

Underage College Students' Drinking Behavior, Access to Alcohol, and the Influence of Deterrence Policies

Findings From the Harvard School of Public Health College Alcohol Study

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Abstract. Underage drinking is a major problem at American colleges, but little is known about the extent of alcohol use in different student groups, in different colleges, and in states with different control policies. We used data from the 2001 and 3 previous Harvard School of Public Health College Alcohol Studies that compared responses of underage students with those of their 21–23-year-old peers. Underage students drank alcohol less frequently but were more likely to drink to excess when they drank. College educational efforts and deterrent policies were limited in their outreach, and half of underage students obtained alcohol very easily. Underage students in states with extensive laws restricting underage and high-volume drinking were less likely to drink and to binge drink. A majority of underage students supported increasing efforts to control underage drinking. The results suggest that additional policy efforts to control underage drinking may be effective and feasible.

Key Words: alcohol, automobile accidents, binge drinking, minimum legal drinking age, underage drinking

The Surgeon General of the United States¹ has established reducing heavy episodic, or binge, drinking among college students as a major health goal for the nation. Approximately 2 in 5 college students engage in binge drinking.^{2–8} This style of drinking is associated with serious negative consequences, including academic difficulties; antisocial behavior; health and psychosocial problems; high-risk sexual behavior; and other risky behavior, such as drinking and driving. Accidental injury is the leading cause of death among older adolescents and young adults.⁹

Heavy alcohol use also affects students other than the drinker. Students at schools with high rates of binge drinking experience more secondhand effects of alcohol use such as verbal, physical, and sexual assaults, and property damage than do students at schools where the rates are low.¹⁰

College students consume alcohol at the 5-drink level more often than age-matched peers who do not attend college.¹¹ Research evidence suggests that environmental factors common in college settings, such as low prices and easy accessibility to alcohol, contribute to this high rate of alcohol use and related problems.^{12–14}

Although drinking and heavy drinking among underage students on college campuses are widespread, in an analysis of the 1999 Harvard School of Public Health College Alcohol Study (CAS) data, researchers found that college students' drinking differs from that of their peers who are of legal drinking age.¹⁴ Underage students drink less often, but they have more drinks per occasion when they do drink.

Legal Steps to Control Underage Drinking

Minimum drinking age laws are one set of tools that have been used to combat heavy alcohol use by college students. In 1984, the United States Congress passed the National Minimum Purchase Age Act,¹⁵ which encouraged each state to enact a minimum legal standard of 21 years for purchasing alcohol. The minimum legal drinking age (MLDA) law may be the single most effective method to combat alcohol use and its adverse consequences among young people.^{15–17} The authors of several studies have noted that this law was associated with a significant decrease in traffic fatalities involving drivers 18 to 20 years of age. The National Highway Traffic Safety Administration estimates that since 1975 the MLDA of 21 years has saved more than 19,000 lives in collisions involving drivers in this age group, and the proportion of youth traffic fatalities involving alcohol dropped from 63.2% in 1982 to 35.1% in 1999.^{9,18} Studies of highway fatalities in the 1970s, when the MLDA in some states was lowered, revealed a similar increase in deaths during that time period.¹⁶ In addition, the authors of a recent review of literature from 1960 to 2000¹⁷ found that the MLDA law was associated with reduced alcohol consumption in under-21-year-olds, fewer alcohol-related traffic fatalities, and

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fewer social and other health problems. The authors of that review also found a dearth of high-quality studies specifically evaluating the effects of MLDA laws among underage college students.

Whereas the MLDA law has played a role in reducing alcohol-related morbidity and mortality, underage alcohol use is still a serious national problem. Enforcement is often lax, and the agencies charged with upholding these laws are underfunded in many states.¹⁵ Underage individuals' use of false identification and others' provision of alcohol to underage persons compound enforcement problems. A study of alcohol retailers shows wide variability in compliance with MLDA laws and indicates that compliance needs to be improved.¹⁹

Other Limits on Alcohol Purchase and Consumption

In addition to the MLDA law, other laws govern the use of alcohol by persons under the age of 21 years. These include prohibitions on attempts to purchase or consume alcohol and on individual use of false identification to purchase alcohol by someone under the legal drinking age. Laws also exist in some states that require those who sell alcohol to be 21 years of age or older. In addition to the laws restricting alcohol sales by age, a series of laws aimed at limiting purchase of alcohol for high volume sales and consumption, such as happy-hour sales, keg registration, and pitcher sales, are in effect in some states. These legal controls have received less attention in research on alcohol use among those below the legal drinking age. Furthermore, although laws may be on the books, those who are targeted must be aware of the laws and they must also be enforced to be meaningful deterrents.

Colleges are mandated to address underage drinking and comply with the MLDA law. In 1989, the US Congress passed the Safe and Drug Free Schools Act, which requires that colleges and universities publish information about laws that regulate drug and alcohol use, including the MLDA; acquaint students with the consequences of breaking those laws; and periodically evaluate the effectiveness of the institution's policy.²⁰

In the present study, we used a national sample of colleges and universities to extend previous work by examining the drinking behavior of underage students, the relationship of place of residence to underage students' alcohol-use patterns, the means by which underage students obtain alcohol, and their perception of efforts on and off campus to prevent them from obtaining alcohol. We compared the reports of underage college students in 2001 with their student peers who are over the minimum legal drinking age and with data on underage students from previous surveys by the CAS in 1993, 1997, and 1999. We also considered the policies and programs that schools have put in place to combat heavy drinking and underage drinking. Finally, we examined the impact of 2 sets of laws: those that target underage drinking and those that are aimed at limiting high volume sales of alcohol.

METHOD

Sample

We drew the data in the present study from the 2001 CAS, a survey of students at 120 of the colleges selected to be a representative sample of accredited 4-year colleges and universities in 38 states and the District of Columbia. The 2001 study was a follow-up survey to a study originally conducted in 1993 and repeated in 1997 and 1999. Following the methods described in the companion article in this journal,² we compared data from the 2001 sample with the 3 previous samples drawn at most of the same sites to examine trends over time. In the present study, we limited the samples in each of the survey years to students aged 23 years or younger and compared underage students (< 21 y) with other traditional college-age students (21–23 y).

The 2001 CAS survey asked students a series of questions about their alcohol use and associated problems, their lifestyles, and demographic and background characteristics. Where possible, we adapted the questions from other major large-scale national studies. The student responses were voluntary and anonymous, and the study received exempt status from the institutional review committees on this basis. We excluded data from 1 school because the response rate was substantially lower than that from the other schools, which left a sample of 119 colleges that represented a national cross-section of students enrolled at 4-year colleges. Details of the survey methods and the composition of the sample are described in detail elsewhere.^{2–4}

Measures

We defined students who were under the legal drinking age on the basis of self-reported age (< 21 vs 21–23 y) and refer to them throughout this paper as *underage* students. The 21- to 23-year age group provides the most appropriate comparison group; these students are referred to as *legal age* or *of-age* students or peers.

