Deterring Sales and Provision of Alcohol to Minors: a Study of Enforcement in 295 Counties in Four States

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Synopsis

The authors analyzed patterns of criminal and administrative enforcement of the legal minimum age for drinking across 295 counties in four States. Data on all arrests and other actions for liquor law violations from 1988 through 1990 were collected from the Federal Bureau of Investigation Uniform Crime Reporting System, State Uniform Crime Reports, and State Alcohol Beverage Control Agencies. Analytic methods used include Spearman rank-

As a RESULT OF THE PASSAGE of the National Minimum Drinking Age Act in 1984, all 50 States and the District of Columbia now have a minimum drinking age of 21 years. Age-21 laws have been shown to reduce youth drinking and alcohol-related problems such as car crashes—see recent review of 56 studies by Wagenaar (1)—despite very limited levels of enforcement, particularly in terms of actions against alcohol establishments or persons who provide, illegally, alcohol to minors (1,2).

Drinking age laws are not uniform. Statutory language varies considerably across States, and procedures for administering and enforcing the law vary widely. States have laws which may prohibit some or all of the following: sales to minors, purchase by a minor, possession by a minor, possession with intent to consume by a minor, consumption by a minor, misrepresentation of age by a minor, and furnishing alcohol to a minor.

Minimum drinking age laws are enforced along

order correlation, single-linkage cluster analysis, and multiple regression modeling.

Results confirmed low rates of enforcement of the legal drinking age, particularly for actions against those who sell or provide alcohol to underage youth. More than a quarter of all counties examined had no Alcoholic Beverage Control Agency actions against retailers for sales of alcohol to minors during the three periods studied. Analyses indicated that 58 percent of the county-by-county variance in enforcement of the youth liquor law can be accounted by eight community characteristics. Rate of arrests for general minor crime was strongly related to rate of arrests for violations of the youth liquor law, while the number of law enforcement officers per population was not related to arrests for underage drinking.

Raising the legal age for drinking to 21 years had substantial benefits in terms of reduced drinking and reduced automobile crashes among youths, despite low levels of enforcement. Potential benefits of active enforcement of minimum drinking age statutes are substantial, particularly if efforts are focused on those who provide alcohol to youth.

with other liquor laws through State administrative agencies, usually referred to as State Alcoholic Beverage Control (ABC) agencies, as well as local law enforcement agencies, including police departments and county sheriffs. Procedures for enforcement of the drinking age are frequently not fully specified (3). Given that ABC agencies have many liquor laws to enforce, limited enforcement staff and no jurisdiction or authority to cite or arrest minors (4), the enforcement burden of the age-21 policy frequently falls to local law enforcement officers.

When a violation of the minimum drinking age is detected, two fundamentally different enforcement procedures may ensue (a) criminal prosecution of violators or (b) referral to the ABC agency for administrative penalties against the holder of a liquor license. The first step in criminal prosecution involves the local law enforcement officer citing or arresting the minor, the seller (who may be the licensee or an employee of the licensee, and may be 'When a violation of the minimum drinking age is detected, two fundamentally different enforcement procedures may ensue (a) criminal prosecution of violators, or (b) referral to the Alcoholic Beverage Control agency for administrative penalties against the holder of a liquor license.'

younger or older than 21), or the person purchasing alcohol and furnishing it to minors. Depending on the laws in a given State, the violator may be guilty of an offense ranging in severity from a misdemeanor (punishable by a fine or incarceration of less than 1 year in jail) to a felony (punishable by imprisonment for more than 1 year). Specific penalties for these crimes also vary according to the number of offenses incurred and include fines, jail sentence, community service, and driver's license revocation for minors (4). Successful prosecution of criminal violations requires the services of prosecutors, defense attorneys, juries, judges, and other criminal justice system personnel (3).

The second type of enforcement of liquor laws, including the minimum drinking age, occurs through an administrative process. Administrative enforcement activity is carried out by ABC agencies and may occur concurrently with criminal prosecution or as an independent process. Generally, ABC agencies are alerted to alleged violations by local law enforcement officers and, occasionally, by concerned citizens.

Once a referral is received by the ABC agency, staff will typically investigate. If evidence warrants, an administrative hearing will be held to determine whether a liquor law has been violated and, if so, determine the administrative penalty that should be imposed. Fines may be assessed against the licensee, or the license may be suspended temporarily or revoked permanently depending on the severity of the offense and the number of prior violations and the State's statutory language.

