suggest that marketing practices and pricing policies for alcoholic beverages need to take into account their likely effects on youth.

REFERENCES

1. Adlaf EM, Smart RG, Walsh GW. Ontario Student Drug Use Survey: 1977-1993. Toronto: Addiction Research Foundation, 1993.
2. Bruun K, Edwards G, Lumio M, et al. Alcohol Control Policies in Public Health Perspective. Helsinki: Finnish Foundation for Alcohol Studies, 1975.
3. Mann RE, Anglin LM. Alcohol availability, per capita consumption, and the alcohol-crash problem. In : Wilson, RJ, Mann, RE, (eds.), *Drinking and Driving: Advances in Research and Prevention*. New York: Guilford Press, 1990;205-25.
4. Room R. Alcohol control and public health. *Annu Rev Public Health* 1984;5:393-417.
5. Vingilis E, DeGenova K. Youth and the forbidden fruit: Experiences with changes in legal drinking age in North America. *J Crim Justice* 1984;12:161-72.
6. Wagenaar AC. *Alcohol, Young Drivers and Traffic Accidents*. Lexington, MA: Lexington Books, 1983.
7. Grossman M, Chaloupka FJ, Saffer H, Laixuthai A. Effects of Alcohol Price Policy on Youth (National Bureau of Economic Research Working Paper No. 4385). Cambridge, MA: National Bureau of Economic Research, 1993.

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