We defined binge drinking as the consumption of at least 5 drinks in a row for men or 4 drinks in a row for women during the 2 weeks before the completion of the questionnaire. The CAS gender-specific measure, which is commonly used in epidemiologic studies,²¹ provides a measure of equivalent alcohol-related problems for college men and women.²² The details of how this measure is constructed are described elsewhere.² Frequent binge drinkers were students who had binged 3 or more times in the past 2 weeks, whereas occasional binge drinkers were those who had binged 1 or 2 times in the same period. Non-binge drinkers were students who had consumed alcohol in the past year but had not binged in the previous 2 weeks. Abstainers did not consume any alcohol in the past year.

In addition to defining the measure of binge drinking, we assessed student patterns of alcohol use by asking respondents who drank any alcohol in the past 30 days about (a) the number of times they drank alcohol, (b) the number of times they were drunk, (c) the usual amount of alcohol they consumed when they drank, and (d) the

importance of drinking “to get drunk” as a reason for drinking.

We calculated the volume of alcohol the students consumed through responses to 2 questions. The first asked about the number of occasions the respondent had a drink in the past 30 days. Response choices were 1–2, 3–5, 6–9, 10–19, 20–39, or 40 or more occasions. For analysis, we used the midpoint of each of the response categories and 40 for the maximum answer of 40 or more. The second question asked about the usual number of drinks per occasion in the past 30 days; the response choices were 1, 2, 3, 4, 5, 6, 7, 8, and 9 or more. We coded the maximum response choice of 9 or more as 9 drinks. We multiplied these 2 values to determine the number of drinks consumed in 1 month. About one third of the students reported that they did not drink in the past 30 days, including 12% to 15% of the students who drank in the past year but not in the past 30 days. For those who did not drink in the past 30 days, we assigned a value of 0 drinks. For this analysis, the possible number of drinks in the past 30 days therefore ranged from 0 to 360. The results presented for the volume of drinking analyses included students aged 24 years and older combined with the 21–23-year age group.

We asked students who drank alcohol in the previous year a series of questions about their experience of alcohol-related problems, including 12 health and behavioral consequences of one’s own drinking. Responses to the personal harms questions ranged from academic difficulties (eg, missing a class or getting behind in schoolwork), to physical and sexual violence, to serious medical problems such as alcohol overdose. We also examined driving after consuming any alcohol; this analysis was limited to students who had driven 1 or more times in the past week.

In addition, we asked all students 8 questions about their experience of the consequences of other students’ drinking (secondhand effects) during the current school year. We used analyses of the secondhand effects of alcohol from a survey conducted among students who did not binge drink (ie, nonbinge drinkers and abstainers) and were residents of on-campus residence halls and fraternity/sorority houses. The details of alcohol-related sexual assault and unwanted sexual advances we present are for female students only.

In addition to CAS survey data, we also examined 2 other data sources for information on policies relating to alcohol use. The first were state and local laws and policies related to sale, use, and consequences of use. We gathered the state alcohol laws and policies from a report by the University of Minnesota (personal communication, AC Wagenaar, Alcohol Epidemiology Program, University of Minnesota School of Public Health, 2000). The local laws and policies were obtained directly from the city hall at each survey site.

We combined these laws into 2 groupings according to their emphasis on underage access and high volume sales, creating 2 aggregate measures that used a general criterion of more than half of the laws in each group to examine the relationship between presence of laws and underage binge drinking. The laws examined had all been in effect for at

least 1½ years before we conducted the 2001 student survey. Underage laws we considered included local minimum age to sell, prohibitions against using a false identification, attempting to buy or consume for those under the legal drinking age, requirements to post warning signs about the consequences of violating alcohol laws, and laws restricting the sales of alcohol by requiring a minimum age of 21 years to be a clerk and a minimum age of 21 years to sell alcohol.

Laws pertaining to volume alcohol sales included keg registration; a statewide .08% per se blood alcohol concentration (BAC) law; and restrictions on happy hour, open containers, beer sold in a pitcher, and billboards and advertising. We did not include laws addressing zero tolerance, prohibitions on selling to underage persons, and possession by underage persons in the analysis because all or nearly all states had these laws. When a law is in effect in all or almost all areas where colleges are located, comparisons are not possible because too few colleges are outside the purview of the law.

Mothers Against Drunk Driving (MADD), a leading activist organization, developed a rating of state efforts to prevent and reduce drinking and driving. MADD, the largest victim-assistance organization in the country, reported its findings in a publication entitled “Rating the States 2000.”²³ This report provided a variable that rated each state according to the resources devoted to the enforcement of underage and drinking and driving laws (rating of A– or better vs lower than A–).

Data Analysis

We reported weighted percentages and directly standardized rates of alcohol use and other outcomes of interest for all analyses. The details of the weighting and standardization procedure are described elsewhere.² We used chi-square tests and logistic regression to examine comparisons of rates of student characteristics and outcomes of interest. We used the multiple logistic regression technique to assess the relationship among the outcomes of interest, adjusting for other covariates. Odds ratios (ORs) and 95% confidence intervals (CIs) are reported. We used the generalized estimating equations (GEE) approach to fitting the logistic regression models to account appropriately for clustered outcomes arising in our sampling scheme.^{24,25} All analyses were conducted using the SAS statistical software package.²⁶

RESULTS

Alcohol Use

In 2001, 43.6% of underage students were classified as binge drinkers, a rate that was similar to the rate for all college students nationally and did not change over the 4 survey years. Underage students were significantly different in their alcohol use from students aged 21 to 23 years. Underage students were less likely to drink any alcohol in the past year (77.4% for < 21 y and 85.8% for the 21–23 y age group; OR = 0.56; 95% CI = 0.44–0.72; $p < .001$), drink any alcohol in the past month (62.8% for < 21 y and 76.7% for 21–23 y age group; OR = 0.51; 95% CI = 0.43–0.61; $p <$

.001), and engage in binge drinking in the past 2 weeks (43.6% for < 21 y and 50.2% for 21–23 y age group; OR = 0.77; 95% CI = 0.69–0.86; $p < .001$). We found this relationship in each of the 4 CAS surveys.

We found significant decreases in the percentages of underage students who drank any alcohol from 1993 to 2001 (81.0% in 1993 and 77.4% in 2001; OR = 0.80; 95% CI = 0.72–0.90; test for linear trend, $p < .0001$). Most of this decrease occurred among men (82.3% in 1993 and 76.2% in 2001; OR = 0.69; 95% CI = 0.59–0.80; test for linear trend, $p < .0001$). At the same time, an increase occurred among underage students who engaged in frequent binge drinking across the survey years (21.3% in 1993 and 23.5% in 2001; OR = 1.14; 95% CI = 1.05–1.23; test for linear trend, $p = .0002$). We observed this increase among both men (23.4% in 1993 and 25.9% in 2001; OR = 1.14; 95% CI = 1.00–1.30; test for linear trend, $p = .0140$) and women (19.6% in 1993 and 21.7% in 2001; OR = 1.14; 95% CI = 1.00–1.30; test for linear trend, $p = .0093$).

Among students who consumed alcohol during the past year, underage students' drinking style differed from that found in of-age students. Fewer underage students drank on 10 or more occasions in the past 30 days (underage = 20.0%, 21–23 y = 26.6%; OR = 0.69; 95% CI = 0.61–0.79; $p < .0001$). However, more underage students (34.2%) than 21–23-year-old students (28.6%) reported that they were drunk on 3 or more occasions in the past 30 days (OR = 1.30; 95% CI = 1.15–1.47; $p < .0001$), and more underage students (55.8%) than 21–23-year-old students (46.8%) reported that drinking "to get drunk" was an important reason for drinking (OR = 1.44; 95% CI = 1.31–1.59; $p < .0001$).