Complicating enforcement efforts is the fact that many States allow underage persons to obtain and possess alcohol in certain circumstances (4). Five States allow underage youth to possess alcohol if they do not intend to consume, and six States have no laws against minors attempting to purchase or actually purchasing alcohol. Some States allow persons under age 21 to possess or consume alcohol, or both, in private residences, private establishments, or when accompanied by a legal guardian older than 20. There are also significant differences across States in the definition of consumption by minors. Twenty-one States have no specific statutory language which prohibits the consumption of alcohol by minors, although possession of alcohol may be prohibited. Sixteen States have no statutory language explicitly prohibiting the deliberate misrepresentation of age by youth to obtain alcohol, and 19 States do not explicitly prohibit youth from using false identification to obtain alcohol (4).

Penalties for violation of drinking age laws vary considerably across States. Criminal penalties against youth who violate minimum drinking age laws range from \$15 to \$5,000 fines or 1 year in jail, or both. A few States increase the severity of the penalty for vouth under a specific age. For example, Iowa vouth younger than 19 are subject to a \$100 fine and 30 days in jail for violating alcohol laws, whereas persons ages 19 and 20 pay a \$15 fine similar to a parking ticket (4). Penalties for selling to minors are often so small they would not be expected to be a strong deterrent to the licensee. Administrative penalties which may be imposed on the licensee for a first time offense of selling to a minor range from nothing to \$5,000 or a 6-month license suspension. Criminal penalties for supplying alcohol to minors range from \$50 to \$10,000 or 5 years in jail or both. State ABC agencies typically do not suspend licenses for first-time offenses, and 10 States allow licensees to pay nominal fines in lieu of a license suspension. Actual revocation of a license is rare (2,4).

Finally, we know from the deterrence literature that the size of the penalty is not as important as the perceived probability of detection (5). Unfortunately, most States have very few ABC enforcement personnel for monitoring alcohol outlets. Most States had less than two dozen enforcement officers in 1987, the last year for which data are available (2). Since 1987, a number of States have further reduced their ABC enforcement staff.

This study specifically analyzed patterns of criminal and administrative enforcement of the legal minimum drinking age across counties in four States and examined characteristics associated with higher or lower than average enforcement levels.

Methods

Data collection. We selected four States for intensive study: Kentucky, Michigan, Montana, and Oregon. Selection was based on the availability of detailed enforcement data for both ABC agencies and local

 Table 1. Descriptive statistics on enforcement of drinking age: rates per 100,000 age-relevant population for 295 counties in Kentucky, Michigan, Montana, and Oregon, 1988–90

	Arrests for liquor law violations					ABC	
Statistic	Total arrests (ages 16–20)	Possession (ages 16–20)	Furnished by 16–20-year-olds	Furnished by 21-year- olds or older	ABC actions against persons for selling to persons younger than 21	suspensions of licenses for supplying to persons younger than 21	ABC revocations for selling to persons younger than 21
Minimum	0	0	0	0	0	0	0
Maximum	46,305	18,618	4,406	693	632	129	82
Median	2,286	604	8	8	53	0	0
Mean	5,512	2,017	158	32	90	6.4	2.5
Standard deviation	7,211	3,594	381	62	107	18	9.7
Skewness	2.1	2.5	6.3	5.5	1.9	4.7	6.1

NOTE: ABC = Alcoholic Beverage Control.

police departments, and on the diversity of the States in terms of their alcohol control systems. However, the States were not selected randomly, and generalizations to other States and localities must therefore be made cautiously.

Laws regarding youth drinking vary across the four study States (6). All prohibit sales to persons under 21, but Kentucky and Oregon also prohibit minors from *attempting* to purchase. Kentucky, Michigan, and Oregon explicitly prohibit minors from *purchasing* alcohol, and all four States prohibit minors from *possessing* alcohol. Montana and Oregon specify exceptions to the possession law if parents or a spouse is present, and Michigan law states that possession with intent to consume is prohibited.

We compiled Federal Bureau of Investigation (FBI) data for each county in the four States on numbers of police employees, arrests for serious ("part 1") offenses, arrests for minor ("part 2") offenses, driving under the influence of alcohol arrests, narcotics arrests, and arrests for a broad category of liquor law violations.