Underage students were more likely to report that they usually drank at binge levels when they drank. For men, 57.8% of those who were underage reported that they usually had 5 or more drinks when they drank, compared with 41.9% of their legal-age peers (OR = 1.93; 95% CI = 1.59–2.34; $p < .001$). We found a similar relationship among women at the 4-drink level (32.4% for underage and 20.5% for of-age students; OR = 1.85; 95% CI = 1.55–2.21; $p < .001$).

When underage students were compared with all students responding to the survey who were of legal drinking age, about half (48.1%) of all the alcohol use reported was con-

sumed by underage students for the 2001 survey year in the 30 days before the survey. We obtained a similar finding in the three previous CAS surveys (see Table 1).

Alcohol-Related Problems

Among students who drank any alcohol during the past year, the underage students differed significantly from their peers aged 21–23 years in their experience of problems related to alcohol use. The underage students were more likely to do something they regretted (38.9% for < 21 y and 35.6% for 21–23 y age group; OR = 1.16; 95% CI = 1.04–1.30); forget where they were or what they did (30.9% for < 21 y and 27.0% for 21–23 y age group; OR = 1.22; 95% CI = 1.10–1.36); cause property damage (12.8% for < 21 y and 10.3% for 21–23 y age group; OR = 1.40; 95% CI = 1.15–1.70); get into trouble with the police (8.4% for < 21 y and 5.7% for 21–23 y age group; OR = 1.66; 95% CI = 1.24–2.21); and to get hurt or injured (15.1% for < 21 y and 12.7% for 21–23 y age group; OR = 1.22; 95% CI = 1.04–1.43) related to their alcohol use.

At the same time, underage students were less likely to have certain alcohol-related problems. Notably, they were much less likely to drive after consuming any alcohol (26.0% for < 21 y and 46.9% for 21–23 y age group; OR = 0.34; 95% CI = 0.29–0.39). They were also less likely to miss a class (29.5% for < 21 y and 33.4% for 21–23 y age group; OR = 0.85; 95% CI = 0.75–0.96) and to engage in unprotected sexual activity (ie, no prophylaxis) because of their alcohol use (9.6% for < 21 y and 12.1% for 21–23 y age group; OR = 0.75; 95% CI = 0.64–0.88).

We noted slight increases in all measures of alcohol-related problems among underage students over the 4 surveys, and these increases were statistically significant in all but 2 cases (getting behind in school work and not using protection during sex).

Place of Residence and the Secondhand Effects of Alcohol

Underage students' housing arrangements tended to be different from those of their of-age classmates. Underage students were more likely to live in on-campus residences such as non-substance-free residence halls [40.6% for underage

TABLE 1
Total Number of Drinks Consumed by Underage and Legal-Age College Students, 1993, 1997, 1999, 2001

Year	<i>N</i>		% drinking in the past month		% of sample by age group		Total drinks consumed		% of total drinks consumed	
	Underage	Legal age	Underage	Legal age	Underage	Legal age	Underage	Legal age	Underage	Legal age
1993	6,838	8,255	66.1	73.6	45.3	54.7	152,753	163,701	48.3	51.7
1997	6,956	7,254	62.6	69.6	49.0	51.0	147,639	145,313	50.4	49.6
1999	6,881	6,833	62.3	69.3	50.2	49.8	148,870	150,420	49.7	50.3
2001	5,413	5,368	62.8	73.6	50.2	49.8	112,688	121,567	48.1	51.9
Total	26,088	27,710	63.5	71.5	48.5	51.5	561,950	581,001	49.2	50.8

and 16.9% for of-age students, $\chi^2(1, N = 8,933) = 601.6; p < .0001$, and substance-free residence halls [17.9% for underage and 4.2% for of-age students, $\chi^2(1, N = 8,933) = 394.8; p < .0001$]. Underage students were less likely to live off-campus with their parents [17.8% for underage and 20.7% for of-age students, $\chi^2(1, N = 8,933) = 7.0; p = .0082$], and independently of their parents [20.9% for underage and 55.3% for of-age students, $\chi^2(1, N = 8,933) = 1013.0; p < .0001$].

Drinking by both underage and of-age students was related to their living arrangements (Table 2). Students who lived in controlled settings were less likely to binge drink, whereas students who lived in fraternity or sorority houses were more likely to binge drink than students in any other type of residence, regardless of age. We found that the lowest rates of binge drinking were among students living in substance-free dorms or off campus with their parents. Underage students were less likely to binge drink when they lived with their parents than their legal-age peers were.

We also examined the secondhand effects of alcohol use among underage students according to their place of residence (Table 3). A consistent pattern in the experience of secondhand effects emerged across each of the negative effects. Fewer students living off campus with their parents experienced secondhand effects of alcohol use. Similarly, fewer residents in substance-free residence halls than in other tradi-

tional campus living arrangements reported experiencing secondhand effects. Students living in fraternity or sorority houses were most likely to experience these effects. In fact, nearly every resident of a fraternity or sorority house experienced at least 1 secondhand effect of others' alcohol use.

Alcohol Use by Venue

Attendance at places where alcohol is likely to be served changed over the 4 CAS surveys, and underage student alcohol use reports differed according to drinking venue. We noted shifts in the patterns of attendance and heavy drinking at each of these venues over the 4 survey years. Table 4 reports the prevalence of drinking at each of 4 selected drinking venues and shows the comparison of behavior between underage students and those in the 21- to 23-year age group.

Off-campus parties and off-campus bars were the locations where students were most likely to report drinking and heavy drinking. We noted no changes over time in attendance at on-campus or dormitory parties but found a significant increase in any alcohol use (17.9% in 1993 and 22.3% in 2001; OR = 1.31; 95% CI = 1.11–1.55; test for linear trend, $p = .0001$) and consuming 5 or more drinks at that venue over time (7.4% in 1993 and 9.9% in 2001; OR = 1.39; 95% CI = 1.12–1.73; test for linear trend, $p = .0018$). We found a significant decrease in attendance (52.4% in

TABLE 2
Binge Drinking for Underage and Legal-Age Students,
by Living Arrangements, 2001

Living arrangements	Total	Underage (<i>n</i> = 4,231)	Legal age (<i>n</i> = 4,547)	Underage vs legal age		
				OR†	95% CI	<i>p</i>
Off campus with parents	29.9	24.9	35.7	0.58	0.44, 0.77	.0001
Substance-free residence hall	35.5	35.8	33.8	1.14	0.73, 1.76	.5656
Off campus without parents	53.9	49.6	56.2	0.79	0.65, 0.95	.0132
Non-substance-free residence hall	49.9	50.7	47.1	1.12	0.89, 1.42	.3411
Fraternity/sorority house	76.0	69.9	83.4	0.52	0.25, 1.08	.0800
Controlled living arrangements‡	32.0	30.3	35.4	0.78	0.63, 0.96	.0188
Uncontrolled living arrangements§	53.1	51.1	55.5	0.86	0.74, 1.00	.0556
Uncontrolled vs controlled						
OR//	2.26	2.33	2.17			
95% CI	1.97, 259	1.95, 2.78	1.77, 2.66			
<i>p</i>	< .0001	< .0001	< .0001			

Note. OR = odds ratio; CI = confidence interval. ORs were adjusted for gender, race, and response rate.