The FBI data were limited because liquor-law violations were not stratified by type of liquor-law offense. Therefore, we also obtained State Uniform Crime Report (UCR) data for the particular liquor-law offenses of interest in each of the four States, including minor in possession, furnishing to a minor by a 16-20-year-old, and furnishing to a minor by someone ages 21 or older. All data were obtained for a 3-year period (1988–90) to compute more stable annual rates.

In addition to arrests by local police, the other major mechanism for enforcement of the legal purchase age is administrative actions taken by State liquor control licensing authorities. We obtained hardcopy logs of all liquor control actions in each State over the 3-year period and coded various types of actions related to underage drinking, including all actions for selling or serving underage youth, license suspensions for selling or serving youth, license revocations for selling or serving youth, and length of suspensions and amounts of fines for such offenses. All data were collected at the county level, which constitutes the unit of analysis for this study. There are 295 counties across the four study States.

No measures of youth alcohol consumption and few indicators of youth drinking problems are available at the county level. However, data on a major youth drinking problem, traffic crashes, were available. We used Fatal Accident Reporting System (FARS) files for 1988, 1989, and 1990 to calculate annual counts of the number of drivers involved in fatal crashes within each county in the four study States. Only drivers of cars, light trucks, and motorcycles were included, and total crash counts were stratified by age (16-17, 18-20, and 21 and older). In addition, fatal crash frequencies were stratified by three measures of potential alcohol involvement: (a) driver's blood alcohol level (BAC) greater than zero, (b) driver BAC greater than 0.10 grams per deciliter, and (c) single-traffic-unit crashes occurring from 8:00 p.m. through 4:59 a.m.

Finally, county demographic data based on the 1990 census were obtained and merged with FBI, UCR, ABC, and FARS data.

Data analyses. Analytic methods include standard descriptive statistics (minimum, maximum, mean, median, standard deviation, skew), including box plots and histograms to examine distributions. Because of the high skewness for the enforcement action variables of interest, rank-order (Spearman) correlation statistics were used as a bivariate measure of association. Single-linkage nearest-neighbor cluster analyses were conducted to understand interrelationships among arrest rates for drinking age violations and arrest rates for other offenses. Multivariate

Table 2. Descriptive statistics on enforcement of drinking age: counts for 295 counties in Kentucky, Michigan, Montana, and Oregon, 1988–90

Statistic		Arrests for law	v violations		ABC		
	Total arrests (ages 16–20)	Possession (ages 16–20)	Furnished by 16–20-year-olds	Furnished by 21-year- olds or older	ABC actions against persons for selling to persons younger than 21	suspensions of licenses for supplying to persons younger than 21	ABC revocations for selling to persons younger than 21
Minimum	0	0	0	0	0	0	0
Maximum	3.905	1.223	35	48	288	29	12
Median	26	7.7	.33	.68	1.0	0	0
Mean	220	52	1.9	4.4	6.0	.5 9	.25
Standard deviation	472	135	3.9	7.6	23	2.5	1.2
Skewness	4.4	4.8	3.8	2.8	9.3	8.6	7.8

NOTE: ABC = Alcoholic Beverage Control.

Table 3. Spearman rank correlations between drinking age enforcement rates and county characteristics for Kentucky, Michigan, Montana, and Oregon, 1988–90

County characteristics		Arrests for liquor	law violations		ABC		
	Total arrests (ages 16–20)	Possession (ages 16–20)	Furnished by 16–20-year-olds	Furnished by 21-year- olds or older	ABC actions against persons for selling to persons younger than 21	suspensions of licenses for supplying to persons younger than 21	ABC revocations for selling to persons younger than 21
Population	10.27	-0.02	10.16	¹ 0.22	10.35	10.49	10.43
Land area	10.41	10.31	10.57	10.55	-10.14	-10.28	-10.18
Percent unoccupied							
housing	10.25	0.00	10.23	¹ 0.24	-0.02	-10.28	-10.36
Percent boarded housing	10.20	-0.02	10.23	10.29	-0.07	-10.22	-10.26
Median value of housing.	10.33	10.24	10.31	10.33	10.20	¹ 0.18	10.34
Percent ethnics	10.30	10.26	10.27	10.30	¹ 0.16	10.15	¹ 0.24
Officer rate	10.34	10.31	10.44	10.39	-0.06	-10.14	0.01

¹Significant at .05 level, 2-tailed test. NOTE: ABC = Alcoholic Beverage Control.

Table 4. Spearman rank correlations between enforcement of drinking age laws and enforcement of other crime-related laws in Kentucky, Michigan, Montana, and Oregon, 1988–90

County characteristics		Arrests for liquor	law violations		ABC		
	Total arrests (ages 16–20)	Possession (ages 16–20)	Furnished by 16–20-year-olds	Furnished by 21-year- olds or older	ABC actions against persons for selling to persons younger than 21	suspensions of licenses for supplying to persons younger than 21	ABC revocations for selling to persons younger than 21
Serious crime	10.80	10.11	10.55	¹ 0.66	¹ 0.56	¹ 0.41	10.27
Serious crime of persons 21 and older	¹ 0.64	0.01	¹ 0.41	¹ 0.53	¹ 0.51	¹ 0.47	10.35
Minor crime of 16–20- vear-olds	10.74	0.08	¹ 0.45	¹ 0.55	¹ 0.59	¹ 0.41	10.27
Minor crime of those 21 and older	10.52	-10.12	¹ 0.22	¹ 0.35	¹ 0.52	¹ 0.42	¹ 0.29
Narcotics crime of 16-20- vear-olds	10.62	0.07	10.34	10.44	10.50	10.37	10.31
Narcotics crime of those	10.56	0.02	10.09	10.40	10.46	10.27	10.33
DUI of 16–20-year-olds	10.65	-0.03	10.31	10.44	10.52	10.26	0.08
older	¹ 0.66	-0.10	10.37	¹ 0.50	10.55	10.33	¹ 0.18
and older	٥.77	0.01	¹ 0.54	¹ 0.68	¹ 0.68	10.37	10.12

Significant at .05 level, 2-tailed test. NOTE: ABC = Alcoholic Beverage Control; DUI = driving under the influence of alcohol.

regression was used to analyze factors contributing to variation in drinking age enforcement levels. Diagnostic analyses of the final models were conducted because of the skewed distribution of the dependent variables. Residuals were examined to identify outliers (that is, significant *t*-value from zero), highleverage cases, and high-influence cases (that is, significant Cook's D). Separate analyses were conducted at the county and enforcement agency level, and agency-level analyses were further stratified by type of agency (municipal policy or sheriff's department).

We focused the analyses on seven major measures: (a) total liquor law arrests among those ages 16–20, (b) arrests for possession by those ages 16–20, (c) arrests of 16–20-year-olds for furnishing alcohol to a minor, (d) arrests of adults age 21 or older for furnishing alcohol to a minor, (e) administrative actions taken by State ABC agencies regarding selling, serving, or drinking by underage youth, (f) suspensions of liquor licenses for selling or serving minors, and (g) revocations of liquor licenses for selling or serving minors.

Arrests of 16–20-year-olds for furnishing are cases in which a charge of furnishing alcohol to a minor is lodged against a furnisher who is ages 16 to 20. These arrests are partly a result of the fairly common situation where youth in their upper teens purchase alcohol and supply it to younger teens—see Wagenaar and coworkers (7) for description of such situations. In addition, 18–20-year-old clerks selling alcoholic beverages to persons younger than 21 may be cited for furnishing. All variables are expressed as rates per 100,000 population in the relevant age group in each county—16–20-year-olds for all variables except adults furnishing, where the denominator is the 21 and older population.

Rates of youth drinking arrests across the 295 counties are highly skewed (skewness 1.9 to 6.3; see table 1). Keep in mind that the underage enforcement variables are arrest or action rates per youth population. The outliers may represent counties that may be a gathering place for underage drinkers where a substantial number of arrests are made but which have few teenage residents.

Low levels of enforcement actions on underage drinking are clear in the number of actions per year in the average county (table 2). The median county has no liquor license suspensions or revocations, 1 ABC action against an alcohol outlet, 1 arrest for furnishing to minors, 8 arrests for possession, and a total of 26 liquor law arrests of 16–20-year-olds. As explained previously, the total liquor law arrests (ages 16-20) variable is derived from FBI data, while the 'We found that rates of enforcement of the legal minimum drinking age are very low, particularly in terms of actions taken against those who sell or provide alcohol to underage youth.'

other variables are derived from State UCR data. The total liquor law variable includes a number of offenses in addition to furnishing and possession, including drinking in public or having an open container in a car and sales violations. It does not include DUI or public drunkenness.