†OR > 1 if underage students are more likely to binge.

‡Controlled living arrangements included substance-free residence hall and off campus with parents.

§Uncontrolled living arrangements included non-substance-free residence hall, off campus without parents, and fraternity/sorority house.

//OR > 1 if students are more likely to binge in uncontrolled living arrangements than in controlled living arrangements.

TABLE 3
Secondhand Effects of Alcohol Among Underage Students, by Living Arrangement, 2001

Secondhand effect	Prevalence of secondhand effects (%)					Test for linearly differential trend of secondhand effects in living arrangement† <i>p</i>
	Live off campus with parents (<i>n</i> = 933)	Live in substance-free residence (<i>n</i> = 938)	Live off campus without parents (<i>n</i> = 1,096)	Live in non-substance-free residence hall (<i>n</i> = 2,128)	Live in fraternity/sorority house (<i>n</i> = 150)	
Been insulted/humiliated	17.9	31.0	32.4	36.4	45.0	< .0001
Had a serious argument/quarrel	18.7	24.6	29.9	27.8	46.9	< .0001
Been pushed, hit/assaulted	8.2	13.1	13.1	14.8	20.5	< .0001
Had property damaged	8.0	15.2	23.0	19.1	28.3	< .0001
Had to take care of drunken student	34.7	55.9	60.1	64.6	83.7	< .0001
Had studying/sleeping interrupted	16.3	55.9	50.1	62.4	77.0	< .0001
Experienced unwanted sexual advance	15.0	25.1	30.6	29.9	34.5	< .0001
Been victim of sexual assault or date rape‡	0.8	2.1	1.4	2.5	6.8	< .0001
Experienced at least 1 of the above problems	48.3	78.1	77.3	86.5	98.0	< .0001

†Living arrangements were coded as 1 (off-campus with parents), 2 (in substance-free residence halls), 3 (off-campus without parents), 4 (in non-substance-free residence hall), and 5 (in fraternity/sorority house). We used multiple logistic regressions after adjusting for gender, race, and response rate. Significant *p* means that there was a significant trend that residents in fraternity/sorority house were more likely to experience secondhand effects than off-campus residents with parents or residents in substance-free residence halls.

‡Analyses are based on responses of women only.

1993 and 44.1% in 2001; OR = 0.72; 95% CI = 0.64–0.80; test for linear trend, *p* < .0001), drinking (42.6% in 1993 and 37.3% in 2001; OR = 0.80; 95% CI = 0.72–0.90; test for linear trend, *p* = .0001), and heavy drinking at fraternity or sorority houses (21.6% in 1993 and 17.5% in 2001; OR = 0.77; 95% CI = 0.67–0.88; test for linear trend, *p* = .0011).

On the other hand, we observed a significant increase in attendance at off-campus parties (75.1% in 1993 and 79.6% in 2001; OR = 1.29; 95% CI = 1.10–1.52; test for linear trend, *p* = .0004), drinking (66.2% in 1993 and 72.9% in 2001; OR = 1.37; 95% CI = 1.20–1.57; test for linear trend, *p* < .0001), and heavy drinking (31.2% in 1993 and 37.1% in 2001; OR = 1.30; 95% CI = 1.16–1.46; test for linear trend, *p* < .0001). Attendance at off-campus bars showed a slight decrease (57.7% in 1993 and 54.8% in 2001; OR = 0.89; 95% CI = 0.79–1.00; test for linear trend, *p* = .0175). However, we found no change in drinking and an increase in heavy drinking at off-campus bars (17.8% in 1993 and 22.7% in 2001; OR = 1.35; 95% CI = 1.16–1.59; test for linear trend, *p* = .0018).

Student Perceptions of Accessibility to Alcohol and Reported Sources of Alcohol

One in 2 underage students reported that alcohol was “very easy” to obtain (50.9%), and binge drinkers reported even higher perceived accessibility to alcohol (56.9%).

Most underage students (71.6%) reported that they obtained their alcohol from another student who was of legal drinking age, although this decreased from 1993 (81.7%; OR = 0.56; 95% CI = 0.47–0.67; test for linear trend, *p* < .0001). Obtaining alcohol from another student under the age of 21 was the second-most-frequent source of supply among underage students (42.2%); use of this source decreased over time, as well (50.6% in 1993; OR = 0.71; 95% CI = 0.64–0.79; test for linear trend, *p* < .0001).

Relatively few underage students (20.9%) reported that they obtained alcohol by themselves without using an ID or by using a false ID (17.8%) or from a stranger of legal drinking age (6.9%). The use of each of these sources decreased significantly from the 1993 survey.

At the same time, increasing numbers of underage students reported that they obtained alcohol from a parent or relative (16.8% in 1993 and 22.6% in 2001; OR = 1.44; 95% CI = 1.30–1.60; test for linear trend, *p* < .0001). In 2001, this was the third-most-used means of obtaining alcohol.

Exposure to Educational Materials

Underage students who lived in residence halls or in fraternities and sororities reported widespread exposure to alcohol education materials. In 2001, some underage students said that they had experienced direct educational efforts of their school (eg, lectures, meetings, or workshops,

TABLE 4
Location of Underage Students Drinking at
Select On- and Off-Campus Venues, 2001

Venue (%)	Prevalence (%)		Underage vs legal age	
	Underage (<i>n</i> = 4,231)	Legal age (<i>n</i> = 4,547)	OR†	95% CI
Dorm event or party				
Attending	41.6	21.1	2.70	2.32, 3.15***
Having any drink	22.3	10.2	2.67	2.18, 3.18***
Having 5 or more drinks	9.9	3.6	3.15	2.26, 4.39***
Fraternity/sorority party				
Attending	44.1	26.1	2.22	1.88, 2.62***
Having any drink	37.3	21.0	2.22	1.85, 2.27***
Having 5 or more drinks	17.5	10.1	1.82	1.43, 2.30***
Off-campus party				
Attending	79.6	70.5	1.70	1.42, 2.04***
Having any drink	72.9	65.8	1.44	1.22, 1.70***
Having 5 or more drinks	37.1	28.0	1.63	1.40, 1.90***
Off-campus bar				
Attending	54.8	86.7	0.18	0.15, 0.22***
Having any drink	43.6	83.6	0.15	0.12, 0.18***
Having 5 or more drinks	17.1	30.2	0.45	0.38, 0.55***

Note. Percentage is based on total students who drank alcohol in the past 30 days. OR = odds ratio; CI = confidence interval.

†ORs were controlled for gender, race, and response rate.

****p* < .001.

or taking a special course on alcohol). The exposure of underage college students to each of these educational efforts increased from 1993 to 2001 (23.0% in 1993 and 29.9% in 2001; OR = 1.43; 95% CI = 1.21–1.68; test for linear trend, *p* < .0001 for lectures, meeting, and workshops; 6.4% in 1993 and 11.2% in 2001; OR = 1.84; 95% CI = 1.41–2.40; test for linear trend, *p* < .0001 for special courses). An even larger proportion of these underage students reported having been exposed to indirect educational methods, such as mailings or handouts (51.1%), posters or signs (78.0%), and announcements or articles (58.4%), although we found no significant increase in the exposure to these methods over the period of the study.

Most underage students who lived in on-campus housing or in a fraternity or sorority house reported that their school provided information to them about alcohol. For the results for 6 separate pieces of information and the change over time, see Table 5. Two in 3 (64.8%) underage students in 2001 reported that their college or university provided them with 4 of 6 select pieces of information related to alcohol use. Their exposure to educational materials differed according to school binge-drinking level. Significantly higher exposure to 2 in 3 indirect educational methods occurred among underage students who attended schools with high binge-drinking rates, compared with those who attended schools with low binge-drinking rates (OR = 3.19; 95% CI = 1.62–6.31; *p* = .0008 for poster or signs; OR = 2.17; 95% CI = 1.41–3.31; *p* = .0004 for announcements or articles). Similarly, students who attended schools with

high binge-drinking rates reported greater exposure to 5 or more information sources the college provided, compared with low binge-drinking rate schools (OR = 2.52; 95% CI = 1.41–4.50; *p* = .0018). We noted no differences between level of binge drinking at an institution and exposure to direct educational materials.

Student Experience of Alcohol-Related Sanctions

We found significant changes in experience of alcohol-related sanctions among underage students across the 4 surveys (see Table 6). Fewer students reported receiving a warning in 2001 than in 1993. On the other hand, we observed significant increases in fines, mandatory attendance at alcohol education classes, community service, and other disciplinary actions. Overall, very few students experienced these sanctions, yet students in the 21–23-year age group experienced larger increases in these sanctions over time, compared with the underage students.

Student experience of these policies also differed according to the level of binge drinking at their school, although the small prevalence in the rates of these imposed sanctions reduced our ability to observe statistical significance in several cases.

Perceived Likelihood of Being Caught for Underage Drinking

Many underage students thought that they were likely to be caught for underage drinking in certain situations. More underage students reported that they were likely to be

TABLE 5
Percentage of Underage Students Who Received Specific Information Provided by College, 1993, 1997, 1999, 2001

Specific information	Prevalence (%)				Change		Test for linear time trend <i>p</i>
	1993	1997	1999	2001	2001 vs 1993		
	(<i>n</i> = 6,900)	(<i>n</i> = 7,047)	(<i>n</i> = 6,979)	(<i>n</i> = 5,472)	OR	95% CI	
College rules for drinking	85.2	83.3		83.3	0.87	0.74, 1.02	.0700
Penalties for breaking rules	82.6	80.1		80.8	0.89	0.75, 1.05	.1306
Where you can get help for alcohol-related problems	68.9	72.0	75.7	71.5	1.13	0.96, 1.33	.0033
How to recognize problem drinker	46.8	49.5	57.5	55.3	1.41	1.21, 1.64***	< .0001
Long-term health effects of heavy drinking	45.4	47.5	57.7	56.5	1.56	1.35, 1.81***	< .0001
Dangers of alcohol overdose	51.4	54.4	68.0	69.3	2.14	1.79, 2.57***	< .0001
Any 4 of above	53.5	55.4		64.8	1.60	1.36, 1.89***	< .0001

Note. Campus and fraternity/sorority residents only. OR = odds ratio; CI = confidence interval.
 ****p* < .001.

TABLE 6
Changes in Underage Students' Exposure to College-Imposed Consequences for Drinking, 1993, 1997, 1999, 2001

Consequence	Prevalence (%)				Change		Test for linear time trend <i>p</i>
	1993	1997	1999	2001	2001 vs 1993		
	(<i>n</i> = 5,530)	(<i>n</i> = 5,401)	(<i>n</i> = 5,255)	(<i>n</i> = 4,231)	OR	95% CI	
Received warning							
Legal age	3.2	2.0	3.4	4.1	1.28	0.91, 1.81	.1032
Underage	10.9	9.8	9.4	8.5	0.77	0.64, 0.93**	.0098
Fined							
Legal age	0.8	0.7	1.6	2.6	3.10	1.86, 5.17***	< .0001
Underage	1.9	1.6	4.2	4.3	2.41	1.63, 3.57***	< .0001
Required to attend an alcohol education program							
Legal age	1.1	0.7	1.6	2.7	2.55	1.49, 3.67***	.0002
Underage	2.7	3.1	4.6	4.5	1.69	1.27, 2.25***	< .0001
Performed community service							
Legal age	0.7	0.6	1.5	2.2	3.20	1.89, 5.43***	< .0001
Underage	1.5	1.5	2.8	2.8	1.98	1.27, 3.08**	.0009
Referred to alcohol treatment program							
Legal age	0.4	0.4	1.4	2.0	5.77	2.95, 11.31***	< .0001
Underage	0.6	0.9	2.2	2.4	3.80	2.50, 5.76***	< .0001
Other disciplinary action							
Legal age	1.2	1.2	1.8	2.4	2.03	1.15, 3.58*	.0121
Underage	2.7	3.3	4.1	3.6	1.40	1.10, 1.78**	.0009
Any 1 of above†							
Legal age	2.5	2.0	2.9	3.7	1.47	0.98, 2.20	.0430
Underage	6.1	6.4	7.7	7.0	1.16	0.96, 1.40	.0183

Note. Analyses were limited to students who drank alcohol within the past year. OR = odds ratio; CI = confidence interval.

†Receiving warning was excluded from the measure.

p* < .05; *p* < .01; ****p* < .001.

TABLE 7
Perceived Likelihood of Underage Students Being Caught Drinking, 1997, 1999, 2001

Venue	Prevalence (%)			Change		Test for linear time trend <i>p</i>
	1997	1999	2001	2001 vs 1997		
	(<i>n</i> = 7,047)	(<i>n</i> = 6,979)	(<i>n</i> = 5,472)	OR	95% CI	
Residence hall room	34.9	39.8	42.6	1.38	1.27, 1.51***	< .0001
Residence hall party or event	50.0	54.0	55.3	1.24	1.13, 1.36***	< .0001
Fraternity/sorority party	24.5	29.6	28.8	1.25	1.11, 1.40***	< .0001
Intercollegiate home athletic event	48.4	47.5	48.1	0.99	0.90, 1.09	.7292
Intercollegiate away athletic event	39.1	38.9	37.7	0.94	0.84, 1.05	.3099
Off-campus party	18.6	22.4	23.0	1.30	1.16, 1.47***	< .0001
Off-campus bar	40.9	40.0	38.5	0.90	0.82, 1.00*	.0469
On-campus event†	71.5	71.4	72.8	1.07	0.97, 1.18	.2489
Off-campus event‡	62.1	52.8	51.2	0.64	0.58, 0.70***	< .0001
Any of above	82.3	80.9	80.1	0.86	0.77, 0.97*	.0102

Note. OR = odds ratio; CI = confidence interval.

†On-campus events included residence hall room events, residence hall parties or events, and intercollegiate home athletic events.

‡Off-campus events included intercollegiate away athletic events, off-campus parties, and off-campus bars.

p* < .05; **p* < .001.