No detailed data are available county-by-county on youth drinking habits, so we could not examine directly the relationship between youth drinking rates and arrest rates. Data on fatal traffic crashes are available, however, and crashes involving drivers with elevated BAC or single-vehicle crashes occurring at night (SVN) can be used as indicators of the level of youth drinking, procedures commonly used in traffic safety studies. We examined relationships between the fatal crash rate among 16-20-year-olds and underage drinking arrest rate and found no associations (BAC>0 crash rate and underage drinking arrest rate r = 0.08; SVN crash rate and underage drinking arrest rate r = 0.03; total fatal crash rate and drinking arrest rate r = 0.11). In short, the crash data suggest that there is not a strong relationship between the extent of youth drinking and the rate of underage drinking arrests.

We examined three categories of community characteristics that might influence the rate of drinking age enforcement: size, socioeconomic composition of the community, and levels of enforcement for other types of crime. Communities that have larger populations, larger land area, less wealth, and higher rates of crime that many residents might deem more serious than underage drinking (for example, violent crime, property crime, narcotics crime, drinkdriving) might be expected to pay less attention to drinking age enforcement.

All socioecological characteristics examined had significant correlations with arrest and ABC action rates for underage drinking (table 3). Rate of total liquor law arrests among 16–20-year-olds was positively associated with county population, land area, unoccupied housing, median value of housing, rate of law enforcement officers, and percent ethnics (defined in this paper as blacks, Native Americans, Single linkage cluster analyses of county-level arrest measures



NOTE: DUI = driving under the influence of alcohol; ABC = Alcoholic Beverage Control.

Asians, Hispanics, and "other races" as a percentage of total population). The pattern was similar for arrests for furnishing alcohol to minors, but differed substantially for the ABC action measures, particularly ABC license suspensions and revocations. Suspension and revocations rates for selling or serving to minors were negatively related to land area, percent unoccupied, and percent boarded housing.

Percent unoccupied and percent boarded housing are related but conceptually distinct. Boarded housing is no longer part of the current housing market and reflects neighborhood decay. Unoccupied housing remains in the current market but is temporarily unoccupied reflecting a transient population, such as an area adjacent to a large college or university, or temporary economic downturns not long enough for the unoccupied housing to be boarded and permanently vacant. Finally, arrests for possession were positively related to land area, median value of housing, percent ethnics, and officer rate.

Enforcement of youth liquor laws is highly correlated with other enforcement measures (table 4); almost all correlations are significant and positive, with the exception of the possession measure. To better understand the interrelationships among arrest rates for various types of crime, we conducted singlelinkage nearest-neighbor cluster analyses (see chart).

Results indicated close clustering of DUI, minor crime, narcotics, and serious crime arrest indices. Total liquor law arrests for youth and adults clustered next, with the specific youth enforcement measures (furnishing by youth, furnishing by adults, possession, ABC actions, ABC suspensions, and ABC revocations) located the farthest away from general enforcement and total liquor law enforcement clusters. The cluster analyses suggest that while liquor law enforcement is related to enforcement for other crimes, it is not simply another measure of general law enforcement activity, but rather is a distinct entity that is not necessarily determined by the same factors that determine rates of enforcement for other crime. Increasing enforcement of the legal drinking age is likely to require increased law enforcement attention to enforcement of liquor laws in general.

Although the rate of arrests for youth drinking is clearly not a reflection of the amount of youth drinking violations actually occurring, it is likely that for other types of crime—particularly serious offenses—the arrest rate may reflect in part the rate of actual offenses (8). If that is the case, counties with high rates of arrests for other crimes may be burdened with dealing with them, leaving few resources available for focusing on underage drinking.

The data do not support this line of reasoning, however. The bivariate correlations between total youth liquor law enforcement and arrest rates for every other type of crime examined are all strong positive relationships (ranging from 0.52 to 0.80; see table 4). The same holds true for correlations between ABC actions and arrest rates for other crimes.

Because arrest rates for all these crime categories are so highly intercorrelated, we could incorporate only one other enforcement measure into our overall models of drinking age enforcement. Inclusion of more than one general crime index in the models resulted in high levels of correlations between the parameter estimates. Therefore, final models included a single minor-crime index across the entire population ages 16 and older to account for the effects of other enforcement activity on drinking age enforcement.

To understand better the simultaneous relationships of county characteristics and general enforcement actions on specific types of enforcement of underage drinking laws, we developed regression models for each measure of underage drinking enforcement, including the six census measures of county charac
 Table 5. Standardized regression coefficients for effects of county characteristics and other enforcement activity on enforcement of drinking age laws in Kentucky, Michigan, Montana, and Oregon, 1988–90

County characteristics		Arrests for liquor	law violations		ABC		
	Total arrests (ages 16–20) R ² = 0.58	Possession (ages 16–20) R ² = 0.42	Furnished by 16–20-year-olds R² = 0.19	Furnished by 21-year- olds or older R ² = 0.46	ABC actions against persons for selling to persons younger than 21 R ² = 0.26	suspensions of licenses for supplying to persons younger than 21 R ² = 0.14	ABC revocations for selling to persons younger than 21 R ² = 0.06
Independent variable:							
Population	- ¹ 0.19	-0.09	-0.07	-10.23	0.01	0.12	0.07
Land area Percent of unoccupied	0.09	10.22	0.04	10.21	0.05	0.12	0.02
housing	¹ 0.27	0.06	-0.02	¹ 0.16	¹ 0.22	0.09	0.20
housing Median value of	-0.09	0.02	0.08	0.04	- ¹ 0.16	-0.09	-0.10
housing	0.01	0.10	-0.02	-0.02	0.01	-0.06	0.05
Percent ethnics Minor crime of those 16	-0.09	-10.11	-0.07	0.04	0.01	0.01	-0.02
and older	10.49	10.28	0.15	10.46	0.13	-0.31	0.07
Officer rate	-0.01	0.08	0.06	0.04	0.04	0.06	0.05
Regression diagnostics:							
Total number of cases Number of high-	295	295	295	295	219	175	175
leverage cases	14	14	14	14	14	11	11
outliers	9	12	6	11	4	4	4
Cook's D	0	0	0	0	0	0	0

¹Significant at .05 level, 2-tailed test.

NOTE: In addition to the independent variables, State dummy variables were

teristics and one measure of total minor crime enforcement activity among youth and adults. To control for substantial cross-State differences, Statelevel dummy variables were included in all regression models. State-level main effects may not adequately control for all differences across States if the relationships differ from State to State. Therefore, for total youth drinking enforcement actions, we analyzed interactions between State and each of the other independent variables. Statistically significant interactions were found between State and land area, percent of unoccupied housing, and minor crime.

To further understand the nature of the interactions, we then estimated regression models separately by State and compared State-specific coefficients with the aggregate results. The relationship of land area to youth alcohol enforcement is positive in Michigan, Montana, and Oregon, but negative in Kentucky. The relationship of percent of unoccupied housing to youth alcohol enforcement is negative in Montana but positive in the other three States. The relationship of minor crime to enforcement of youth alcohol laws is positive in all four States, but the standardized coefficients are larger for Michigan and Montana than for Kentucky and Oregon. State-specific models are based on small numbers of cases (N = 36 to 120), and involve analyses of 28 regression models (seven included to control for State-level confounding factors. ABC = Alcoholic Beverage Control.

different variables times four States), presenting potential problems of capitalizing on random error.

The reader is reminded of the skewed nature of the dependent variable distributions; therefore, *P*-values may be biased. Furthermore, we have a census of all counties in the four study States, not a sample, technically obviating the need for significant tests. We note statistically significant parameters in table 5, but we urge the reader to focus not only on *P*-values, but also on the magnitude of the standardized coefficients.

Because of the skewed distributions of these variables, we conducted extensive diagnostic analyses of the final ordinary least squares regression models. Three diagnostic statistics were used-high-leverage, residual outlier, and Cook's D statistics as well as graphical analyses of residuals and predicted values (9,10). Of the total 295 counties, at most 14 were high-leverage, and no cases had unusually high influence on the parameters as measured by a significant Cook's D. Finally, the highest number of residual outliers (identified by a significant t-value from zero) for any model was 12, well within expectation for an N of 295. In short, extensive diagnostic analyses of each model summarized in table 5 supported the appropriateness of the model to these data, and increased the level of confidence in

"... there are a small number of jurisdictions with very high rates of enforcement actions on underage drinking, suggesting that barriers to enforcement ... are not insurmountable."

interpreting the parameter estimates.

Results showed that 58 percent of the county-bycounty variance in total enforcement of the youth liquor law can be accounted for by these few variables (table 5). Youth liquor law enforcement is positively related to general enforcement—the higher the level of arrests for all types of minor crime in a county, the higher the level of arrests for liquor law violations, after controlling for socioecological characteristics of the county. The relationship is very strong; for the average county, a 1 percent increase in the rate of minor crime arrest is associated with a 0.9 percent increase in the total rates of youth liquor law arrests. The pattern held for all arrest measures of drinking age enforcement, but did not hold for ABC actions.