TABLE 8
Percentage of Underage Students Reporting Perceived Consequences of Using Fake ID, 1993, 1997, 1999, 2001

Perceived consequence	Prevalence (%)			Change		Test for linear time trend <i>p</i>
	1997	1999	2001	2001 vs 1993		
	(<i>n</i> = 7,047)	(<i>n</i> = 6,979)	(<i>n</i> = 5,472)	OR	95% CI	
<i>When underage students use it on campus†</i>						
Refused alcohol	57.8	61.0	39.8	0.48	0.42, 0.55***	< .0001
ID confiscated	61.3	70.0	48.5	0.59	0.51, 0.69***	< .0001
Official warning	30.0	35.1	21.7	0.65	0.57, 0.74***	< .0001
Fined	21.6	29.2	21.9	1.01	0.80, 1.28	.5745
Sent to education program	15.1	22.6	16.1	1.08	0.88, 1.31	.2082
Required to do community service	9.6	13.6	10.4	1.09	0.82, 1.45	.3869
Put on probation	19.6	23.6	15.2	0.73	0.62, 0.88***	.0130
Parents will be notified		17.5	15.1	0.83	0.69, 1.00	.0547
<i>When underage students use it off campus‡</i>						
ID rejected and sale refused	90.3	90.8	88.6	0.83	0.74, 0.94**	.0040
ID confiscated	71.3	73.0	71.0	0.98	0.89, 1.09	.9367
Local police notified	40.1	45.1	45.5	1.25	1.13, 1.38***	< .0001
School notified	11.6	18.1	21.5	2.08	1.80, 2.41***	< .0001
Parents notified	13.8	18.3	21.1	1.67	1.47, 1.91***	< .0001

Note. OR = odds ratio; CI = confidence interval.

†Campus and fraternity/sorority residents only.

‡All underage students were included.

p* < .01; *p* < .001.

TABLE 9
Laws and Policies Targeting Underage Alcohol Use and
Underage Student Binge-Drinking Rates at the College Level, 2001

Law/policy	<i>n</i>	% binge	Adjusted OR†	95% CI
< 21 illegal to have fake ID				
No law	15	49.5	1	
Law exists	104	42.6	0.84	0.64, 1.11
< 21 illegal attempt to buy				
No law	12	52.6	1	
Law exists	107	42.7	0.72	0.45, 1.17
< 21 illegal try to consume				
No law	35	44.7	1	
Law exists	84	43.2	0.96	0.77, 1.19
21 minimum age to sell				
No law	90	46.0	1	
Law exists	29	36.5	0.67	0.52, 0.87**
21 minimum age to sell (local)				
No law	87	45.6	1	
Law exists	32	38.6	0.72	0.58, 0.91**
21 minimum age to be clerk				
No law	108	44.9	1	
Law exists	11	30.8	0.53	0.27, 1.07
Warning sign posted				
No law	65	45.7	1	
Law exists	54	40.8	0.89	0.74, 1.08
Underage laws‡				
< 4	86	47.8	1	
≥ 4 laws	33	38.7	0.72	0.59, 0.89**
Restrict beer sold in pitchers				
No law	111	43.8	1	
Law exists	8	41.6	0.90	0.43, 1.89
Keg registration				
No law	83	43.5	1	
Law exists	36	44.0	1.13	0.89, 1.45
Restriction on happy hour				
No law	47	45.3	1	
Law exists	72	42.4	0.88	0.69, 1.11
Billboard/ads restricted				
No law	69	43.5	1	
Law exists	50	43.7	0.99	0.79, 1.24
.08 BAC is illegal				
No law	70	46.3	1	
Law exists	49	39.2	0.83	0.64, 1.06
Open container law				
No law	41	46.5	1	
Law exists	78	42.0	0.86	0.69, 1.07
Volume laws§				
< 4	97	45.7	1	
≥ 4 laws	22	31.7	0.63	0.42, 0.96*
Investment in law enforcement				
Worse than A-	103	44.9	1	
A- or better	16	33.9	0.81	0.63, 1.04

Note. OR = odds ratio; CI = confidence interval; BAC = blood alcohol content.

†Adjusted for gender, race, and response rate.

‡Underage laws included local minimum age to sell, fake ID, attempt to buy, attempt to consume, minimum age to be clerk, minimum age to sell, and warning sign posted.

§Volume laws included keg registration, restriction on happy hour, restriction on beer sold in a pitcher, billboard/advertisement restricted, 0.08 BAC law, and restriction on open container.

* $p < .05$; ** $p < .01$.

caught drinking at a party or event in a residence hall. Fewer students said this would happen at an off-campus party or a fraternity or sorority party. For the perceived likelihood of being caught and the changes in these rates over time, see Table 7. More students believed they were likely to be caught drinking at on-campus venues over the 4 surveys, whereas fewer students believed this to be the case for off-campus venues over time.

Perceived Consequences of Using a False Identification

We noted significant changes in the perceived consequences of using a false ID between 1997 and 2001. The data in Table 8 show these results for selected consequences both on and off campus. We discovered significant declines in the consequences of on-campus use of a false ID and significant increases in 3 of the 5 consequences for off-campus use.

Underage Student Support for School Alcohol Policies

More than half of all underage college students reported that they “supported” or “strongly supported” efforts at their college to “crack down on underage drinking.” This represents a slight and nonsignificant increase since 1997 (52.7% in 1997, 54.7% in 2001; OR = 1.08; 95% CI = 1.00–1.18; $p = .0644$). However, these results differed according to the level of drinking. In 2001, 77% of students who did not binge drink supported efforts to crack down on underage drinking, whereas only 29% of binge drinkers expressed similar levels of support.

The Impact of Underage Drinking Laws

We examined the relationship of individual and combined sets of related alcohol policies that targeted underage and high-volume drinking with underage students’ binge-drinking rates (see Table 9). The presence of each of these laws appears to be associated with lower college rates of underage student binge drinking at schools in areas where the laws are in effect, although the relationship was statistically significant for only 2 of the laws. The relationships were statistically significant for colleges in areas where state or local laws establish 21 as the legal minimum age to sell alcohol. In some instances, the number of affected schools was so small that statistical comparisons between colleges with and without such laws are not possible.

A composite measure based on whether more than half of these laws (4 or more of 7 laws) were in effect indicated that the presence of a comprehensive set of underage drinking laws is associated with less drinking among underage students. The presence of 4 or more binge-drinking laws was also associated with significantly fewer underage students’ use of any alcohol in the past year (73.0% for 4 or more laws and 81.2% for fewer than 4 laws, OR = 0.64; 95% CI = 0.48–0.86) and with fewer using any alcohol in the past 30 days (57.5% for 4 or more underage drinking laws and 67.3% for fewer than 4 laws, OR = 0.68; 95% CI = 0.54–0.86).

We created a composite variable for laws related to volume of sales and alcohol consumption. Schools in areas where 4 or more of these 6 laws were in effect were compared with colleges in areas with fewer laws. Colleges under the jurisdiction of 4 or more of the laws had significantly less underage binge drinking. We noted similar associations with these composite variables of underage drinking laws and restrictions on volume sales for outcomes of drinking any alcohol in the past year (67.3% for 4 or more laws and 79.3% for fewer than 4 laws, OR = 0.62; 95% CI = 0.38–0.99) and any drinking in the past 30 days (50.7% for 4 or more laws and 65.0% for fewer than 4 laws, OR = 0.64; 95% CI = 0.43–0.96) among underage students.