The observed strong relationship between general arrest rates and youth drinking arrest rates runs counter to the often-heard argument that higher attention to general crime enforcement prevents giving attention to liquor law enforcement. If such a displacement hypothesis were correct, we would expect counties with low general arrest rates to have proportionately higher liquor law arrest rates, and counties with high general arrest rates to have lower liquor law arrest rates. In fact, counties with higher general arrest rates also have higher liquor law arrest rates.

The second most important predictor of youth liquor law enforcement is the proportion of unoccupied housing in the county. The higher the proportion of unoccupied housing, the higher the rate of youth liquor law arrests. This relationship is also strong; for the average county, a 1 percent increase in proportion of housing unoccupied is associated with a 0.5 percent increase in the total rates of youth drinking arrests.

The third significant predictor of the total rates of youth liquor law arrests is population, but this effect is small. For the average county, a 1 percent increase in population size is associated with a 0.08 percent decrease in youth liquor law arrests. Given the research literature suggesting the role of extra-legal factors (especially prejudice against specific ethnic groups) in decision-making concerning arrests (11,12) and lower drinking rates among young blacks than among whites (13), one might expect less attention to drinking age enforcement in counties with higher proportions of ethnics in the population. Controlling for the effects of socioeconomic status (with median value of housing and percent boarded housing in the model), there is a tendency for counties with higher proportions of ethnics in the population to have lower drinking age arrest rates, but the effect is significant only for arrests for possession.

The size of the county in terms of population was negatively related to rate of total liquor law arrests and rate of adult arrests for furnishing alcohol to minors. Keep in mind that all dependent variables are rates per population in the relevant age group. Counties with large total populations had a tendency toward lower rates of youth drinking arrests. The size of the county in terms of land area had the opposite effect. Arrest rates for possession by minors and for adults furnishing to minors were significantly higher in counties with larger land areas.

Discussion

We found that rates of enforcement of the legal minimum drinking age are very low, particularly in terms of actions taken against those who sell or provide alcohol to underage youth. Many counties give no attention to drinking age enforcement at all. Twelve percent of the counties examined had no arrests of youth younger than age 21 for illegal possession of alcoholic beverages across the entire 3-year period examined. When enforcement actions are taken, they typically are focused on the individual young drinker, rather than on the commercial outlet or private person that supplied the alcoholic beverages to youth.

More than one-quarter (27 percent) of all counties examined had no ABC actions against any outlet over the entire 3-year period examined. Forty-one percent of counties made no arrests in the 3-year period for adults furnishing alcohol to minors. In addition to substantial numbers of counties making no drinking age arrests at all, most jurisdictions with some arrests or ABC actions had very low arrest rates. Conversely, there are a small number of jurisdictions with very high rates of enforcement actions on underage drinking, suggesting that barriers to enforcement of this law are not insurmountable.

We found that levels of enforcement of the

drinking age vary considerably according to characteristics of the jurisdiction. Counties with high general crime arrest rates, high proportions of unoccupied housing, small populations, and larger land areas tend to have higher rates of enforcement of the drinking age.

Results suggest a number of avenues for future research on enforcement of the minimum drinking age. Despite limiting our study to several major county ecological characteristics, statistical models accounted for more than half the county-level variation in youth arrest rates, and a quarter of the variation in ABC action rates. Examination of the role of additional environmental characteristics is needed. We made several simplifying assumptions in conducting our analyses; future research should explore the possibility that use of alcohol by underage persons, crime, community characteristics, and police activity are related to one another in more complicated ways than represented in our models. Finally, enforcement levels should be compared across different types of law enforcement agencies (for example, sheriff's departments, municipal police departments, and State police).

Underage drinking contributes to thousands of serious injuries and deaths in the United States each year. Raising the legal age to 21 has had significant effects in reducing drinking and alcohol-related problems among youth. The potential benefits of active enforcement of minimum age statutes is substantial and the costs are low, particularly if efforts are focused on those who provide alcohol to youth. Thus, efforts to enforce laws prohibiting sales and provision of alcohol to minors is one important component of comprehensive efforts to reduce drinking among teenagers and to reduce the damaging sequelae of alcohol use by youth.

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