MADD’s rating of investment in law enforcement was related negatively to the level of binge drinking among underage students (ie, higher investment was associated with less binge drinking). But the MADD findings failed to reach statistical significance, perhaps because of the relatively few schools located in areas that have high investments in enforcement.

COMMENT

Despite the national prohibition on alcohol use by people under the age of 21 years, significant numbers of college students in the United States drink and drink heavily. Although the proportion of underage students who drink has decreased, the rate of binge drinking has remained constant. Of greater concern, frequent binge drinking and the problems associated with that style of drinking have actually increased among underage students nationally. When they drink, underage students are more likely to get drunk 3 or more times in a month, to drink “to get drunk,” and to consume more drinks at an average occasion than of-age students. As a result of this increase in extreme drinking, our survey found significant increases in reports of alcohol-related problems among underage students. These findings are similar to findings among all college students nationally.² Overall, underage college students consume approximately half of all the alcohol college students report consuming.

Some observers have concluded from similar findings that controls on underage drinking, such as minimum drinking-age laws, do not work for college students and that such laws should be modified or rescinded.²⁷ Although the extreme drinking styles of some underage students may be an undesirable effect of the MLDA law, it is also possible that the constraints of that law may reduce the opportunities for underage students to drink and limit this heavy drinking style to fewer occasions. Further research should examine the factors that help limit a heavy drinking style among underage students. Despite this finding, we found strong indications that laws regarding the minimum legal drinking age may, indeed, limit the underage students’ drinking behaviors.

More underage drinkers report some alcohol-related problems. Yet, in an analysis limited to those students who drive 1 or more times per week, we found that far fewer underage students drink and drive. Zero-tolerance laws that set per se

BAC limits at .02% for drivers under the legal drinking age may be a factor in this significant difference between underage students and their legal-age peers. It may be that the fear of losing their drivers' license is a significant incentive for underage students to avoid drinking and driving.

Underage students' drinking differed according to their living arrangements, with binge drinking lower among students who lived in residences that had greater controls, namely, those who lived off campus with parents or in substance-free residence halls. These findings are consistent with previous findings from the CAS²⁸ and provide evidence for the possible protective effects of more controlled living arrangements.

College campus authorities have changed their alcohol prevention educational efforts and policies to some extent during the past decade, increasing both educational efforts and alcohol-related policies.²⁹ Although students' experiences of educational efforts designed to reduce underage alcohol consumption increased from 1993 to 2001, many underage students did not report being affected by these efforts. In addition, more students reported experiencing college-imposed sanctions for their alcohol use in 2001 than in 1993, but the total number remained low.

The increase in imposed sanctions corresponded with underage students' reports of a greater likelihood of being caught when drinking alcohol at on-campus events. These changes were accompanied by a decrease in the perceived consequences of being caught on campus with a false ID, or off campus using a false ID to purchase alcohol, which increased over the 4 surveys. However, the consequences of being caught using a false ID may not be a significant deterrent to using one. Students may regard "getting caught" as the undesired event and expend their energy on avoiding apprehension rather than on altering their drinking behavior. It is difficult to evaluate the impact of educational, policy, and enforcement trends on drinking behavior when they appear to be incongruent. It might be that lax enforcement or weak consequences in one area compensate for strong efforts in another, resulting in no change in the binge-drinking rate.

One sign that prevention efforts are addressing underage drinking is the decrease in the percentage of underage students who attend and drink heavily at fraternity or sorority parties, which are a primary source of alcohol for underage students. The rates of heavy drinking at this venue remain high, and efforts should continue to address the provision of alcohol to underage students at fraternity and sorority parties. At the same time that attendance at fraternity and sorority parties is decreasing, we noted an increasing trend toward attendance and heavy drinking at off-campus parties, where successful enforcement efforts are more difficult.

The results of this study are consistent with an increase in efforts by colleges to prevent underage drinking on campus and to comply with MLDA laws.²⁹ A similar decrease in the likelihood of getting caught drinking off campus, the decreased perceptions of consequences for using a false ID, and an observed increase in heavy drinking at off-campus

venues suggest a decrease in off-campus and community enforcement efforts. Campuses and communities should consider collaborating on efforts to prevent underage drinking and to enact and enforce laws that target underage drinking.

In other research, we found that communities surrounding colleges experience the negative effects of college students' heavy drinking, and these negative effects are higher in communities with many alcohol outlets.³⁰ In addition, student drinking taxes community resources (eg, police, hospitals, and local courts). Campus efforts to crack down on underage drinking may be associated with a shift in drinking from the campus to the community, where enforcement may not be rigorous.

Half of the underage students still report that alcohol is very easy to get, a statistic that has not changed in recent years. In previous research, we have found that easy accessibility to alcohol among college students is strongly associated with drinking and heavy drinking.¹⁴ The various pathways underage students use to obtain alcohol should be examined to develop further prevention efforts. In addition, planners should recognize that underage students have many sources, each of which may require different interventions to close.

Parents should be encouraged to examine their role in providing alcohol to underage students. More students reported that a parent or relative provided them with alcohol in 2001, compared with previous survey years, a means that has become the third-most-frequent source of alcohol for underage students. Although significant attention has been devoted to strategies to reduce using false IDs to purchase alcohol, this method of obtaining alcohol is used by fewer underage students than is obtaining alcohol from peers of legal age or from another underage student. Additional attention should be directed at these informal provider networks of peers and family members.

Although our findings regarding increased campus efforts to control underage drinking are mixed, the study does provide some evidence for control strategies that might be effective in curtailing underage drinking. Lower rates of binge drinking were found at colleges in areas covered by each of the 7 underage laws we studied. In the case of local and state laws that required persons who serve alcohol to be at least 21 years old, the findings were statistically significant.

In areas covered by 4 or more of the 7 underage laws, we noted lower rates of annual alcohol use, drinking in the past 30 days, and binge drinking among underage college students. We found that laws that restrict high-volume alcohol sales had significant effects on underage alcohol consumption. We also found that colleges in areas where 4 of the 6 laws restricting volume sales were in effect had significantly lower rates of (a) annual alcohol consumption, (b) drinking in the past 30 days, and (c) binge drinking.

Students who attended college in states that spent more on law enforcement were somewhat less likely to drink at binge levels, although this finding was not statistically significant, perhaps because of the very small number of

states with sufficient investment to test adequately for this relationship. Readers should note the limitations of this type of research as they consider the results of our study. The data collected are cross-sectional and can be used to test for association, but not for causality. Alternative explanations, such as students' selecting low- or high-drinking colleges, or the presence of other factors in states with more laws controlling drinking, may account for the findings. They are not evidence of causality. Further study should be undertaken to evaluate newly implemented policy initiatives rigorously targeting underage drinking. In addition, the responses to the student survey are self-report data and should be considered in context. The cautions regarding CAS data are discussed in greater detail elsewhere.²

Enacting and enforcing alcohol-control policies on a state or local level are promising prevention strategies for reducing underage drinking. Although these data are cross-sectional, the present results provide some evidence that legal prohibitions targeting underage drinking may be effective deterrents. Rather than rescinding the MLDA law, or exempting college students from its purview, prevention planners should renew efforts to examine and implement policies that deter underage drinking. We have previously noted the possible deterrent effect of the zero-tolerance law on drinking and driving among underage students. Given this result, it might be reasonable to expect that similarly specific and meaningful penalties might be used as a deterrent to various points of access to alcohol and to alcohol consumption. These deterrents should also consider additional actors beyond the underage drinker, including providers of alcohol to those under the legal drinking age. Whereas any single law may not have a significant impact on underage drinking, the cumulative effect of several of these laws may be strong. Controlling the ways in which alcohol is sold in a college community will probably have beneficial effects in curtailing excessive drinking and drunkenness and limiting the numbers of underage students who drink.

States and localities may want to experiment with establishing similar legal and enforcement strategies. These policies, if implemented, should be rigorously evaluated. Students, parents, and college administrators can be effective advocates for these policy changes. In fact, a majority of students under the legal drinking age nationally support tougher actions to curb underage drinking. Three in 4 underage students who do not engage in binge drinking support stronger actions on underage drinking; this particularly high level of support may be the result of experiencing the negative effects of their peers' drinking. Policies that address underage drinking and resources devoted to enforcement should lead to reduced consumption of alcohol among underage students.

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REFERENCES

1. *Healthy People 2010: Understanding and Improving Health and Objectives for Improving Health*. 2nd ed, Vol 2, Goal 26–11: "Reduce the proportion of persons engaging in binge drinking of alcoholic beverages." US Dept of Health and Human Services. Washington, DC: US Government Printing Office. 2000. Available on line: <http://www.health.gov/healthypeople/> Accessed February 22, 2002.
2. Wechsler H, Lee J, Kuo M, Seibring M, Nelson TF, Lee H. Trends in alcohol use, related problems and experience of prevention efforts among US college students 1993–2001: Results from the 2001 Harvard School of Public Health College Alcohol Study. *J Am Coll Health*. 2002;5:203–217.
3. Wechsler H, Lee J, Kuo M, Lee H. College binge drinking in the 1990s: A continuing problem: Results of the Harvard School of Public Health 1999 College Alcohol Study. *J Am Coll Health*. 2000;48:199–210.
4. Wechsler H, Davenport A, Dowdall G, Moeykens B, Castillo S. Health and behavioral consequences of binge drinking in college: A national survey of students at 140 campuses. *JAMA*. 1994;272(21):1672–1677.
5. Johnston LD, O'Malley PM, Bachman JG. *Monitoring the Future national survey results on drug use, 1975–2000. Vol 2: College students and young adults ages 19–40* (NIH Publication 01-4925). Bethesda, MD: National Institute on Drug Abuse; 2001.
6. CDC. Youth risk behavior surveillance: National college health risk behavior survey United States 1995. *Morbidity and Mortality Weekly Report*. 1997;46(SS-6):1–54.
7. Presley CA, Leichliter JS, Meilman PW. *Alcohol and Drugs on American College Campuses: Findings From 1995, 1996, and 1997. A Report to College Presidents*. Carbondale, IL: Southern Illinois University, 1999.
8. Presley CA, Meilman PW, Cashin JR, Lyerla R. *Alcohol and Drugs on American College Campuses: Use, Consequences, and Perceptions of the Campus Environment*. Vol IV: 1992–94. Carbondale, IL: Southern Illinois University; 1996.
9. CDC. Notice to readers: Alcohol involvement in fatal motor-vehicle crashes—United States, 1999–2000. *Morbidity and Mortality Weekly Report* 2001;50:1064–1065.
10. Wechsler H, Moeykens B, Davenport A, Castillo S, Hansen J. The adverse impact of heavy episodic drinkers on other college students. *J Stud Alcohol*. 1995;56:628–634.
11. Bachman JG, O'Malley PM, Johnston LD. Drug use among young adults: The impacts of role status and social environment. *J Pers Soc Psychol*. 1984;47:629–645.
12. Chaloupka F, Wechsler H. Binge drinking in college: The impact of price, availability, and alcohol control policies. *Contemporary Economic Policy*. 1996;14:112–124.
13. Sloan F, Reilly B, Schenzler C. Effects of prices, civil and criminal sanctions, and law enforcement on alcohol-related mortality. *J Stud Alcohol*. 1994;55:454–465.
14. Wechsler H, Kuo M, Lee H, Dowdall G. Environmental correlates of underage alcohol use and related problems of college students. *Am J Prev Med*. 2000;19:24–29.
15. Toomey T, Rosenfeld C, Wagenaar A. The minimum legal drinking age. *Alcohol Health and Research World*. 1996;20:213–218.
16. Wechsler H, ed. *Minimum Drinking Age Laws: An Evaluation*. Lexington, MA: Lexington Books; 1980.
17. Wagenaar AC, Toomey TL. Effects of minimum drinking age laws: Review and analyses of the literature from 1960 to 2000. *J Stud Alcohol*. In press.

18. *Traffic Safety Facts 2000*. National Highway Traffic Safety Administration Alcohol, DOT HS 809 323, US Dept of Transportation. Available on line: <http://www.nhtsa.dot.gov>. Accessed February 13, 2002.
19. Wolfson M, Toomey T, Forster J, Wagenaar A, McGovern P, Perry C. Characteristics, policies and practices of alcohol outlets and sales to underage persons. *J Stud Alcohol*. 1996;57:670–674.
20. *Developing Effective and Legally Sound Alcohol Policies*. Washington DC: American Council on Education; 1994.
21. Wechsler H, Nelson TF. Binge drinking and the American college student: What's five drinks? *Psychol Addict Behav*. 2001;15:287–291.
22. Wechsler H, Dowdall G, Davenport A, Rimm E. A gender-specific measure of binge drinking among college students. *Am J Public Health*. 1995;85:982–985.
23. *Rating the States 2000: A Report Card on the Nation's Attention to the Problem of Impaired Driving and Underage Drinking*. Mothers Against Drunk Driving. Irving, TX; 2000.
24. Zeger SL, Liang KY, Albert PS. Models for longitudinal data: A generalized estimating equation approach. *Biometrics*. 1988;44:1049–1060.
25. Liang KY, Zeger SL. Longitudinal data analysis using generalized linear models. *Biometrik*. 1992;73:12–22.
26. *SAS/STAT User's Guide, Version 6. 4th ed*. Cary, NC: SAS Institute; 1994.
27. Hanson DJ, Heath DB, Rudy JS. The misguided prohibition that governs US colleges. *The Chronicle of Higher Education*. August 10, 2001:B14.
28. Wechsler H, Lee JE, Nelson TF, Lee H. Drinking levels, alcohol problems, and secondhand effects in substance-free college residences: Results of a national study. *J Stud Alcohol*. 2001;62:23–31.
29. Wechsler H, Kelly K, Weitzman E, SanGiovanni JP, Seibring M. What colleges are doing about binge drinking: A survey of college presidents. *J Am Coll Health*. 2000;48:219–226.
30. Wechsler H, Lee JE, Hall J, Wagenaar AC, Lee H. Second-hand effects of student alcohol use reported by neighbors of colleges: The role of alcohol outlets. *Soc Sci Med*. In press.